



**International
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**Updated Chapter 4 of the ICN Investigative
Techniques Handbook for Merger Review**

“The Role of Economists and Economic Evidence in Merger Analysis”

Prepared by
The Merger Working Group

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PREFACE

This work product updates Chapter 4, of the ICN Investigative Techniques Handbook for Merger Review (the Handbook), “The Role of Economics and Economic Evidence in Merger Analysis”. The Handbook was presented by the Merger Working Group (MWG) at the 2005 ICN Annual Conference in Bonn. The updated chapter is part of the MWG Project on Economic Analysis in Merger Review, a multi-year project started in 2011 with the objective of exploring common practices in areas of economic analysis in merger review in a useful manner for both economist and non-economist merger case handlers.

The updated draft: (i) strengthens the content of Chapter 4 by providing more concrete guidance on the practical use of quantitative techniques in the investigation, and (ii) updates and broadens the scope of the chapter by including economic tools not mentioned in the previous version of the chapter.

To redraft the chapter, the MWG co-chairs worked with a drafting team composed of the German Bundeskartellamt, the UK OFT, the Taiwan FTC, the US FTC, the Canada Competition Bureau, the Italian Competition Authority, DG Competition of the European Commission and the South Africa Competition Commission. Other MWG members, including agencies and non-governmental advisors (NGAs), provided helpful comments that strengthened the chapter.

The work product was enriched by discussions at the 2012 Merger Workshop held in Bogotá and on the MWG teleseminar call series organized in the previous ICN year 2011-2012. The experience-sharing among MWG members and NGAs greatly benefited the chapter.

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Updated Chapter 4

“The Role of Economists and Economic Evidence in Merger Analysis”

1. Introduction

In most merger control regimes, economists and lawyers work in tandem to evaluate the potential pro- or anti-competitive effects of proposed concentrations, and to conclude whether particular mergers should be prevented or modified by remedies. It is widely recognized that economic and legal expertise are complementary aspects of competition agency merger assessment. It is important to underscore that the use of economics in merger control is not limited to conducting (sometimes sophisticated) empirical analysis. In fact, economics is embedded within merger control as it provides the essential conceptual framework to analyse the functioning of markets and to assess merger effects.

This chapter concentrates on the role of economics in the review of horizontal mergers.¹ While it offers an extensive overview of the qualitative and quantitative analyses that competition agencies may undertake to complement the legal assessment of mergers, it is not a comprehensive list of all economic tools or theories that may be used in merger analysis. Nor does it set out to systematically rank or compare the usefulness of each type of analysis. The factors and tools identified in this chapter are all part of an integrated approach to merger analysis which is not always a linear, step-by-step process that begins with market definition and ends with efficiencies.

Section 2 explains the main role of economic analysis in the assessment of mergers by identifying the primary benefits that economic analysis brings to merger assessment.

Section 3 reviews the specific economic tools typically used for assessments of horizontal mergers, illustrated by actual case studies. In particular, Section 0 explains the types of economic analysis that can be conducted during the early stages of the merger investigation. Sections 3.2-3.5 explain in detail the qualitative and quantitative economic techniques carried out when dealing with the definition of the relevant markets and the assessment of possible unilateral and/or coordinated effects theories of harm. Sections 3.6-3.8 provide an overview of the economic analyses of crucial issues, such as countervailing buyer power, entry and efficiencies.

Section 4 concludes the chapter by giving some guidance on the necessary requirements of any quantitative economic analysis.

It should be underlined that the theoretical and empirical treatment as developed in the chapter focuses on the price effects of mergers. Changes in prices reflect one of the primary concerns about mergers. However, other competitive effects might be important and very relevant as well. Other dimensions of competition such as marketing practices, capacity adjustments, quality, R&D and innovation may be central to understanding and analysing

¹ Although mergers can have vertical or conglomerate natures, of those mergers that raise potential competitive concerns, the vast majority involve horizontal competitors.

competition in certain industries (e.g., R&D in pharmaceuticals). These aspects of markets deserve the same attention in the context of the merger review as prices. Therefore, some but not all of the analytical tools and approaches discussed in this chapter with respect to prices apply in an analogous manner to these other strategic variables. Adjustments to the analysis should be made when these tools are used to analyse non-price effects.

This chapter is addressed not only to economists, but to all agency officials who are involved in the assessment process. To make this chapter widely accessible, it uses non-technical language whenever possible. Technical terms, appearing in bold text, are explained in more detail in the Glossary. Finally, an Annex contains the case studies referred to in the chapter, while a Bibliography contains suggestions for further reading, including materials created by the ICN.

2. The role of economics

The goal of merger analysis is to identify and prevent or remedy only those mergers that are likely to harm competition *significantly*, and to eliminate from consideration as quickly as possible those mergers that do not raise competitive concerns.² Economics and economic evidence are central to that assessment.

Economics provides competition agencies with the conceptual framework and tools to distinguish between mergers that are unlikely to have significant anticompetitive effects from those that may, and require further analysis. When more analysis is required, economics and economic evidence can inform predictions of the likely competitive effects of a merger, which can aid in determining whether the applicable legal test is met and whether agency intervention is ultimately necessary. As will be seen in this chapter, economic analysis may be qualitative and/or quantitative.

There are three main ways in which economics enters merger analysis: (i) understanding how the market functions; (ii) formulating a credible theory or theories of harm; and (iii) applying relevant evidence to the theory or theories to better understand the effects of the merger.

Understanding how the market functions and what market structure(s) are most applicable to a case is often the first step in a merger review. This informs the types of economic theories and tools that can be used, and by extension, the types of information the agency may wish to gather to conduct its review. Once an understanding of the market has been obtained, economics can help in formulating a theory of harm that is consistent with that understanding.

Broadly speaking, there are two categories of economic theories of harm for horizontal mergers: unilateral effects and coordinated effects. In some cases there may be both unilateral and coordinated effects. Each of these is described in greater detail below.³ In most cases agencies identify and use economic tools to analyse multiple theories of harm. Once a theory of harm has been formulated, and evidence gathered, economics can help

² See the [ICN Recommended Practices for Merger Analysis](#).

³ As general references, see also [ICN Merger Guidelines Workbook](#) and [ICN Recommended Practices for Merger Analysis](#).

analyse the effects of the merger; in other words, it can help *test* the theory and, where necessary, make *predictions*.

Agencies often apply a series of economic screens to mergers to determine initially whether they raise issues requiring further analysis. For example, many agencies identify “safe-harbour” thresholds based on market shares and levels of concentrations. Where appropriate, agencies may also rely on indices (such as UPP, discussed in section 3.4.3.8) that estimate post-merger incentives to raise price. These and other screens can obviate the need for more detailed competitive effects analyses or predictions (e.g., by suggesting that there are unlikely to be competition issues under any plausible theory), or can be used to complement further analyses.

Economics also provides a range of tools that can be used to estimate empirically the effects of mergers. As described below, the economic tools available range from simple price comparisons and correlation analyses to more complex merger simulation models. Studying the effects of natural experiments such as prior acquisitions or entry/exit events can also be particularly useful. It is important to note that economics and antitrust are constantly-evolving disciplines, and new and acceptable methods are being developed that are not covered in this chapter.

The type and sophistication of analysis that can be performed depends on the data available, the features of the market, the economic issues under consideration, and any timing and/or resource constraints that the agency might be under. It is important to note that one does not always have to develop complex models to gain valuable insight into the effects of mergers: sometimes simple models can suffice, and they can be just as informative as complex ones. In some cases, economists conduct complex analyses to test whether simpler methods are valid. When more complex methods are used, case teams should be aware of how to explain complex analyses to non-economists.

Under any set of analyses, it is important that the evidence of potential anti-competitive effects be weighed against mitigating factors (to the extent that they are not already being controlled for). These include ease of entry/expansion, countervailing buyer power or any efficiencies stemming from the merger. Economics can help in assessing the relevance and significance of each of these.

3. The economist’s toolbox

Economic analysis is essential in the early stages of an investigation, and it plays a key role throughout the investigation as case teams work to define the market, determine market shares and market concentrations, assess unilateral and coordinated effects, and analyse countervailing buyer power, entry, expansion, repositioning, and efficiencies. This section describes the process and specific economic tools used during an investigation.

3.1. Early stage economic investigation

As mentioned above, the first step in every merger investigation is to understand the economics of the market at stake to begin to plan the investigation.⁴ Often this process begins by researching the market. Case teams start by evaluating the information submitted by the parties and interacting with market participants including competitors, customers, and other stakeholders, such as industry analysts. Publicly available information about an industry, recent studies of the market, and consultations with colleagues who have analysed the market may also be useful. The goal of this initial research is to identify possible areas where the merging firms may have competing products that could raise competitive concerns. Early contacts with market participants can help identify potential competitors and customers that can provide more information. For example, the agency might consider initially whether the parties' products compete with each other, and if so, whether they are **homogeneous** or **differentiated products** (see Glossary). If the products appear to be homogeneous, then economic theory tells us that the existence of capacity constraints is likely to be an important consideration, and so the agency may wish to prioritise that assessment (see Section 3.4.1).⁵ Similarly, the agency may consider whether the merging parties compete by setting prices or quantities, as this will suggest whether competition can be modelled respectively as **Bertrand** or **Cournot competition** (see Glossary). Other questions that could be asked early on include:

- What are the products (and what are the producing companies) that are suitable substitutes of the merging parties' products?
- How are the products sold: through auctions, in the spot market, through a negotiation process, by posting prices?
- Are the merging parties involved at the same or different levels of the supply chain?
- Are there barriers to entry and expansion?
- What is the nature of the firms' customers? Are they large, well-informed, or geographically dispersed?

As a second and necessary step, the case team should identify candidate theories of harm and identify sources and types of evidence needed to test those working theories early in the investigation.

There are, as mentioned earlier and explained below, two main economic theories of harm for horizontal mergers: unilateral effects and coordinated effects (see sections 3.4-3.5).⁶ Articulating a theory of harm is often highly case-specific. For example, it is often useful to review agency guidelines, case precedents, and economic literature in formulating a theory of harm that applies to the particular facts of a case. The theory or theories can and should be revisited and refined throughout the investigation as evidence is gathered. Comparing the

⁴ For more information on investigative planning in the merger context, see [ICN Investigative Techniques Handbook for Merger Review](#), Chapter 2: Planning a Merger Investigation.

⁵ Homogeneous goods may also lend themselves to a greater focus on measures of market shares, market concentration, and coordinated effects theories of harm. In contrast, differentiated goods mergers may focus less on market definition, and more on diversion analyses, product repositioning, and unilateral effects theories of harm.

⁶ See also [ICN Recommended Practices for Merger Analysis](#), RP IV, pp. 16-18.

anticipated state of competition in the relevant market(s) with and without the merger⁷ is central to the analysis under any theory, and it helps identify the competitive effects that are attributable to the merger, rather than to other factors.

The case team should be thinking from the outset about what types of economic analysis could be done to test whether the economic evidence supports or undermines the candidate theories of harm. For any candidate theory of harm, there will be necessary conditions that must hold for there to be significant harm. For example, if the products are close substitutes, it may be necessary to show that there are a small number of other similar products from competing firms. Focusing on reliable indicators of key elements that negate the potential for harm, such as low market shares, many close substitutes, or ease of entry, can help to conclude investigations that do not require further investigation and allow the agency to focus its resources where they are most needed.

The economist will often be able to evaluate whether the necessary conditions hold using qualitative evidence. Continuing with the example above, qualitative evidence that consumers view the parties' products as part of a large group of similar products could be enough to rule out a candidate theory of harm where the products of the merging parties must be the closest substitutes for a substantial number of customers. This process may be able to eliminate theories of harm that do not require further investigation. In many cases, it is possible to eliminate all potential theories of harm using qualitative evidence and end the investigation without more rigorous quantitative analysis.

In the early stage, the economist should identify the types of data that may be available to analyse the markets. The case team should engage the parties and, as appropriate, other market participants about what data is kept and its business purpose, how much historical data is available, how they aggregate the data, what types of reports they produce in the ordinary course of business, and how difficult it would be to produce the various types of data. There may also be publicly available data that could be used either as the sole source of data or as a supplement to the parties' data.

The availability of data and the likelihood that the merger will lead to a competitive problem will influence the choice of analysis. A large data request requiring a complex analysis may only be considered for cases where other evidence indicates that there may be a competitive problem, while in other cases less sophisticated data analysis may be sufficient to rule out candidate theories of harm. See Section 4.4 for information about ensuring quantitative evidence is reliable.

3.1.1. Planning the economic analysis

Once enough information has been gathered to start determining the potential theories of harm, the economist can begin to determine what economic analysis would be helpful to evaluate those theories and what data will help test the theories. Another key aspect of planning the economic analysis is to focus the investigation. As the economist learns more

⁷ An agency's assessment of the state of competition without the merger is sometimes called the "counterfactual". The counterfactual should be informed not only by the existing conditions of competition (which is often the starting point), but also by any significant changes in the state of competition likely to occur without the merger.

about the case and economic analyses are completed, the case team might eliminate potential theories of harm or determine that requests for certain data are less useful than previously thought. As the case team focuses the investigation, it may be able to limit its data requests and so reduce burdens on the merging parties.

3.1.1.1. Identifying analytical tools to test potential theories of harm

For each potential theory of harm, it is useful to identify necessary conditions that must hold to indicate a significant loss of competition. Then, for each necessary condition, the economist should identify potential analytical tools to determine whether the facts of the market meet these conditions.

Usually the necessary conditions are related to one or more of the different elements of merger analysis, such as market definition, competitive effects, entry, or efficiencies. To build the evidence to decide whether to block a merger or to require remedies, each of these elements will require varying degrees of support from economic analyses. Sections 3.2-3.8 below discuss some types of analysis that may be appropriate. Early in the investigation, it is useful to narrow the potential types of analysis for each element and determine what additional information may be necessary.

The first step in any type of analysis is to define the empirical question that will help determine whether the theory of harm is valid. Once the question is determined, the economist needs to select an economic analysis, or possibly analyses, to test that theory. For example, in a unilateral effects case, a possible empirical question would be what is the diversion ratio between the parties' products. This question could lead to the economist conduct a switching analysis that utilizes data from the parties tracking to whom they lost customers. Any empirical or theoretical economic model used in an analysis needs to fit the facts of the market in question. Furthermore, a model is most compelling if it can explain past behavior as well as to make predictions of how the market will be impacted by the merger. The investigative team should identify which analyses can best explain the past and predict market impacts.

3.1.1.2. Identifying sources of information and requesting data

After identifying potential analyses, the case team needs to determine what data may be available to conduct the analyses and how to gather it. What analyses are worth pursuing will depend in part on what data is available, how long it will take firms to produce the data, and how difficult it will be to analyse it. As the economist learns more about the case, it may be possible to limit or reduce data requests as potential theories of harm are eliminated.

Different jurisdictions have different procedures early in the investigation. In some agencies, data requests to the parties need to be made early, sometimes before candidate theories of harm have been fully thought out. In these cases, the data request may need to be quite broad to make sure that the agency receives the data necessary to conduct the analyses for whichever candidate theories of harm are worth pursuing. In that case, communication and cooperation with parties is even more critical to minimise the burden on and time that both the parties and the case team spend gathering data that ultimately will be irrelevant. Some agencies send questionnaires or surveys to other market participants at an early stage. For

these agencies, the timing of the case may dictate how detailed its questionnaires and surveys to other participants will be. Other agencies may interview market participants to gather similar information. If requests involve a large dataset, it is important that the data request is guided by a well formulated theory of harm and, consequently, by the elements that need to be validated.

When requesting data from firms, the agency staff needs to be clear about what data or information should be submitted to ensure that different firms answer consistently. This is true for quantitative data as well as qualitative data. For example, when requesting sales data from multiple firms, it is important to request the data in a manner that will allow it to be aggregated. Some of the issues to consider are the appropriate units of sale (individual item or multiples), whether the sales prices are wholesale or retail, and whether there are significant quality differences that can be quantified. When gathering qualitative data, it is important to phrase the questions in a neutral manner to ensure that the answers to the questionnaire, survey, or interview are unbiased. Other sources of data and information to consider are company documents or industry studies. Documents created in the ordinary course of business are much more likely to have reliable information than those created for the agency. In the early stages and throughout the investigation, it is important to make sure that the data and information that the analysis will depend on are reliable.

3.1.1.3. Focusing the investigation

Early in the process, the economist can conduct quick analyses that may be able to screen out transactions that do not require further investigation, more narrowly focus investigations, and determine which more complex analyses may be useful later on. These analyses may be based solely on qualitative data or involve basic quantitative analyses.

For example, a necessary condition for many potential theories of harm is that there is an antitrust market where the merging firms will have market power after the merger. This usually requires them to have a substantial share of the market. Some agencies use market share screens because without high combined shares, the merged firm is unlikely to have market power. For agencies that use such thresholds, qualitative evidence may be useful to determine if there is a potential market that exceeds the indicative thresholds.

If, based on the qualitative evidence, it appears unlikely that the merger will lead to a significant loss of competition, more rigorous analysis may be unnecessary and the merger can be allowed to proceed. It may be easier to determine whether the evidence supports some of these necessary conditions than others. Therefore, there is not a set order to analyse the merger. Instead, it may be useful to prioritize the analyses that test the necessary conditions that are least likely to be supported by the evidence as a means of shortening or narrowing the investigation. For example, there may be evidence that recent entrants have been able to capture significant market share, so that focusing on their experience may allow a quick appraisal of whether ease of entry would make it unlikely that there would be significant harm from the merger.

It is unlikely that any one analysis will be conclusive on whether or not a merger might lead to competitive harm. If possible, several analyses should be conducted to ensure that the results are robust. If it does look like there are significant competitive concerns, then more rigorous quantitative analysis is more likely to be appropriate. In the early stages of the

investigation, the economist should plan for more rigorous quantitative analysis by ensuring that the necessary data will be available in time for the proper analysis to take place. The requirements for a high-quality quantitative analysis are discussed in Section 4 below.

3.1.2. Economics of the market and descriptive analysis

To assess the effects of a merger, it is first essential to have a good grasp of how competition is functioning in a particular market. Indeed, industries vary with respect to the ease of entry, the presence of capacity constraints, product differentiation, negotiations with customers, the degree of innovation or the presence of network effects. Although market shares or other simple measures may provide a starting point for an analysis, these are not in themselves rich enough to capture all of these differences.

The case team should draw up a list of market participants and other stakeholders. This list will be used to identify firms that should be included in market share calculations, and it will also identify firms that need to be considered when developing candidate theories of harm. For example, if the theory of harm is that the merging firms will reduce output after the merger, how the other firms in the market react will determine whether that theory is credible.

The case team should also identify the key parameters of competition in the market. For example, do the firms compete on price, quality, capacity and/or innovation? How the firms compete should influence the economic theory underlying any analysis. If the firms compete mainly on prices, models based on **Bertrand competition** (see Glossary) may be more appropriate, while models based on **Cournot competition** (see Glossary) may be more appropriate if they compete on capacity. Over the years, economists have developed literally hundreds of variations of these forms of competition depending on different conditions and the analysis shows that outcomes depend delicately on the assumptions made. In this way, these theoretical models need to be treated with care and as a guide as part of the overall framework of analysis, which comprises economic evidence as well as theory.

The economist should understand the recent history of the market. How prices, revenues, and margins evolve may influence what theories of harm are appropriate. For example, if the acquired firm always initiates price decreases, the economist may want to explore a theory of harm involving the loss of a **maverick firm** (see Glossary).

The economist may want to compute the capacity and idle capacity of market participants. The amount of idle capacity, as well as the owners of that idle capacity, will also influence which candidate theories of harm are more likely.

These features will shape the analysis of the potential theories of harm. The economist may also identify aspects of the market that will influence the analysis of barriers to entry, expansion and repositioning, and buyer power. These analyses are discussed in more detail in sections 3.7-3.8. However, key market features that influence that analysis will usually be included in the description of the market. For example, if purchasing manufacturing equipment involves long lead times, it would influence the entry analysis and be useful to include in the market description.

While it is useful to describe the market early in the investigation, it is not necessary to complete the market description before analyzing other aspects of the merger. The economist will need to update the description throughout the investigation as new information is coming to light.

3.2. Market definition

Market definition is a tool to identify and define the boundaries of competition between firms. It serves the aim of identifying in a systematic way the competitive constraints that the merging parties face and can be an important indicator of the merger's likely competitive effects.

Economists frequently use the hypothetical monopolist test (HMT) to define antitrust markets. Specifically, the HMT assesses whether a profit-maximizing monopolist in a candidate market would likely impose at least a small but significant and non-transitory increase in price ("SSNIP").⁸ An economist will assess qualitative and quantitative evidence within this framework for the purpose of market definition.

In assessing market definition, the sources of substitution and thus competitive pressures arise from three aspects: demand substitution, supply substitution, and potential competition.⁹ To define a market, many competition authorities focus on demand substitution as it represents direct and immediate competitive pressure faced by the product or service.

When competition authorities define a relevant market, there are two basic aspects, product¹⁰ and geographic¹¹ markets. A relevant product and geographic market comprises all those products and/or services that consumers regard as interchangeable or substitutable due to their characteristics, their prices, their intended use and the location of those firms involved in the supply of those products or services.

The presence of **price discrimination** (see Glossary) can complicate market definition exercise and may result in defining separate antitrust markets for the same product or service due to differences in demand characteristics (e.g., age, gender, preferences, etc.) which may result in different demand price elasticities.¹² Therefore, during the merger investigation, the case team should assess the existence of those market conditions and demand characteristics. Internal documents describing the commercial strategy of the merging parties might be important in evaluating the existence of such practice.

During the early stages of investigation, the case team may consider several hypothetical antitrust markets until enough evidence is gathered throughout the investigation to finish

⁸ For an in-depth description of the HMT see: [ICN Merger Guidelines Workbook](#), Worksheet A – Market definition, pp. 15-30, and [ICN Recommended Practices for Merger Analysis](#), RPII, B-C-D, pp. 5-11.

⁹ For an in-depth discussion of demand-side substitution, supply-side substitution and potential competition, see: [ICN Merger Guidelines Workbook](#), Worksheet A – Market definition, pp. 15-30, and [ICN Recommended Practices for Merger Analysis](#), RPII, pp. 4-12.

¹⁰ See [ICN Merger Guidelines Workbook](#), paragraphs A.11-A.13, pp.19.

¹¹ See [ICN Merger Guidelines Workbook](#), paragraphs A.24-A.25, pp.26.

¹² See [ICN Recommended Practices for Merger Analysis](#), RPII, E, pp. 10-11.

defining the market. However, in some cases it might not be necessary to arrive at a determination of the matter.

3.2.1. Qualitative evidence

In assessing product market definition, economists and case teams rely on evidence that often includes, but is not limited to:

- the characteristics, prices, functions, and customer usage of the product(s) in question;
- evidence that customers have shifted or have considered shifting purchases between products in response to relative changes in price or other competitive variables;
- evidence that sellers base business decisions on the prospect of buyer substitution between products in response to relative changes in price or other competitive variables;
- evidence regarding the strength and nature of customer preferences among products (e.g., brand loyalty, preferences for certain product performance or compatibility standards, etc.);
- legal or regulatory requirements (e.g., product certification standards, regulatory compliance standards, etc.) that may impact the substitutability of products from the standpoint of customers; and,
- the time and costs required to switch products, as high switching costs relative to the value of a product tend to make substitution less likely.

As for the geographic market definition, relevant evidence often includes, but is not limited to:

- the cost and difficulty of transporting the product in relation to the value of the product which can also be derived from empirical analysis of quantitative data;
- product characteristics (e.g., product perishability or fragility, the nature and requirements of offered services, etc.), geographic features, or other circumstances impacting the ability of customers to obtain products from sellers outside the geographic area;
- evidence that customers have shifted or have considered shifting purchases between different geographic locations in response to relative changes in price or other competitive variables. In some instances, such evidence can be derived from empirical analysis of quantitative data (see section 3.2.2);
- evidence that sellers base business decisions on the prospect of buyer substitution between geographic locations in response to relative changes in price or other competitive variables;
- the willingness of customers to obtain the relevant product or service from suppliers in other geographic locations, including customer preferences for obtaining the product from a supplier with a local presence or with the ability to communicate in the local language;
- constraints on the ability of outside sellers to expand their sales into the geographic area (e.g., production capacity, committed capacity, the need to establish brand recognition and acceptance; distribution and after-sales service capabilities, etc.);

- legal or regulatory requirements (e.g., import duties, tariffs, quotas, licensing requirements, required regulatory authorizations or approvals, etc.) that may raise the costs of suppliers from outside the geographic area or impact the ability of customers to obtain the product or service from suppliers located outside the geographic area; and,
- the timing and costs of switching suppliers from one region to another, as high switching costs relative to the value of the product will make substitution less likely.

In assessing the extent to which supply-side substitution is likely¹³, relevant factors include, but are not limited to:

- the extent to which obtaining new tangible or intangible assets, or switching or extending existing assets, to enter into production or sale in the relevant market is technically feasible;
- the extent to which customers would be willing to switch to products offered by the firm in the relevant market;
- the time it would take to enter into production or sale, including the time necessary to comply with any applicable legal or regulatory requirements;
- the costs of shifting or entering into production or sale relative to the profitability of sales at the elevated price; and,
- whether the firm's capacity is elsewhere committed or elsewhere so profitably employed that such capacity likely would not be made available to respond to an increase in price in the relevant market.

When considering whether price discrimination is present in a market, case teams and economists typically consider:

- whether different customers are subject to different selling conditions;
- whether the company is offering different type of contracts to customers for the same product; and,
- whether consumers can systematically circumvent the company's attempt to discriminate between groups of customers. For example, in the airline industry where the same seat is sold at different prices, airlines can enforce the price discrimination scheme by making the tickets non-transferable thus preventing possible reselling of tickets from tourists to business people. Furthermore, airlines may also prevent business people from directly buying cheap tickets. Airlines accomplish this by imposing conditions that would be difficult for the average business person to meet, such as advance ticketing requirements or minimum stay requirements.

Internal reports and/or strategy documents held by the parties can sometimes provide a lot of information about market definition and potential theories of harm. For example, market research reports can sometimes convey useful information on the boundary of the product

¹³ If supply side substitutability cannot be achieved relatively quickly and at low cost then it should be considered in the assessment of barriers to entry, expansion and reposition (see section 3.7). Also, some agencies consider supply-side substitution as part of market definition, while other agencies consider it in identifying market participants.

and geographic market, and on which products/brands compete most closely with those of the parties.

3.2.2. Quantitative techniques

Competition agencies also make use of quantitative methods that try directly to assess the substitution between different products. The quantitative methods often used by agencies to define markets are described below. Tools discussed in the section are helpful to inform a theory of harm but may not by themselves be sufficient to conclude that a merger harms competition significantly.

3.2.2.1. Pricing Analysis

Various pricing tests have been developed to define markets. While no single price test offers conclusive evidence, the results taken together with other evidence offer a rich picture that is useful for market definition purposes.

- **Price correlation**

Two products may be in the same market if a price change in one of the products causes consumers to switch to the other product. The **price correlation** is a measure of the extent to which prices move together (see Glossary). Information on co-movement of products' prices in the past helps to confirm the level of substitution between those products. An important data feature of this analysis is the level of disaggregation – do the data pertain to product category (e.g. soup, soft drinks) or to more specific types of products (e.g. fresh soup, canned soup, carbonated soft drinks etc.)?

Price correlation analysis, on one hand, does not provide a direct answer to the SSNIP test, but it can still be helpful. For example, a finding that prices of two products move closely together does not provide any insights as to the causality of the relationship between the prices, though it could indicate that products are in the same market.¹⁴ On the other hand, pricing correlation analysis uses straightforward and easy-to-implement empirical techniques. There is thus a trade-off between the evidentiary value of the findings from the pricing analysis and the ease with which the pricing analysis can be implemented. To come to a more solid conclusion, it is always important to support the findings from the pricing correlation analysis with some factual evidence. Together, these can help explain how the competing producers constrain the hypothetical monopolist.

In order to assess the degree of correlation, i.e., whether prices are sufficiently correlated, one usually refers to a benchmark, which allows comparing the correlation for the candidate product with the correlation between products that are thought to be in the same market. It may also be helpful to compare correlations with cost factors. It is not uncommon for products' prices to be correlated even though they are not substitutes, which, for example,

¹⁴ Consider for example a hypothetical monopolist in country A that produces a particular product. Finding that the prices of this product move closely with prices of products of competing producers in surrounding countries does not provide any evidence for whether the competing producers provide a constraint on the hypothetical monopolist, or whether the competing producers simply follow the prices set by the hypothetical monopolist. Obviously, for merger control purposes, the latter rather than the former is required.

could be due to common demand or cost shocks. It is also possible for products in the same market to have a relatively low price correlation, for example if there were a lag in the price changes for one of the two products. Therefore the case team should be cautious when analyzing correlation results. A visual inspection of the plotted price series trying to understand the reasons for certain relative movements (that can impact the correlation) can be of help in such cases.

It is important to view this and all tests within the context of the market being considered and understand the impact that aspects of the market have on the economic tools used. For example, consider the case of high correlation between two price series because of the influence of external demand and supply factors. This is called **spurious correlation** (see **price correlation** in the Glossary). Where the products share the same input and the input's cost represents a high share of price, close movements in prices may be caused by changes in the cost of the underlying input rather than by competitive interaction. Spurious correlations are also possible when only some of the products share common costs while others do not. It can be difficult to assess what is a meaningful difference in correlations. Thus, a good correlation analysis does not only require data on prices for each product of the merging parties but it also requires data on demand and supply factors potentially affecting the correlation.

Other more sophisticated price tests have been developed to account for dynamic markets. For instance, **error correction models** and **co-integration analysis** techniques (see Glossary) are used to determine the extent of the market and to analyse the mechanisms by which price changes are transmitted across products or geographic areas. Note that co-integration analysis and **stationarity tests** also play a large role in validating the robustness of correlation analysis. For instance, if prices present certain features (i.e., non-stationary and co-integrated), the results of a correlation analysis are non-reliable and other techniques (such as error correction models) can be used as alternatives. However, even these more advanced techniques are not exempt from limitations, and caution is warranted in the interpretation of the results. Hence, it is always important to complement such analysis with qualitative evidence, such as internal documents and surveys.

3.2.2.2. *Geographic market tests*

In defining geographic markets, tests could be used such as:

- a ratio between the cost of transporting the product and the value of the product: since the higher the value of a product relative to its transportation costs, the more likely customers are to seek suppliers in more distant locations and the more likely suppliers located in other areas are willing to supply customers in that area; and,
- relative price levels and price movements of products in different geographic areas (see price correlation and price difference test above).

A more advanced test for assessing geographic markets is the **Elzinga-Hogarty test** (see Glossary). It uses the flows of products between geographic markets to determine whether they are in the same relevant market. The rationale behind this test is that if imports and exports to and from a given region are relatively small, then prices are likely determined by

the domestic competition. However, this and other geographic-market definition tools may not be needed when there is direct evidence of anticompetitive effects.

As with all economic tools, there is a trade-off between the evidentiary value of the Elzinga-Hogarty analysis and the ease with which this analysis can be implemented.

3.2.2.3. *Natural experiments / Shock analysis*

A natural experiment is the analysis of how companies' variables such as prices, volumes, costs and margins have evolved in response to particular events or shocks, such as new brand entry, new product launch, specific innovations, special promotions and advertising campaigns, and supply disruptions. Natural experiments are most effective when a clearly identified event of significant magnitude has affected the market at a time when no other major changes were taking place. Natural experiments are based on the idea that a significant change - especially a sudden and unexpected change - in a market can provide useful insights of its competitive conditions by observing how customers and/or competitors have reacted to the event. Therefore, a careful study of and enquiry into the history of the industry can often yield useful information about the existence of such changes. As already mentioned above, outages/production-downtime, entry/exit, strikes, stock shortages, promotion and advertising activity, trade frictions, sudden exchange rate movements, technological change, and regulatory intervention are examples of such changes.

Consider, for example, product market definition for products A and B. If the facts show that there was an increase in the tariff charged on imports of product B that led to an increase in the market price of product B, then analysing what happened to product A could help determine if they were in the same product market. If A and B are in the same market, it is likely that the price, and possibly sales, of product A would increase, holding all else constant. Other exogenous changes could be analysed similarly.

Similar observations could be made regarding geographic market definition. Consider an example, where entry into one area leads to a similar decrease in product prices both in that area and in an adjacent area. In this case, we may conclude that the two areas are in the same geographic market.

Natural experiments may be attractive because they are intuitive in nature and sometimes have relatively small data requirements. Furthermore, competitive conditions can be understood and effects of a changed market condition can be directly extrapolated from the market at stake. Indeed, it is essential to be certain that the identified effect is attributed to the correct cause. This is typically quite difficult to ascertain. For example, when relative prices in an industry change at the same time as entry occurs, it cannot always be assumed that entry was the sole driving force behind the relative price change. Furthermore, depending on the type of event selected, consumers' and suppliers' reactions might be of different magnitude and not necessarily be comparable to the way they would react to a merger. It is possible that certain natural experiments might lead to overestimation or underestimation of the real effect of a merger. As in all cases, the specific circumstances of the industry need to be examined and a shock analysis needs to incorporate the impact of any other factor that might explain the observed patterns. Natural experiments can provide

supportive supplementary evidence to augment the overall market analysis, and, as with any evidence, should be tested against other factors and relevant evidence.

It is worth mentioning that natural experiments can be not only useful in the context of market definition, but can be adapted to the assessment of unilateral effects, see section 3.4.3.2.

3.2.2.4. *Critical loss analysis*

The concept of **critical loss analysis** (see Glossary) is a direct application of the hypothetical monopolist test. In the context of market definition, critical loss analysis measures the minimum sales volumes that a hypothetical monopolist would need to lose to make a 5-10% price increase unprofitable. This critical loss is then compared to the actual loss that the hypothetical monopolist would incur in response to the same price increase to determine whether such a price increase would be profitable. If the actual loss is smaller than the critical loss, the price increase would be profitable for the hypothetical monopolist, which would be indicative of a relevant antitrust market.

Undertaking critical loss analysis thus requires the computation of two values: critical loss and actual loss. The critical loss computation is rather straightforward, as it is based on a simple formula and only requires information on contribution margins. However, as the contribution margin depends on the average product price and variable costs, correct information on these variables must be collected. In particular, the contribution margin should identify the cost savings realized by a reduction in output in the relevant time period (generally considered to be around 2 years for merger control purposes). It is thus imperative that total costs are correctly divided between variable and fixed costs, as a poor identification of variable costs can lead to relevant markets being too broadly defined (i.e., when margins are too high) or too narrowly defined (i.e., when margins are too low). Additionally, the contribution margin must reflect the costs of all firms in the candidate market, and thus it may be necessary to obtain comparable price and cost information for all market participants and not just the parties. It may also be important in some specific instances to make adjustments to the basic critical loss formula to account for special features of a particular industry. Thus, all these elements must be taken into account when calculating the critical loss.

To compute the actual loss, the reaction of consumers (and competitors) to a 5-10% price increase must be modeled. The most direct way to model this reaction is by estimating the elasticity of demand that captures how much demand for a product changes when the price of the product changes. Demand estimation however has very high data requirements and may sometimes place quite restrictive assumptions on consumer behaviour and thus may often result in rather non-robust estimates or no estimates at all. Although less precise than demand estimation, demand elasticity can also be approximated by taking advantage of exogenous price shocks (if they exist) such as for example exchange rate or cost shocks, as one can compute by how much the demand changed in response to this particular price change.¹⁵

¹⁵ There are also other ways of estimating actual loss. For example, it may also be estimated with the use of an accurate customer survey that directly asks a large enough group of customers whether they would switch to a different product in response to a 5-10% price increase in the product concerned. By assessing the proportion

Since the critical loss analysis is also not exempted from limitations, it is therefore always important to complement such analysis with other evidence.

3.2.2.5. *Cross price elasticity*

Cross price elasticity (see Glossary) is a measure of how changing the price of one product affects the quantity of another product. When the cross price elasticity is positive, those products are substitutes while if they are negative, those products are complements. Where there is zero cross-elasticity, the products in question will be unrelated.

In horizontal mergers, cross price elasticity plays a key role. Competition authorities need to know the negative or positive value of cross-elasticities and more importantly, their relative size. The higher the positive cross elasticity value, the more likely products are close substitutes. This evidence would be indeed consistent with the inclusion of these products in the same relevant market.

Cross price elasticities can be important to market definition; however, like all economic tools, it has limits. The estimation of cross elasticity can only be conducted with complete information and a reliable model. Estimating cross-elasticities is typically a very involved exercise and requires large sets of data and assumptions on the behavior of demand in order at least to estimate a demand model. In practice, it is difficult to correctly evaluate cross price elasticity.

See Annex:
Case study – US: FTC v. Whole Foods Market, Inc. and Wild Oats Markets, Inc.

Other case studies can be found in OECD, [Economic Evidence in Merger Analysis, Policy Roundtables](#), 2011. For instance:

- *Market definition techniques*: case studies from New Zealand (p. 196-197), European Commission (p. 253-255 on critical loss and correlation analysis), South Africa (p. 285, section 3.2.4); Turkey (p. 216 on Elzinga-Hogarty test, p. 217-219 on SSNIP test and cross elasticity).
- *Natural experiments*: see case studies from Greece (p. 143-144), New Zealand (p. 197-198, case study n. 3), European Commission (p. 253), United States (p.230).

3.3. Market shares and market concentration

Once a market is defined, it is possible to determine market shares and concentration. This begins by identifying the market participants and determining each participant’s sales volume, production, and capacity. Market shares, concentration ratio (CRn) and Herfindahl-Hirschman index (HHI) can play an important role in the initial assessment of the likelihood of a horizontal merger generating harm to consumers. Many agencies make use of these

of customers that would switch as opposed to the number of customers that would not switch in response to the price increase, the actual percentage loss of customers can be calculated. Qualitative evidence on how customers responded to sudden shocks or on past switching customer behaviour between different products can also be used as a “rough guide” for the magnitude of actual loss, although the evidentiary value of such analyses tends to be lower.

tools to help identify mergers that may raise competitive concerns and which therefore require further analysis.¹⁶

Although market shares, CRn and HHI have an intrinsic evidentiary value they might be more informative in some industries rather than others. Economic theories support a direct relationship between high market shares and market power in homogenous markets where companies compete by setting quantity/capacity (Cournot competition). Conversely, less evidentiary value should be given in other circumstances, for instance when products are differentiated and competition takes place primarily through price-setting. See sections 3.4.1-3.4.2 for a more detailed discussion.

Another important element to consider when computing those indices is the selection of the base. Values and volumes are the most common bases. The type of the industry should guide in the selection of the right base. As also explained in sections 3.4.1-3.4.2, the heterogeneity or homogeneity of products in a given market is a key aspect in the selection. However, other factors might play an important role in competition between companies such as the intensity of research or advertising. In these cases, more qualitative evidence may be necessary.

The computation of market shares is often carried out by companies themselves. In this situation, following the industry standards may be possible. It is important to note that the way a company defines a market is not necessarily congruent with the proper relevant market for merger analysis purposes. Further refinements of a company's computations might be necessary to capture the relevant market and the relative importance of companies. For example, in the context of differentiated product markets it is often useful to calculate market shares for sub-segments of the market as well. If the firms have high shares in certain sub-segments, that may indicate a potential area for further inquiry. As discussed below, these sub-markets may include products for which there may be unilateral effects due to high diversion between the products. It is also possible that these sub-segments may themselves be smaller product markets or markets in which there is price discrimination.

While market shares and measures of market concentration play an important role in merger analysis by providing useful initial guidance to help identify mergers that may raise competitive concerns, they are not determinative of possible competition concerns.¹⁷

3.4. Unilateral effects

A merger gives rise to **unilateral effects** (see Glossary) if it leads to price increases post-merger as a result of the merged firms acting independently of what their competitors do.

Post-merger, the new entity might find it profitable to increase prices (or reduce production to drive prices up) because part of the sales that pre-merger would have been lost to its competitors, are now recaptured by the merged entity. The larger the share of customers who would switch from one to the other merging party (i.e., limited diversion of customers

¹⁶ For more on the measures of concentration, including case studies, see [ICN Merger Guidelines Workbook](#), Paragraphs B.9-B.24, pp. 33-38.

¹⁷ See [ICN Recommended Practices for Merger Analysis](#), RP. III, pp. 13-15.

to third parties), the more profitable the strategy of raising prices will be. If competitors or new entrants are not expected to act in a way that counteracts such price increases, the merger is likely to lead to higher prices in the market.¹⁸

This section explains the economic rationale behind the analysis of unilateral effects in cases of homogeneous products (section 3.4.1) and differentiated products (section 3.4.2)¹⁹ and it discusses economic evidence to be gathered to assess the likelihood of such effects. Section 3.4.3 then describes less complex types of quantitative analysis that can be performed to help assess whether a merger makes unilateral effects likely. Finally, section 3.4.4 provides an overview of more sophisticated quantitative techniques that can be used to directly estimate the unilateral effects of a merger on prices and output. Elements and tools discussed in these sections are helpful to inform a unilateral effects theory of harm but may not by themselves be sufficient to conclude that a merger harms competition significantly.

In addition to the case studies provided throughout this section, other examples are listed in the box below.

Case studies

Additional case studies can be found in OECD, [Economic Evidence in Merger Analysis, Policy Roundtables, 2011](#). For instance:

- *Direct assessment of competitive constraints*: see case studies from European Commission (p. 257-259), United States (p. 230-232).
- *Unilateral effects*: case studies from Denmark (p. 118), Israel (p. 155-157 on changes in HHI), Turkey (p. 219 on price concentration studies and p. 220 on diversion ratios), South Africa (p. 284-285 on diversion ratios); United States (p. 232 on changes in concentration).
- *UPP measures*: case studies from Japan (p. 164), Korea (p. 171-173), European Union (p. 255-256), United Kingdom (p. 225-227).

3.4.1. Underlying economics and qualitative evidence in homogeneous product markets

If the products are homogeneous, i.e., if customers have no significant preference for the products of a specific supplier, the substitutability and competitiveness of the firms' products are essentially determined by capacity, geographical position, or costs. Examples include markets for certain raw materials, minerals, oil, electricity, and generic pharmaceuticals.

A merger between producers of a homogeneous product may incentivize the parties to withhold supply in order to drive prices up (quantity and/or capacity withholding). This strategy could be profitable, because, post-merger, the increased margins resulting from a price increase accrue on the parties' combined customer base.

The overall effect of the merger on the price level and the quantity sold, however, crucially depends on the response of competitors. The reduced capacity and higher price set by the merged entity might create an incentive for other suppliers to expand production and sales,

¹⁸ See also [ICN Merger Guidelines Workbook](#), pp. 39-44.

¹⁹ In conducting unilateral effects analysis, authorities should apply the economic theory or model that best fits the characteristics of the market(s) at issue. See [ICN Recommended Practices for Merger Analysis](#), RP V, B, p 19.

in particular if they have spare capacity, no significant capacity constraints, or can divert capacity from other product or geographical markets to the market under investigation in a timely manner. In general, if the merging parties produce a homogeneous mass product and their competitors can expand production sufficiently and find it profitable to do so, the merger is unlikely to cause a substantial unilateral anticompetitive effect. On the contrary, if competitors do not have spare capacity or expanding capacity is an expensive investment, the merged entity might find it profitable to withhold capacity in order to force prices up.

The following economic evidence should be gathered to assess whether the merger is likely to cause unilateral anticompetitive effects in case of homogeneous products.²⁰

- **Market shares and market concentration**

Market shares and market concentration can give an initial indication of the possibility for unilateral effects to arise in homogeneous products settings. The larger the combined market share of the merging parties (and the increment in market share due to the merger), the greater is the benefit that the parties would gain from a price increase (or output restriction). Furthermore, the larger the market shares of the parties pre-merger, the greater is the competitive pressure exercised by the parties on each other that would be lost due to the merger.

It must be noted, however, that market shares do not necessarily reflect future demand- and supply-side responses. The analysis should proceed by assessing the potential reaction of competitors, in particular the scope for expansion of non-merging firms: if there is sufficient excess capacity in the hands of non-merging firms, or if it is easy to acquire, unilateral effects in the case of homogeneous goods are less likely to occur.

- **Bound capacity of merging parties**

The ability of a firm to withhold capacity by the merging companies is a key concern because it can lead to reduced output and increased prices. The strategy of withholding capacity presupposes that the merging parties can actually reduce supply. This might not be the case if they are contractually bound to deliver, e.g., by long-term contracts. Additionally, the incentive to withhold non-bound capacity crucially depends on the profit margins which could be realized by using this capacity; the lower the margin on the non-bound capacity, the lower is the profit loss from withholding this capacity, and thus the more profitable such a strategy would be. It may also be that the factory has to be run at 100% capacity because of the high costs of increasing and decreasing output (e.g., a furnace, aluminum smelter).

- **Excess capacity of remaining firms**

The ability of the merged firm to increase price depends on the supply elasticity of the remaining firms. This, in turn, depends, at least in the short-run, on the amount of excess capacity available to the firms. Should the competing firms promptly respond to any reduction of sales or capacity by the merged entity by expanding capacity, the merger is unlikely to result in a price increase.

The economic incentive of using spare capacity should be carefully evaluated. Having established the existence of overcapacity, the authority should further investigate whether

²⁰ See also [ICN Merger Guidelines Workbook](#), pp. 41-44 and See [ICN Recommended Practices for Merger Analysis](#), RP. V, pp. 19-22.

the fringe firms would find it profitable to expand output sufficiently to make a post-merger price increase unprofitable for the merged entity. Section 3.4.3 describes in more detail which data can be used and which factors should be taken into account in order to assess the implications of excess capacity.

- **Other factors**

In assessing the likelihood of unilateral effects, countervailing factors such as efficiencies, entry and buyer power should be taken into account. If the merger creates synergies that reduce production costs, this might offset the incentive for reducing capacity post-merger. Furthermore, even if a reduction of supply and capacity occurred, the resulting higher prices could attract entry in the market and restore pre-merger prices. Sections 3.6, 3.7 and 3.8 provide further discussion of the need to take dynamic responses and countervailing factors into account.

- **Sources of evidence**

Sources of information that can help in developing economic evidence include companies' websites and marketing materials/brochures, specialized press and industry reports, pricing information, internal documents, customer surveys and questionnaires and interviews to customers and competitors. These sources of information will be analysed in greater detail below in the context of differentiated product markets (section 3.4.2). For a discussion on the reliability of these sources of information, see section 4.4 and Chapter 3.

3.4.2. Underlying economics and qualitative evidence in differentiated product markets

If products are differentiated (i.e., if customers have significant product-specific preferences, for example by branding or quality) competing products become imperfect substitutes. This is the case in most consumer goods markets, where consumers usually prefer a specific brand over another. In such markets, the effects of a merger depend on the "closeness of competition" between the products of the two merging parties: the higher the degree of substitutability between the merging firms' products, relative to the degree of substitutability with other firms' products, the more likely it is that the merging parties will be able to raise prices significantly post-merger.

The key question in competitive analysis of differentiated products markets is therefore how close substitutes the parties' products are: the closer the substitutability between the products of the merging parties, the higher is the competitive pressure that they exercise on each other and that would be lost after the merger. If the products of the merging parties are considered to be less substitutable by customers (e.g. because of different quality, price range, branding, location or simply taste), a small share of them would turn to the other party should one merging party decide to increase prices post-merger, while its lost sales to other competitors might be significant. On the contrary, if the products of the merging parties are considered to be close substitutes by a large share of customers, many customers would have switched to the other party's product pre-merger and the internalization of this effect could make price increases profitable post-merger. If multi-product firms are involved, the merger could cause concern with respect to only some product lines. The analysis should then focus on establishing closeness of competition between the overlapping brands. In general, if consumers do not consider the products of the merging parties as substitutes, the

merger is unlikely to lead to unilateral effects. On the contrary, a merger involving products that consumers consider to be close alternatives is more likely to result in unilateral effects.

The following economic evidence should be gathered to assess whether the merger is likely to cause unilateral anticompetitive effects in cases of differentiated products.²¹

- **Market shares and market concentration**

Market shares are not a conclusive indicator for the effects of the merger when products are highly differentiated. Imagine that firm A and firm B merge. They may have small market shares but be very close competitors, meaning that a significant part of A's customers considers the products of B as the closest alternative. Thus, should A decide to increase prices post-merger, the portion of lost sales to B will exceed the portion that B's market share would predict, and the increase will be profitable. On the other hand, if A and B have large shares but their products are not perceived as close substitutes by customers, an attempt to increase prices for one product is unlikely to be profitable as most customers would switch to the substitutable products of non-merging parties. Therefore, market shares could understate or overstate the potential for anticompetitive effects. Other measures of substitution (see diversion ratios in section 3.4.3.7), or switching analysis tend to be superior indicators for mergers in differentiated product markets.

- **Competitive position of the merging parties and of the remaining firms**

The competitive position of all the firms in the market should be explored. In particular, when the merger involves an innovative firm that has recently entered the market and is expected to exert a significant competitive pressure on other firms, the merger is likely to relax competition as it eliminates an important competitive force in the market. Information on the evolution of market shares and property rights on key innovations may help identify a "maverick" in the market. Questionnaires and interviews with competitors might also shed light on their role in the market.

<p>See Annex: Case study EU - COMP/M.3916 - T-Mobile Austria/Tele.ring</p>
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- **Closeness of competition between the merging parties' products**

Closeness of competition between the merging firms is established by looking at the characteristics of the products, positioning of the products in terms of marketing/brand image, distribution channels and/or customers served by the parties, customers' behaviour, preferences and choices made in the past.

The parameters according to which the substitutability of different products is assessed must be well defined: closeness of competition might depend also on location (relatively distant substitutes sold in the same geographic area might exercise a stronger competitive pressure than close substitutes sold in a different geographic area) and on consumer attitudes (if for certain products consumers tend to shop around and compare many offers, also relatively distant substitutes might exercise a strong competitive pressure).

²¹ See also [ICN Merger Guidelines Workbook](#), pp. 41-44 and [ICN Recommended Practices for Merger Analysis](#), RP. V, pp. 19-22.

The following sources of information can help answering the question of closeness of competition between merging parties.²²

- *Companies' websites and marketing materials/brochures*

Websites and marketing materials often provide useful insights and a first source of information on key product characteristics, prices and distribution channels used by the parties.

- *Specialized press and industry reports*

Many sectors have one or more (renowned) reports/journals which usually describe the market trends, players and market shares evolution over time. These could be useful to gain knowledge about the market and the relevant players.

- *Pricing information*

Price levels of the products involved in the merger and prices of competing products can provide information about the brand positioning when prices convey some information about the (perceived) quality of the product: if the parties' prices are very similar while the prices of rival firms are significantly higher or lower, this may be evidence that consumers consider the parties' products as closer substitutes compared to other products on the market.

- *Internal documents*

Internal documents are a valuable source of information. They may include, for example, visualisation charts comparing key product features, brand positioning maps which show how the parties see their own products in relation to others, including private label brands, and which competing products they regard as main sources of competition, PowerPoint presentations on planned projects, where the advantages of the proposed merger might be analysed, etc. Internal documents can also provide information on past behaviour/substitution patterns of customers. For example, companies may make various internal business reports, such as sales management reports, in which they analyse which important customers were lost, to whom and why. Internal documents of customers may also illustrate how different products are compared. Finally, internal documents can provide information on market segmentation, i.e., on whether firms address a specific customer target group or a specific need, whether the merging parties overlap in one segment and whether alternative suppliers serve those segments as well. In markets where the products in question are sold to business customers through bidding procedures or customer negotiations, it may be worth examining internal information about the bidding process, as well as who won and lost the bids.²³

- *Customer surveys*

Companies often undertake or commission surveys in differentiated product markets. These surveys explore how customers make their choices, how the company's brand is perceived, how it is positioned relative to rivals in the customer's

²² For a discussion on the reliability of these sources of information, see section 4.4 and Chapter 3.

²³ For example which firm(s) the parties win contracts from and which they lose contract to (e.g. based on cancellation records). A comparison of firms' new and lost customers can also inform switching between the merging firms. See also the section on bidding analysis below.

view (including relative to private label products), how customers chose in the past, etc. When available, these surveys are very useful in illustrating which brands are considered closer substitutes by customers.

Surveys or market studies carried out by the merging parties before their plans to merge are to be preferred to surveys carried out after agreement has been reached since they tend to be more objective.

The agency could consider undertaking or commissioning its own customer surveys. However, it must be kept in mind that the design of such a survey is a complex and time-consuming exercise which is difficult to accomplish in the usually quite short timeframe of a merger investigation and responses must be analysed carefully.

○ *Questionnaires and interviews to customers and competitors*

Targeted questions to customers and competitors are a useful way to collect information about the closeness of competition between products. Particularly if products are complex, targeted interviews are often preferable in order to obtain a better understanding than several rounds of detailed questionnaires and may save time.

Competitors can be asked about brand positioning and the main sources of competitive pressure in the market. Customers can be asked about substitutability among brands, ability to switch and past switching behaviour (whether they switched in the past, to which brand, and why). Common substitution patterns might indicate whether there is any element which makes the parties' products particularly close competitors.

Should prices not be publicly available, competitors and/or customers could be asked for price lists, average prices or price ranges of the products concerned. Questionnaires or interviews could also serve to understand whether the parties use the same distribution channels and/or serve the same customer groups, and whether actual sales prices differ from list prices.

Agencies should, however, keep in mind that competitors might have an interest in the outcome of the merger and their answers should therefore be critically reviewed. Customers, who are directly affected by the merger, are more likely to provide unbiased answers; however they could exaggerate the impact of the merger if they believe prices will increase. Customer responses may not be replicable in other scenarios as well, for example, if customers could partially pass-on a potential price increase downstream, they might underestimate the effects of the merger.²⁴ In talking to customers, it is almost always more informative to obtain information as to what they actually did in dealing with past increases than asking for opinion as to possible future response.

▪ **Switching costs**

A limited ability of customers to switch between products or different suppliers may lead to higher pre-merger margins, and it could indicate that post-merger unilateral effects are

²⁴ The answers of customers might be biased if: a) Customers are not end-users, but intermediate customers; b) customers' costs are a low share of the total cost of the final product; c) customers can pass-on price increases of their inputs; d) customers are integrated vertically and therefore profit from weakened competition upstream e) the price elasticity for the final product is low. Fear of retaliation and reluctance to disclose a weak bargaining position are also further aspects to be considered. See Bibliography.

more likely. If switching products or suppliers implies significant customer-specific investments or high costs (in terms of money, time and/or information), customers are unlikely to switch even to relatively close substitutes in case of price increases. Customers' internal documents, questionnaires, surveys and interviews can inform on current substitution options for customers and switching costs. However, if there are high switching costs between merging firms' products, it also may be less likely that the firms are constraining each other. For switching costs to be important, they need to be lower between the merging firms than they are between the other firms in the market. A switching analysis (see section 3.4.3) might infer switching behaviour by looking at past substitution patterns.

▪ **Other factors**

Finally, the likelihood of unilateral effects will depend also on countervailing factors such as entry and/or repositioning. In cases of differentiated products, competitors might react by changing their product offering to attract customers of the merging parties and therefore compete more effectively with the new entity. New competitors could enter the market: should a product be relatively simple to produce and share common inputs with neighbouring industries, high prices are more likely to attract new entry, providing that there is not strong product differentiation. Powerful buyers could also decide to sponsor new entry or to produce the input on their own. In addition, efficiencies could be sufficient to prevent or mitigate the anticompetitive unilateral effects from the merger.²⁵ Sections 3.6-3.8 provide further discussion of the need to take dynamic responses into account.

See Annex:

Case study – US: *FTC v. Whole Foods Market, Inc. and Wild Oats Markets, Inc.*

Case study – US: *FTC v. Staples, Inc. and Office Depot, Inc.*

3.4.3. Simpler quantitative techniques

As a general rule, less complex analyses should be undertaken first to provide initial insights into the competitive interaction between the parties and their rivals. Depending on the quality of the data and the expected balance between benefits and costs of undertaking any further analysis, simpler analyses may be complemented with more sophisticated techniques. Tools discussed in this section are helpful to inform a unilateral effects theory of harm but may not by themselves be sufficient to conclude that a merger harms competition significantly.

Data on the evolution of prices over time, on margins and on customers' switching behaviour can be used to investigate the closeness of competition between the merging parties' products in more detail.

Data on costs and profit margins of the parties' products could also be used to explore the incentives of the parties to increase prices post-merger (see UPP analysis below). Ideally, margins should be calculated as the difference between price and marginal cost (i.e. the cost of producing one additional unit of the product under consideration). However, it is most likely that the accounting systems of the companies concerned will not record marginal

²⁵ See [ICN Recommended Practices for Merger Analysis](#), RP V, C, p. 21.

costs. Variable costs can then be used as a proxy for marginal costs, though variable costs also are time-dependent.²⁶

In consumer goods markets significant amounts of data can be available. Market research companies such as AC Nielsen or GfK regularly gather information on prices and quantities purchased in the form of scanner data or consumer panel data.²⁷ This data can be used to estimate simple statistics (trends/correlations) as well as to perform more sophisticated econometric analysis (demand estimation and merger simulation, see section 3.4.4 below).

The present section describes less complex types of quantitative analysis that could be used to establish the closeness of competition between the merging parties' products (switching analysis, diversion ratios) and to estimate the profitability of a price increase post-merger (UPP-analysis and critical loss analysis). The next section (section 3.4.4) deals with more sophisticated quantitative techniques that aim at directly estimating the outcome of the competitive process post-merger.

3.4.3.1. Price correlation analysis

Price correlation analysis (see section 3.2.2) can be used not only to help define markets, but it can also be used to investigate the closeness of substitution between the merging firms' products. In this case, a comparison among the correlation coefficients, calculated from all possible pairs of the products of the relevant market, is conducted to see whether the correlation coefficients between the merging parties' products are significantly different in size and sign (of the correlation coefficient) from all the other combinations. If the prices of the products of the merging firms are more correlated than are the prices of either firm's product and other substitutes, an anticompetitive effect from the merger may be more likely. It could also indicate close competition and/or similar cost structures. A lack of correlation would suggest that the parties price their products independently from each other and do not respond to variations in the other party's prices. This indicates that the merging parties may not compete closely. Similarly, the correlation between the evolution of volumes and the evolution of the price-ratio between two products could be used to infer the degree of competition between the two products.

3.4.3.2. Natural experiments / shock analysis

Data on prices and/or margins can be used to evaluate how these variables evolved in response to a particular event that affected the market, for example a new entrant, a new product launch, a special promotion or a production problem. These events, preferably selected where they are considered exogenous to the market, may give clear hints on the substitution patterns between different products and inform the analysis of closeness. Also, comparisons between prices and margins in geographic areas where both parties are

²⁶ In this case, it is important to assess whether costs submitted by the parties are truly variable, and whether there is reason to believe that marginal cost may exceed average variable cost.

²⁷ Retail scanner data are POS (point of sale) data on the volumes sold and the price at which those volumes were sold, including discounts or promotions. Consumer panel data are data on the purchasing behaviour of specific consumers in a representative sample. Consumer panel data may offer more precise data on substitution patterns as it allows the analysis of the purchasing decisions of particular households over time. Also, consumer panels may offer more complete coverage of retail outlets given that purchases which are recorded are not dependent on scanner technology being available. Such datasets also tend to include demographic information about the households in the panel.

present versus areas in which only one is present, could provide information about the competitive constraints that the parties exercise on each other (comparison of overlap and non-overlap areas).

The results of natural experiments should, however, be interpreted with care, mostly because it is not always easy to isolate the effect of a specific event. Other variables/events that might have influenced prices and/or margins in the same period or in the same geographical area must be taken into account in order to estimate only the effect of the event under consideration (see section 3.2.2.3).

**See Annex:
Case study Canada - Leon's / The Brick**

3.4.3.3. Analysis of excess capacity of fringe firms

As explained in section 3.4.1, in the case of homogeneous products, unilateral effects are unlikely if the non-merging firms could easily expand output or capacity with no significant increase in cost. The data needed to evaluate such possibilities are excess capacity figures and information on the costs and ease of capacity expansion. The analysis should take into account the fact that in some industries the effective capacity is lower than the potential capacity because not all capacity is actually used or usable. The evaluation of the spare capacity should take risks of outages into account. Sometimes shifting capacity to respond to a price increase might not be economically viable, e.g., if there are significant costs for downtime. Additionally, the fact that non-merging firms could expand production or capacity does not necessarily mean that they would do so: if firms have excess capacity and positive margins, it means that even before the merger they could expand production but decided not to do so. The economic incentives for the fringe firms to expand output sufficiently and make a post-merger price increase unprofitable for the merged entity should be carefully evaluated.

**See Annex:
Case study EU - COMP/M.6471 - Outokumpu /Inoxum**

3.4.3.4. Switching analysis

Past substitution patterns help predict to which products customers would switch if the price of one party's product were to increase post-merger. If a large share of customers had switched to the other party in the past, the likelihood that the merger could have an anticompetitive unilateral effect is higher. However, past behaviour should be interpreted carefully: switching may not always have been a reaction to a price increase. It might be due to other factors. Disentangling the switching due to price change and to other factors is thus crucial in order to collect information with the right evidentiary value.

**See Annex:
Case study DE - B3 187/11 Akzo/Metlac
Case study EU - COMP/M.3916 T-Mobile Austria/Tele.ring**

3.4.3.5. Bidding analysis

In markets where firms sell their products through bids or tenders (or even negotiations with single clients), a merger removes an alternative from the market and/or possibly increases

the bargaining power of the merged entity, should the parties possess (and combine) valuable information about customers.

Firms are likely to be close competitors if they frequently face each other in bidding contests. Additionally, the ranking of the parties in the tenders is of importance: data showing that in the bids won by one party, the other party was usually the runner-up, are a good indication that the parties exercise a relevant competitive pressure on each other.

Detailed information on won/lost offers can therefore be useful to assess the closeness of competition between merging bidders. Firms are likely to systematically record information on the bids they participated in (product, customers, winner of the bid, price of the bid, margin expected on the contract). As the identity of the other participants to the bids and of the runner-up is not always known to the bidders, the company/companies soliciting the bids could be requested to submit information on participants, amount of the offers, ranking and reasons why a bidder was selected. If no systematic bidding information is available, sales records (sales by product and by customer) could also be used to assess patterns of substitution between firms participating in the bids. Bidders could then be asked to explain the reasons for the most significant customer wins and losses observed in the sale records. Bidders could also be asked about the factors that matter in bids, in particular the factors that are relevant to determine the price, and how they ranked the bidders when they were considered.

Depending on the quality of the data collected and the availability of a sufficient number of observations, bidding analysis can range from descriptive analysis to econometric analysis. Descriptive analysis would look at how often the parties compete against each other (i.e. the number of bids in which the parties to a merger competed against each other, the value of these bids, the volumes involved by these bids, the extent to which the parties were the only two bidders, the number of times the merging parties were the runner-up in each other's won bids, the average number of other competitors etc.). These descriptive statistics should provide a good overview of the frequency and strength of interaction between the parties. The analysis can also be refined to evaluate whether there are types of contracts, types of customers or geographic areas where the parties seem to compete more often in order to identify which are the other rivals that constitute a credible alternative. Additionally, the amount and value of information about customers that the parties possess could provide information about the effect of the merger on the bargaining power of the merged entity vis-à-vis the clients post-merger.

<p>See Annex: Case study DE - B9 84/09 Webasto/Edscha</p>

If enough data are available and if there is sufficient variation in the data, an **econometric analysis** could be used to estimate the impact on prices (or preferably the impact on expected margins or discounts) of the participation of one merging party when the other party participates in the same bid. If it appears that the participation of one merging party systematically leads the other party to offer higher discounts or otherwise more advantageous terms to the tendering firm, the parties obviously exercise a strong competitive constraint on each other and the merger is likely to raise concerns.

3.4.3.6. *Price concentration studies*

Price/concentration studies examine the relationship between price and the level of concentration. Such analyses can give an insight into market definition and can also be used to infer the possible effect of a merger on prices. The logic behind the approach is that higher concentration in a market is frequently assumed to be associated with greater market power. This market power leads to higher prices, so higher levels of concentration might be expected to coincide with higher prices.

The basis of the test is to compare prices in the different markets in order to see whether those markets in which concentration is higher tend also to be those in which price is higher. Such tests can be conducted if data on concentration (or the number of competitors) and prices in different geographic regions or over time are available with varying concentration levels.

Thus, if the agency finds significant effects of concentration on price, it can estimate how the expected change in concentration from the merger will affect prices in the industry.

This type of analysis can also be extended to see whether specific rivals are particularly important competitive constraints on a firm, for example, because the firms' products are closer substitutes. This involves examining whether the firm's prices tend to be significantly lower in areas where it directly competes with a specific rival or where the rival has a large share of sales – if prices are significantly lower this suggests that this rival is a particularly significant competitive constraint on the firm.

This same type of analysis can be used to assess whether the particular competition between the two merging parties matters if the presence of the two parties differs over time or over geographic areas. See sections 3.2.2.3 and 3.4.3.2.

However, caution should be taken when carrying out this technique for various reasons. First, if there are factors that can affect concentration and prices simultaneously, these should be neutralized. For example, higher costs in one area could lead both to higher concentration and higher prices, and without adequately accounting for the costs differences, the higher prices could be mistakenly attributed solely to the higher concentration. Second, this technique relies on the assumption that prices are influenced by concentration and by the other variables without influencing them in turn. This may not be the case (for instance, high price could result in new entry and more imports into the market, and ultimately lead to lower concentration). Third, caution is warranted when applying this technique in a market with differentiated products. Indeed, for a price concentration study to provide meaningful results, it is important to check that the price variable used describes the same product across regions. If the products are heterogeneous across the regions, then the use of an average price is more likely to reflect differences between the products across regions rather than the effect of concentration. Conversely, the exclusion of substitute products that are immediately outside the relevant market, could

influence the prices of the products in the market, no matter how concentrated the market is.

3.4.3.7. *Diversion ratios*

Diversion ratios provide a direct measure of the closeness of competition between products. The diversion ratio between product A and B is defined as the percentage of lost sales of product A which are diverted to product B, should A increase its price. The higher the diversion ratio from A to B, the greater is the competitive constraint that B imposes on A. Suppose, for example, that by increasing its prices, the producer of A loses 100 units of sales. If 60 of these sales are captured by product B ($D_{AB} = 60/100 = 60\%$) and 20 by product C ($D_{AC} = 20\%$), product B can be considered a closer substitute for A than product C. Note that the diversion ratios between two products are not necessarily symmetric: Customers of product A might see B as the closest substitute, while customers of product B might consider A simply one of many possible substitutes.

When products are highly differentiated, diversion ratios are a more refined indicator of the likely effects of a merger compared to market shares. In a market for undifferentiated products, they may simply be proportional to market shares. Using the previous example, suppose that the producers of A and B have market shares of 15% and 10% respectively. Looking at the combined market share, the merger does not seem to raise competitive concerns. However, if product B is a close substitute of A, it is likely that the share of sales diverted to B in case A decides to raise prices will be higher than 10% and the diversion ratio tells us by how much (in the previous example 60% of the sales). In general, for any two products brought under common control by a merger, the higher the diversion ratios, the more likely is a significant harm to competition.

See Annex: Case study EU - COMP/M.6497 - Hutchison 3G Austria / Orange Austria

Formally, the diversion ratio from A to B is calculated as the ratio between the cross-price elasticity between products B and A (i.e. responsiveness of volumes of B to price changes in A) and the own-price elasticity of product A. To calculate diversion ratios accurately, precise elasticity estimates may be required, but these are not always available (or possible to compute econometrically). Diversion ratios can be calculated in other ways. Alternative sources are consumer surveys which ask consumers to which product they would switch in case of a price increase or, more frequently, in case their best preference would not be available. When survey data are used, it is important to assess the objectivity and the representativeness of the survey, namely that a representative sample of consumers participated in the survey and that questions are correctly formulated and not misleading. Also internal documents (see section 3.4.2 above) as to where their customers are lost when they purchase a substituting product away could be used to estimate diversion ratios.

Diversion ratios alone, however, do not provide proof as to the likelihood and degree to which prices may rise following the merger. Additional information is required for such analysis, in particular, the margins of the products concerned, product repositioning, and efficiencies. Information on diversion ratios and margins can be combined to assess the likelihood of a price increase post-merger (see upward pricing pressure (UPP) analysis and critical loss analysis below, also discussed above in section 3.2.2.).

3.4.3.8. *Upward pricing pressure measures*

Upward pricing pressure (UPP) (see Glossary) assesses the incentive to raise price due to the “diversion effect” as explained above and the incentive to reduce price due to cost savings. The UPP test thus evaluates the net effect on pricing incentives.

UPP measures are built upon diversion ratios, but require an additional piece of information, data on merging parties’ margins. Both high diversion ratios and high gross profit margins can suggest that there may be competition concerns. They can also be combined to provide different measures of upward pricing pressure (as set out below). These measures can be used as initial indicators on whether a merger may raise competition concerns. It is also important to take account of how merger-specific efficiencies can lead to downward pricing pressure and entry or repositioning. These efficiencies can either be considered alongside these UPP measures (see section 3.8) or incorporated directly into the analysis. There are different measures of upward pricing pressure (see Glossary).

The appropriateness of undertaking this type of analysis will be case-dependent and the UPP measures must be assessed in the context of all other qualitative and quantitative evidence obtained. It is important to understand the underlying assumptions behind the UPP measures and the competition authority must be satisfied that these are reasonable for the industry under consideration.

See Annex:
Case study Italy - Simmental/Manzotin
Case study UK - ME/3777/08 CGL/Somerfield

3.4.3.9. *Critical loss analysis*

Critical loss analysis (see section 3.2.2) can also be used to assess the ability of the merged firm to raise prices unilaterally. While in the context of market definition, the critical loss analysis assesses the effect of the loss of competition among firms in a candidate market, in the context of unilateral effects the analysis is used to assess the effects of the loss of competition between the merging firms. Diversion ratios from the merging firms' to their competitors can be used to estimate the actual loss.

When considering the ability of the merged firm to raise prices unilaterally, a number of adjustments to the critical loss analysis must be made. Since unilateral effects are considered, it is not a hypothetical monopolist we are concerned with, but rather the merged firm with at most a competitive fringe (i.e., price-taking firms competing with the merged firm). While the calculation of critical loss is much as it was above (requiring the measurement of contribution margins), the calculation of actual loss is more involved. The increase in price by the (merged) firm will generally result in its rivals increasing production, so the residual quantity demanded from the (merged) firm falls with an increase in price both because of the decreased quantity demanded (a shift along the demand curve) and because of the increase in the quantity supplied by its competitors. Thus, in order to get an estimate of whether such actions would be profitable, an estimate of the reaction curves of the remaining competitors to a price increase is needed in addition to the estimate of demand elasticity. At least in the short-run, this will depend, among other things, on the amount of excess capacity available to the fringe firms (see section 3.4.1).

All of the above discussed analyses assume that a post-merger price increase would not cause any new entry or product repositioning. However, the reactions of competitors and customers might well offset the presumed negative effects of the merger. In addition, efficiencies can offset the potential increase in price. The assessments of these elements can be analysed and taken into account by the more advanced quantitative techniques described below. Sections 3.6-3.8 provide further insights on how countervailing buyer power, entry and efficiencies might offset or outweigh anticompetitive unilateral effects.

3.4.4. Advanced quantitative techniques: demand estimation and merger simulation

Simulation aims at modeling the functioning of the industry under investigation in order to directly predict the effect of the merger on the relevant parameters (prices, quantities, or other parameters). Simulation may be useful at later stages of an investigation and it proves most helpful when the balancing between anti-competitive and pro-competitive effects of a merger is particularly ambiguous. Simulation also allows evaluating the effects of potential divestments. Merger simulation requires information on consumer substitution patterns and a model of competition.

Simulation requires econometric expertise: models rely on a number of restrictive assumptions that should be well understood if an adequate model specification is to be found and if results are to be interpreted correctly. Results from a simulation exercise should be consistent with the other evidence gathered through the merger enquiry (market investigation, internal documents, simpler empirical analyses, etc.).

To simulate the effects of a merger, assumptions are made about the industry demand curve and about competitors' cost functions. The simulation process includes: specification of a demand function that describes the relationship between prices and quantities sold in the relevant market; specification of type of competition on the supply-side (**Bertrand competition** or **Cournot competition** and extensions in case there are capacity constraints); and simulation of the new equilibrium adjusting the data to the post-merger scenario (i.e. assuming that the two merging firms are under common ownership). The new equilibrium incorporates the reactions by rivals and efficiencies by the merger, if they can be substantiated. Hence, merger simulation directly quantifies the price increase (or decrease) that can be expected from the merger.

Estimating demand function

The first step in merger simulation is to specify a demand function that reflects consumer behaviour, i.e. how consumers react to price changes. Demand estimation alone can provide insights on the possible effects of the merger. Indeed, demand estimation allows the estimation of own-price elasticities and cross-price elasticities between the products of all the competing firms in the market using econometric analysis. **Own-price elasticities** (see Glossary) are important in order to identify the effect of a price increase post-merger on overall demand, while cross-price elasticities indicate the extent to which the merging firms' products are substitutes. Demand estimation can also be used to calculate the efficiencies (in terms of cost reductions) that would be necessary to avoid a price increase post-merger.

Demand can be specified to be of a number of functional forms, each with strengths and weaknesses. Some demand systems (e.g., AIDS) allow for greater flexibility and complexity in modeling but they may not be able to produce results (estimation of demand elasticity) if the model contains many parameters and requires a lot of independent variation in all products' prices (the so-called identification problem). Other demand systems make assumptions about consumer substitution patterns that, by construction, will generate plausible elasticity estimates (e.g., logit models always have positive cross-price elasticities), however, at the cost of imposing structure that may be rejected by the data. In addition, an expert practitioner should check the sensitivity of the results to the choice of demand system.

The most frequently used demand models are: linear, log-linear, logit, nested logit, and Almost Ideal Demand System (AIDS).²⁸ Logit demand and linear/log-linear demand have the advantage that they are easy to calculate. While the models have the problem as identified below, the reason these models are used is simplicity.

3.4.4.1. Linear and log-linear functions

The simplest models of demand are linear or log-linear functions.²⁹ They express the demand for a product as a linear or log function of its price and the prices of other products and control variables. Regression analysis is commonly used to estimate own-price elasticity and cross-price elasticities as coefficients of the variables "price" and "price of competitors". This log-linear model is often criticised because it assumes constant elasticities of demand, i.e. that elasticities are the same along all points of the demand curve. Since the merger affects prices, the demand elasticities may also change as prices change. In many models of demand, if prices rise, the elasticity is expected to rise as well, because consumers become more price-sensitive (i.e. the elasticity varies along the demand curve). Therefore, assuming constant elasticity, the merger simulation may over-estimate post-merger price rises.

3.4.4.2. Logit and nested logit model

The logit demand model is based on a discrete choice model: consumers are assumed to choose among a finite number of alternative products depending on the price and the characteristics of these products. In particular, the utility that a consumer derives from a product depends on observed product characteristics, including price as well as other unobservable attributes. Demand parameters can be estimated using logit/probit regression models. The model requires the calculation of market shares and therefore postulates market definition. The biggest limitation of the logit model is that it assumes that products are equally close to each other and that consumers react to a price increase by switching in proportion to the relative market shares of the products (the so called "Independence of

²⁸ A detailed description of these models goes beyond the scope of the Handbook. For more information see the Bibliography.

²⁹ The linear and log-linear demand functions provide respectively a lower and upper bound of the set of demand models. It should be noted that the linear demand function is more favourable to merging parties while the log-linear demand function is typically more biased towards the view of the opponents to the merger: see Crooke, P., Froeb, L. e Tschantz, S., "Effects of assumed demand form on simulated postmerger equilibria", *Review of Industrial Organization*, 15 (2009) 205-217.

Irrelevant Alternatives” assumption).³⁰ However, if substitutability is based on market shares, the merger simulation exercise will add little value to the simple assessment of market shares.

The nested-logit model partially addresses the problem by taking into account different degrees of substitutability between products. In particular, products are grouped in nests so that substitution within nests is higher than substitution between nests. This means that a consumer is more likely to switch to products within the same nest if the price of his/her first choice rises. Since the Independence of Irrelevant Alternatives assumption holds only within a nest, the nested logit model is more flexible and is likely to provide more realistic results than the simple logit model. However, more assumptions need to be made (which are the relevant nests, i.e., which are the most important dimensions of product differentiation, and which products go in which nests). If the assumptions are wrong, the results of the simulation will be biased. Additionally, when products can be classified according to different criteria, the order in which criteria are used to define the nests significantly affects the results of the model.

See Annex:
Case study EU - COMP/M.5658 – Unilever / Sara Lee Body Care

3.4.4.3. *Almost ideal demand system (AIDS)*

The AIDS model relates the market share of a product to the logarithm of the prices of all products in the market and the real expenditure in the market (total expenditure³¹ divided by a price index). Consumers first choose how much they will spend in the top level, i.e., on a type of product, based in part on the prices of this type of product. Then they choose which brand or model to purchase based on price and other observable characteristics of the brand. And so on (additional levels can be added to the model). Regression is used to estimate the parameters, namely own- and cross-price elasticities. The AIDS model allows a flexible representation of the own- and cross-price elasticities and provides a more direct answer to the closeness of competition between the merging parties’ products than (nested) logit models. However, the model requires the econometric estimation of a large number of parameters (for N products, N² parameters). Therefore, in practice the model can only be used when a large data set is available, for example supermarket scanned data over a lengthy time-period. The key problem with AIDS is the large information requirement: because demand is allowed to be very flexible the econometrician needs lots of independent variation in prices to identify demand. Because this rarely happens in practice, AIDS models often generate poor estimates (e.g., wrong signs on cross-price elasticities).

See Annex:
Case study Canada - Commissioner of Competition vs Superior Propane
Case study EU - COMP/M.5046 - Friesland Foods/Campina

Other case studies can be found in OECD, [Economic Evidence in Merger Analysis, Policy Roundtables](#), 2011. See for instance: case studies from New Zealand (p. 197), European Commission (p. 256-257), South Africa (p. 284, paragraph 3.2.1).

³⁰ Put it in another way, the model assumes that consumers’ choice between two alternatives is not affected by the number/characteristics of the alternatives they could choose from.

³¹ It is typically assumed that the expenditure on a particular set of products is fixed.

Another problem with the AIDS approach is price endogeneity, i.e., the price contains information about both the demand shocks and the supply shocks, which make it impossible to produce estimates. In such cases, experts typically have a solution (the instrumental variables) but applying the solution to AIDS is not easy since it requires obtaining a valid set of additional variables and it is perhaps among the weakest points of this demand approach.

Estimating supply function

The supply-side (cost functions and competitive interaction between firms) is typically modeled assuming **Cournot competition** (in case of homogeneous products) or, most commonly, **Bertrand competition** (in case of differentiated products). With Cournot, firms choose output to maximize profits, holding other firms' outputs fixed. Most simulation studies assume that marginal costs linearly increase with supply or that they are constant. With Bertrand, firms set prices, given prices and characteristics of other firms. Prices, quantities, own and cross-price elasticities are used to infer the empirical marginal costs of the firms pre-merger.

When demand and supply are specified, the model is run to compute the post-merger equilibrium. The new equilibrium shows how prices and quantities would change after the merger, assuming that the demand function and the type of competition stay the same and firms do not collude. The estimates already take efficiencies and reaction of the competitors into account.

The results of the simulation exercise crucially depend on whether the demand function and the firms' behaviour have been correctly specified. To the extent the competitive aspects of the market are not accurately represented as Cournot or Bertrand competition, resulting estimates of the effect of the merger will be wrong. It is important to determine what model of behavior best fits the market and whether this is likely to change post-merger. The fit of a model must be evaluated on the basis of the totality of the evidence. Results must be then checked for robustness, i.e., it must be tested how the results would change if alternative scenarios and assumptions are used. Section 4 deals with robustness tests, as well as statistical techniques to deal with measurements errors, outliers, missing observations and sample selection problems.

3.5. Coordinated effects

Coordinated effects (see Glossary) are less common to arise in a merger than are unilateral effects.³² Coordinated effects arise when a merger changes market structure and conditions such that post-merger it becomes easier and more likely for existing firms in the market to collude, i.e., align or coordinate their behaviour in an anticompetitive way instead of competing effectively against each other (see also **collusion** in the Glossary). Coordinated interactions may consist of explicit agreements or of actions by a group of firms, whose pricing and output decisions impact each other and result in counter response, that are coordinated as if they were a cartel with or without an explicit or overt agreement.

³² Asserting one theory does not necessarily foreclose the other: in some cases, a competition agency may want to assert both a coordinated effects and a unilateral effects theory.

To be sustained over time, such successful coordination requires a certain degree of ‘stability’ both inside and outside the group of coordinating firms. The ‘internal stability’ is determined by looking at the presence of three conditions in the market:

1. whether the coordinating firms are able to establish terms of coordination (or ‘focal points’);
2. whether the participating firms are able to monitor each other’s adherence to the terms of coordination and to detect deviations from the established terms; and
3. whether effective deterrence mechanisms exist to discourage and effectively discipline deviation from the terms of agreement by coordinating parties.

The ‘external stability’ depends on the general market conditions and the potential reactions to the coordinated behaviour from non-coordinating competitors, potential new entrants and buyers. Evidence of past coordination is important and may serve as strong evidence that all the conditions for internal and external stability of successful coordination are present if the relevant market characteristics have not changed appreciably or are not likely to do so in the near future. The case team should understand how the merger *changes* the ability of firms to come to agreement, monitor that agreement, and punish deviations from that agreement.

While a description of the conditions and elements affecting both internal and external stability can be found in other ICN documents³³, the terms of coordination or focal points are addressed below.

As stated above, the first condition for the internal stability of coordination may be that the firms in the market are able to allocate the market amongst themselves and achieve an understanding on how to do so. Such an understanding among firms does not have to state how customers will be harmed or what price and other terms customers will be offered but only needs to provide a ‘focal point’ that ensures firms know the allocation and so competition for customers is restrained. Some of the potential focal points for dividing the market include:

- **Price/Output Focal Point**

If a price or output level is chosen as the focal point, this may be based on an understanding that the current market shares are to remain constant in the coordinated period. Non-price factors may need to be kept constant to limit other incentives for customers to change supplier while all firms increase price. Selecting a price or output target may be difficult because the optimal target may vary over time (e.g. with cost or demand shocks), and firms could disagree on the desired price based on their differing costs. Punishment of a deviation usually affects all firms in the market even if only one firm was responsible for the price cut.

- **Geographic Focal Point**

If the same firms compete across many local markets, but each of these markets have different competitive conditions, firms could develop an understanding to limit the extent of actual competition in some of those local markets. An industry is

³³ For internal stability: see [ICN Merger Guidelines Workbook](#), p. 47-50, and [ICN Recommended Practices for Merger Analysis](#), RP IV, B, pp. 23-25. For external stability see: [ICN Merger Guidelines Workbook](#), p. 50-51, and [ICN Recommended Practices for Merger Analysis](#), RP IV, C, pp. 25-27.

particularly vulnerable to this where some local markets have only one major or national operator. The other major operators would face some fixed costs to entering into these local markets or may find that local demand is not enough to support additional large operators in the long term.

A market allocation based on geographic focal points may be much more obvious to competitors and so more prone to tacit agreement, and more transparent when being monitored. The focal point may merely be that the current split of local markets should be maintained with the main players in the future avoiding entry into the others' areas. Reaching such understanding may be easier if the current geographic allocation is relatively stable. If there is a deviation from a geographic allocation (i.e., a coordinating firm enters into an area reserved by another coordinating firm), then the deviating firm can be easily identified. Punishment can be targeted at that firm by entry into a local market that is particularly profitable to the firm that deviated. This limits the costs of the punishment to the punishing firm(s).

- **Customer Focal Point**

Another aspect of competition in a market that may be very stable and transparent is the key customers served by each firm. In certain industries, some of the largest customers will have long term relationships with their suppliers, and these entities may even be the sole suppliers. It may be easy for firms to arrange not to compete for key customers. Such an understanding may not require an explicit or written agreement.

When a customer is lost it may be possible for the firm to detect which competitor has won the customer and target that firm for punishment in which tailored offers are made to specific customers. This punishment does not have to harm other firms and coordination in the rest of the market. Further, it can be done with minimal additional capacity because a firm that has lost a major customer may need only to target new sales to customers of the firm that deviated.

Other focal points (e.g. market segmentation) are possible but may require specific investments which make the threat of retaliation or punishment less credible.

From an economic analysis perspective, in order to determine if the industry under consideration is vulnerable to coordination around one of these focal points, it will first be necessary to determine which potential focal points may be transparent to the firms and could be the basis of coordination. For instance, markets where firms or industry associations regularly publish individual or market wide transaction prices or output could be susceptible to the price focal point, though it may depend on how current the pricing information is. Sectors where local markets are served by a limited number of national/regional competitors who meet regularly could be considered for the geographic focal point. Homogenous product industries, with large customers who tend to keep the same (potentially single sourcing) supplier for long periods, may be more likely to be vulnerable to the customer focal point. All of these are more likely to raise concern about coordinated effects in mergers that significantly increase concentration and general

transparency (such as a merger that only leaves two firms), and in markets where there are few external constraints (such as potential entry or imports).

Once the focal point has been identified, it is necessary to examine how stable the current allocation is based on this focal point, and whether the market appears to exhibit existing coordination. Any situations where the (potential) coordinated outcome appears to have been violated by the actions of the suspected firms should be examined. It is important to check whether the target company in the merger was the deviator, i.e., acted as a maverick, playing a disruptive role in the market to the benefits of consumers. For instance, the target firm was a leader for its price cutting policies or had a new technology, or it was not a member of a trade association where the geographic allocations were agreed or did not face a threat of punishment because it did not have geographic areas at risk or it had long term contracts with customers. In addition, it is also important to check whether there appears to have been some sort of punishment. Punishment would include targeted entry that mostly harms the specific firm that started the deviation. This is different to a more pro-competitive reaction to a loss of sales that may be spread across many markets where the firm believes it can expand profitably and does not target any particular competitor.

Other market conditions that may be relevant in assessing the likelihood and stability of a coordination around a focal point may include, but are not limited to, the following factors:³⁴

- the existence of frequent and regular orders, which make it easier to coordinate and to detect deviations from the terms of coordination;
- the homogeneity of the firms, especially in terms of symmetry of market shares, similarity of cost structures, levels of vertical integration, and the impact that such homogeneity may have on their ability or incentives to coordinate;
- the presence of Most Favoured Nation (MFN) clauses: they can mean that pricing is more transparent because customers check that others do not receive lower prices. This makes monitoring easier for competitors. A MFN clause policy can reduce the incentive to break a coordinated outcome by requiring lower prices to be offered to all customers and not just the customers that a firm attempts to win from competitors;
- excess capacity: some excess capacity may be required for deviation (in terms of attempting to sell additional volume) so if firms do not have any excess capacity they do not appear to be constraining their competition through coordination. Larger amounts of excess capacity allow firms to punish competitors and respond to any deviation by reducing the market price; and,
- other market conditions: for instance, it is easier to coordinate on price when demand and supply conditions are relatively stable than when they are frequently changing (e.g., because of the ease of entry by new firms or rapid, significant product innovations).

The fact that a market satisfies a set of the above factors (or has been stable based on certain focal points) in itself is not sufficient to conclude that a merger is likely to further or enhance coordination. The above elements are helpful in informing the theory of harm

³⁴ See also 'Collusion' in the Glossary and [ICN Recommended Practices for Merger Analysis](#), RP VI, B, Comment 2.

under investigation and should fit in a coherent way with the particular facts of the investigation.

See Annex:

Case Study South Africa: Investec Bank / RJ Southey Merger

Case Study UK: OFT inquiry into the Anglo American/Lafarge aggregates and cement merger in the UK

Other case studies can be found in OECD, [Economic Evidence in Merger Analysis, Policy Roundtables](#), 2011. See for instance: case studies from Israel (p. 153-155), European Commission (p.246-247).

3.6. Countervailing buyer power

The competitive pressure on the merging parties is not only exercised by existing and potential competitors but can also come from its customers if they possess countervailing buyer power.

Buyer power (see Glossary) concerns how customers (or downstream firms) affect terms of trade with sellers (or upstream suppliers). If relevant, it typically arises in the context of intermediate markets. The effects of buyer power depend on how sellers and buyers meet and trade (see Glossary). Buyer power is beneficial, i.e., countervailing, when it constrains the exercise of sellers' power in the market.³⁵ It can also be beneficial if it helps only some customers.

In general, the source of buyer power of the customer is due to several factors including: (i) the size and sales volume of the firm; (ii) the commercial significance of the customer to the seller; (iii) the ability of a customer to credibly threaten to switch to alternative suppliers within a reasonable timeframe; (iv) the ability of the customer to refuse to buy products produced by the supplier or (in the case of durable goods) delay purchases; (v) the capability of a customer to vertically integrate to a supply position (vi) the ability of the customer to directly import the products or (vii) the ability of a customer to sponsor entry. Each of these factors, thus, needs to be assessed.

Even where a market is characterised by customers who are larger than the suppliers, it does not necessarily follow that there will be countervailing buyer power. It is important to understand the choices available to buyers and how those choices would likely change due to the merger. Normally, a merger that eliminated a supplier whose presence contributed significantly to a buyer's negotiating leverage will harm that buyer, even if the buyer had been powerful enough to obtain very good terms pre-merger. Therefore in considering the alternative suppliers that a buyer could switch to, it is important to assess amongst other factors: (i) the supplier's capacity to absorb additional demand or to expand capacity with relative ease; (ii) the supplier's ability to deliver on the desired quality required by the customer; (iii) the types of products supplied by the competitors on the upstream market and (iv) the number of competitors that would be in the market post-merger. The analysis also has to take into account various costs to the customer associated with switching suppliers as well as costs for vertical entry by the customer or expansion into the upstream market (through sponsoring small or new entrants).

³⁵ The concept of buyer power is different from the concept of monopoly power. See 'Buyer power' and 'Monopsony power' in the Glossary and OECD, [Monopsony and Buyer Power, Policy Roundtables](#), 2007.

In a market where some of the customers have countervailing buyer power, a merger may result in increased prices for those other customers with less countervailing buyer power. In this case, it is important to analyse whether the countervailing buyer power of some customers will be sufficient to protect all customers in the market post-merger. For instance, in markets where individual negotiations between supplier and customers occur, it is likely that any countervailing buyer power possessed by the individual customer will not protect other customers. There may still be pressure to cut prices to those customers if not doing so would limit their competitiveness downstream with the firms that were able to negotiate a lower price. On the other hand, in markets where there is no price discrimination, the countervailing power of one customer may protect the other customers, thus ensuring that post-merger the merging parties do not raise prices. In markets where the competitor is also a customer of the merging parties (for example, retailers selling private-label or branded products competing with the merging parties' products), a customer with buyer power would be able to seek favourable trading terms from its supplier to maintain profitability. The supplier is thus likely to earn smaller profit margins on products sold to customers with countervailing buyer power than to those with no countervailing buyer power.

Evidence that may be useful for the analysis includes information related to:

- examples of cases where customers have previously sponsored entry or vertically integrated;
- documentation indicating that customers have considered sponsoring entry or vertically integrated and that such a strategy is viable; and
- documentation indicating that customers have previously successfully resisted attempts by supplier(s) to raise prices, pre-merger, unless this was due to the competition between the two merging firms.

3.7. Entry, expansion and repositioning

The assessment of entry of new firms, expansion and product repositioning by existing competitors is an integral part of the analysis of whether a merger is likely to harm competition significantly.³⁶ Entry, expansion and repositioning may occur as likely responses from others (competitors, potential competitors and customers) to the merger, i.e., as a result of the post-merger competitive situation. They may also occur independently of the merger, in which case they are properly considered in the counterfactual analysis.³⁷

Entry, expansion or repositioning which occurs quickly and without any significant sunk investment can be considered at the stage of market definition (see section 3.2.1). Responses involving significant sunk costs and occurring within the foreseeable future require a more in-depth assessment. This could also be considered at a later stage of the merger investigation, when designing effective structural remedies (e.g., divestitures).

³⁶ See [ICN Recommended Practices for Merger Analysis](#), recommended practice VII. A and related comments, p. 28.

³⁷ See [ICN Merger Guidelines Workbook](#), paragraph E.3, p. 53.

3.7.1. Types of entry

The assessment of entry requires an understanding of the relevant market in question (e.g., homogenous product markets vs differentiated product markets, consumer product markets vs input markets) and the underlying competitive environment (i.e., unilateral and/or coordinated effects, see sections 3.4-3.5). While expansion might occur in a homogenous product market and repositioning in a differentiated product market, de novo entry can happen in either setting. Examples of entry would also include customers sponsoring a new entrant or customers deciding to make their own input so that they can credibly threaten not to buy from the merged firm.

From an investigative point of view, entry analysis usually starts by considering what has to be done to replicate the business of one of the merging parties. In this perspective, it might be helpful to list the specific types of entry that may occur. For instance, in a relatively homogenous product market, a response can assume the form of a full-scale or full-line product entry, or, alternatively, a niche entry into the fringe market. In a differentiated product market, there can be different approaches to entry, each of which may require a separate analysis. For example, the merging parties may compete with significantly different resources and an entrant could imitate either entity. Moreover, existing competitors of the merging parties could use different strategies to compete and these could also be duplicated by a new firm. Entry in differentiated product markets may also involve a fringe entity investing new resources to build an ability to compete with the incumbents at the core of the market, exploiting economies of scope.

3.7.2. Assessing likelihood, timeliness and sufficiency of entry

In order to be effective, entry should be timely, likely, and sufficient. Various factors are relevant in the assessment of the timeliness, the likelihood and sufficiency of entry.³⁸ While the timeliness and the likelihood analysis may be required for each form of entry, the sufficiency assessment may entail an analysis to evaluate the impact of all the potential forms of entry that are found to be both timely and likely to determine the impact of entry on the competitive effect of the merger. In fact, each form of entry could be insufficient when considered by itself, but when taken together, the overall effect of entry might deter or counteract the anti-competitive effect.

The most commonly used evidence for assessing the three aspects of entry include, but are not limited to:

- Instances of actual entry³⁹ can be scrutinized to understand not only the ease of entry into (and exit from) the industry, but also to identify the market conditions that led to entry. Studies of past entry behaviour can lead to a better understanding of why the merger is taking place (e.g., the optimal size of the firm has increased over time), and of the effect such entry or exit had on market performance. Therefore, history of entry can be a relevant direct indicator of whether barriers or obstacles to entry are hindering entry. There are different types of barriers or obstacles to entry, including: (i) absolute barriers such as

³⁸ Factors to assess the three criteria are illustrated in: [ICN Merger Guidelines Workbook](#), paragraphs E.7 – E.16, p. 55-59, and [ICN Recommended Practices for Merger Analysis](#), RP VII. B and related comments, p. 28-29.

³⁹ For a more detailed discussion, see: [ICN Merger Guidelines Workbook](#), paragraphs E.10-E.14, pp. 57-58.

government regulations (e.g., licensing or intellectual property rights); (ii) structural barriers such as scale economies, sunk costs, access to essential inputs (e.g., natural resources), superior technology or distribution network; (iii) strategic advantages such as reputation, excess capacity and endogenous sunk costs (e.g., expenditure in advertising and R&D).⁴⁰

- A profitability analysis⁴¹ may be useful in establishing whether entry is economically profitable at pre-merger prices. Profitability depends upon (a) the output level the entrant is likely to obtain, accounting for the barriers to entry facing new entrants; (b) the price an entrant would likely obtain in the post-merger market, considering the impact of that entry itself on prices; (c) the cost per unit the entrant would likely incur, which may depend upon the scale at which the entrant would operate; and (d) the estimated fixed investment costs.
- An estimation of the minimum viable scale (MVS, or minimum efficient scale) of an entrant may be necessary to establish whether entry is likely.⁴² The MVS is the smallest level of annual sales the potential entrant must obtain for its capital to be adequately remunerated. Entry is likely if the MVS is smaller than the sales potentially available to an entrant (sales opportunities) in the market at the pre-merger prices. However, if entry at MVS is likely to depress post-merger prices below the competitive level, the entrant may not be able to cover investments and exit the market in presence of significant sunk costs. Estimates for MVS may be obtained from the analysis of the history of rivalry in the relevant market, or from available industry studies.⁴³
- The presence of excess capacity in the relevant market makes entry less likely. Excess capacity may act as a threat to any firm considering entering since incumbent firms would be able to increase output and make it more difficult for the entrant to recover its entry costs. It is also possible that incumbent firms could respond to new entry by investing in excess capacity to deter further entry. An indicator of excess capacity can be the ratio of the total capacity of the merging firms over their total sales. It is necessary to check whether existing excess capacity is significantly more costly to operate than capacity currently in use. In such cases, the excess capacity is less likely to affect entry.
- Information about past and expected market growth may also be an indicator of the likelihood of entry. Generally, in a market that has experienced recent growth which is expected to continue, new entry is more likely. In contrast, a shrinking market where suppliers face increasingly reduced margins can be expected to attract less new entry. An indicator of market growth is the average annual market growth calculated from the total value of products sold by relevant market. Other evidence must support that growth will continue in the future.

⁴⁰ For more on barriers to entry, see [ICN Merger Guidelines Workbook](#), paragraph E.8, pp. 56-57, and [ICN Recommended Practices for Merger Analysis](#), RP VII. B and comment 2, p. 28.

⁴¹ Generally, profitability models use net present value of the investment to determine the profitability of entry. Positive cash flows are built up from revenue and cost data. Then future earnings are discounted back to the present with an estimate of the cost of capital.

⁴² Scale considerations can affect not only the likelihood but also whether entry is sufficient nature, scale and scope to compete effectively with the merged entity.

⁴³ In addition, the profitability models can compute the break-even level of sales, which can be used to calculate the MVS.

See Annex:

Case study Brazil – TAM-LAN (Case 08012.009497/2010-84)

Case study Brazil – Coca-Cola Company acquisition of Mate Leão (Case 08012.001383/2007-91)

Case Study EU - Ryanair/Aer Lingus (Case COMP.4439)

Case Study NL – Netherlands Authority for Consumers and Markets – KPN/CAIW (Case 7204)

Other case studies on entry, expansion and repositioning can be found in: [ICN Merger Guidelines Workbook](#), p. 60; and pp. 95-96; and [Commentary to Horizontal Merger Guidelines](#), pp. 37-47.

3.7.3. Expansion

Expansion by existing suppliers can occur as investment in new capacity, conversion of existing capacity to a new use, extension of the product line, or increase of the frequency of the services provided.

The ability of existing competitors to expand capacity in response to an output restriction by the merging parties (so to benefit from a price rise) might be limited by barriers to expansion: e.g., the existence of capacity constraints, adding new capacity with significant sunk costs, the existing excess capacity is more costly to operate than the capacity already in use.

This inability to expand capacity is most likely to be problematic where products are homogenous, but it may also be important when suppliers offer differentiated products. For instance, competitors in a low-value segment of the market may not be able to expand into the high-value segment where merging parties operate since the former might lack some requisites highly valued by the customers (e.g., capability, capacity, industry reputation and experience). Therefore these competitors may not be able to constrain a short-run exercise of market power.

The merging parties may themselves have the ability to hinder expansion by competitors, for example as a result of controlling or influencing essential inputs, access to distribution channels, access to intellectual property rights (e.g., patents, brands).

The criteria for assessing entry (likelihood, timeliness and sufficiency) are also valid for evaluating expansion and repositioning.

3.7.4. Repositioning

Product repositioning can consist of investments in marketing and product design to reposition existing brands so that they compete more with those of the merged firm.

Mergers in differentiated product markets may result in the merged firm repositioning their products after the merger. Rivals' response to the merged firm repositioning may vary according to the merged firm's actions. For instance, if post-merger the merged entity increases the differentiation between the merging parties' products, their rivals may then reposition their products between those of the merged firms. If so, post-merger product

repositioning increases variety but the net effect of product repositioning on prices may be uncertain.⁴⁴

In some markets, it may be relatively easy and not too costly for competitors to reposition their products. However, product repositioning may entail risks and large sunk costs and may be unprofitable.

An explicit consideration of repositioning in assessing competitive effects (see sections 3.4-3.5) may be useful if the quantitative indicators used for the competitive effects analysis do not account for it (see section 3.4.3). Estimates of these indicators may be difficult to obtain in the context of frequent product repositioning or endogenous repositioning (i.e., when it occurs in response to shocks in demand that also affect pricing). If repositioning is common, however, there may be a greater reason to credit it as a possible offset to competitive effects concerns.

3.8. Efficiencies⁴⁵

Efficiencies may broadly be characterised as supply-side efficiencies and demand-side efficiencies. Supply-side efficiencies arise if the merged firm can supply its products at lower cost as a result of the merger. Common examples of supply-side efficiencies are cost reductions such as economies of scale (from having a larger scale of operations), economies of scope (e.g., from the joint supply of different products), more intensive use of existing capacity, synergies that enable more efficient production processes or working methods of one or both of the merging firms. These efficiencies result in reductions in marginal (short-run variable) costs, which are likely to stimulate price competition in the short term, and they can also affect fixed costs and transportation costs, which may play an important role in price competition in the longer-term. Fixed cost savings might also result from elimination of redundant capacity, reallocation of production among plants and capital investment avoidance. They might also encompass pro-competitive changes in the merged entity's incentives, for example by capturing complementarities in R&D activity, which in turn might increase incentives to invest in product development in innovation markets.

Demand-side efficiencies arise if the attractiveness to customers of the merged firm's products increase as a result of the merger. Common examples of demand-side efficiencies include increased network size, product quality or extension of brand name capital to new goods, one-stop shopping or joint marketing opportunities.

The treatment of efficiencies in merger review is highly complex. Efficiencies need to be validated against a test that aims at checking their verifiability, their merger specificity and importantly their pass-on to customers. These elements and especially the last one are necessary to answer the fundamental question when assessing efficiencies in otherwise

⁴⁴ When merging parties, e.g., firm A and firm B, are each other's closest competitors, then a post-merger price increase in A is likely to be profitable because a large portion of customers who switch from A will move to B. Now suppose that firm C repositions its product C between A and B. If A raises its price, some of the sales that would have gone to B are now diverted to C, and this price rise may be unprofitable depending on how successful the product reposition of C turns out to be.

⁴⁵ See: [ICN Merger Guidelines Workbook](#), Worksheet F, pp. 61-63.

anticompetitive mergers on how efficiency gains are weighed against anticompetitive effects.

3.8.1. Broad theoretical considerations

Mergers can generate efficiencies and may increase rivalry in the market so that no adverse competitive effects would result from a merger. For example, this could happen where merging firms lower costs sufficiently.

Efficiency evidence is taken into account as part of the competitive effects analysis by investigating whether the economic incentives of the merged firm are actually to lower price rather than to raise it. This 'integrated' approach looks at the net effect of a merger on prices (and other indicia of competitive performance, for example, greater product innovation or improved quality). Efficiency evidence can also be used as a formal, legal defence if a merger is otherwise found to be anticompetitive. Also, the types of efficiencies to consider in the assessment vary among jurisdictions depending on whether the goal of merger review is consumer welfare or total welfare.⁴⁶ In the latter case, efficiencies other than those that are likely to be passed on to consumers (such as reductions in variable costs passed on in terms of lower prices) are also taken into account in the assessment.

3.8.2. Assessment of efficiencies in merger review

Most jurisdictions consider a set of cumulative requirements to take efficiencies into consideration. Efficiencies have to:

- be verifiable, i.e., only those efficiencies which are demonstrated to have a high probability of realization, are taken into account in the assessment;
- benefit consumers usually in the form of lower prices, increased quality or increased output: efficiencies that lead to reductions in variable or marginal costs are more likely to be relevant for the assessment of efficiencies than reductions in fixed costs, as they are more likely to result in lower prices for consumers; and,
- be merger-specific, i.e., not likely to be produced or available at as low of a cost absent the merger. The verification of this requirement entails the specification and possible quantification of alternative scenarios, i.e., different forms of non-merger cooperation between the companies such as joint ventures.

Evidence of claimed efficiencies is normally solely in the possession of the merging parties. Such evidence may include internal documents that were used by the management to decide on the merger, statements from the management to the owners and financial markets about the expected efficiencies, historical examples of efficiencies and pre-merger external experts' studies on the type and size of efficiency gains. This information is best obtained early on as part of the merger notification process. An economist can play a key role in understanding efficiencies by estimating, for example, pass through and reductions in transportation or production costs.

Efficiencies are often claimed in the form of increased ability of the merging parties to innovate successfully. This could occur in three ways: (i) through increased capabilities

⁴⁶ Total welfare is the sum of consumer welfare and producer welfare.

realized by combining complementary assets, (ii) a larger firm size may lead to greater ability to absorb risk and to fund R&D; (iii) from reduced competition and greater margins or product-market profits which can then be used to fund R&D.

Evaluation of efficiency benefits for innovation will likely turn on the analysis of whether the combination of complementary assets could not be otherwise obtained through a less anticompetitive alternative solution than the merger in question. Therefore, an analysis is needed to determine whether the parties need a merger rather than a research joint venture or some other form of cooperation that creates innovation benefits without removal of an effective competitor. In advancing efficiency arguments, parties should submit evidence in support of their claims.

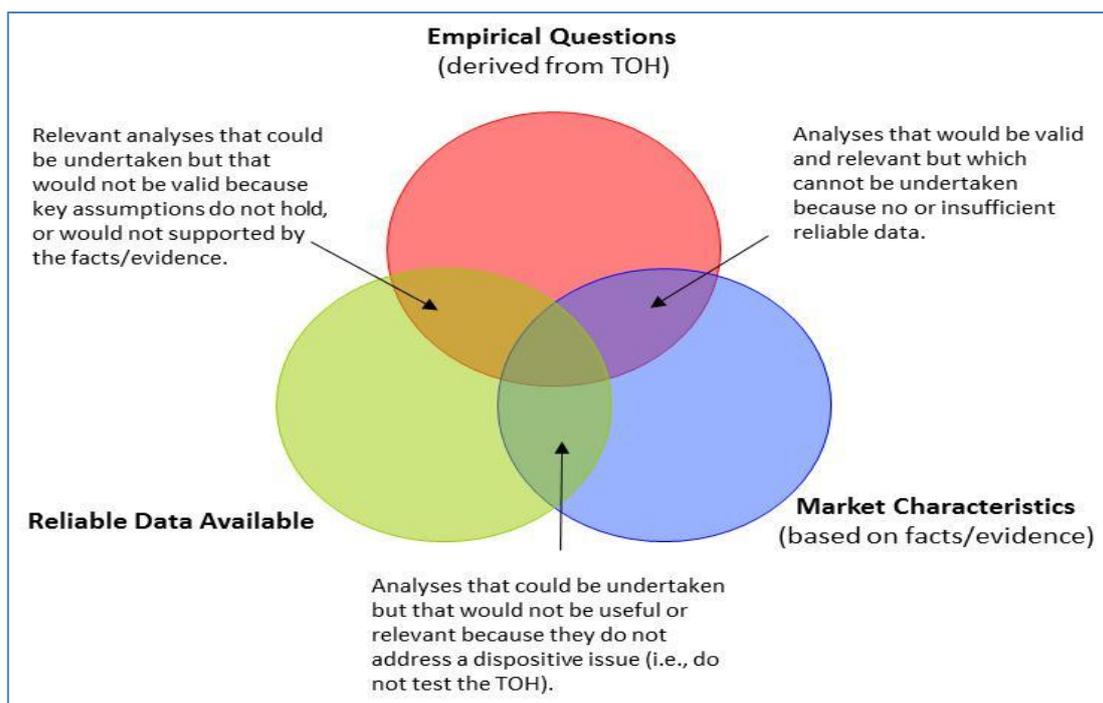
See Annex:
Case Study - EU: COMP/M.6166 - Deutsche Börse / NYSE Euronext
Case Study - South Africa: Trident Steel
Case Study - South Africa: Pioneer Hi-Bred / Pannar Seed

4. Requirements for a solid quantitative analysis

4.1. A solid quantitative analysis

The preceding sections have described in some detail the tools available in the “economist’s toolbox” for analysing the competitive effects of mergers. Stepping back from specific tools, this section aims to present some of the main elements of a solid quantitative analysis from a technical perspective.

A high-quality quantitative analysis typically satisfies five criteria: 1) it answers a well-defined empirical question that helps test a credible theory of harm (TOH); 2) the underlying assumptions of the analysis are consistent with the observed features of the market (market characteristics); 3) it uses a reliable dataset; 4) the results are robust (meaning they are not highly sensitive to small changes in assumptions or methodology that are equally consistent with the observed market characteristics); and 5) it is presented in a clear and coherent manner. Each of these elements will be addressed in greater detail below.



4.2. Defining a relevant empirical question

A necessary element in any quantitative analysis is the formulation of a well-defined empirical question. That question should be derived from the theory of harm, and relevant to a dispositive issue in the case at hand. It should be precisely stated so that the answer can be interpreted without ambiguity, and properly motivated taking into account the relevant theory of harm and the facts of the case.

For example, in a merger of firms A and B, an agency may wish to study the impact of various entry events – for example, instances where firm B has entered firm A’s market(s). The study could be motivated by firm A’s internal documents discussing the impact that firm B’s entry is having on competition. The relevant question might be framed as follows: “Has the entry of firm B resulted in a significant decrease in firm A’s prices?” The answer to this question could be informative in defining relevant markets or analysing the closeness of competition between the parties, or testing other aspects of the theory of harm. To the extent that the increase in competition observed from firm B’s entry is expected to be eliminated by the merger⁴⁷, the analysis could also be used to estimate the competitive effects of the merger.

4.3. Selecting an appropriate methodology

A second requirement is the selection of an appropriate methodology for answering the empirical question. Economic models are necessarily an abstraction and simplification of reality; therefore, the goal should not be perfection. However, as explained above, the underlying assumptions of the analysis should fit reasonably well with the features and facts of the market(s) in question (e.g., they should not be inconsistent with the weight of evidence found in company documents, market interviews, etc.).

⁴⁷ Of course such inferences should be properly motivated, for example with reference to company documents, economic literature, and any relevant domestic/international case precedents.

Continuing with the example described above, there are a number of ways in which the agency might try to estimate the effect of firm B's entry on firm A's prices. An initial step may be a simple comparison of firm A's average prices in the relevant market(s) over a six month period before and after the entry event(s). Though relatively simple to implement and understand, a drawback of this approach is that it assumes that any other factors affecting firm A's pricing (e.g., costs, demand-side factors, etc.) did not change over the relevant time period. In other words it attributes any observed price changes to the entry event(s) regardless of other potential explanations. Failing to control for these other factors may understate or overstate the effect observed.⁴⁸ Similarly, this might not be an appropriate methodology if the market is characterised by long-term contracts. In such a case, a longer time horizon might be required, or the agency may simply wish to focus on the effects observed for specific customers whose contracts expired over the relevant period.

The analysis will also typically be considered more reliable the more established the methodology is in the economic literature. A study based on a new or untested approach may carry less weight, however, economics and antitrust are constantly evolving disciplines and new techniques, provided they are sound, should not be rejected.

Lastly, the methodology chosen should be realistic in light of time and resource constraints and the technical capacity of the agency. A less intensive analysis that can be successfully executed should be preferable to one that is unlikely to be practically completed.

4.4. Ensuring a reliable dataset

A third requirement of a solid quantitative analysis is having a reliable dataset. This can be divided into three steps: (i) determining what data is available; (ii) ensuring that the data requested is reasonably tailored and economically relevant to the analysis; and (iii) "cleaning" the data once it has been obtained (see section 3.1).

When considering the data that is available, it can be useful to look at both public and non-public sources. Conversations with market participants and industry experts can help the case team learn what data is available and what sources are relied on in the industry for purposes of reporting and decision-making. It can be useful to engage in a dialogue with business representatives of the merging parties regarding their information management and reporting systems to understand what data they keep (and in what form), and the types of reports that they generate in the ordinary course. Often company databases are accompanied by "data dictionaries" or other manuals that describe the data that is kept and how it is structured; it can often be useful to request that these be provided early on to aid the dialogue with the parties and the crafting of information requests. It can also be useful to request small samples of the data to better understand what the output looks like and whether it will be useful for the intended analysis. To the extent that data is being requested

⁴⁸ One technique for addressing this type of issue is to use a "bottom-up" approach. For example, the agency may consider using simple models first and then engage in more refined empirical work if necessary in order to avoid bias. This will enable the agency to test whether the results are highly sensitive to model specification, and if so, to focus on the question of which model is most appropriate. This is discussed further in the subsection dealing with robustness checks.

from multiple sources (e.g., from the parties and third parties), thought should be given to how the data will be combined in a way that ensures apples-to-apples comparisons.

Recognizing that merger analysis often requires substantial amounts of information, competition agencies should seek to avoid imposing unnecessary or unreasonable costs and burdens on merging parties and third parties in conducting merger investigations. Information requests should be reasonably tailored to obtain the information the agency needs to complete its investigation and to take any necessary enforcement actions.⁴⁹ The request should include the minimum amount of data required to conduct the empirical analyses, including data reasonably required for robustness checks.

The data must of course also be economically relevant. This means that the data requested should bear a close relationship to the economic variables of interest in testing the theories of harm. For example, the agency may wish to conduct an analysis that requires information on margins. Accounting margins maintained by the parties may be one source of this information, but that data may not correspond well to the economic margins required for the analysis.⁵⁰ For example, accounting margins generally do not reflect opportunity costs, and may or may not be available at the product level for the products of interest. As such, the agency may require disaggregated price and cost information to construct the relevant margins for the analysis. Similarly, when conducting analysis that requires use of price data, the agency needs to consider whether it is most appropriate to use firm A's advertised prices or its transaction prices (i.e., the actual price at which the product was sold). If the qualitative evidence suggests that promotions, rebates or discounts are an important element of competition in the market, then net transaction prices might be considered a more economically relevant measure of price.⁵¹

Once the data is received, the responses should be thoroughly inspected to ensure that they match the corresponding requests and are complete. Additionally, it can be useful initially to examine the data for outliers, missing observations, miscoding errors or other anomalies. Depending on the size of the dataset this can be done either by physical inspection, or by generating basic plots or summary statistics (such as sample minimums and maximums, averages and variances).

For instance, an observation of negative sales volumes or prices can result from data extraction errors, coding errors, or inadequate accounting of rebates or taxes that should be "backed-out". Non-numeric variables such as customer or competitor names may have coding errors (e.g., separate entries for "Alpha co" and "Aphla co") that can be identified by listing the states of these fields alphabetically and scanning for mistakes. The agency should keep a running list of issues encountered with the data and follow-up with the data providers for explanations and corrections as necessary.

⁴⁹ See [ICN Recommended Practices for Merger Notification and Review Procedures](#), RP IV.E, pp. 16-17.

⁵⁰ For an analogous discussion on the use of accounting information to derive appropriate cost measures in the context of a predatory pricing investigation, see [ICN Unilateral Conduct Workbook Chapter 4: Predatory Pricing Analysis](#).

⁵¹ In some cases it may be possible to conduct the analysis using both measures. If the results are broadly consistent under either measure then the issue of which is most appropriate can be rendered moot.

As for outliers, they can result from measurement errors (e.g., inadvertently recording a price with an extra zero, failing to account for currency exchange, etc.) or can simply be explained by extreme circumstances (e.g., a price spike following a natural disaster). Outliers can be corrected, accounted for (e.g., by controlling for the extreme circumstances or by using outlier robust regression techniques), or discarded in a systematic way (e.g., by truncating the tails of the distribution based on some reasonable cut-off). The most appropriate treatment will depend on the circumstances of the case; however any manipulation of the raw data should be recorded and reported.

Finally, it is important to recognize that data will rarely if ever be perfect, especially given the tight merger review timelines. The goal is to use the best evidence available, rather than the best 'imaginable'. The analysis should recognize any important limitations in the data, but such limitations should not necessarily discourage the agency from pursuing quantitative analyses altogether.

4.5. Robustness checks

A fourth element of a solid quantitative analysis is that it should withstand various robustness checks. For example, where possible, the agency should verify that the empirical results are not highly sensitive to small changes in the data (e.g., different measures of price) or model specification (e.g., inclusion or non-inclusion of certain variables) that are equally plausible. For example, in the entry study described above, the agency may consider a model that controls for the presence or absence of competitors within a given radius. It may be useful to run the analysis under various plausible radii (3,5 and 10 km) to see if the results are consistent. If they are not, then the agency can focus more seriously on which measure is the most appropriate in light of the evidence. Similarly, the agency can run the analysis over different time periods or different subsets of the data to check whether there are any unexpected inconsistencies. Understanding the source of such inconsistencies can often shed light on a feature of the market that was not fully appreciated *a priori*. Case teams should also understand data outliers and how those impact the analysis.

At a more macro level, robustness of conclusions can also be achieved by using complementary but different methodologies (e.g., UPP analysis, cross-sectional studies, merger simulation) and/or asking different empirical questions. The objective of this approach is to have a number of independent studies each supporting the same conclusion, each of which is independently robust. This may not always be achievable in practice.

4.6. Presentation

It is important to interpret and report the results in as fair and open a manner as possible, subject to appropriate confidentiality restrictions. Economic evidence should be based on clear economic theory, and the process and analysis should be transparent, replicable and intuitive to allow the parties and other stakeholders to fully understand the analysis.

Key underlying assumptions should be explicitly stated and motivated with reference to documentary and other evidence. Where there are limitations to the data or to the generality of the results, these should be acknowledged. Similarly, counterarguments should be given adequate consideration and rebutted as necessary.

The main findings should be reported clearly. Where appropriate, illustrative graphs, plots and tables should be included to improve the presentation. Technical details can be included in appendices, with appropriate citations of any academic papers or other sources being relied upon.

4.7. Third parties' submissions

This section has mainly dealt with quantitative analyses that agencies may wish to perform. Often the merging parties or third parties make economic submissions as well. The same factors and scrutiny should apply to those submissions. In particular, it is important that external submissions provide the underlying data and a sufficient description of the methodology to enable timely replication. A number of agencies have developed best practice guidance on the submission of economic evidence (see Bibliography).

4.8. Qualitative evidence

It is always important to complement the quantitative analysis with qualitative evidence in order for the competition agency to base its decisions on all reliable and relevant evidence gathered during the investigation process. Qualitative evidence and quantitative analysis should both support conclusions about whether a merger is likely to harm competition significantly. As described in Chapter 3, agencies evaluate many types of qualitative evidence from a variety of sources in merger reviews, each of them presenting different reliability issues. Chapter 3 also offers tips for ensuring reliable qualitative evidence.

Pre-existing documentary evidence (such as corporate strategy documents, planning documents, and sales reports) tend to be viewed as relatively reliable sources of evidence upon which analysis can be conducted and appropriate conclusions drawn because they were created before the merger was contemplated and were not likely prepared primarily to influence regulators. Materials created in anticipation of the merger or as part of the merger investigation and analysis (such as surveys, reports, maps, strategy documents, and analyses and compilations of information developed during the merger negotiation process) can be particularly useful if they give an accurate representation of the parties' analysis of the merger at that time. Information from these two sources can often supply data for quantitative analyses.

Descriptive evidence from customers, suppliers, competitors, and the merging parties can be important to provide early indications of concerns and identify relevant sources of additional detailed information. Other types of evidence include written responses to inquiries and compulsory requests for information. These sources of evidence can greatly affect the types of quantitative analysis that can be done in a case.

Agency staff must also consider qualitative evidence throughout the process to ensure that all evidence is consistent with the theories of harm and not subject to other interpretations that are equally or more persuasive. See section 4.4 above, and Chapter 3 of the ICN Investigative Techniques Handbook for Merger Review for additional information on qualitative evidence.

GLOSSARY⁵²

Bertrand competition

In a Bertrand model of **oligopoly**, firms independently choose prices (not quantities) in order to maximize profits. This is accomplished by assuming that rivals' prices are taken as given. The resulting equilibrium is a **Nash equilibrium** in prices, referred to as a Bertrand (Nash) equilibrium.

When the industry is symmetric, i.e., comprising firms of equal size and identical costs, and the costs are constant and the product homogenous, the Bertrand equilibrium is such that each firm sets price equal to marginal cost, and the outcome is **Pareto efficient**. This result holds regardless of the number of firms and stands in contrast to the **Cournot equilibrium** where the deviation from Pareto efficiency increases as the number of firms decreases.

However, when products are differentiated even the Bertrand model results in prices which exceed marginal cost, and the difference increases as products become more differentiated. This shows how different theoretical models of competition are sensitively dependent on their underlying assumptions

Buyer power

Buyer power may arise in a market framework or a bargaining framework. In a market framework (i.e., the supply side is fragmented and competitive and the trading is via a market price), buyer power is about **monopsony power** if a buyer can profitably reduce the price paid below competitive levels by withholding demand. In other words, powerful buyer must reduce demand in order to achieve a lower price. Thus, buyer power as monopsony power will result in a quantity distortion and loss of efficiency in the input market, and will likely harm consumers in downstream markets. An indicator of buyer power in this case is the buyer size relative to the market in question.

In a bargaining framework (i.e., the supply side relatively concentrated, prices and terms individually negotiated) buyer power is seen as bargaining power, which refers to the bargaining strength that a buyer has with respect to suppliers with whom it trades. In this framework, buyer power is typically seen as beneficial (countervailing) or neutral (transfer of rents). There is no need to reduce demand in order to achieve lower price: unlike monopsony power, bargaining power can achieve lower prices via the threat of purchasing less.

In a bargaining context, an indicator of buyer power is given by the significance of alternative options in terms of other sellers in order to reach an agreement. Indeed, buyer power is enhanced if the seller does not have alternative source of demand for its products. An individual customer's negotiation position will be strong if it can easily switch its demand away from the supplier, or where it can otherwise constrain the behaviour of the supplier by increasing its cost even if switching is not possible, such as refusing to buy other product from the supplier, or delaying purchases if the customer does not require constant supply.

Cointegration / Error correction models

Dynamic price regressions and co-integration analysis techniques are used to determine the extent of the market and to analyse the mechanisms by which price changes are transmitted across products or geographic areas. Price adjustments across markets may take place over a period of time rather than instantaneously, so that assessing whether markets are integrated can depend critically on the length of the price adjustment. The reactive adjustment process to changes in one price through a set of products or geographic areas can be represented by a class of econometric models called **error correction models (ECM)**. ECM can be used to test whether two or more series of price data exhibit stable long-term relationships and to estimate the time required for such relationships to be re-established when a shock causes them to depart from equilibrium. Although the analysis of prices alone is not sufficient to establish whether a market is not an antitrust market, it is often the case that no other data but time series of prices are available to the analyst.

Error correction models allow the estimation of equilibrium relationships using time series of data that are non-stationary. Generally speaking, a **stationary series** has a mean to which it tends to return, while non-stationary series tend to wander widely; also, a stationary series always has a finite variance (that is, shocks only have transitory effects) and its autocorrelations tend to die out as the interval over which they are measured widens. These differences suggest that when plotting the data series against time, a stationary series will cut the horizontal axis many times, while a non-stationary series will not. Econometricians have discovered that many time series of economic data are non-stationary, more precisely that they are integrated of order 1. A

⁵² Based on extracts the following documents: OECD, [Glossary of Industrial Organisation Economics and Competition Law](#) 16 Jul 1993; Office of Fair Trading Economic Paper n. 17, [Quantitative techniques in competition analysis. A report prepared for the OFT by LECG Ltd](#) (October 1999).

series is said to be integrated of order 1 if it can be made stationary by taking its first difference. Two non-stationary time series are said to be co-integrated if they have a linear combination that is stationary.

The correct way of proceeding is as follows. First, the analyst has to test for stationarity in the two price series via a unit root test.¹¹³ If, and only if, the test results show that the data is non-stationary, then the analysis requires testing whether they are co-integrated. Testing for **co-integration** implies testing whether there exists a linear combination of the two series that is stationary.

If evidence of co-integration is found, then the conclusion can be drawn that the relationship between price movements tends to equilibrium in the long run. So, if a simple ECM representation cannot be found, co-integration analysis becomes more sophisticated and needs to be carried out by experienced analysts. Moreover, if the analysis involves more than two prices, it can only be performed using specialist software. This technique requires the availability of long time series of data, with at least 50 observations

All techniques based on the analysis of prices alone, including co-integration techniques, are very useful to define economic markets, but they should be used with care when establishing relevant antitrust markets. The fact that prices in one area are found to affect prices in another area is not sufficient proof of the existence of a wider antitrust market.

Collusion / Coordinated behaviour

Collusion refers to coordinated behaviour among sellers to raise or fix prices and to reduce output in order to increase profits. As distinct from the term cartel, collusion does not necessarily require a formal agreement or explicit communication, whether public or private, between members.

In oligopolistic industries, firms tend to be interdependent in their pricing and output decisions so that the actions of each firm impact on and result in a counter response by the other firm(s). In such circumstances, oligopolistic firms may take their rivals' actions into account and coordinate their actions as if they were a cartel without an explicit or overt agreement. Such coordinated behaviour is often referred to as tacit collusion or conscious parallelism. However, it should be noted that the economic effects of collusion and a cartel are the same.

The theory of collusion is premised on game theory (see **Game Theory**), which refers to competition as a strategic game of action and reaction. This theory considers the market as an active entity where participants are active at the same time and can consequently influence each other. Game theory assumes that every player in the market makes a decision which is a deliberate response to the decision of the other market players, therefore the smaller the number of firms in the market the higher the incentive to collude. Subsequently the number and strength of the remaining competitors are reduced and there is a greater probability of exchanging information, monitoring behaviour and ultimately punishing a player that deviates from the required and compulsory agreement.

Under the game theory context, coordination is established if the discounted future profits of coordinating are higher than the discounted future profits of deviation followed by punishment. The deviation payoff is higher than the coordinated one and the punishment payoff is lower. Thus the longer that it takes for the deviation to be discovered and the punishment to be imposed then the greater benefit there is to deviation and the less likely coordination is to be sustained.

The following tests can be conducted to see whether coordination exists and/or is a likely outcome of the merger:

1) Analyzing industry data

Summaries of industry data are useful for learning whether the underlying market conditions are conducive to coordination. Details about industry sales patterns (do total sales vary greatly over time, or are they fairly stable), customer sales patterns (are customers large with relatively infrequent purchases, or small with regular purchasing habits), and pricing patterns (are prices highly volatile, or stable) will help determine whether collusion seems likely.

2) Most-Favored-Nations Clause

One manner in which collusive agreements may be enforced is to use most-favored nations clauses, which have the potential dual effects of lessening the variability in pricing across customers than might otherwise occur, and lessening the incentive to give discounts. The result of such clauses can be that, since firms have less incentive to lower prices, collusive agreements are more stable. Analysis of this potential effect can be done by (1) analyzing contracts across customers and suppliers to determine the prevalence of such contracts; (2) analyzing prices to assess the variations in price across a single supplier's customers, controlling for observable differences; and (3) analyzing negotiations with individual customers to determining the prevalence of offering individual discounts.

3) Analyzing competitor production reactions to price changes

Competitors can be expected to react to price changes by a firm in more dimensions than price alone. Thus, an increase in the price of an important competitor can be expected to lead to an increase in price by the firm, and, if the firms are not colluding, to an increase in quantities (and market shares). In a collusive agreement, however, quantities are not expected to increase. Thus, an analysis of quantity reactions to price changes is also relevant. To conduct this test, data on quantities need to be gathered with the same resolution as the price data discussed above. Of course, prices may go up because costs increased, and this must be considered in the analysis – one would anticipate prices of competitors to generally move together as cost and other conditions change.

4) Analyzing customer turnover – churning

If customers are large, each firm has an increased incentive to try to lure competitors' customers. If, in addition, orders are infrequent, such actions will be more difficult to detect and will make cheating more attractive as retaliation may not be possible in the short run. An analysis of customer turnover among different suppliers can shed light on this issue.

5) Analyzing changes in market shares

Collusive agreements generally rely on firms getting fixed market shares. If a member of a cartel suddenly finds its market share falling, it is likely to react by cutting prices. Thus, fairly constant market shares over time would be consistent with (but do not prove) coordination, while frequent changes in market shares suggest that collusion is less likely to be occurring. The required data are unit or dollar sales for each firm.

6) Analyzing markets with Sealed Bids

When contracts are relatively large (but relatively frequent) and are awarded via sealed bids, firms might coordinate by taking turns winning auctions, thus maintaining high prices and market shares. Government sealed bids often become transparent and deter cheating on a collusive agreement. Such collusive methods may be simpler to establish and enforce after a merger. Analysis of this issue requires a careful study of winning patterns and prices of winners and losers and the role of the merging parties.

7) Analyzing the stability of costs and demand

Coordination is likely to be easier when the market is stable, and when firms are similar. Frequent changes in suppliers' costs or demand over time will cause instability in private incentives, and, thus, in production quantities and prices, making coordination difficult to maintain (partly because it will make cheating on a cartel agreement appear to be simply "noise"). In addition, if the cost structures of the firms differ, and/or changes in factor prices are different across suppliers, coordination would be difficult to maintain. This analysis necessitates data on the cost structure of the firms, and on input prices over time for each firm as well as estimates of market demand.

8) Analysis of new product introductions

Changes in products by existing firms, changes the status quo in an industry, and can make coordination difficult to maintain. Analysis of these issues would ask: Are such changes common? How important are new products to sales?

See also ICN Merger Guidelines Workbook, p. 45-52, and ICN Recommended Practices for Merger Analysis, recommended practice VI, pp. 23-27.

Coordinated effects (see Collusion/Coordinated Behavior)

See also ICN Merger Guidelines Workbook, p. 45-52, and ICN Recommended Practices for Merger Analysis, recommended practice VI, pp. 23-27.

Cournot competition

The Cournot model of **oligopoly** assumes that rival firms produce a homogenous product, and each attempts to maximize profits by choosing how much to produce. All firms choose output (quantity) simultaneously. The basic Cournot assumption is that each firm chooses its quantity, taking as given the quantity of its rivals. The resulting equilibrium is a **Nash equilibrium** in quantities, called a Cournot (Nash) equilibrium.

The Cournot model provides results which are of some importance to industrial economics. First of all, it can be shown that price will not in most cases equal marginal costs (see **costs**) and **Pareto efficiency** is not achieved. Moreover, the degree to which each firm's price exceeds marginal cost is directly proportional to the firm's market share and inversely proportional to the market elasticity of demand.

If the oligopoly is symmetric, that is all firms have identical products and cost conditions, then the degree to which price exceeds marginal cost is inversely related to the number of firms. Thus, as the number of firms increases, the equilibrium approaches what it would be under perfect competition.

Correlation

Correlation analysis is a statistical technique used to measure the degree of interdependence between two variables. Two variables are said to be correlated if a change in one variable is associated with a change in the other. This need not imply a causal relationship between the two since the movement in both variables can be influenced by other variables not included in the analysis. Variables that are independent do not depend upon each other and will only be correlated by chance ('spurious correlation').

The degree of association between two variables is sometimes measured by a statistical parameter called covariance, which is dependent on the unit of measurement used. The correlation coefficient between two variables, X_1 and X_2 , is, however, a standardised measure of association between two variables:

$$\rho = \frac{\sigma_{12}}{\sigma_1\sigma_2}$$

Where σ_{12} is the covariance between X_1 and X_2 , and σ_1 and σ_2 are the square roots of the variances of X_1 and X_2 respectively. The price correlation coefficient lies in the range between 1 and -1. When the coefficient is 1, there is perfect positive correlation meaning that every movement in one price series is exactly reflected, in percentage terms, in the other series. Equally, a correlation coefficient of -1 would mean that every movement in one series is reflected by an exactly (in percentage terms) opposite movement in the other price series. A correlation coefficient of zero implies that movements in one price series are not reflected in movements in the other price series, in any direction. For example, when the prices of two products (or same product in two different regions) are positively correlated, a graph of these prices would be seen to move up and down together over time.

The implementation of PC requires time series of data which have at least 20 observations. It is customary to compute the correlation coefficient using the natural logarithm (log) of the price series, because the first log difference is an approximation of the growth rate. Equal changes in the log represent equal percentage changes in price. Correlations could be computed both between levels and differences in the log prices to check that the results are the same in both cases. For more advanced techniques see below (**Cointegration**). Price correlation analysis really only makes sense when applied to price series that are stationary. Hence, stationarity analysis is recommended prior to conducting price correlation analysis.

Critical loss

The logic of the test is to identify a group of producers that would be able to exercise market power if they could coordinate their pricing and output behaviour. The standard hypothetical monopolist test starts with the smallest possible candidate market (i.e. products of the merging parties), asks whether a hypothetical monopolist could profitably impose a SSNIP, and progressively broadens the market by adding the nearest substitute products up to the point when such a price increase is profitable.

The price increase contemplated by the SSNIP test has two opposing effects on the hypothetical monopolist's profits. On one hand, it has a negative effect on profits because sales will fall as some consumers buy less or switch to rival firms' products in response to the increase in price. On the other hand, there is an offsetting positive effect on profits as the hypothetical monopolist now earns higher margins on all of the remaining sales. The purpose of critical loss analysis is to evaluate this trade-off and to determine whether the price increase is profitable or not by way of comparing the critical loss and the actual loss due to the price increase. The critical loss is the percentage reduction in quantity such that the two effects just balance out, i.e. the gains from the price increase are exactly offset by the losses. The actual loss is the actual percentage reduction in quantity that the hypothetical monopolist would realize in the candidate market in the event of such a price increase. If the actual reduction in unit sales is greater than the critical loss, then the price increase will be unprofitable (as customers would switch to other competitors that would be willing to supply enough products to them) and the candidate market has to be expanded (as there are other credible competing products in the market). If the actual reduction in unit sales is less than the critical loss, the price increase will be profitable, and the candidate market is indeed the relevant market (as customers will not switch to other competing products in sufficient volumes).

To illustrate this critical value, we assume the income reduction effect of hypothetical monopoly A resulting from sales loss equals to the income increase effect resulting from price-cost markup:

$$\Delta P * (Q - \Delta Q) = (P - MC) * \Delta Q \quad \text{profit} = \text{loss}$$

divided by PQ on both sides:

$$\Delta P * (Q - \Delta Q) / PQ = (P - MC) * \Delta Q / PQ \quad \text{or} \quad \frac{\Delta P}{P} = \frac{\Delta Q}{Q} \left[\frac{(P - MC)}{P} + \frac{\Delta P}{P} \right]$$

The critical loss formula can be shown as:

$$\frac{\Delta Q}{Q} = \frac{\Delta P / P}{M + \Delta P / P}$$

Where M is the mark-up equal to $(P - MC) / P$, $\Delta P / P$ refers to ratio of price change and $\Delta Q / Q$ is the ratio of sales change for the measurement of critical loss. For example: if the markup of A is 40%, when price increases by 5%, the critical loss is:

$$\frac{\Delta P / P}{M + (\Delta P / P)} = \frac{5\%}{40\% + 5\%} = 11.1\%$$

This tool is exempt from criticism. Some scholars argue that the inference typically drawn from critical loss analysis --- that high margins make a merger less likely to be anticompetitive --- is often inconsistent with economic theory. Also, note that M is not the same as the profit margin that businesses think about in practice (which is the percentage mark-up of price over marginal/average cost). Rather M above is defined differently and known as the Lerner Index. See Daniel P. O'Brien and Abraham L. Wickelgren, A Critical Analysis of Critical Loss Analysis, US FTC Working Paper No. 254, May 23, 2003.

Cross price elasticity of demand

Refers to the percentage change in the quantity demanded of a given product due to the percentage change in the price of another "related" product. If all prices are allowed to vary, the quantity demanded of product X is dependent not only on its own price (see elasticity of demand) but upon the prices of other products as well. The concept of cross price elasticity of demand is used to classify whether or not products are "substitutes" or "complements". If an increase in the price of product Y results in an increase (a decrease) in the quantity demanded of X (while the price of X is held constant), then products X and Y are viewed as being substitutes (complements). If substitutes (complements), the cross price elasticity measure is a positive (negative) number varying from zero (no substitutes/complements) to any positive (negative) number.

The cross elasticity is calculated as the follow. If X and Y are to compare for the cross elasticity of demand where P_x is price of X and Q_y is the quantity of Y, the cross elasticity is

$$E_{P_x Q_y} = \frac{\Delta Q_y / Q_y}{\Delta P_x / P_x}$$

For example:

When X increases its price from 10 dollars to 11 dollars, consumers increase their purchase of Y from 10 units to 12 units. The cross elasticity is:

$$E_{P_x Q_y} = \frac{(12 - 10) / 10}{(11 - 10) / 10} = 2$$

X and Y are substitutes to each other.

When X increases its price from 10 dollars to 11 dollars, consumers decrease their purchase of Y from 10 units to 8 units. The cross elasticity is:

$$E_{P_x Q_y} = \frac{(8 - 10) / 10}{(11 - 10) / 10} = -2$$

X and Y are complements to each other

Diversion ratio

Formally, the diversion ratio from A to B is calculated as the ratio between the cross-elasticity between products B and A, (i.e. responsiveness of volumes of B to price changes in A) and the own-price elasticity of product A, multiplied by the ratio between the quantity of product B and A:

$$D_{AB} = \frac{\varepsilon_{BA}}{\varepsilon_{AA}} * \frac{Q_B}{Q_A}$$

If the quantities A and B are the same (i.e., merging parties are symmetric in size), then the diversion ratio is calculated simply as:

$$D_{AB} = \frac{\varepsilon_{BA}}{\varepsilon_{AA}}$$

Elasticity of demand (price)

See **Own-price elasticity**.

Elzinga-Hogarty test

The Elzinga-Hogarty indicators are LIFO (Little in from outside) and LOFI (Little out from inside). LIFO measures the importance of imports relative to the domestic consumption and it is defined as 1 minus the ratio of imports to domestic consumption. LOFI measures the importance of exports relative to the domestic production and it is defined as 1 minus the ratio of exports to domestic production.

The creators of this test, Elzinga and Hogarty, suggested that a candidate region is a geographic market if both LIFO and LOFI exceed a prescribed threshold. Elzinga and Hogarty have proposed two thresholds: 75% ("weak market") and 90% ("strong market").

Such an analysis is a straightforward and easy-to-implement empirical technique. However, it does not provide a direct answer to the SSNIP test since it tells us nothing about the responsiveness of quantities to changes in relative prices. Furthermore, while the presence of large trade flows tends to imply a wide market, the absence of large trade flows does not necessarily imply a narrow market since an absence of flows may be consistent with fierce competition between areas. Lastly, before applying this test to a region, the analyst should, in order to have valid results, check whether there is geographic price discrimination in that region.

Homogenous products

Products are considered to be homogenous when they are perfect substitutes and buyers perceive no actual or real differences between the products offered by different firms. Price is the single most important dimension along which firms producing homogenous products compete.

Hypothetical monopolist

The hypothetical monopolist is assumed to be the only producer of the candidate relevant product and geographic market. For an in-depth description of the HMT see: ICN Merger Guidelines Workbook, Worksheet A – Market definition, pp. 15-30, and ICN Recommended Practices for Merger Analysis, RPII, B-C-D, pp. 5-11.

Game theory

Game theory is a study of strategic decision making or interactive choice. A game consists of a set of players, a set of moves (or strategies) available to those players, and a specification of payoffs for each combination of strategies. The payoffs of the game are generally taken to represent the utility of individual players. Often in modeling situations the payoffs represent money, which presumably corresponds to an individual's utility. A game is cooperative if the players are able to form binding commitments. For instance the legal system requires them to adhere to their promises. In non-cooperative games this is not possible.

Simultaneous games are games where both players move simultaneously, or if they do not move simultaneously, the later players are unaware of the earlier players' actions (making them effectively simultaneous). Sequential games (or dynamic games) are games where later players have some knowledge about earlier actions. This need not be perfect information about every action of earlier players; it might be very little knowledge. For instance, a player may know that an earlier player did not perform one particular action, while he does not know which of the other available actions the first player actually performed.

Maverick firm

A maverick firm is a firm whose strategy is different from the majority of firms competing in the market because of lower costs or other differences, but nevertheless is rational for itself. Therefore, the presence of a maverick firm in a market makes coordination more difficult to sustain since the maverick firm has a greater economic incentive than its rivals to deviate from the terms of coordination. Alternately, if the maverick firm is one of the merging parties, then the likelihood of coordinated behaviour may rise because the merger eliminates the differences that led to maverick behaviour.

Monopolistic competition

It describes an industry structure combining elements of both **monopoly** and **perfect competition**. As in perfect competition, there are many sellers and entry and exit is relatively easy. However, unlike the situation in perfect competition, products are somewhat differentiated. As a consequence, each firm faces a downward sloping demand curve which gives it some power over price. In this sense the firm is like a monopolist, although the demand curve is more elastic than that of the monopolist (see elasticity of demand). In essence, although the product is differentiated, it does have substitutes so that the demand curve facing the firm will depend on the prices charged by rivals producing similar products.

Monopoly

Monopoly is a situation where there is a single seller in the market. In conventional economic analysis, the monopoly case is taken as the polar opposite of perfect competition. By definition, the demand curve facing the monopolist is the industry demand curve which is downward sloping. Thus, the monopolist has significant power over the price it charges, i.e. is a price setter rather than a price taker.

Monopsony

A monopsony consists of a market with a single buyer. When there are only a few buyers, the market is defined as an *oligopsony*. In general, when buyers have some influence over the price of their inputs they are said to have monopsony power.

Nash equilibrium

In non-cooperative **oligopoly** theory it is necessary to model the manner in which firms choose strategies, given the fact that their decisions will affect their rivals. The most common assumption is that each firm chooses its strategy so as to maximize profits, given the profit-maximizing decisions of other firms. The result is a Nash Equilibrium, developed by the game theorist John Nash. A Nash equilibrium is a strategy selection such that no firm can gain by altering its strategy, given the existing strategies of its rivals. Thus, a Nash equilibrium represents a best response by each firm, given the strategies of the others.

Oligopoly

An oligopoly is a market characterized by a small number of firms who realize they are interdependent in their pricing and output policies. The number of firms is small enough to give each firm some market power.

Oligopoly is distinguished from **perfect competition** because each firm in an oligopoly has to take into account their interdependence; from **monopolistic competition** because firms have some control over price; and from **monopoly** because a monopolist has no rivals. In general, the analysis of oligopoly is concerned with the effects of mutual interdependence among firms in pricing and output decisions.

There are several types of oligopoly. When all firms are of (roughly) equal size, the oligopoly is said to be symmetric. When this is not the case, the oligopoly is asymmetric. One typical asymmetric oligopoly is the dominant firm. An oligopoly industry may produce goods which are homogeneous/ undifferentiated or it may produce goods which are heterogeneous/ differentiated.

Own-price elasticity / Price elasticity of demand

The price elasticity of demand measures the responsiveness of demand to variations in price. It is defined as the percentage change in quantity demanded divided by the percentage change in price. Since the demand curve is normally downward sloping, the price elasticity of demand is usually a negative number. However, the negative sign is often omitted.

Minus one is usually taken as a critical cut-off point with lower values (that is less than one) being inelastic and higher values (that is greater than one) being elastic. If demand is inelastic a price increase will increase total revenues while if demand is elastic, a price increase will decrease revenues.

The price elasticity of demand is determined by a number of factors, including the degree to which substitute products exist (see **cross price elasticity of demand**). When there are few substitutes, demand tends to be inelastic. Thus firms have some power over price. When there are many substitutes, demand tends to be elastic and firms have limited control over price.

Pareto efficiency

Pareto efficiency, also referred to as *allocative efficiency*, occurs when resources are so allocated that it is not possible to make anyone better off without making someone else worse off. When referring to a situation as Pareto efficient, it is usually assumed that products are being produced in the most efficient (least-cost) way.

Price correlation (see Correlation)

Price discrimination

Price discrimination is the ability to charge different prices to different categories of customers and, to an extreme, different prices to any single customers. Price discrimination can occur if costs are different as well, and price discrimination can be across customers or within customers (e.g., non-cost-based volume discounts). In the market definition, the existence of a price discrimination strategy plays an important role because, on this basis, separate relevant markets might be defined. In fact, the existence of such practice is typically consistent with different consumers' willingness to pay and therefore a high likelihood that these consumers have different and independent demands (for the same product).

Examples of price discrimination can be found in the travel industry, e.g. airlines, ferries, where the same seat is sold at different prices. Typically companies in these industries deploy a large set of rules in order to discriminate between business and leisure passengers or the so called time and non-time sensitive and ultimately charge higher price to time-sensitive passengers. Likewise amusement parks, travel agencies, theatres might charge different prices to families or single people or apply other differentiation strategies, for instance according to age. The telecom industry is also another example where there is a large use of price discrimination. The same minute of call is priced differently depending on the type of contract, e.g. flat or per minute tariff or pre-paid and post-paid. Consumers are thus discriminated along their different propensity of use.

Unilateral effects

Unilateral effects, also known as non-coordinated effects, arise where, as a result of the merger, competition between the products of the merging firms is eliminated, allowing the merged entity to unilaterally exercise market power, for instance by profitably raising the price of one or both merging parties' products, thus harming consumers. See also ICN Merger Guidelines Workbook, pp. 41-44 and See ICN Recommended Practices for Merger Analysis, RP. V, pp. 19-22.

Upward pricing pressure (UPP)

UPP assesses compares the incentive to raise price due to the "diversion effect" as explained above and the incentive to reduce price due to cost savings. The UPP test thus evaluates the merging parties' incentive to raise their prices depending on how sales lost by one party are recaptured by the other. Before merging, each firm may find it too costly to raise their prices due to the lost profits from customers switching to competing products or services. Following a merger, some of these lost profits may be recaptured by customers switching to the other merging party. This can give each merging party an incentive to raise prices as it can reduce the costs they face from customer switching. The reduction in cost that each merging party faces can be quantified by the value of sales that the merging parties lose to each other.

The value of lost sales can be estimated using two pieces of evidence:

- Diversion ratios (D): the percentage of sales lost by one merging party that are recaptured by the other.
- Gross profit margins (M): the profit that each merging party earns on each unit of sales that they recapture expressed as a percentage of each firm's price. In some cases this is estimated by taking the difference between a firm's revenues and its variable costs and dividing this by its revenues.

Thus, UPP measures are built upon diversion ratios, but require an additional piece of information, data on merging parties' margins. Both high diversion ratios and high gross profit margins can suggest that there may be competition concerns. They can also be combined to provide different measures of upwards pricing pressure as set out below.

Different measures of upward pricing pressure:

- Net UPP test: $DM/(1-M) > E$ where E is the predicted proportionate decline in marginal costs post-merger and assuming symmetry between the merging firms. When this condition is met, it suggests that the merger may cause upwards pricing pressure.
- Gross Upward Pricing Pressure Index: $GUPPI = D_{12}M_2P_2/P_1$ where D_{12} is the diversion ratio from firm one to firm two, M_2 is the gross profit margin of firm two, and P_1 and P_2 are the prices of firms one and two respectively. GUPPI can be combined with evidence on the pass-through of firm-specific cost shocks on pricing to give an initial indication of a post-merger price rise.
- Illustrative price rises (IPRs): this involves making explicit assumptions about demand and the competition authority must be satisfied that this is appropriate. Demand assumptions include the shape and curvature of the demand curve and whether competition between the parties is symmetric

or asymmetric. These assumptions can be supported by the same types of evidence used to define markets such customer switching patterns and customers' responsiveness to price increases, Under symmetry with linear demand, $IPR = MD/2(1-D)$ and under symmetry with constant elasticity demand $IPR = MD/(1-M-D)$.

These measures can be used as initial indicators on whether a merger may raise competition concerns. It is also important to take account of how merger-specific efficiencies can lead to downward pricing pressure and entry or repositioning. These efficiencies can either be considered alongside these UPP measures or incorporated directly into the analysis.

For more info see Bibliography and for examples of implementation see the section "Other case studies" in the Annex on Case Studies.

ANNEX - CASE STUDIES

In alphabetical order of jurisdiction

Canada - Case study - Commissioner of Competition vs Superior Propane

In December 1998, the Competition Bureau filed an application with the Competition Tribunal challenging Superior Propane Inc.'s proposed acquisition of ICG Propane Inc. One of the Bureau's economic experts, Professor Ward, submitted econometric evidence about the likely effects of the merger using a merger simulation model. Professor Ward used Superior Propane's data on prices, sales, and product groupings, and ICG data on litres sold, dollar sales, gross profits, and product groupings to establish volumes and prices for each firm in four product segments: residential, industrial, autopropene, and "other" which included construction, commercial, government and agriculture end-uses. With this data, he estimated the extent to which consumers substituted between ICG and Superior using a linear approximation of the Almost Ideal Demand System. Ultimately, Ward concluded, based on a number of assumptions regarding the elasticity of demand for propane (which had been estimated independently by other experts for the Bureau), that average prices would rise by eight percent or more as a result of the merger.

In its initial decision the Tribunal summarised Ward's analysis (paras 247-257) and stated that the analysis was "highly relevant to a determination as to whether there is a likely substantial lessening of competition" and that "the fact that Professor Ward simulated the merger's effects under a variety of assumptions and reached the same conclusion gives the Tribunal more confidence in his opinion than it would have if he had restricted his simulations to a narrowly defined set of assumptions." [257, 261]

For more information, including the Tribunal's decision and the relevant expert reports, [click here](#).

Canada - Case study - Leon's / The Brick

In 2013, the Canadian Competition Bureau cleared a merger of two national retailers of furniture, mattresses, appliances and electronics – Leon's and The Brick. The Bureau determined that the parties' retail operations overlapped in over sixty local markets across Canada. In order to assess the degree of direct competition between the parties, the Bureau requested sales data at the transaction level from all Leon's and The Brick's stores and undertook a natural experiment study. Using this data, the Bureau compared the parties' prices in areas where they competed against prices in areas where they did not compete. In doing this comparison, the Bureau controlled for other factors that affect demand and supply conditions across areas. In addition to this analysis, the Bureau assessed other sources of information on the level of competition between Leon's and The Brick. This included reviewing internal documents from both companies, considering the views of market participants, and analysing the impact that Leon's entry into a number of local markets had on the performance of The Brick's stores. Considering all of this information, the Bureau concluded that the price effects of the merger would not be material, and that the transaction was unlikely to lead to a substantial lessening or prevention of competition.. For more details on the Bureau's analysis, including how geographic overlaps were identified, and what control variables the Bureau considered, [click here](#).

Brazil - Case study - TAM-LAN (Case 08012.009497/2010-84)

In December 2011, CADE approved the merger plan of air transport companies TAM Linhas Aéreas and LAN subject to conditions regarding airline slots in the Brazilian market.

CADE's Commissioners observed that the overlaps in the international air lines of merging firms would not be contested by rivals considering the regulatory framework regarding the control of slots in HUB airports. In Brazilian air services regulatory framework there are a relevant number of factors that prevent the regulatory authority to refuse or take back the authorization of an air company to operate a determined slot in Brazilian airports. During the trial CADE observed that the overlaps that would lessen or block competition in the international air lines services would not be solved by the regulatory authority in short time. The access to slots in HUB airports was considered a relevant entry barrier in Brazilian market.

In its decision, CADE understood that competition concerns existed in the airline route that linked the city of São Paulo to the city of Santiago and imposed thus the transfer of a couple of daily flights routes to a competitor as a condition to approve the merger. The conditions applied by the Chilean Competition Tribunal were also confirmed, including the need to choose one of the two international airline alliances. During the review period, CADE held informal cooperation exchanges with the Chilean Competition Authority which also reviewed the same transaction.

For more information, including the Tribunal's decision and the relevant expert reports, see: www.cade.gov.br

(the decision is only available in Portuguese)

Brazil - Case study - Coca-Cola Company acquisition of Mate Leão (Case 08012.001383/2007-91)

In June 2009, CADE approved under settled conditions the acquisition of tea and iced tea producer Mate Leão by Coca-Cola Company. Based on the records of the case, the operation resulted in a significant reduction of alternative options in the offer of iced teas in the Brazilian market. Mate Leão was the leading firm in the market. Coca-Cola was the principal rival offering the Nestea brand (resulted from a previous association agreement with Nestlé).

CADE's Commissioners discussed the relevance of customers' capacity to absorb alternative offer of iced tea entrant firms in the Brazilian market, especially in the HORECA (hotels, restaurants, etc), given the fact that CADE's market investigation identified that HORECA demand segment is very sensible to the amount of brands which they can stock in the establishment place (i.e. the freezers).

The decision considered that each customer in the Brazilian HORECA market would not take more than two or three iced tea brands in stock in order to not raise its own costs regarding deposit and control of contracts with suppliers. The decision also noticed that HORECA market is especially relevant for the introduction of new entrant brands because the consumer option for a specific iced tea brand came from its experience in the HORECA market segment. In conclusion, CADE ruled that, additionally to other facts related to the distribution, the low capacity of choices in the Brazilian HORECA market represented a relevant entry barrier in the iced tea market.

As a consequence, CADE has settled an agreement with Coca-Cola where Coca-Cola compromised to give up its association agreement with Nestlé regarding the production and distribution of the Nestea brand in Brazilian Territory, in order to allow space of opportunity of new entrant firms.

For more information, including the Tribunal's decision and the relevant expert reports, see: www.cade.gov.br (the decision is only available in Portuguese)

EU - Case study - COMP/M.3916 - T-Mobile Austria / Tele.ring

In 2006 T-Mobile Austria wanted to acquire an independent mobile network operator, Tele.ring, which had been very active in the market. The analysis of market shares alone showed that in the three years before notification, Tele.ring had more than doubled its market share in terms of turnover or even almost tripled it in terms of customers. The European Commission concluded that the elimination of such a "maverick" in the market and the simultaneous creation of a market structure with two leading, symmetrical network operators (T-Mobile Austria and Mobilkom) would have been likely to produce unilateral effects.

Also, the European Commission looked at switching data collected by the Austrian regulator on the basis of number portability and noted that, in the year before notification, more than half of all customers who switched providers and made use of number portability went to Tele.ring and between 57% and 61% of those who left T-Mobile and Mobilkom with their telephone numbers switched to Tele.ring. In second place behind Tele.ring was H3G, which picked up some 20% of all customers switching provider and using number portability. This analysis provided a further indication that Tele.ring exerted the strongest competitive pressure on Mobilkom and on T-Mobile in particular.

EU - Case study - COMP/M.6471 - Outokumpu / Inoxum

In 2012 the European Commission performed an in-depth investigation of the acquisition of Inoxum, the stainless steel division of ThyssenKrupp of Germany, by the Finnish stainless steel company Outokumpu. The merger would have combined the first and the second largest supplier in the market, creating a player three times as big as Aperam and five times as big as Acerinox, the closest competitors and respectively the third and fourth player in the market. The Commission's investigation found that imports were insufficient to constrain price increases. Moreover, pre-merger competition was not intense and was characterised by the coexistence of positive margins and excess capacity. Despite their level of spare capacity, it was more likely that Aperam and Acerinox would have found it profitable to follow price increases by the merged entity rather than competing sufficiently aggressively to prevent them. The Commission therefore concluded that price increases resulting from the transaction would have likely been much higher than any potential synergies.

EU - Case study - COMP/M. 4662 – Syniverse / BSG

In 2007 the European Commission examined the merger between Syniverse and BSG, two providers of billing services for mobile network operators, which are typically procured by MNOs using a tender or a bidding process. Among other analyses, the European Commission performed an econometric estimation of the relationship between the BSG's price and Syniverse's participation. Specifically, the price offered by BSG was modelled as a function of Syniverse's participation in the tender and of other potentially relevant variables.

The results of the econometric analysis confirmed that the participation of Syniverse to the tender was not associated with lower prices offered by BSG. On the contrary, the results of the econometric analysis indicated that the coefficient for the participation of Syniverse in a tender was positive and not statistically significant.

EU - Case study - COMP/M.6497 - Hutchison 3G Austria / Orange Austria

The proposed acquisition of Orange by Hutchison 3G (H3G) would have brought together two of the four mobile network operators in Austria. Telecom Austria would have remained the market leader with an overall market share of 46%, followed by T-Mobile with 31% and the merged entity with 22%, combining H3G's 10% and Orange's 12% individual shares. Due to the parties' particular strength in the private customer and data market segments, the market power of the parties after the merger would have been higher than what their market shares suggested: market shares predicted a diversion ratio of 0.13/0.15 from H3G to Orange and a diversion ratio of 0.11/0.10 from Orange to H3G. Past switching data (data derived from Mobile Number Portability - MNP), however, led to a much higher diversion ratio, namely of 0.36 from H3G to Orange and 0.37 from Orange to H3G. On the basis of this analysis, the Commission concluded that the transaction would have led to higher prices and a reduction of competition.

EU - Case study - COMP/M.5658 - Unilever / Sara Lee Body Care

The Unilever/Sara Lee merger provides an example of an econometric estimation of demand using a nested logit model. Unilever and Sara Lee were two companies active in the personal care sector. They were particularly close competitors in the market for deodorants, where both had strong brands. The merger would have given Unilever a very strong leadership position in a number of deodorants markets by combining the parties' brands.

The Commission estimated one and two-level nested logit models with nests for male and non-male deodorants and sub-nests depending on whether the deodorant was labeled as skin friendly. In practice the Commission assumed that a particular consumer who chooses e.g. a male deodorant is more likely to choose another product within the nest of male deodorants if there is a rise in the price of the first choice product. Furthermore, within the nest of e.g. male deodorants, a consumer who prefers a skin-friendly product is more likely to choose another product that is also skin-friendly. With the estimated elasticities, the Commission simulated the price increase post-merger. Based on this analysis, the Commission found that the transaction would have led to price increases between 2% and 5% depending on the country. In order to remove the Commission's concerns, the merging parties made the commitment to divest Sara Lee's strongest brand and related business in Europe.

EU - Case study - COMP/M.5046 - Friesland Foods / Campina

The merger is between two leading Dutch dairy co-operatives covering the entire production chain from raw milk to all kinds of dairy products like milk, yoghurt, cream, butter, cheese, flavoured drinks, lactose.

The case identified concerns on several markets: the Dutch markets for the procurement of raw milk, fresh basic dairy products, value added yoghurt and quark, fresh flavoured dairy drinks ("FFDD"), fresh custard and porridge and cheese as well as in the market for long-life dairy drinks in The Netherlands, Belgium and Germany. FFDD was the main focus of the merger.

The FFDD was segmented in two markets: health related FFDD and non-health related FFDD, with a further distinction into branded and private label and according to distribution channel (retail/wholesale). The conclusion on separate product markets for health related FFDD and non-health related FFDD were based mainly on descriptive statistics computed on scanner data on different identity of producers, evolution of prices, packaging characteristics and flavours.

Unilateral effects were established in the non-health FFDD based on high combined market shares (almost 100%) with a significant overlap (14-20%) in the Netherlands. Moreover, the parties were perceived as closest substitutes and countervailing factors like entry or buyer power were not present. Descriptive statistics, e.g. comparison of prices at retail level over time using scanner data and presence of brands within non-health related FFDD and its sub-segments were also very useful for developing the closeness analysis. As the case dealt with fast moving consumer goods, it was easy to get this information. The analysis was also complemented with AIDS demand estimation at retail level to identify competitive constraint exerted by the parties' brands on each other as well as the role of private label products.

The divestiture of the entire overlap in fresh dairy products, dairy drinks and cheese was requested. In addition, access to raw milk was required to avoid foreclosure of divestment businesses.

EU - Case Study - COMP/M.4439 – Ryanair / Aer Lingus

During the investigation of the merger between the two airline companies, the European Commission

extensively investigated entry and expansion issues /see section 7 of the published decision, pages 137-190) and found significant barriers such as: (i) base advantages, i.e., the strong base of the merging parties in Ireland (Dublin, Cork and Shannon cities); (ii) well established brand and position at their home base - in Ireland; (iii) strong position as customers of Irish airports; (iv) airport congestion at Dublin airport and nearby airports; and, (v) the high risk of aggressive retaliation by the Ryanair/Aer Lingus.

As for the latter element, the Commission found that Ryanair had a reputation of engaging in aggressive competition in case of new entry to Ireland, by temporarily lowering prices and expanding its capacity in order to drive out the new entrant on routes to or from Ireland. The Commission assessed numerous examples where Ryanair attacked the entrant by increasing frequencies and capacity. According to the Commission, Ryanair used its base-advantage by rapidly expanding capacity on routes in order to force new entrants out. Furthermore, on several of the routes, the Commission found that after the exit of the new entrant, Ryanair reduced its frequencies on the route to fewer frequencies than it had when the new carrier entered the route. According to the Commission, this suggested that the frequency increase was rather a strategic one than a reaction to changes in demand. The Commission also found evidence that indicated that following the exit of the competitor, Ryanair increased prices again by reducing capacity.

The analysis of previous examples of entry supported the view expressed by competitors that Ryanair systematically reduces prices and increases frequencies when competitors enter the Irish market. Therefore, the Commission concluded that it would be significantly easier for an even stronger Ryanair/Aer Lingus entity to react aggressively on entry after the proposed merger, since the merged entity would be the dominant operator on literally all routes from and to Ireland.

EU - Case Study –COMP/M.6166 - Deutsche Börse / NYSE Euronext

Both Deutsche Börse and NYSE Euronext are exchanges that offer trading and post-trading services for financial instruments. The presence of strong economies of scope in post-trading services, which acted both as a barrier to entry and as a source of potential efficiencies were at the heart of the investigation.

Deutsche Börse and NYSE Euronext are the only two exchanges that offer a wide scope of European interest rate derivatives and European equity derivatives: futures and options on European interest rates and European stocks. Due to the similar size and scope of their respective collateral margin pools, Deutsche Börse and NYSE Euronext act as potential entrants into each other's successful product areas. The market investigation and internal documents of the parties showed that the two exchanges impose a strong competitive constraint on one another in this respect. For any European derivative they are likely to be able to offer better cross-margining opportunities than any other exchange.

Cross-margining is the technical term for the operation of netting off the risk attached to several assets against each other allowing to reduce the collateral requirement that is needed for achieving a given risk exposure. This is the source of the economies of scope but also the reasons for high barrier to entry for entrants that could not offer better cross-margining.

It was thus concluded that the proposed merger between Deutsche Börse and NYSE Euronext was likely to result in a significant net increase in the total cost of trading given that the merger would have led to the elimination of the closest actual and potential competitor in markets with high barriers to entry.

Deutsche Börse and NYSE Euronext claimed that, post-merger, customers would benefit from having to post less collateral because the two entities would pool their clearing operations into a single clearing house due to improved cross-margining opportunities across correlated contracts. This was considered to be an a priori credible source of efficiencies from the transaction. A complex balancing exercise was then undertaken. Both the anti-competitive effects and the efficiencies could not be clarified to precise numbers, but qualitative indications of these effects were found. In particular, it was established that the increase in the fee level that would be necessary to recover the total of the estimated clearing efficiencies would be much smaller. Moreover, explicit fees are only a small component of the total cost of trading. The impact of the explicit fee increase on the total cost of trading would appear small enough that trading demand would have to be implausibly elastic for the merging firms not to generate such a fee increase.

It was eventually concluded that the transaction would have impeded effective competition in various derivatives markets which could not be outweighed by efficiency benefits. The transaction was prohibited.

Germany - Case study - B3 187/11 Akzo / Metlac

In 2012 the Bundeskartellamt analysed the merger between the Dutch chemical company Akzo Nobel NV and the Italian company Metlac S.p.A. The parties were active in the production of coatings for food and beverage cans and other metal packaging. Akzo had a market share of about 25-30% and Metlac of 10-15%. Apart from the parties, two other large producers were present on the market, Valspar and PPG, with market shares of 25-30% and 20-25% respectively. Qualitative evidence indicated that the merging parties focused their

production on coatings for different packaging formats (Akzo focused on coatings for beverage cans and Metlac on coatings for food cans). A switching analysis confirmed that the two parties were not the closest competitors. The Bundeskartellamt asked buyers about the possibility of changing supplier and as well as about the relevant supplier's changes, which occurred in the period 2007-2011. The results showed that the switching rates between Akzo to Metlac in terms of volume and value were significantly lower than the switching rates between all three largest producer of metal packaging coatings (Akzo, PPG and Valspar) among each other. This analysis led to the conclusion that the three largest producers were "closer" competitors compared to Akzo and Metlac. The merging parties, therefore, did not exercise a strong competitive constraint on each other.

Germany - Case study - B9 84/09 Webasto / Edscha

In 2009 the Bundeskartellamt analysed the merger between Webasto and Edscha, two producers of, among others, convertible roof systems. A total of four suppliers were active in the European market (Webasto, Edscha, Magna and, Karmann) with market shares of between 20% and 30%. Car manufacturers called for tenders for the development and manufacture of new convertible models and subsequently awarded a contract to a single manufacturer for the entire life of the model (single sourcing). The Bundeskartellamt examined how many times the parties met in a tender since 2002 and, for each tender won by one of the parties, it considered which other bidders participated in the tender. Edscha and Magna had met 29 times in a tendering proceeding, Magna-Webasto 20 times, Edscha-Webasto (the parties) 14 times. Magna was found to be by far the more aggressive bidder in the market and the closest competitor of Edscha: in 14 bids that Edscha had won, Magna participated 13 times, while Webasto participated only 3 times. In 12 bids that Webasto won, Magna participated 6 times and Edscha 4 times. The frequency of the parties' encounters in the tenders lead to the conclusion that Webasto and Edscha were not the closest competitors.

Italy - Case study – Simmenthal / Manzotin (Case-C11799)

In December 2012, the Italian Antitrust Authority gave a conditional go-ahead to the purchase of the Simmenthal (Kraft Group) business unit by the Bolton Group (owner of the Manzotin brand).

The Authority found that the merger would have lessened competition substantially in the market for canned beef as the transaction would have created an entity with a large market share (Simmenthal and Manzotin brands had 60-80% of the market, depending on the distribution channels), significantly larger than that of its competitors and owning also the historical leading brand (Simmenthal). The Authority also ascertained significant barriers to entry/expansion to this market, mostly due to limited (independent) production capacity.

All the evidence gathered by the Authority supported such competition concerns, including the econometric evidence produced by the Authority's chief economist team. The case team undertook an econometric analysis to estimate the closeness of the two brands and the potential for price rise as a result of the merger. In particular, the case team estimated an AIDS model in order to get estimates for the own and cross price elasticities of each brand, which in turn were used to construct the diversion ratios. The dataset was provided by the acquirer BOLTON, based on Nielsen data, containing information at brand level on sales of canned meat in value and volume as well as data on price and non-price promotions (in terms of shares of sales). These data were provided for each distribution channel (modern retail, discount, traditional distribution), type of product, format of tin and other characteristics of these products.

In this case, the diversion ratio from Manzotin to Simmenthal was in the order of 60%, showing that the target brand represented a competitive constraint particularly important for the purchaser Manzotin. This value was indicative of the fact that the demand for meat Manzotin is largely made up of consumers that, while showing a marked preference for branded meat, they are not willing to pay for the product Manzotin a higher price than that one charged. In the event of a price increase, about 60% of these consumers prefer to move on Simmenthal. The diversion ratio from Simmenthal to Manzotin is instead of about 33%. These values are well above the thresholds used in the European antitrust practice (14-15% are considered a source of concerns from a competition point of view).

The diversion ratios were used to identify areas for possible price increases as a result of the merger. This information is captured by the Gross Upward Pricing Pressure Index ("Guppi"), which measures the "strength" of the incentive for firms to increase prices. Guppi values were obtained for different values of the gross margin achieved by the producer in a range between 20 and 30%.

It was shown that considering a gross margin value in the range of 20-30%, the Guppi can be estimated in the order of 5-8% for Simmenthal and 15-23% for Manzotin. These values were considered higher than the safe-harbours suggested by the US practice (for indexes of less than 5%, significant unilateral effects of a merger can be excluded while values greater than 10% may be indicative of competition concerns). The case team also

estimated the illustrative price rise (IPR) assuming: firms' linear demand, constant marginal costs and margins of 20-30%. The market average price increase determined by the concentration was estimated in the order of 6-9%. The IPR may reach 21% for the demand satisfied by Manzotin and 8% for that of Simmental, depending on the margin.

The Authority accepted the remedies presented by Bolton and made them binding; they included the sale of the Manzotin business unit of Bolton (the acquirer) to a third party having suitable production capacity of canned beef. The assets to be sold will be comprised of the intellectual property rights of the brand, the existing production contracts, any stock and all the other trade information relating to the brand. See the [decision](#) (in Italian only) and the [press release](#) in English.

Netherlands - Case Study - KPN/CAIW (Case 7204)

This case concerns the acquisition of a regional service provider on a hybrid-fiber-coax (HFC) network in the Netherlands, by the incumbent national telecom operator which provides its services based on its copper network in that region. Parties proposed to upgrade both the HFC and the copper network to a full glass-fiber network and provide access to this network to potential entrants.

One of the aspects of the assessment was whether potential entrants would be able to profitably enter the market. The Authority for Consumers and Markets has assessed the (i) likelihood, (ii) timeliness and (iii) sufficiency of entry by conducting a thorough business case analysis. In this analysis estimates were made, amongst others, of the fixed and variable costs of providing services and the evolution of market demand. Information was obtained from the merging parties, other market participants and experts. A business case analysis like this led to very useful insights on the likelihood, timeliness and sufficiency of entry, although the outcome of the model can be sensitive to the underlying assumptions applied (i.e. future demand, switching behaviour). The merging parties decided to cancel their merger agreement after receiving the Statement of Objections.

South Africa - Case study - Investec Bank - RJ Southey Merger

In 2007, the South African Competition Commission received a merger filing where Investec intended to acquire all the shares in RJ Southey. The merger involved Investec which had a controlling interest in DCD Dorbyl acquiring RJ Southey. Both DCD Dorbyl and RJ Southey were active in the market for ship repair and marine blasting. The market was defined as regional. There were two other major ship repairers and the barriers to entry in the market were high. The market was also characterized by subcontracting; where a repairer would secure the contract for repairing a ship and then subcontract certain tasks like marine blasting to the other ship repairers or through a joint venture between the merging parties.

The Commission was concerned that the merger would lead to an environment conducive to coordinated effects. This was due to increased transparency (the ship repairers would have information on prices charged for the projects, they knew the capabilities of each firm, and a further barrier was that the port terminal was allocated to the firms) and new links created by Investec which through DCD Dorbyl had board representation and would have appointed board members at RJ Southey post-merger and thus enhanced coordination.

The Commission recommended an approval with the conditions that Investec would divest its shares from RJ Southey within a 12 month period as its rationale for the transaction was premised on investment opportunities. The Competition Tribunal approved the merger with the condition proposed by the Commission

South Africa - Case study - Trident Steel

In **Trident Steel** (Trident Steel (Pty) Ltd and Dorbyl Ltd,) the Competition Tribunal identified three types of efficiencies. Firstly, dynamic efficiencies associated with innovation and which improve product service or quality. Secondly, production efficiencies which allow firms to produce more or better quality output with the same amount of input. Third, pecuniary efficiencies such as "tax savings or lower input costs resulting from improved bargaining power with suppliers." The first two categories would generally constitute 'real efficiencies' while pecuniary efficiencies would not. The claimed efficiencies must be quantified, verifiable and must be merger specific. Finally, the Tribunal also indicated that "where efficiencies constitute "real efficiencies" and there is evidence to verify them of a quantitative or qualitative nature, evidence that the efficiencies will benefit consumers, is less compelling." See also another case: Tongaat-Hulett Group Ltd and Transvaal Suiker Bpk & Others, Case No.: 83/LM/Jul00.

South Africa - Case study - Pioneer Hi-Bred / Pannar Seed

More recently, the question whether efficiencies could be sufficient to offset the lessening of competition resulting from a merger was again argued in the highly publicised transaction of **Pioneer Hi-Bred / Pannar**

Seed (Pioneer HI-Bred International Inc and Pannar Seed (Pty) Ltd,). The merging parties argued that the implementation of the transaction will bring about certain dynamic efficiencies such that the merged entity would *inter alia* be able to produce new, higher-performing hybrids more efficiently and effectively (hybrids refer to cross-bred maize plants that are produced from the cross-breeding of two “pure” maize lines).

In its decision the Tribunal referred to the UK Merger Guidelines and noted that the efficiencies must also be (i) likely, (ii) timely, and (iii) sufficient to prevent a substantial lessening of competition. The Tribunal rejected the parties’ efficiency claims on the grounds that they were not merger specific, sufficient, timely and likely to be passed on to consumers. The parties appealed the Tribunal’s decision to the Competition Appeal Court (“CAC”).

The Competition Appeals Court (“CAC”) firstly considered the specific dynamics of the market and noted that where it is *“dominated by innovation competition, verification of the existence of such efficiencies, rather than their precise quantification, should be emphasized.”* The CAC highlighted (with reference to academic writers) the differences between static efficiency gains and long term efficiency gains and the importance to give due consideration to innovation in merger analysis. In this regard the CAC indicated that innovation has two roles in merger analysis (see Kats and Shelanski 2005).

First, an assessment must be made on how a transaction *“changes market participants’ incentives and abilities to undertake investments in innovation.”* - the innovation incentives criteria. Second, that innovation can dramatically affect the relationship between the pre-merger market place and what is likely to happen post-merger – the innovation impact criteria. In answering how these criteria should be applied the CAC referred to Katz and Shelanski and quoted *“Under the innovation incentives criterion, one asks how the change in market structure and competition brought about by a merger will likely affect consumer welfare effects on the pace or nature of innovation that might reduce costs or bring new products to consumers. Under the innovation impact criterion, the situation is reversed. It refers not to how market structure will affect innovation but to how innovation will affect the evolution of market structure and competition. Innovation is a force that could make static measures of market structure unreliable or irrelevant, and the effects of innovation may be highly relevant to whether a merger should be challenged and to the kind of remedy antitrust authorities choose to adopt.”*

The CAC considered all of the efficiency claims evidence presented on behalf of the merging parties and was of the view that the Tribunal was wrong to conclude that the claimed efficiencies were not merger specific or timely. It argued that the views of the Tribunal illustrated the *“danger of pursuing immediate static efficiency gains, at the expense of long-term dynamic efficiency improvements...”*

It then turned to answer the “innovation incentives” and “innovation impact” criteria. As regards “innovation incentives” the CAC indicated that the merger will benefit consumers as the transaction will result in innovation and that absent the merger the same level of innovation will not be achieved. As regards the “innovation incentives” criteria the CAC was of the view that the merger is likely to affect the market structure as a more competitive competitor will be created (via the merger) which will be able to challenge the market leader.

It therefore appears that the CAC was of the view that the implementation of the merger would bring about dynamic efficiencies to the benefit of consumers.

Turkey - Case Study - UN Ro-Ro İşletmeleri A.Ş. (Decision dated 01.10.2012 and numbered 12-47/1413-474)

In 2012, the Turkish Competition Authority (TCA) performed an in-depth investigation on exclusionary practices conducted by UN Ro-Ro İşletmeleri A.Ş. (UN Ro-Ro), a maritime transportation company operating ro-ro lines between Turkey and ports in Europe (France and Italy). Determination of dominant position of the undertaking in question was closely linked with the definition of the relevant market. The Department of Economic Analysis and Research of the TCA conducted a research to determine whether seven routes between Turkey-France and Turkey-Italy are substitutable to each other and hence in the same relevant market. The analysis consisted of two stages: (i) estimating an econometric demand model, and (ii) performing the hypothetical monopoly test using the estimated demand elasticities and other relevant data. In the first stage, the demand for the ro-ro lines in question was estimated via logit demand model. The model included time and route fixed-effects. To overcome inconsistency caused by the endogeneity of price, 2SLS method was adopted by using cost variables of the Turkish ro-ro companies as instrumental variables. In the second stage, in order to determine the border of the product market, a full-equilibrium relevant market test (FERM) approach is preferred. The FERM approach suggests using the results of a merger simulation technique to see whether parties to a hypothetical merger are able to increase their prices with more than 5% or 10%. It is similar to SSNIP, but unlike SSNIP it takes into account the possible responses of firms (or products) that are not initially subject to the market definition test. In its analysis, the TCA conducted a series of merger

simulations for hypothetical mergers between alternative ro-ro routes and calculated how much prices will increase after a potential merger between alternative routes. In doing this, the TCA started by simulating price effects of mergers between routes which are close substitutes, then, included other alternative routes in the simulations if the increase in prices is below 5% in the previous simulation. Firms are assumed to play a Bertrand game with differentiated products and unit costs are assumed to be fixed before and after mergers. Results of the TCA depended on the threshold to be taken into account: at 5% threshold, all the ro-ro lines between Turkey and Europe are in the same market, but in case of 10% level, the market should be determined larger as containing other transportation alternatives, like land routes. As a result, the Competition Board decided that the relevant market is the ro-ro business between Turkey and Europe (narrower) relying also on other market specific factors and that UN Ro-Ro has a dominant position in the market and its practices in the market were contrary to Article 6 of the Competition Act.

Turkey - Case Study – OYAK/LaFarge (Decision dated 18.11.2009 and numbered 09-56/1338-341)

The TCA has used the SSNIP test for defining the geographic market in a horizontal merger case in the cement industry. In this case, Oyak Çimento, a cement producer located in the city, Bolu aimed to acquire two plants of its rival undertaking Lafarge, which were located in İzmit and Ereğli, cities located 151 km west of and 159 km northeast of the city Bolu, respectively. Prior to SSNIP test, the demand for the relevant products was estimated econometrically and the own and cross demand elasticities of the products of these producers were obtained from the estimated model. Then, the hypothetical monopolist test has been implemented separately for three regions using the estimated demand elasticities and predicted average costs of the plants.

For the first step, the nested logit demand model was used to estimate the demand elasticities. In this model, cement products were assumed to be differentiated by their degrees of strength and hence the bulk cement products were grouped into three nests according to this criterion. Therefore, for every plant, different items having a particular strength degree have been considered as a distinct “product”. As a technical requirement of the model, a separate category of “other goods” has been defined as the “packaged cement”. Data on other cement producers located in cities around the merging plants are also included in the model. Using data for every city/month pair, the relative market share of a particular “product” of a plant to the market share of “other goods” is regressed to the average price of this particular product, to the market share of that product in the nest to which it belongs, and to these explanatory variables; the plant, city and month fixed effects, the distance between the plant and the city marketed, its square, cost of labor and energy, and two-period lagged prices which were needed as instrumental variables in order to overcome the endogeneity problem that might be caused by correlation between price and unobserved demand shocks. The demand elasticities of every product of a particular plant were calculated using data on market shares, prices and the coefficients estimated in this model.

In the second step, the SSNIP test was implemented separately to cities of Bolu, İzmit and Ereğli. Düzce and Sakarya, which are located between Bolu and İzmit, were also included in the initial regions to be tested. Then, profits of the three hypothetical monopolists operating in those initial regions were calculated before and after 10% price increase. In calculating these profits, all plants located in the same initial region were assumed to be belonging to the same hypothetical monopolist. In addition, the average variable costs of the hypothetical monopolists were assumed to be constant before and after the SSNIP.

The price increases were applied to all products that the hypothetical monopolists produce. Therefore, in calculating the effect of a price increase, in addition to the own-price elasticity, the cross-price elasticities of demand within nest and between nests are also taken into account. Finally, the SSNIP for every three hypothetical monopolist resulted in increase in profits. This result suggested that the initial regions described above constituted relevant geographic markets for every three merging plants. The quantitative evidence for this merger case stopped at this stage and further quantitative assessment was done conventionally depending on parameters of market structures such as market shares, number of undertakings, HHI levels, entry and demand conditions. The merger was allowed along with a divestiture commitment which excludes the plant of Lafarge in Ereğli from the scope of the transaction.

UK - Case study - ME/3777/08 CGL / Somerfield

In retail mergers, the UPP measures can be used as a filter to identify the local areas where competition concerns may not arise post-merger. The UK Office of Fair Trading (OFT) took this approach in its inquiry into the CGL/Somerfield groceries merger, using symmetric isoelastic IPRs of five per cent as a filter to rule out competition concerns in a number of local areas. It used this analysis in conjunction with other evidence, for example on barriers to entry, to conclude that the proposed merger would result in a substantial lessening of competition in 94 local areas as a result of local unilateral effects. The OFT estimated the IPRs using data on the profit margins of parties' stores and diversion ratios at over 400 stores based on customer surveys

undertaken by the parties.

UK - Case study - OFT inquiry into the Anglo American/Lafarge aggregates and cement merger in the UK

This anticipated joint venture between Anglo American plc and Lafarge SA would have brought together two of the four domestic producers of cement. There were concerns about whether imported cement was a full substitute for domestically-produced cement. One of the merging firms appeared to have different incentives from the other cement producers as it used almost all of the cement it produced in its own large ready mix concrete operation in the downstream market. There were customer complaints that the firms did not compete to win their business given that each had an established relationship with a single cement supplier and each were significant enough for their purchasing behaviour to be known to the producers who communicated informally, and they all jointly gathered industry data. Some examples of customer switching may have been related to industry capacity adjustments and thus not evidence of active competition. The merger was referred by the OFT to the Competition Commission for a second phase inquiry. The Competition Commission confirmed the finding of concern about coordinated effects at second phase and a structural divestment was required to resolve this concern.

US - Case Study - H&R Block / TaxAct

In October 2010, H&R Block, the second largest provider of digital do-it-yourself (“DDIY”) tax preparation products in the United States, agreed to purchase TaxAct, the third largest provider. After the merger, H&R Block and Intuit, the largest DDIY provider, would have had 84% of the DDIY market. The U.S. Department of Justice sought to enjoin the merger, arguing that the combination would substantially lessen competition, resulting in higher prices and reduced innovation. At trial, the U.S. DOJ asserted both coordinated and unilateral effects theories, and the court ultimately concluded the evidence supported both.

In support of its coordinated effects theory, the U.S. DOJ argued that TaxAct had a history of acting as a maverick and “disrupting” the market with aggressive pricing, including free tax preparation products. Relying in part on internal documents created by H&R executives, the U.S. DOJ argued that by eliminating an aggressive competitor, H&R Block believed that it could regain control over industry pricing, and H&R Block and Intuit would each have the incentive to offer only low quality free products while maintaining higher prices for paid products. The court did not find it necessary to label TaxAct a “maverick,” but it did determine that TaxAct played a special role in the market that restrained prices and that the merger would make coordinated interaction between H&R Block and Intuit more likely.

In support of its unilateral effects theory, at trial the U.S. DOJ introduced a study prepared by its expert witness of a linear demand Bertrand model simulation. The court determined that although this merger simulation model was an “imprecise tool,” it “nonetheless ha[d] some probative value in predicting the likelihood of a potential price increase after the merger.” In its opinion, the court stated “the results of the merger simulation tend to confirm the Court’s conclusions based upon the documents, testimony, and other evidence in this case that HRB and TaxACT are head-to-head competitors, that TaxACT’s competition has constrained HRB’s pricing, and that, post-merger, overall prices in the DDIY products of the merged firms are likely to increase to the detriment of the American taxpayer.” For more information, including the court’s memorandum opinion, [click here](#).

US - Case study – AT&T/T-Mobile

On March 20, 2011, AT&T Inc. announced plans to purchase T-Mobile USA, Inc. for \$39 billion. Had the merger been consummated, AT&T and T-Mobile would have become the largest wireless carrier in the U.S., and the merger would have eliminated T-Mobile, one of only four national competitors with national networks. The U.S. DOJ sued to block the merger, and in its complaint, it alleged both unilateral and coordinated effects. The DOJ asserted that although smaller providers exist, they were significantly different from the four national carriers and did not have national scope. For instance, smaller regional competitors often lacked a nationwide data network, nationally recognized brands, significant nationwide spectrum holdings, and timely access to the most popular handsets. The DOJ also asserted that to replace the competition lost by the merger, a new entrant would need to have nationwide spectrum, a national network, scale economies, and a strong brand. Due to the time, difficulty and expense of gaining national scope, the DOJ alleged entry would not be likely, timely, or sufficient. The parties abandoned the transaction prior to trial.

US – Case study - FTC v. Staples, Inc. and Office Depot, Inc.

In 1997, the US FTC challenged the proposed merger of Staples and Office Depot, two of the three leading office supply superstore chains in the United States. The federal district court granted the FTC's request for a preliminary injunction blocking the merger. A key issue in the investigation was whether other retailers (e.g., stationary supply stores, mass merchandisers, and warehouse clubs) significantly constrained the pricing of Staples and Office Depot. Compared to these other retailers, office supply superstore chains generally offer more variety of office supplies and lower prices.

The FTC presented a unilateral effects theory (in a market with differentiated products) that office superstore chains provide the primary competitive constraint on each other's pricing. Evidence from the parties' documents demonstrated that the two chains charged lower prices for office supplies in cities where they competed head-to-head relative to cities where they did not. This suggested that prices would increase after the merger in areas where competition between Staples and Office Depot would be eliminated.

Econometric evidence played an important role in confirming what the documents showed. The FTC performed extensive econometric analysis of the prices charged at individual Staples stores and estimated the effect of having an Office Depot located in the same metropolitan area while controlling for the presence of other competitors and cost differences. The analysis focused on how Staples' prices varied from one store to the next or over time as the number of nearby Office Depot stores varied. The results were used to simulate the effect of the merger in two ways: as closing down Office Depot stores near Staples stores and as converting Office Depot stores into Staples stores. The analysis indicated that Office Depot was a significant constraint on pricing by Staples, a key aspect supporting the Court's decision to block the merger.

For more details on the econometric analysis in FTC v. Staples, please see: [Econometric Analysis in FTC v. Staples](#), and [Merger Analysis at the Federal Trade Commission: Two Recent Retail Cases](#).

The FTC's brief is available [here](#) and citation for the Court's opinion is Federal Trade Commission v. Staples, Inc., 970 F. Supp. 1066 (D.D.C. 1997) (Hogan, J.).

US – FTC v. Whole Foods Market, Inc. and Wild Oats Markets, Inc.

In 2007, the US FTC challenged Whole Foods Market's acquisition of its chief rival, Wild Oats Markets. According to the complaint, the transaction would have eliminated substantial competition between two uniquely close competitors in numerous markets in the operation of "premium natural and organic supermarkets." In defining the relevant markets, the FTC found that premium natural and organic supermarkets are differentiated from conventional retail supermarkets in several respects, and that Whole Foods and Wild Oats constrain one another in ways that conventional supermarkets did not. The complaint alleged that the acquisition would reduce direct competition and would allow Whole Foods to exercise unilateral market power, resulting in higher prices and reduced quality, service and choice for consumers.

The district court denied the FTC's preliminary judgment request (based, in part, upon the testimony of Whole Foods' economic expert) and the parties merged. The FTC then appealed the district court's decision, and the Court of Appeals reversed it. Ultimately the FTC achieved a settlement with Whole Foods to sell 32 supermarkets and related assets to restore the competition that was eliminated.

One of the FTC experts developed econometric evidence on substitution and price effects. He performed an econometric analysis of the effect that entry had on sales and operating margins at Whole Foods and Wild Oats. The magnitude of the effects was used to help identify the relative degree of substitution between the products offered by sellers and the products offered by Whole Foods and Wild Oats. The results were consistent with the proposition that Whole Foods and Wild Oats were the closest substitutes for one another. He also prepared a rebuttal report criticizing the critical loss methodology presented by the parties' expert.

For more details on the econometric analysis, please see the FTC expert reports:

- [Expert Report](#) Public Version
- [Rebuttal Expert Report](#) Public Version
- [Supplemental Rebuttal Expert Report](#) Public Version
- [Expert Report](#) Public Version

The FTC's complaint and other filings are available [here](#).

Other case studies

Other case studies can be found in OECD, [Economic Evidence in Merger Analysis, Policy Roundtables](#), 2011. For instance:

- Descriptive analysis of data: case studies from European Commission (p. 249-250 on scanner data, p. 250 on consumer panel data, p. 251-253 on bidding data).

- Market definition: case studies from New Zealand (p. 196-197), European Commission (p. 253-255 on critical loss and correlation analysis), South Africa (p. 285, section 3.2.4); Turkey (p. 216 on Elzinga-Hogarty test, p. 217-219 on SSNIP test and cross elasticity).
- Natural experiments: see case studies from Greece (p. 143-144), New Zealand (p. 197-198, case study n. 3), European Commission (p. 253), United States (p.230).
- Direct assessment of competitive constraints: see case studies from European Commission (p. 257-259), United States (p. 230-232).
- Unilateral effects: case studies from Denmark (p. 118), Israel (p. 155-157 on changes in HHI), Turkey (p. 219 on price concentration studies and p. 220 on diversion ratios), South Africa (p. 284-285 on diversion ratios); United States (p. 232 on changes in concentration).
- UPP measures: case studies from Japan (p. 164), Korea (p. 171-173), European Union (p. 255-256), United Kingdom (p. 225-227).
- Demand estimation/Merger simulation: case studies from New Zealand (p. 197), European Commission (p. 256-257), South Africa (p. 284, paragraph 3.2.1).
- Coordinated effects: case studies from Israel (p. 153-155), European Commission (p.246-247).

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