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Vertical Mergers in the Technology, Media and Telecom Sector

Background Note by the Secretariat

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More documentation related to this discussion can be found at:

https://www.oecd.org/competition/vertical-mergers-in-the-technology-media-and-telecom-sector.htm

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Vertical Mergers in the Technology, Media and Telecom Sector

Background Note by the Secretariat[*]

Vertical mergers are increasingly becoming a focus of attention, due to a number of recent high-profile cases in the technology, media and telecom (TMT) sector. Evidence suggests that vertical mergers are generally pro-competitive, as they are driven by efficiency-enhancing motives such as improving vertical co-ordination and realising economies of scope. However, in a few cases vertical mergers may indirectly harm competition, by increasing the risk of anti-competitive behaviour post-merger, such as foreclosure and horizontal collusion. Competition harm is potentially higher when foreclosure enables a vertically-integrated firm to create entry barriers, gain bargaining power or avoid market regulation, which could arguably occur within the TMT sector. Building on previous OECD work, this background note discusses the assessment of vertical mergers, bringing together insights from economic theory, empirical evidence and recent case law in the technology, media and telecom sector.

[*] This paper was written by Pedro Gonzaga and Gabriella Erdei of the OECD Competition Division, with comments from Antonio Capobianco and Sabine Zigelski of the OECD Competition Division.

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1. Introduction

1. Vertical mergers involve the integration of two or more firms operating at different stages of the supply chain, while horizontal mergers take place between direct competitors and conglomerate mergers between unrelated businesses (OECD, 1993[1]) (ICN & CMA, 2018[2]). The main purpose of vertical integration is to substitute market exchanges with internal exchanges within the boundaries of the firm (Coase, 1937[3]). This can either be achieved with forward integration in a downstream market (e.g. television broadcaster acquires telecom operator) or backward integration in an upstream market (e.g. computer manufacturer acquires producer of electronic components).

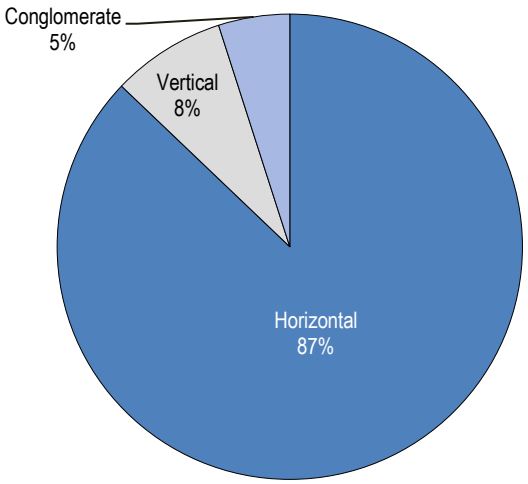
2. Vertical mergers are traditionally presumed pro-competitive, as they are generally driven by efficiency-enhancing motives. Moreover, as vertical mergers bring together non-competing firms whose interests are aligned with consumers,[1] they can only harm competition indirectly, by potentially increasing the risk of anti-competitive conduct post-merger. It is therefore not surprising that vertical mergers account for less than 10% of total antitrust intervention (Figure 1.1), as competition authorities widely recognise that these transactions are substantially less likely to significantly impede competition than horizontal mergers (European Commission, 2008[4]).

> *Horizontal mergers combine competitors. By definition, a merger of competitors directly and necessarily reduces competition by eliminating a substitute. (…) In contrast, vertical mergers do not combine substitutes, and in fact often involve complements, such as a product plus distribution or a critical input to a complex device. Where horizontal mergers reduce competition on their face – though that reduction could be minimal or more than offset by benefits – vertical mergers do not. Instead, to determine whether a vertical merger threatens competitive harm requires predictions about the post-merger conduct of the merged firm where theoretical predictions are ambiguous. (FTC, 2018[5])*

3. Antitrust policy has traditionally given a favourable treatment to vertical mergers, in part motivated by proponents of the Chicago School – such as Richard Posner, Robert Bork and Frank Easterbrook – who broadly argue that vertical mergers should be legal per se or at least nearly so (Salinger, 2014[6]). One of their most well-known arguments is the single monopoly profit theory, which posits that a monopolist cannot vertically extend its market power in an upstream or downstream market, suggesting that enforcement against vertical mergers results from *"the simple arithmetical error of counting the same market power twice."* (Bork, 1978[7]). Another common argument is the successive monopoly result, which shows that vertical integration eliminates double mark-ups and therefore leads to lower prices (Spengler, 1950[8]).[2]

4. The lenient treatment of vertical mergers by competition authorities has received criticism by post-Chicago scholars, including Jonathan Baker, Steven Salop and Michael Salinger, who often advocate for more vigorous antitrust enforcement (Salop, 2018[9]). These authors have developed many theories explaining how vertical integration could increase the risk of anti-competitive behaviour, arguing that the Chicago critique *"should not be credited as a basis for presuming that vertical mergers or other exclusionary conduct are neutral or pro-competitive."* (Baker, 2014[10]).[3] The post-Chicago literature concludes that vertical mergers have an ambiguous effect on consumers, depending on the trade-off between efficiencies and potential anti-competitive effects (Salinger, 2014[6]).

Figure 1.1. Merger intervention by nature of concern in 2017



Note: The reported figures are based on 2017 data on merger control activity from 26 jurisdictions, including Australia, Canada, the European Union, Japan, South Korea, Turkey, the United States and several OECD key partners. In 2016, vertical and conglomerate mergers accounted for 10% of total merger intervention.
Source: Allen & Overy (2018), "Global Trends in Merger Control Enforcement", http://www.allenovery.com/SiteCollectionDocuments/Global%20trends%20in%20merger%20control.pdf.

5. Despite existing concerns about the anti-competitive risks of vertical mergers, empirical evidence seems to systematically support the view that vertical integration enhances consumer welfare. According to one of the most comprehensive surveys of empirical studies in this area, *"evidence on the consequences of vertical mergers suggests that consumers mostly benefit from mergers that firms undertake voluntarily"* (Lafontaine and Slade, 2007[11]). A more recent survey reviews empirical studies published after 2008 and reaches very similar conclusions (Global Antitrust Institute, 2018[12]). As a result, current economic thinking seems to be settling around the conclusion that vertical mergers are generally pro-competitive and only pose competition concerns in rare circumstances.

6. The longstanding debate on vertical mergers is now gaining renewed interest due to an ongoing wave of high-profile cases in the technology, media and telecom (TMT) sector. Competition authorities in several jurisdictions have recently reviewed billion dollar transactions such as Broadcom/Brocade, Qualcomm/NXP and AT&T/Time Warner, the last of which led the US Department of Justice (DoJ) to bring the first litigated vertical merger case in 40 years (Wong-Ervin, 2019[13]). At the same time, the US Federal Trade Commission (FTC) and the DoJ are currently in the early stages of discussing new guidelines on vertical mergers, which have not been updated for several decades (Guniganti, 2019[14]).

7. All on-going developments have motivated the OECD Competition Committee to again discuss the competition law enforcement approach to vertical mergers, focusing in particular on the challenges posed by the recent cases in the TMT sector. The last time the Competition Committee looked at vertical mergers was in 2007, when it recognised that these mergers have complex effects, but are generally less likely to pose competition concerns than horizontal mergers (OECD, 2007[15]). The OECD has also previously looked at media mergers (OECD, 2003[16]) and competition concerns in telecommunications (OECD, 2001[17]), although this earlier work addresses competition challenges beyond vertical concerns.

8. Building on previous OECD work, this background note revisits the assessment of vertical mergers within competition law enforcement, taking into account insights provided by economic theory, empirical studies and recent case law. While the framework and methods discussed herein apply to vertical mergers in general, this note uses recent cases in the TMT sector to illustrate practical examples of theories of harm, efficiency effects and remedies. The analysis and research conducted in the context of this background note leads to the following preliminary findings:

1. **Empirical evidence suggests that vertical mergers are mostly pro-competitive or neutral.** To the best of the OECD Secretariat's knowledge, no empirical study to date has found a clearly negative welfare effect of vertical mergers voluntarily undertaken by firms.[4] While some studies identify anti-competitive behaviours post-merger as predicted by economic theory, these are often compensated by efficiency effects, resulting in a net increase in consumer welfare.
2. **The main efficiency effects of vertical mergers result from enhanced vertical co-ordination and economies of scope.** Vertical integration is often a more efficient solution to co-ordinate activities than arms-length contracts, enabling firms to decrease prices and improve quality. Also, economies of scope generate cost savings that are likely to be passed through to consumers, at least partially, in the form of lower prices.
3. **In rare cases, vertical mergers may indirectly harm competition by facilitating anti-competitive conduct post-merger.** Most vertical theories of harm involve the merged entity *excluding competitors* (total foreclosure), *raising rivals' costs* (partial foreclosure) or enhancing *horizontal collusion*. The risk of competitive harm is potentially higher when foreclosure strategies enable a firm to create entry barriers, gain bargaining power or avoid market regulation.
4. **The ability-incentive-effect framework can help identifying vertical mergers that pose competition concerns.** Firstly, the merging parties must have the ability to harm competition, by controlling an important/unique asset (e.g. input, base of customers, complementary good, sensitive information). Secondly, the parties must have a profit incentive to harm competition. Thirdly, the merger must have a negative impact on consumer or total welfare (not on competitors).
5. **Behavioural remedies are often a less restrictive solution to address the risks of vertical mergers than a full prohibition.** While usually inadequate to deal with horizontal mergers, well-designed behavioural remedies might be better-suited to prevent a vertically-integrated firm from behaving anti-competitively post-merger. Common behavioural remedies include supply obligations with non-discrimination clauses, mandatory licensing, interoperability provisions, prohibition of exclusivity contracts and firewalls.

9. The remaining sections of the background note are structured as follows. Section 2 provides a short analysis of the TMT sector that gives context to the illustrative cases and examples in this note. Section 3 describes the three steps of the ability-incentive-effect framework applied in the context of vertical mergers. Section 4 identifies the most important vertical theories of harm. Section 5 identifies the main efficiency effects. Section 6 discusses the application of remedies to vertical merger cases. Finally, Section 7 offers some concluding remarks.

2. The technology, media and telecom sector

10. The assessment of a vertical merger requires a good understanding of the market environment and strategic interaction between the main players involved. This section characterises the TMT sector, describing the economic activities comprised in each of its segments and discussing the multiple vertical relationships along a complex supply chain. This section also discusses the importance of merger and acquisition (M&A) activity within the TMT sector.

2.1. Definition and characterisation of the sector

11. The TMT sector refers to a broad range of economic activities that comprise technology, media and telecommunications. While this industry aggregation is not foreseen in standard industrial classification systems, the TMT abbreviation is popular among investors and traders, probably because many of its economic activities are closely interconnected and the same market players overlap. The TMT sector has gained importance in the last two decades, particularly due to the high rates of return of its technology and media segments. Currently, the sector accounts for 9 of the 10 most profitable companies in the world, and for 13 of the top 20 (BCG, 2018[18]).

12. Within the TMT sector, the **technology** segment is by far the broadest, comprising both the development of intangible goods, as well as the manufacture and distribution of tangible goods. Intangible goods include software, search engines, email, social networks, GPS navigators, internet banking, booking services and music distribution. Tangible goods include materials (substances such as metals, plastic, glass, ceramics and semiconductors[5]), components (elements that constitute part of a device but don't have a purpose or utility on its own, such as processors, memory, drives, transceivers and amplifiers), equipment (items with a specific purpose, such as routers, servers, satellites and tower stations) and consumer electronics (devices for personal use, such as computers, phones, tablets, printers and cameras).

13. The **telecommunication** segment consists of all economic activities required for the provision of long-distance means of communication, through the transmission of signs, words, image, sound or any other form of information. The sector fundamentally comprises companies responsible for investing and maintaining the network infrastructure, as well as telecom operators who provide telecom services, including mobile phone, landline phone, television and internet access. Usually, the largest telecom operators own and share part of the network infrastructure within a region, but there are also smaller non-integrated operators who rely on access to the network of the incumbents.

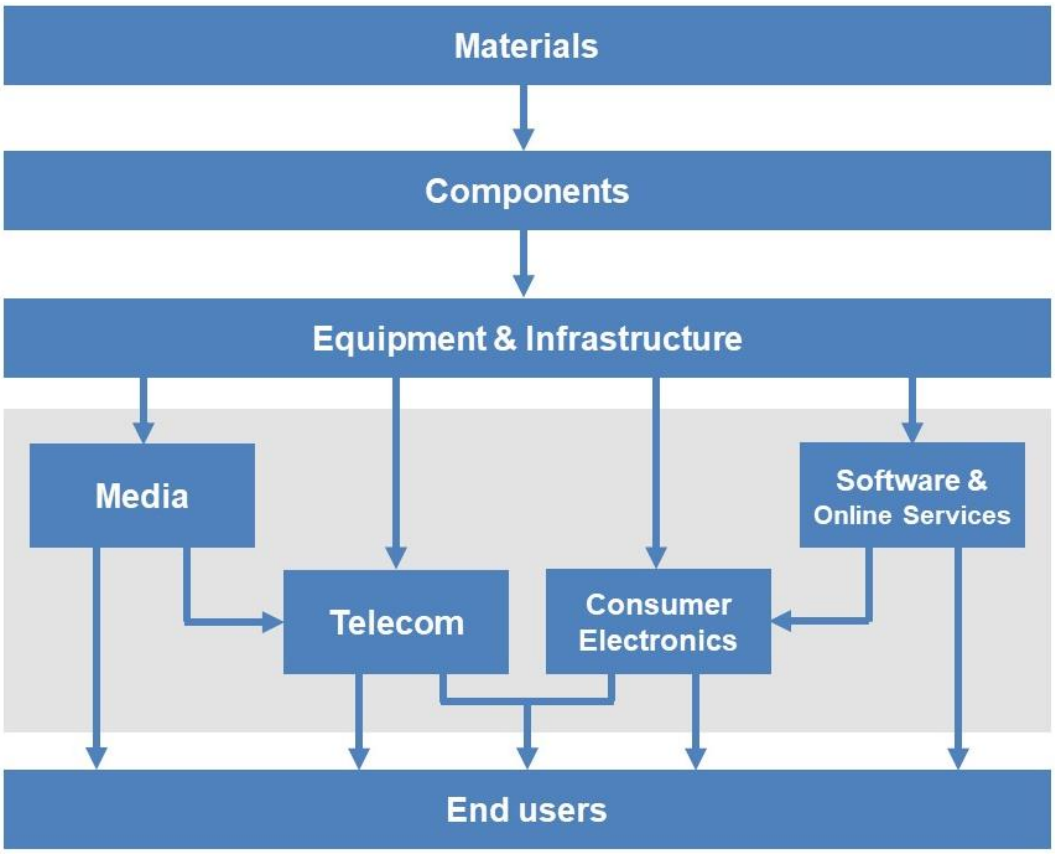
14. Lastly, the term **media** refers to the main means of mass communication that enables the distribution of information and data to large audiences. The media sector incorporates both the production of content, such as news, entertainment, education and research, as well as its distribution through the means of mass communication. Mass media includes the press, television and radio broadcasting, film producing, video streaming, video games, online publishing, social media and podcasting, among others.

15. The economic activities developed within the TMT sector are all interconnected in a complex **supply chain** (Figure 2.1), whose analysis is crucial to understanding the wide range of vertical relationships between the main players in the industry. At the top of the supply chain is the production of materials, which are sold and integrated in components that, in turn, are used to build the equipment and infrastructure supporting all remaining

activities of the sector. The downstream activities include the media, the development of software and online services and, further downstream, telecom services and consumer electronics. The supply chain concludes with the end users, which comprise not only final consumers, but also sellers, advertisers and other agents.

16. The type of vertical relationships observed between different companies and end users may substantially vary along the supply chain, due to the existence of a wide variety of business models within the TMT sector. Some media companies, software developers and providers of online services directly supply their services to end users, including providers of over-the-top content and online booking platforms. Other media companies and software developers instead provide their products indirectly through a telecom operator (e.g. television channels) or through a retailer of consumer electronics (e.g. pre-installed software). Moreover, telecom operators and manufacturers of consumer electronics can choose to provide their services independently or to bundle their services, for instance by selling smartphones and telecom contracts as a package.

Figure 2.1. The supply chain of the TMT sector

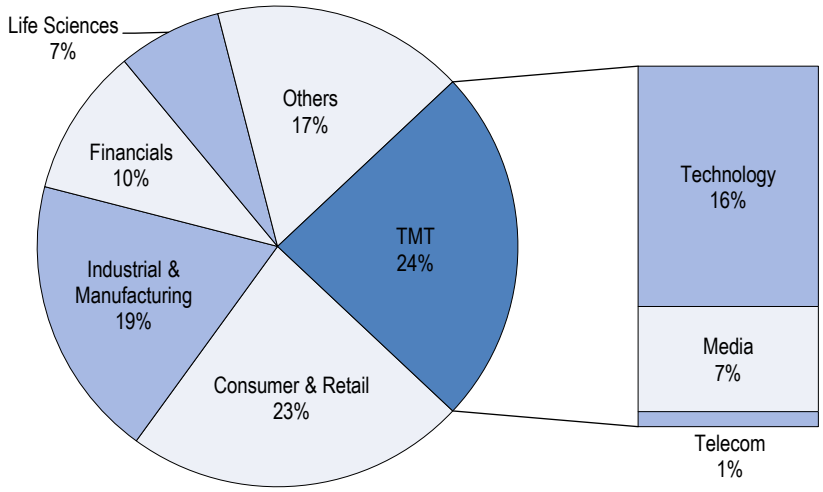


Note: Media companies and providers of online services often take the form of multi-sided platforms, providing therefore services to more than one group of users.

2.2. Merger activity within the sector

17. The TMT sector has a high incidence of mergers and acquisitions, exceeding the volume of transactions in any other sector and currently accounting for around one quarter of the total M&A activity around the world (Figure 2.2). Within the TMT sector, the vast majority of mergers takes place within the technological segment (16%), which is relatively new as compared to other industries and, therefore, might still be undergoing a process of market consolidation. The substantial number of mergers within the TMT sector is also explained by the fact that the sector is very dynamic and characterised by the constant entry of firms with innovative business models, many of which are acquired by the established incumbents.

Figure 2.2. Mergers and acquisitions in the TMT sector in 2017

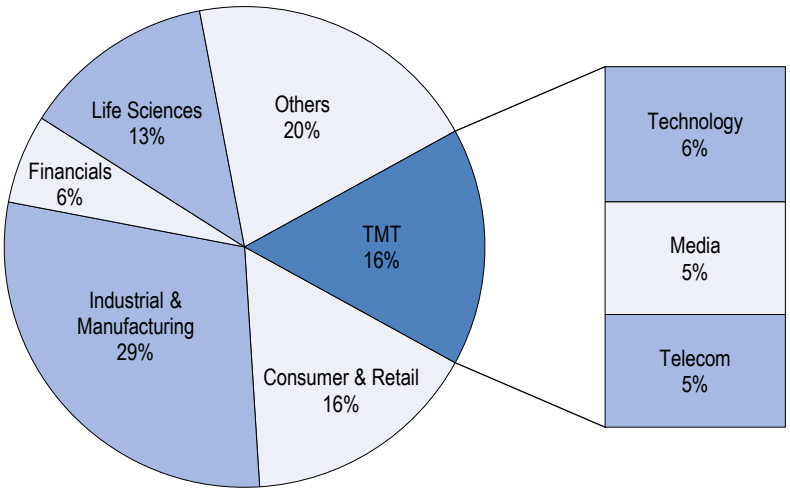


Note: Other categories include Energy & Natural Resources (6%) and Transport & Infrastructure (3%). The reported figures are based on 2017 data on merger control activity from 26 jurisdictions.
Source: Allen & Overy (2018), "Global Trends in Merger Control Enforcement", http://www.allenovery.com/SiteCollectionDocuments/Global%20trends%20in%20merger%20control.pdf.

18. The volume of potentially anti-competitive mergers within the TMT sector is also high, corresponding to 16% of the total volume of merger intervention around the world – though this value is nearly half of the level of intervention in industrials and manufacturing (Figure 2.3). Within the TMT sector, mergers in telecom appear to be the most problematic, accounting for 5% of all merger intervention, despite the small share of M&A activity within the telecom segment (1%). In contrast, technology only accounts for 6% of merger intervention, even though this segment has a much larger share of M&A activity (16%), suggesting that most acquisitions of high-tech firms do not pose competition concerns.

19. The considerable volume of merger intervention within the TMT sector is particularly surprising given that many of these mergers are of a vertical or conglomerate nature and, as such, should have less scope to restrict competition. One possible explanation for the emphasis given by authorities to TMT mergers could be the fact that the sector has certain structural characteristics that increase the risk of anti-competitive effects, such as the prevalence of successive oligopolies along the supply chain, or the existence of market regulation. However, it is also plausible that the structural characteristics of the TMT sector are not as likely to pose competition concerns as they might initially appear (Yoo, 2002[19]) and that the current antitrust focus on the sector is partially unjustified.

Figure 2.3. Merger intervention in the TMT sector in 2017



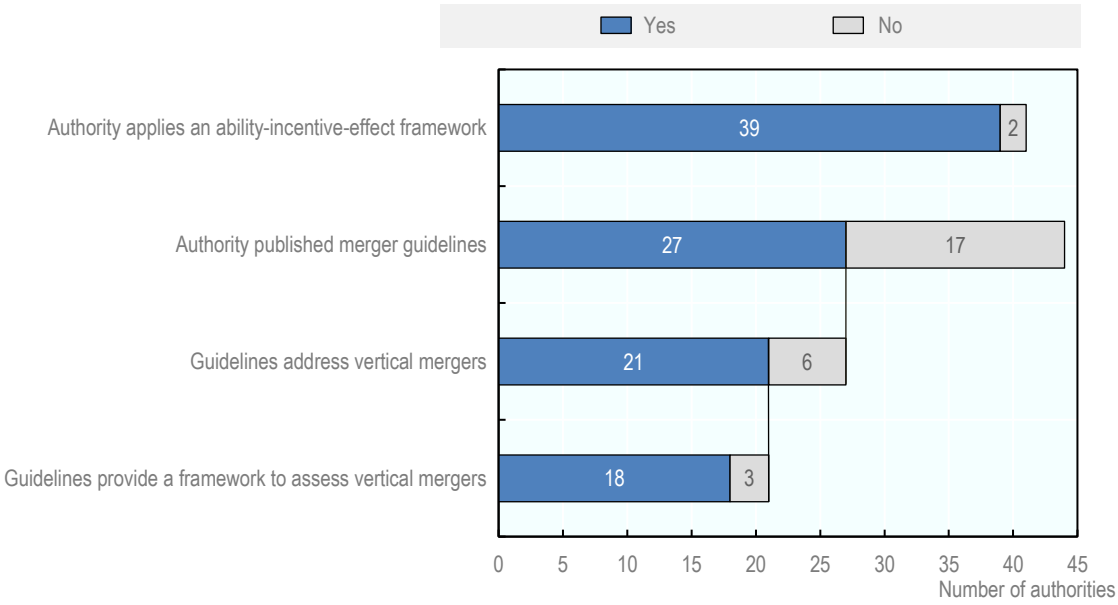
Note: Other categories include Energy & Natural Resources (6%) and Transport & Infrastructure (7%). The reported figures are based on 2017 data on merger control activity from 26 jurisdictions.
Source: Allen & Overy (2018), "Global Trends in Merger Control Enforcement", http://www.allenovery.com/SiteCollectionDocuments/Global%20trends%20in%20merger%20control.pdf.

3. The assessment framework for vertical mergers

20. Vertical mergers are usually assessed under a three-step analytical methodology known as the ***ability-incentive-effect framework*** (European Commission, 2008[4]) (OECD, 2007[15]). The first step of the framework consists of determining whether the merging entity has the ***ability*** to harm competition post-merger, which would require it to have at least some degree of market power. The second step is to analyse if the merging entity has an ***incentive***, that is, a profit motive to distort the competitive process. The last step is to measure the likely ***effect*** of the vertical merger on competition, provided that both ability and incentive have been established. This section discusses each of the three steps of the analysis in turn.

21. While the ability-incentive-effect framework is generally applied by almost all competition authorities to the assessment of vertical mergers, more than half of the jurisdictions do not have guidelines explaining how the framework should be applied in the context of vertical mergers (Figure 3.1). Other countries have outdated guidelines that do not take into account more recent economic thinking or agency practice (Kwoka and Moss, 2012[20]) (Salop and Culley, 2016[21]) (Langenfeld, 2016[22]). The FTC and the DoJ are now in the early stages of discussing new guidelines for vertical mergers (Guniganti, 2019[14]), an action that could potentially help to improve the transparency and effectiveness of merger review not only in the United States, but also in other jurisdictions that may decide to follow suit.

Figure 3.1. Guidelines and frameworks for vertical mergers



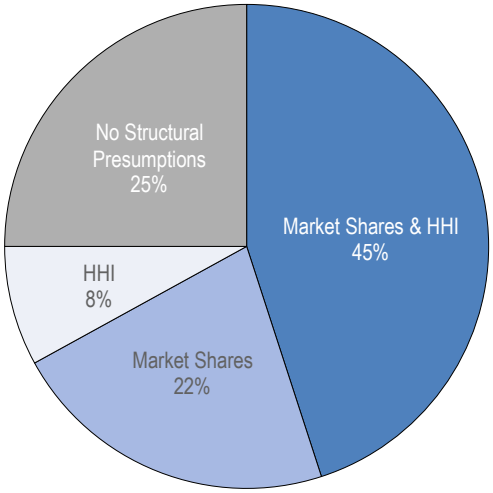
Note: Based on an ICN survey involving 44 competition authorities.
Source: ICN & CMA (2018), "ICN Vertical Mergers Survey Results", http://icn2018delhi.in/images/ICN-survey-report-on-vertical-mergers-17-03-18.pdf.

3.1. Ability to harm competition

22. As the ability of a firm to harm competition requires a minimum level of market power, many competition authorities use **safe harbours** based on market shares or concentration measures such as the HHI[6] (Figure 3.2). This way, if these standard measures are below an established threshold – usually ranging from 25% to 30% for market shares and from 1 000 to 2 500 for the HHI (ICN & CMA, 2018[2]) – authorities make a structural presumption that the parties have little or no market power and are therefore unlikely to be able to harm competition. The safe harbours established for vertical mergers do not appear to differ significantly from those applied to horizontal mergers, with the exception that authorities must naturally look at two distinct markets instead of one.

23. While the use of safe harbours can help improve the allocation of the scarce resources of enforcers towards more problematic merger cases (OECD, 2017[23]), authorities should be aware of the limitations of market shares and concentration measures as indicators of market power. Such static measures fail to account for dynamic effects, namely the capacity of established firms to innovate and rapidly expand their market share (Salop and Culley, 2016[21]). For that reason, some authorities combine market shares and HHI indicators with other considerations, such as whether the merger involves a recent entrant, an important innovator, a "maverick", or significant cross-shareholdings between market participants (European Commission, 2008[4]).

Figure 3.2. Types of safe harbours used in vertical mergers



Note: Based on an ICN survey involving 36 competition authorities. Market share thresholds are usually between 25% and 30%, and HHI thresholds range from 1 000 to 2 500.
Source: ICN & CMA (2018), "ICN Vertical Mergers Survey Results", http://icn2018delhi.in/images/ICN-survey-report-on-vertical-mergers-17-03-18.pdf.

24. In cases where the vertical merger falls outside of the safe harbours, the competition authority must make a judgment about the ability of the merged entity to harm competition, considering alternative **theories of harm**. Most common theories in vertical merger cases involve the risk that the merging entity behaves anti-competitively post-merger, namely by *excluding competitors* (total foreclosure), *raising rivals' costs* (partial foreclosure) or enhancing *horizontal collusion* – see section 4. This is in opposition to horizontal mergers, where there is a direct risk of upward pressure on prices or downward pressure on quality, even in the absence of anti-competitive behaviour.

25. When assessing the ability of a vertically-integrated firm to behave anti-competitively post-merger, it is important to consider whether any of the merging parties owns or controls an **asset** that could be used to foreclose competitors or to enforce collusion. Depending on the particular theory of harm, this asset could be an input, a customer base, a complementary product or commercially sensitive data. Most importantly, in order to establish the *ability* to harm competition, the asset must have two essential characteristics to make any anti-competitive strategy effective:

1. The asset must be **important**, in the sense that denying access or misusing the asset in any way can substantially harm competitors and prevent them from competing effectively.
2. The asset must be **unique**, implying that competitors cannot easily access alternative assets in order to avoid harm or to retaliate.

26. The importance of identifying the relevant underlying asset and analysing its characteristics is illustrated in the *Apple/Shazam* merger (Box 3.1). One of the main concerns in this case was that Apple would misuse Shazam's data to foreclose competitors. However, the European Commission concluded that Apple would not have the ability to engage in such a practice, because Shazam's data was neither unique in any way, nor did it contain sensitive information that could be used to significantly harm Apple's competitors.

Box 3.1. The *Apple/Shazam* merger

The parties and the transaction

In 2017, Apple announced its acquisition of Shazam. The acquisition was firstly notified to the Austrian Competition Authority, who submitted a referral request to the European Commission, jointly with the competition authorities of France, Iceland, Italy, Norway, Spain and Sweden. Although the acquisition did not meet the turnover thresholds of the EU Merger Regulation, the Commission accepted to assess the merger in February 2018.

Apple is a multinational technology company designing, developing and supplying consumer electronics, computer software and online services. It is also the operator of Apple Music, one of the largest music streaming services in Europe. Shazam is a UK-based developer of a music recognition application that can be installed on smart devices in order to identify music and movies from a small sample captured by the microphone of the device. As the online services offered by Apple Music and Shazam are complementary and do not compete, the merger was investigated for potential vertical and conglomerate effects.

Assessment of the case

The European Commission examined the risk that the acquisition would result in the exclusion of competing music streaming services, focusing in particular on two main theories of harm. The first concern was that, post-merger, Apple would gain access to commercially sensitive data about rivals' customers through Shazam, and that Apple would misuse such information to target customers and convince them to switch to Apple Music, therefore obtaining a unique competitive advantage. In addition, the Commission considered the risk of Apple foreclosing competing music streaming services, by discontinuing any referrals from Shazam to its competitors (Zingales, 2018[24]).

After an in-depth investigation, the Commission concluded that Apple would not have the ability to exclude competitors through any of the potential anti-competitive strategies identified. This was mainly because Shazam's data is not unique (competitors have access to similar datasets) and *"would not materially increase Apple's ability to target music enthusiasts and any conduct aimed at making customers switch would only have a negligible impact"* (European Commission, 2018[25]). Moreover, the Commission concluded that Shazam is not an important entry point to music streaming services, and would therefore not enable Apple to foreclose rivals by restricting their access to Shazam.

Decision

In September 2018, the European Commission cleared the merger unconditionally.

Source: Apple/Shazam, Case M.8788, Commission Decision of 6/9/2018, http://ec.europa.eu/competition/mergers/cases/decisions/m8788_1279_3.pdf.

3.2. Incentive to harm competition

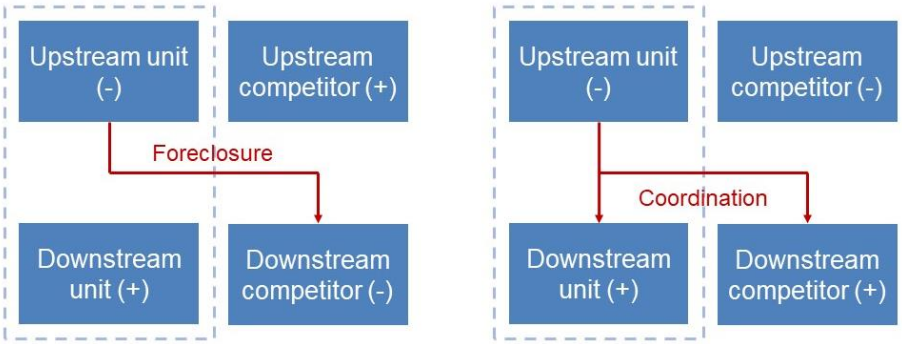
27. The incentive for a firm to vertically integrate for anti-competitive motives is often unclear, as illustrated by the ***single monopoly profit theory***. This theory postulates that a monopolist cannot increase profits by *leveraging* its market power into a downstream or upstream market, because there is only a single monopoly profit to be made along the whole supply chain (Bork, 1978[7]) (Posner, 1976[26]). The economic intuition for this result is that, if a monopolist already earns the entire monopoly profit, any attempt to charge an extra margin in an adjacent market would cause an equivalent margin loss in the primary market. While this theory is often criticised for relying on highly-stylised assumptions and having many exceptions (Baker, 2014[10]) (Elhauge, 2009[27]), it serves to illustrate that even a firm with market power may have no incentive to harm competition through vertical integration.

28. It is nonetheless possible that a non-monopolist, who cannot earn the entire monopoly profit, could vertically integrate with the purpose of *"creating and exploiting market power"* (Stuckey and White, 1993[28]). Moreover, even an apparent monopolist without direct competitors may have its market power constrained by potential competition (Salop and Culley, 2016[21]), countervailing bargaining power (De Fontenay and Gans, 2005[29]) or market regulation (Armstrong, 2002[30]). In such scenarios, vertical integration could be motivated by the prospect of eliminating one or more of these competitive threats, either by foreclosing competitors (Rey and Tirole, 2007[31]) (Salinger, 1988[32]) or by facilitating collusion post-merger.

29. In light of the potential anti-competitive motivations behind a vertical merger, it is important to assess on a case-by-case basis if the theory of harm considered is consistent with **profit incentives**. For that, authorities should measure the impact of potentially anti-competitive behaviour on the profits of the upstream and downstream units of the merged entity, as vertical theories of harm typically involve trading-off a profit in one of the markets against a loss in the other market (Figure 3.3). When assessing the profitability of a certain anti-competitive behaviour, the following information should be considered:

1. Upstream and downstream **diversion ratios**, which measure the percentage of sales lost by a firm that are captured by a competitor following a vertical anti-competitive strategy. Diversion ratios can be obtained through the estimation of discrete choice models of consumer demand (Berry, 1994[33]), as illustrated in *TomTom/TeleAtlas* and *Nokia/Navteq* (De Coninck, 2008[34]), or through surveys to consumers as in *MEO/GMC* (Codinha et al., 2018[35]). When calculating diversion ratios it is important to consider potential capacity constraints.
2. Upstream and downstream **price margins**, which measure the profitability of each unit of sale. Price margins can be calculated from business statements, as well as from confidential information provided by the merging parties and competitors in the context of the merger.

Figure 3.3. Profit incentives within vertical theories of harm



Note: Downstream foreclosure decreases the profit of the upstream unit of the merged entity, due to the lost sales for refusing to supply to the downstream competitor, but increases the profit of the downstream unit, which captures part of the downstream competitor's sales. Likewise, facilitating downstream collusion decreases the profit of the upstream unit of the merged entity, due to the lost sales associated with lower consumer demand, but increases the profit of the downstream unit, which is able to profitably co-ordinate a higher price margin with the downstream competitor. The same reasoning applies to upstream foreclosure and upstream collusion.

30. When establishing incentives in a vertical merger case, competition authorities may also consider the profitability of alternative anti-competitive strategies. For instance, even when excluding competitors (total foreclosure) is a profitable strategy, a vertically-integrated firm is unlikely to engage in such a behaviour if partial foreclosure would generate a higher return. This is illustrated in the *MEO/GMC* case (Box 3.2), where the Portuguese Competition Authority concluded that the merged entity would likely raise rivals' costs (partial foreclosure) by increasing input prices, instead of attempting to exclude its competitors, even though the latter strategy would also be profitable (Codinha et al., 2018[35]).

31. The economic methodology to assess incentives in vertical mergers has recently been subject to debate, following the *AT&T/Time Warner* case (Box 3.3). While the quantitative analysis of the DoJ's expert Carl Shapiro established that AT&T would have an incentive to engage in partial foreclosure (Salop, 2018[36]), the federal district court judge put into question the economic principle that a vertically-integrated firm considers its entire profit when making decisions (Caffara, Crawford and Weeds, 2018[37]).[7] Nonetheless, in the absence of such a principle, it is hard to explain empirical evidence of foreclosure, or to explain why vertical mergers generate so many efficiency effects, many of which can only be materialised if the merged entity considers the profits of its downstream and upstream units.

Box 3.2. The *MEO/GMC* merger

The transaction and the parties

In August 2017, MEO announced its acquisition of GMC to the Portuguese Competition Authority (AdC). MEO is one of the main telecom operators in Portugal, providing telecom services through mobile and fixed networks, including paid television channels. Previously owned by the state, the company is currently a wholly-owned subsidiary of Altice Europe. GMC is the main media company in Portugal, controlling the television studio and content producer Plural, as well as several Portuguese-speaking television channels (under the TVI brand) and radio stations.

Assessment of the case

The AdC performed an in-depth investigation to evaluate whether the merged entity would have the ability and incentive to exclude competitors through total input foreclosure, or at least to raise rivals' costs through partial input foreclosure. After establishing that the TVI channels are an important input for MEO's competitors, who have no good substitutes available, the AdC assessed whether the merged entity would have an incentive to exclude competitors or to raise rivals' costs, using data collected from the parties and from consumer surveys. The authority found that both strategies would be profitable, though it considered it more likely that the merged entity would attempt to raise rivals' costs through partial foreclosure instead of entirely denying access to TVI channels. The AdC concluded that the merger would not only enable MEO to increase prices and deteriorate quality due to less competitive pressure from current competitors, but it would also create barriers to entry of alternative low-cost online providers (Codinha et al., 2018[35]).

Decision

In 2018, the AdC terminated the merger proceedings after the notifying parties decided to withdraw the notification. Even though the merging parties proposed a set of behavioural remedies to provide MEO's rivals with access to the TVI channels, the AdC found the commitments insufficient to address the competition concerns, since the remedies proposed would require constant monitoring and could be circumvented or manipulated by the merged entity.

Source: MEO/GMC (Altice/Media Capital), Case Ccent. 35/2017, AdC Decision of 19 June 2018.

Box 3.3. The *AT&T/Time Warner* merger

The transaction and the parties

In October 2016, AT&T announced its intention to acquire Time Warner. AT&T is a US multinational holding and the largest telecom company in the world. It provides mobile and fixed telephone services through its subsidiary AT&T Communications. It is also a multichannel video programming distributor (MVPD) through DirecTV and DirecTV Now. Time Warner is a media company that owns and produces video content through its subsidiaries CNN, HBO, DC Comics, Warner Bros. Studios and Turner Broadcasting System. Time Warner sells its video content to MVPDs, including AT&T and several of AT&T's direct competitors.

Assessment of the case

The US Department of Justice (DoJ) concluded that the transaction would increase the bargaining power of the merged entity, allowing it to charge higher prices and to set less favourable terms for the media content sold to competing MVPDs. The strong bargaining position of the merged entity would be reinforced by the threat of input foreclosure: if competitors did not agree to pay higher prices for content, they would be denied access to the programming of Time Warner and lose subscribers, who would likely switch to DirecTV. The primary expert of the DoJ, Professor Carl Shapiro, developed a bargaining model to provide economic evidence of this effect.

The parties argued that the transaction would nonetheless result in efficiency effects that would benefit consumers, particularly by enabling a price reduction through the elimination of double marginalisation (EDM). This efficiency was accepted by the DoJ, different from similar cases in the TMT sector where the elimination of double marginalisation was rejected by the respective authority.[1] The parties also claimed that the merger would allow Time Warner to improve targeted advertising by using consumer data collected by AT&T, increasing add revenues and potentially enabling the merged entity to reduce prices to consumers.

The DoJ decided to challenge the transaction, concluding that the unilateral effect on prices due to enhanced bargaining power outweighed any efficiency effects. The main concern of the DoJ was hence that the merged entity would raise the price charged to subscribers and would *"use its increased power to slow the industry's transition to new and exciting video distribution models that provide greater choice for consumers"* (DoJ, 2017[38]).

Decision

In June 2018, the US federal court rejected the economic evidence provided by the DoJ and gave the green light for AT&T's acquisition of Time Warner. The judge of the federal court also turned down some of the economic arguments used in the analysis, rejecting the idea that a merged entity considers its full profit (downstream and upstream) when negotiating with its distributors. The judge, however, accepted the efficiency claim that the merger would eliminate double marginalisation, even though such efficiency effect would require the merged entity to consider its entire profit when setting prices to subscribers.

The DoJ filed an appeal against the decision, claiming that the federal district court misunderstood and misapplied fundamental economic principles. The appeal was rejected by the US Court of Appeals for the District of Columbia in February 2019.

Notes: [1]See, for instance, *United States v Comcast*, Case 1:11-cv-00106 (DDC, 2011), https://www.justice.gov/atr/case/us-and-plaintiff-states-v-comcast-corp-et-al.
Source: United States v AT&T Inc., Case 1:17-cv-02511 (DDC, 2017), https://www.justice.gov/atr/case/us-v-att-inc-directv-group-holdings-llc-and-time-warner-inc.

3.3. Effect on competition

32. The last step in the analytical framework of vertical mergers is to calculate the likely effect of the transaction on competition, by balancing the risk of competition harm against any merger-specific efficiencies. In other words, once it is established that the merged entity has the ability and incentive to engage in an anti-competitive strategy post-merger, it is necessary to evaluate if such conduct would have a probable and significant harmful impact on the competitive process, and whether such harm would not be offset by merger-specific efficiency effects. For this, it is necessary to establish a legal standard to quantify the net impact of the merger.

33. Generally the decision to clear or challenge a vertical merger should be based on the expected impact of the transaction on **consumer welfare** or **total welfare**,[8] as opposed to considering the impact on any particular competitor. This guarantees that the resources of competition authorities are efficiently allocated to promote the competitive process as a whole, instead of serving the private interests of parties who could be worse off as a result of a merger. For instance, even though the joint venture and subsequent merger *KPN/Reggefiber* were contested by two competitors, the Netherlands Authority for Consumers and Markets (ACM) cleared both with access remedies, as that decision was seen to promote competition and bring benefits for consumers and businesses (Box 3.4).

34. The welfare effects of vertical mergers are the subject of a longstanding debate and remain a controversial issue in economic theory to date (Crawford et al., 2018[39]). On the one hand, the theoretical work proposed by the Chicago literature suggests that vertical mergers enhance or, at least, do not decrease welfare (Bork, 1978[7]) (Perry, 1989[40]). On the other hand, the so-called post-Chicago literature proposes alternative theories of harm and concludes that vertical mergers have an ambiguous welfare effect, depending on the relative size of efficiencies and indirect anti-competitive effects (Riordan, 1998[41]) (Hart and Tirole, 1990[42]) (Ordover, Saloner and Salop, 1990[43]) (Salinger, 1988[32]). There are, however, disagreements between post-Chicago scholars concerning the circumstances under which a vertical merger could decrease consumer welfare.[9]

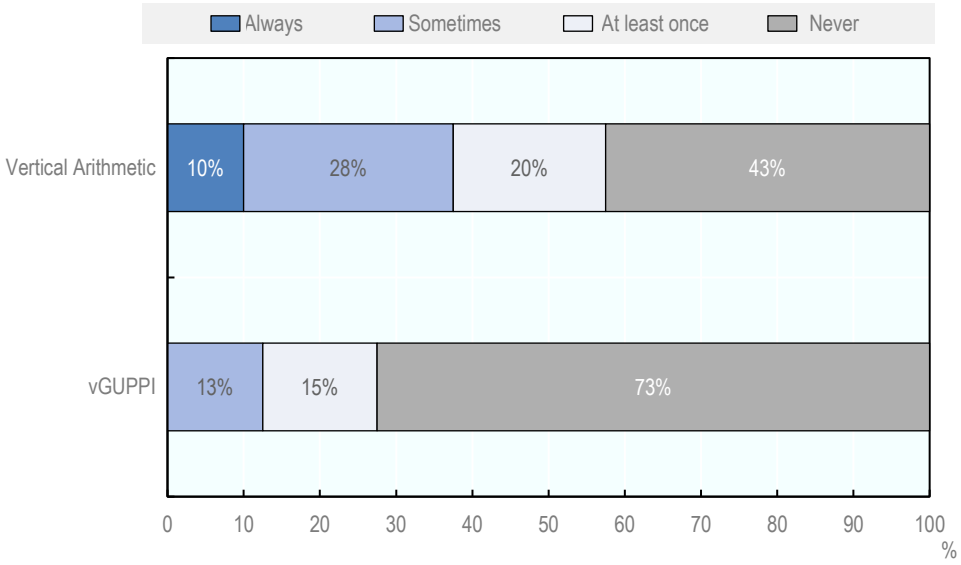
35. Despite the contradicting predictions of different economic theories, **empirical evidence** seems to support the view that vertical mergers are either welfare-enhancing or competitively neutral (Wong-Ervin, 2019[13]). Among 34 studies reviewed in 2 surveys of the empirical literature (Lafontaine and Slade, 2007[11]) (Global Antitrust Institute, 2018[12]), 27 of them suggest that vertical integration had a positive or neutral impact on consumer welfare (see Annex). The remaining studies do not identify clear welfare effects.[10] This suggests that no empirical study to date has found a significant decrease in consumer welfare as a result of vertical mergers voluntarily undertaken by firms, even though studies tend to focus on potentially problematic cases that are investigated by authorities (Lafontaine and Slade, 2007[11]).[11]

36. The existing empirical evidence suggests that it is important to support enforcement decisions in vertical mergers with a quantitative analysis of the likely welfare effects of the merger. As shown by some of the studies reviewed in the surveys, even when a vertical merger leads to foreclosure, efficiency effects may outbalance anti-competitive effects and result in a better outcome for consumers (Chipty, 2001[44]) (Mullin and Mullin, 1997[45]). Therefore, showing that a vertically-integrated firm would have the ability and incentive to foreclose is not sufficient to establish competition harm, even if the merger would likely lead to the exclusion of a competitor.[12] It is also necessary to quantify the net impact of the merger on competition.

37. There are currently some **quantitative methods** available to measure the price effect of vertical mergers, which balance unilateral effects from foreclosure against merger-specific efficiencies. The most common method is vertical arithmetic, used for instance by the United States Federal Communications Commission (FCC) in the review of *Comcast/NBCU* (Baker, 2011[46]). A more recent and less common method is the vGUPPI test which scores a vertical gross upward pricing pressure index (Moresi and Salop, 2013[47]), implemented for example by the CMA in *Tesco/Booker* (Oxera, 2018[48]). Both of these methods have still a short record of being used by authorities (Figure 3.4), who often use other sources of evidence to balance anti-competitive effects against efficiency effects, such as documents and witness testimony (FTC, 2018[5]).

38. The quantification of co-ordinated effects associated to horizontal collusion is substantially more challenging, as there are currently no widely accepted methods that can be applied in the context of vertical mergers. While the literature reports some quantitative methods to measure co-ordinated effects in horizontal mergers, including a *co-ordinated price pressure index* (Moresi et al., 2011[49]), measures of incremental profits from collusion (Aubert, Rey and Kovacic, 2006[50]) and numerical simulations (Ivaldi and Lagos, 2017[51]), it is still not clear how these methods could be extended to vertical mergers. It is therefore not surprising that authorities are generally reluctant in opening vertical merger cases based on co-ordinated effects alone.[13]

Figure 3.4. Use of quantitative methods by competition authorities



Note: Based on an ICN survey involving 40 competition authorities.
Source: ICN & CMA (2018), "ICN Vertical Mergers Survey Results", http://icn2018delhi.in/images/ICN-survey-report-on-vertical-mergers-17-03-18.pdf.

Box 3.4. The *KPN/Reggefiber* merger

The transaction and the parties

In February 2014, KPN notified the Netherlands Authority for Consumers and Markets (ACM) that it would acquire 60% of the shares of Reggefiber, obtaining full control over the company. KPN is the incumbent Dutch telecom company that owns the national copper network, which is used by downstream competitors to provide telecom services (telephony, television and internet). The access to the network infrastructure is subject to access regulation imposed by OPTA, the Dutch Telecom Regulator. Reggefiber was a recent entrant in the Dutch telecom market, originally established by a construction company in order to build and develop a network of optical fibre.

Prior to this acquisition, in 2008 KPN had already concluded a joint-venture with Reggefiber. At that time, the ACM co-operated closely with the sectorial regulator, OPTA, to remedy any potential negatives effects on competition. The ACM cleared the joint venture under the condition that the optical fibre network built by Reggefiber would be subject to the existing access regulations of the copper network, in order to guarantee that the downstream firms would have "unbundled" access to the local loop of the optical fibre network (Hesseling and Vermeulen, 2011[52]). The decision was contested by the cable company Ziggo, the main upstream competitor of KPN, but the appeal was rejected in 2015 by the Tribunal of Appeals.

Assessment of the case

The ACM analysed both the horizontal and vertical effects of the merger, which were similar to the concerns already raised in the 2008 review of the joint venture. With respect to the horizontal effects, the ACM analysed whether the transaction would lessen competition between the copper and the optical fibre network. Concerning the vertical effects, the ACM assessed if the merger would increase the ability and incentive of the merged entity to foreclose access to the optical fibre network, in order to strengthen its own position downstream.

The ACM concluded that the regulation and remedies imposed on the joint venture in 2008 were sufficient to address any negative effects on competition. While one of the downstream competitors, Vodafone, opposed the merger on the grounds of a potential risk of margin squeeze, the ACM considered that such risk is addressed by the wholesale access regulation. Moreover, the AMC concluded that its decision to open unbundled access to the local loop would contribute to promote effective competition, leading to lower prices and faster network speeds that would ultimately benefit consumers and businesses:

> *All consumers in the Netherlands will be able to choose from at least three telecommunication providers for their landline, broadband access, and television services. In a lot of cases, they even have four or five providers to choose from (…) So in the near future, consumers will also be able to choose from different telecommunication providers for combined services on fixed and mobile networks. ACM has calculated the outcome (in monetary terms) of this decision for consumers and businesses: at least EUR 250 million [euros] per year as a result of prices that continue to be competitive. (ACM, 2014[53])*

Decision

The ACM cleared the transaction in October 2014, in considering that the current and future access regulation is sufficient to address the competition concerns. Vodafone appealed the decision, but the appeal was rejected by the Rotterdam Court in May 2016.[1]

Notes: [1]*Vodafone Libertel BV v Autoriteit Consument & Markt*, ECLI: NL: RBROT: 2016: 3476 (Rechtbank Rotterdam).

Source: KPN/Reggefiber, Case 6397, ACM Decision of 19/12/2008, https://www.acm.nl/en/publications/publication/3978/KPN---Reggefiber.

KPN/Reggefiber, Case 14.0672.24, ACM Decision of 31/10/2014, https://www.acm.nl/nl/publicaties/publicatie/13492/KPN-mag-volledige-zeggenschap-in-Reggefiber-krijgen-concentratiebesluit.

4. Vertical theories of harm

39. There are several theories of harm showing how vertical mergers might indirectly harm competition under certain market circumstances (FTC, 2018[5]). While it has been suggested that competition authorities should investigate the full range of potential anti-competitive harms when evaluating vertical mergers (Baker et al., 2019[54]), such a task is hard to implement in practice, due to the very extensive list of theories of harm proposed in the economic literature (Salop and Culley, 2016[21]). Fortunately, the main concerns raised in almost all of these theories involve either the risk of foreclosure or of horizontal collusion, thus giving authorities some clues about what to look for when reviewing a vertical merger.

40. This section identifies the most common vertical theories of harm, dividing them into two categories: i) theories of **foreclosure** that may result in unilateral effects; and ii) theories of **horizontal collusion** that may lead to co-ordinated effects. Within each category, the main difference between alternative theories is the underlying asset that the merged entity uses to harm competition, which can be an input, a customer base, a complementary good, or commercially sensitive information (Table 4.1). This section is not exhaustive, leaving out very specific theories derived from more general theories (e.g. evasion of price regulation, which usually involves some form of foreclosure).[14] It also leaves out concerns that vertical integration facilitates price discrimination, as such effect is generally pro-competitive (OECD, 2018[55]) (OECD, 2016[56]).

Table 4.1. Vertical theories of harm by type of asset

Asset	Unilateral effects	Co-ordinated effects
Input	Input foreclosure	Elimination of a disruptive seller
Customer base	Customer foreclosure	Elimination of a disruptive buyer
Complementary good	Foreclosure through tying	-
Commercially sensitive information	Misuse of commercially sensitive information	Exchange of commercially sensitive information

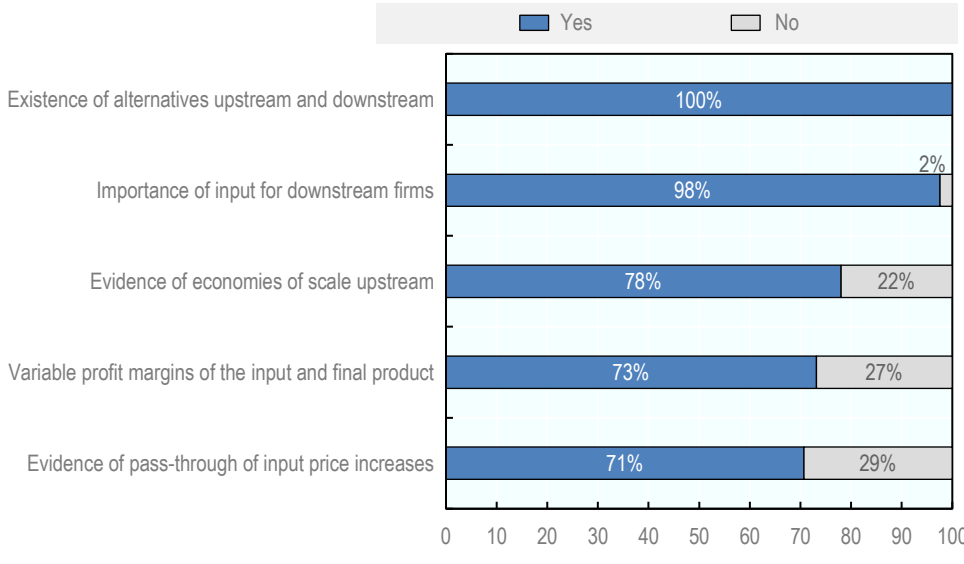
4.1. Foreclosure (unilateral effects)

41. Unilateral effects may arise when vertical integration enables a firm to gain control over the supply chain and foreclose the market upstream or downstream, either by **excluding competitors** (total foreclosure) or by **raising rivals' costs** (partial foreclosure). The exclusion of competitors is almost always the number one concern of authorities in vertical merger cases, as such a strategy could result in more permanent damage to the competitive process. In other occasions, authorities also look at the risk that a vertically-integrated firm raises rivals' costs (Ordover, Saloner and Salop, 1990[43]), by using its strong position upstream or downstream to deteriorate the business terms for unintegrated competitors.

42. There are several theories of harm suggesting how a vertically-integrated firm could unilaterally harm competition by engaging in partial or total foreclosure. The following list enumerates the main theories of harm of vertical foreclosure that have been considered by competition authorities in vertical mergers and in abuse of dominance cases:

1. **Input foreclosure**: the most common theory of harm in vertical merger cases involves the concern that a vertically-integrated firm refuses to supply an input to a downstream competitor (total foreclosure), or deteriorates the conditions under which the input is provided, for instance by increasing its price or lowering its quality (partial foreclosure). Within the TMT sector, important and scarce inputs include semi-conductor components, network infrastructure, paid television channels, operating systems and different types of data (e.g. traffic data for GPS navigators or search engine data). Figure 4.1 identifies some of the evidence that competition authorities use to assess whether an input can be used to foreclose downstream competitors.
2. **Customer foreclosure**: another common theory of harm is that a vertically-integrated firm may foreclose an upstream competitor, by denying or deteriorating access to an important distribution network. A typical example is foreclosure of television channel access to multi-channel video programme distributors (MVPDs) (e.g. *Comcast/NBCU*,[15] *LG/Ziggo*[16]). A more recent concern is the possibility that e-commerce platforms foreclose unintegrated sellers from accessing their base of consumers. This problem is not new, but takes a novel format: while traditional retail distributors, such as supermarkets, might favour own-label brands on the shelves, e-commerce platforms may favour their own products in rankings or search results (e.g. *Google search*[17] case).
3. **Foreclosure through tying**: tying or bundling occurs when the purchase of one good requires the customer to acquire another (complementary) good. While tying concerns normally arise in conglomerate mergers, conglomerate effects may also occur in mergers that appear to be only vertical in nature, as vertically-related firms often produce complementary components and products (e.g. *Broadcom/Brocade* merger – Box 4.1). An example would be the tying of telecom services to the streaming media content of an "over-the-top" (OTT) provider, which is normally sold as a standalone product. Another example is the tying of online services to consumer electronics, for instance by requiring manufacturers of smartphones to pre-install applications on their devices (e.g. *Google Android*[18] case).
4. **Misuse of commercially sensitive information**: a less common theory of harm is that vertical integration may enable a firm to misuse commercially sensitive data about competitors. In particular, if a vertically integrated firm uses its privileged access to data to react aggressively against price cuts or innovation by competitors, it may preclude them from engaging in such pro-competitive actions in the first place and even drive them out of the market (e.g. *Broadcom/Brocade* and *Amazon* case[19]). A similar concern arises when integrated platforms leverage their privileged access to data to appropriate innovation by users, engaging in the so-called forced free-riding. Examples of this include search engines appropriating content from competing websites (Shelanski, 2013[57]) or online marketplaces imitating the design of products sold by third parties (Khan, 2016[58]).

Figure 4.1. Evidence gathered by competition authorities to assess input foreclosure



Note: Based on an ICN survey involving 41 competition authorities.
Source: ICN & CMA (2018), "ICN Vertical Mergers Survey Results", http://icn2018delhi.in/images/ICN-survey-report-on-vertical-mergers-17-03-18.pdf.

43. All of these forms of foreclosure could potentially enable a vertically-integrated firm to increase or preserve its market power, by eliminating competitive constraints. However, as the incentives to harm competition through vertical integration are often unclear and harmful effects are generally hard to establish, all these theories should be assessed on a case-by-case basis, using the ability-incentive-effect framework described in section 3. Authorities might consider testing theories of foreclosure in cases where there is a higher risk of competitive harm, namely when vertical integration could be motivated by one of the following reasons:

1. **Eliminate potential competition**: Market power can be significantly constrained by the external pressure of potential entrants. This often occurs in the high-tech industry, where established incumbents are constantly threatened by new innovative business models. In such cases, vertical integration might be a strategy to eliminate vertically related firms who could become a viable *direct* competitor in the future or who could serve as an entry point for new entrants (Salop and Culley, 2016[21]).
2. **Increase bargaining power**: Market power can also be constrained by the countervailing bargaining power of downstream buyers, who use their strong market position to negotiate lower wholesale prices, or by upstream suppliers who pressure the retailer to decrease retail prices. This type of strategic interaction is common in industries characterised by successive concentrated markets along the supply chain, which might be the case of the TMT sector. Vertical integration can thus be a mechanism for an already powerful firm to further improve its bargaining position, by eliminating its dependency upon strong vertically-related business partners (Gaudin, 2018[59]) (Salop, 2018[36]).
3. **Avoid market regulation**: Lastly, even natural monopolies may have their market power constrained by market regulation. For instance, regulations in liberalised

telecommunication industries typically require the owner of the network infrastructure to provide telecom operators with access to portions of the infrastructure that are hard to replicate (e.g. the local loop connecting the consumer premises to the network), at a regulated accessing price (Armstrong, 2002[30]). When these regulations are not carefully designed, the monopolist may have an incentive to vertically integrate in order to evade the regulation and exert market power in the non-regulated segment of the market.

Box 4.1. The *Broadcom/Brocade* merger

The transaction and the parties

In March 2017, Broadcom notified the European Commission of its acquisition of Brocade. Broadcom is a US semiconductor manufacturer that develops semiconductor components, such as integrated circuits and chips. It also manufactures Host Bus Adaptor (HBS) cards, a device that connects a computer to other network devices. Brocade is a technology company specialised in data and network-storage equipment. In particular, it supplies switch devices that allow secure and reliable data transfers between servers and storage equipment in data centres.

The merger has both a vertical and a conglomerate dimension. On the one hand, Broadcom produces application-specific integrated circuits (ASIC) that are a fundamental input used by Brocade in the production of switch devices. On the other hand, the HBS cards manufactured by Broadcom and Brocade's switches are complementary devices within computer networks, giving rise to conglomerate effects.

Assessment of the case

In the assessment of the vertical effects of the merger, the Commission assessed the risk of input foreclosure, customer foreclosure and the misuse of confidential information. Firstly, it concluded that the merged entity would not have the ability to engage in input foreclosure, because there is at least one viable alternative upstream competitor, GlobalFoundries, who has a significantly higher market share than Broadcom in the provision of ASIC components. Secondly, the Commission concluded that customer foreclosure would also be unlikely, due to i) the existence of another customer downstream (Cisco); ii) the fact that Broadcom does not have the fabrication facilities required to fully supply Brocade; and iii) the significant costs of switching suppliers. The Commission found, however, that Broadcom receives confidential information from switch manufactures that can be used by the merged entity to favour its own switch devices (Salop and Culley, 2016[21]).

In the assessment of the conglomerate effects of the merger, the Commission assessed whether the merged entity would have the ability to squeeze out competitors, either by commercially bundling switch devices and HBA cards, or by degrading the interoperability between its own switch devices and competing HBA cards. While the Commission concluded that a bundling strategy was unlikely to harm competition, it raised some concerns about interoperability.

Decision

In May 2017, the Commission conditionally approved the acquisition. In order to address the vertical and conglomerate concerns identified, Broadcom committed to protect third party confidential information and to co-operate with competing HBA card suppliers to guarantee the interoperability between competing devices.

Source: Broadcom/Brocade, Case M.8314, Commission decision of 12/05/2017, http://ec.europa.eu/competition/mergers/cases/decisions/m8314_662_3.pdf.

4.2. Collusion (co-ordinated effects)

44. Harmful co-ordinated effects may arise when vertical integration facilitates **horizontal collusion** between the merged entity and its upstream or downstream competitors. A vertical merger may facilitate not only **explicit collusion**, which is a hard-core violation of competition law, but also **tacit collusion**, which is difficult to tackle out of the context of merger review (OECD, 2015[60]) (OECD, 2010[61]). Unlike horizontal mergers, which reduce the number of competitors in the relevant market and hence directly increase the likelihood of a collusive outcome, vertical mergers may facilitate collusion by enabling firms to better monitor and punish deviators.

45. The economic literature identifies some theories of harm describing how a vertical merger could enhance horizontal collusion, but to date these have not been tested empirically and rarely resulted in enforcement action. The following list identifies the three most common theories of harm that are generally supported by economic theory:

1. **Elimination of a disruptive buyer/seller**: a vertical merger may increase the risk of upstream collusion by eliminating a disruptive buyer downstream. Essentially, the acquisition of the disruptive buyer increases the incentives of non-integrated upstream firms to co-operate, because in the case of cheating the downstream integrated unit can refuse to buy inputs from the upstream competitors (Nocke and White, 2007[62]). Likewise, the risk of collusion may be enhanced by the acquisition of a disruptive seller, who can refuse to supply to any non-integrated downstream firms who deviate from the agreement (Salop and Culley, 2016[21]).[20] Notably, the success of these strategies depends on the credibility of foreclosure threats, requiring the merged entity control an important input or customer base.
2. **Exchanges of commercially sensitive information**: one of the main mechanisms through which vertical integration can facilitate collusion is by enabling the exchange of sensitive business information and thereby increasing market transparency, a concern that was raised in *GrafTech/Seadrift* (Box 4.2). This theory of harm is similar to the misuse of sensitive information to unilaterally harm competitors, except that in this case the merged entity exchanges information bilaterally to facilitate reaching a consensus, and to reduce the detection lag of any deviations from collusion. Information exchanges raise particular concerns in the media and high-tech sectors, where businesses are data-intensive, and possess the means to detect deviations and retaliate in real time (OECD, 2017[63]).
3. **Changes in the cost structure**: lastly, some authors have pointed out that a vertical merger could increase the likelihood of collusion, by changing the cost structure of the merging parties in at least two ways. Firstly, vertical integration generally creates efficiency effects that reduce variable costs, potentially increasing the reward from collusion (Biancini and Ettinger, 2016[64]). Secondly, vertical integration may also reduce cost asymmetries, or help sustain collusion under cost asymmetry by enabling implicit side transfers between integrated and non-integrated units (Mendi, 2009[65]). While these theories of harm are of academic interest, they may hardly lead to enforcement action in practice, as that would involve blocking a merger on the basis that it would reduce the cost of the merging parties (Salop and Culley, 2016[21]).

Box 4.2. The *GrafTech/Seadrift* merger

The transaction and the parties

In April 2010, GrafTech notified the US Department of Justice (DoJ) of its intention to acquire the remaining 81.1% of Seadrift, in order to obtain control of 100% of the company stock. GrafTech is one of the world biggest producers of graphite electrodes, a type of electrical conductor that is essential to produce steel and other metals. Seadrift produces petroleum needle coke, a carbon-rich material derived from oil refining and which serves as the primary input to produce graphite electrodes. Apart from Seadrift, the main producers of petroleum needle coke are the US multinational energy company ConocoPhillips and two other competitors located in Japan.

In 2001, before the transaction took place, GrafTech had signed a long-term supply agreement with ConocoPhillips, where the former agreed to buy from the latter the majority of its petroleum needle coke at a most-favoured-nation (MFN) price. The MFN clause guarantees that the price paid by GrafTech is no higher than the price that ConocoPhillips charges to any of GrafTech's competitors. The supply agreement granted GrafTech with audit rights to ensure compliance with the MFN clause, enabling the company to access and audit ConocoPhillips data on costs, prices, volume of production and other commercially sensitive information.

Assessment of the case

As the main theory of harm, the DoJ evaluated whether the merger would increase the risk of tacit co-ordination, by facilitating the exchange of commercially sensitive information. The DoJ concluded that the merger between GrafTech and Seadrift, combined with the supply agreement between GrafTech and ConocoPhillips, would enable Seadrift to access pricing data and other sensitive information from its direct competitor ConocoPhillips. As explained by the DoJ, this could lead to harmful co-ordinated effects:

> *The ability of a vendor to verify current commercial terms granted by a competitor could facilitate a tacit understanding on price or output and provide a means to detect cheating on such an understanding, increasing the likelihood of coordination. Accordingly, as the merger would remove a significant barrier to collusion, it likely would lead to anticompetitive effects.*[1]

Decision

In March 2011, the DoJ conditionally cleared the acquisition, requiring that GrafTech remove the MFN clause and eliminate all of its audit rights from the supply agreement. The final judgement imposes additional behavioural remedies on the merged entity, including i) reporting any future supply agreements with ConocoPhillips; ii) building a firewall separating the employees that negotiate with ConocoPhillips from those who make price and production decisions at Seadrift; and iii) not sharing any sensitive business information between Seadrift and ConocoPhillips.

Notes: [1] *United States v. GrafTech International Ltd.*, Case 1:10-cv-02039, Competitive Impact Statement (2010), https://www.justice.gov/atr/case-document/file/497806/download.
Source: United States v. GrafTech International Ltd., Case 1:10-cv-02039 (DDC, 2010), https://www.justice.gov/atr/case/us-v-graftech-international-ltd-and-seadrift-coke-lp.

5. Efficiency effects of vertical mergers

46. The main motivation for a firm to vertically integrate is, in general, not to enhance its market power, but to improve efficiency (OECD, 2007[15]). Vertical integration has two main direct or *first-order* efficiency effects. Firstly, it improves **vertical co-ordination** between the downstream and upstream units of the firm, by enabling the two units to internalise the impact of their business decisions on each other's profit; secondly, it induces cost savings through **economies of scope**, by allowing the merging parties to share costs that are common to the different stages of the productive process. In contrast, the risk that vertical integration enhances market power (section 4) is an indirect or *second-order* effect, as it depends on some additional anti-competitive behaviour taking place post-merger.

47. The theoretical and empirical evidence that vertical integration creates efficiency effects largely explains why vertical mergers are generally presumed to be welfare enhancing and to pose substantially fewer competition concerns than horizontal mergers (OECD, 2007[15]). For a vertical merger to decrease consumer welfare, it would be necessary that the *second-order* effect of enhanced market power overcomes the *first-order* efficiency gains from both vertical co-ordination and economies of scope. The welfare impact of horizontal mergers is, on the other hand, more ambiguous, trading-off a *first-order* increase of market power (due to horizontal unilateral and co-ordinated effects) against a *first-order* efficiency gain from economies of scale.

48. This section provides an overview of the main efficiency effects of vertical mergers that can result from enhanced vertical co-ordination and economies of scope. The list of effects enumerated here is not exhaustive (Bishop et al., 2005[66]), but it identifies the most relevant efficiency claims that authorities might consider in the assessment of vertical mergers. The section also discusses whether these effects are merger-specific or whether the same efficiency gains could be achieved through alternative means.

5.1. Vertical co-ordination

49. Improved co-ordination between vertically-related firms has the potential to bring many efficiency gains for consumers, in the form of lower prices and increased output, innovation and overall quality of the product (Bishop et al., 2005[66]). Unlike horizontal co-ordination, which can restrict direct competition in the relevant market and therefore harm consumers, vertical co-ordination generally aligns the interests of non-competing firms with the interests of consumers, thereby making all agents better-off and improving both consumer and total welfare. The following list provides the most important efficiency effects resulting from enhanced vertical co-ordination:

1. **Elimination of double marginalisation**: double marginalisation occurs when vertically-separated firms set wholesale and retail price margins without considering the negative impact of lost sales on each other's profit, resulting in an inefficiently-high price. Vertical integration creates an incentive for the two firms to decrease the price by setting a single margin instead, allowing each unit to internalise the positive effect of higher demand on the other level of the supply chain (Verouden, 2008[67]) (Spengler, 1950[8]).[21] Examples of circumstances where double margins could be eliminated include the integration of paid television channels and telecom services, specialised software and laptops, or semi-conductor components and optical fibre.

2. **Quality externalities**: improving the quality of a product has a positive effect on vertically-related firms (vertical externality) and sometimes on direct competitors as well (horizontal externality), who benefit from greater demand (Bishop et al., 2005[66]). When a firm does not capture such externalities, it has an incentive to cut down R&D, institutional marketing, quality control, pre-sales services and post-sales support, free-riding on the services provided by other suppliers and distributors. Vertical integration enables a firm to internalise vertical and horizontal externalities, thereby eliminating free-riding and improving quality (Lafontaine and Shaw, 2005[68]). As an example, an integrated producer of smart phones has an incentive to develop functional applications and high-quality online services, as that will largely affect the total sales of smart phones.

3. **Elimination of the hold-up problem**: the hold-up problem occurs in contractual relationships where one of the parties delays an investment out of the fear that, once the investment is sunk, the other party will exploit its improved bargaining position. This problem is likely to arise when the investment is specific to the contractual relationship and therefore cannot be easily transferred to any alternative use (Klein, 1998[69]). Vertical integration is a possible solution to avoid the hold-up problem (Hart and Moore, 1990[70]) (Schmitz, 2006[71]), enabling a firm to internalise the full benefits of the investment and to eliminate concerns about future bargaining power. For instance, a telecom company has a greater incentive to invest in infrastructure if it is integrated in the retail market; otherwise, once the investment is made, the telecom operators would have increased bargaining power to negotiate low access tariffs.

4. **Elimination of input substitution**: inefficient input substitution may occur when a final good is produced using substitutable inputs in variable proportions, and one of the inputs is sold at a high price in a monopolised market. In such a case, downstream firms have an incentive to substitute away the more expensive input, using an inefficient combination of inputs that does not reflect upstream production costs (Schmalensee, 1973[72]). Vertical integration would prevent input substitution, as the downstream unit would access inputs at a marginal cost. Although the elimination of input substitution increases profits of the integrated firm, this effect unambiguously increases consumer welfare (Abiru, 1988[73]).[22] As an example, a telecom company that owns infrastructure may integrate upstream in order to access optical fibre at a cheaper cost and avoid substituting it with cheaper copper cable.

5. **Price discrimination**: vertical integration may facilitate price discrimination, particularly by enabling an upstream firm with market power to gain control over retail prices (Romano, 1988[74]). Vertical integration may also create new means to identify consumers' valuations and prevent arbitrage (for instance, a telecom company could acquire a media company in order to access personal data and better discriminate consumers in the provision of telecom services). While price discrimination is sometimes pointed out as a potential harmful effect of vertical mergers (Salop and Culley, 2016[21]), price discrimination is generally pro-competitive, increasing static and dynamic efficiency and often resulting in lower prices for consumers (OECD, 2018[55]) (OECD, 2016[56]). Therefore it might be appropriate to treat price discrimination as a potential efficiency effect of vertical mergers.

50. Vertical co-ordination clearly improves efficiency and brings gains for consumers in many forms, but it is not always clear whether these efficiency effects are **merger-specific**, as they may also be achieved through contractual clauses between the two parties. In particular, double marginalisation could be eliminated through (maximum) retail price maintenance, two-part tariffs and quantity forcing. Input substitution could be avoided by tying the two inputs. Price discrimination could be achieved with a combination of retail price maintenance and two-part tariffs (Chen, 1999[75]). Likewise, it is possible to impose minimum investment or quality requirements using selective distribution models and other contractual clauses.

51. In light of the variety of contractual tools available to enforce vertical co-ordination, competition authorities often reject efficiency claims in vertical merger cases. In *Comcast/NBCU*, the DoJ concluded that *"any potential double marginalization is reduced, if not completely eliminated, through the course of contract negotiations between programmers and distributors over quantity and penetration discounts, tying requirements, and other explicit and verifiable conditions."*[23] Similarly, in *LG/Ziggo* the European Commission rejected the efficiency claim that the transaction would result in the elimination of double marginalisation, on the basis that this could be also achieved with minimum quantity clauses.

52. Nevertheless, the fact that contracts are incomplete and costly to enforce implies that vertical integration could be more effective in improving co-ordination than the use of contractual clauses (FTC, 2018[5]).[24] Indeed, it is hard to write a contract that foresees all possible events, particularly when some actions cannot be observed after the contract is signed, creating opportunities for the parties to behave opportunistically (moral hazard). For example, one of the contracting parties could avoid retail price maintenance by charging hidden fees for extra services; or could go around contractual quality requirements by under providing post-sale services.

53. Finally, if a merger is shown to improve efficiency through enhanced vertical co-ordination, it is important to consider the dimension of the efficiency effect when assessing the risk of competition harm, as these two effects are intrinsically linked. In many occasions, the incentive for a vertically-integrated firm to raise rivals' costs may be solely motivated by the prospect of eliminating double margins, in which case the net welfare effect of the merger would likely be positive, even in the presence of foreclosure. Accordingly, *"when the link between EDM [elimination of double marginalisation] and RRC [raising rivals costs] is taken into account, predicted price effects of a vertical merger can turn out to be significantly different relative to those predicted by standard antitrust techniques"* (Varma and Stefano, 2018[76]).

Box 5.1. The *LG/Ziggo* merger

The parties and the transaction

In March 2014, Liberty Global (LG) notified its acquisition of Ziggo to the European Commission. LG is a multinational telecom company that owns UPC, one of the main operators of telecom services (including cable TV) in the Netherlands. UPC is also active upstream in the media industry, through its pay TV channels Film1 and Sport1. Ziggo is the largest cable television operator in the Netherlands and it indirectly owns the media company HBO Nederland (HBO), which operates three pay TV channels.

Assessment of the case

The European Commission identified two main vertical concerns, namely that the merged entity would i) exclude competitors through full input foreclosure; or ii) use its enhanced bargaining power to raise rivals' costs (either through partial input or partial customer foreclosure). The first risk is linked to the fact that the merged entity would own all premium pay TV film channels in the Netherlands, whose provision could be denied to downstream competitors. Alternatively, the merged entity could use its increased bargaining power to worsen the position of its competitors in at least two ways: by increasing the price of premium pay TV channels to telecom operators (partial input foreclosure); or by restricting broadcasters upstream from supplying their content to OTT ("over-the-top") services or from launching their own OTT services (partial customer foreclosure).

While the parties claimed that the merger would result in the elimination of double marginalisation (EDM), the Commission rejected this claim due to the fact that such efficiency is not merger specific. As pointed out by the Commission, the elimination of double marginalisation can be achieved through minimum quantity clauses in carriage contracts, which *"align the interests of independent upstream firms (Film1) and downstream firms (Ziggo). This is because the downstream retailer has an incentive to set the retail prices low enough to achieve at least the minimum number of subscribers required"*.[1]

Decision

The Commission conditionally cleared the transaction in October 2014, subject to structural and behavioural remedies. In order to resolve the input foreclosure concerns, the merged entity divested Film1 channel to a third party, Sony. To reduce the risk of customer foreclosure, the merged entity was required to terminate any clauses in existing contracts restricting TV broadcasters from distributing channels through OTT services, and not to include these clauses in future contracts for the next eight years.

Following an appeal from the rival operator KPN, the General Court annulled the approval in 2017 for procedural reasons.[2] However, after a new investigation in 2018, the case was closed with a conditional approval, with commitments similar to those imposed in 2014.

Notes: [1] *Liberty Global/Ziggo*, Case M.7000, Commission decision of 10/10/2014, page 52, http://ec.europa.eu/competition/mergers/cases/decisions/m7000_20141010_20600_4221982_EN.pdf.
[2] *KPN BV v European Commission*, ECLI:EU:T:2017:756, General Court Judgement of 26/10/2017, http://curia.europa.eu/juris/document/document.jsf?text=&docid=196107&pageIndex=0&doclang=EN&mode=req&dir=&occ=first&part=1.
Source: Liberty Global/Ziggo, Case M.7000, Commission decision of 10/10/2014, http://ec.europa.eu/competition/mergers/cases/decisions/m7000_20141010_20600_4221982_EN.pdf.

5.2. Economies of scope

54. Another fundamental effect of vertical mergers is to enable the integrated firm to reduce its average production cost by benefiting of economies of scope (Farsi, Fetz and Filippini, 2008[77]) (Saal et al., 2013[78]). Unlike economies of scale, which consist of cost savings from an increase in the *quantity* of output, economies of scope are cost savings from the production of a greater *variety* of goods, and are hence likely to be observed in vertical or conglomerate mergers of firms with complementary costs (Gorman, 1985[79]). There are essentially two mechanisms through which vertical integration can lead to economies of scope:

1. **Sharing of indivisible assets**: the production of complementary products often involves the use of common assets that cannot be easily divided or transacted between separated businesses, such as infrastructure, machinery, human capital, management, marketing, financial services and know-how. Vertical integration enables a firm to cut down fixed costs by sharing the same indivisible assets across different stages of the productive process, reducing this way the average production cost of the final good. Vertical mergers in the TMT industry might enable, in particular, the sharing of costly data assets that have a high fixed cost of production but a low or zero cost of replication, resulting hence in economies of scope (Shapiro and Varian, 1999[80]).
2. **Elimination of redundant processes**: in some cases, several components of a final good have to repeatedly go through the same processes in order to be transacted in the market, including packaging and transportation between factories. Vertical integration can help avoid the replication of costly processes along the supply chain, this way reducing the marginal cost – and thus the average cost – of the final good (Bishop et al., 2005[66]).[25] While transportation costs are relatively less important for providers of media content, software or online services, these companies often supply personalised products that require them to encrypt private information and reformat data whenever they transact with a competitor, a cost that could potentially be eliminated through vertical integration.

55. Cost efficiencies associated to economies of scope are, in general, specific to vertical and conglomerate mergers, because there are few other alternatives for a firm to achieve the same gains. Apart from a merger, a firm can benefit from economies of scope by directly entering a downstream, upstream or complementary market, but this option is only viable if such entry is profitable. Therefore, as long as the merging parties show that the combination of their economic activities would enable the realisation of substantial economies of scope, authorities might consider accepting these efficiency claims as merger specific, unless entry would be profitable.

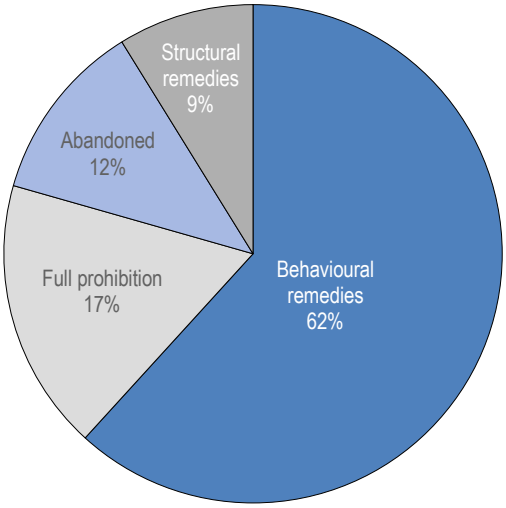
56. In jurisdictions where consumer welfare is the legal standard, an important additional step in the assessment of economies of scope is to evaluate whether these efficiencies are likely to be passed through to final consumers. Unlike efficiencies from enhanced vertical co-ordination, which result in lower prices or higher quality that directly benefit consumers, economies of scope decrease average production costs and lead to higher profits. For economies of scope to benefit consumers it is therefore necessary that the cost savings are passed through in the form of lower prices. In general, the cost pass-through is complete if both merging parties operate in competitive markets, and incomplete if at least one of the parties has market power.

6. Remedies for vertical mergers

57. Finally, once the economic effects of a merger are assessed on a case-by-case basis, the last challenge for competition authorities is to determine the best **enforcement action**, which may entail unconditionally clearing the merger, clearing it subject to remedies or prohibiting the transaction. Almost all mergers reviewed by authorities – horizontal and vertical – are cleared unconditionally. Among the small minority of mergers that is found likely to result in competitive harm, authorities impose remedies in most cases, whereas a prohibition decision is usually a measure of last resort (OECD, 2016[81]).[26] As the risk of a vertical merger harming competition is particularly small, the use of remedies in vertical cases might be almost always preferable to entirely blocking the transaction, to ensure that the parties can realise the many efficiency gains associated with vertical integration.

58. There are two main categories of remedies in merger control, **structural** and **behavioural**, which can either be applied in isolation, or combined into a hybrid remedy. This section distinguishes these two categories of remedies in the context of vertical mergers, presenting examples of each and discussing their main potential and limitations in addressing vertical theories of harm. Notably, while structural remedies are usually more effective in reducing the risk of harm in horizontal mergers, behavioural remedies might be appropriate to address some of the competition concerns in vertical merger cases (OECD, 2011[82]) (OECD, 2003[83]). Accordingly, even though structural measures are the preferred remedy in most jurisdictions (OECD, 2016[81]), authorities apply behavioural remedies seven times more often in vertical cases (Figure 6.1).

Figure 6.1. Outcomes of vertical mergers not unconditionally cleared between 2015 and 2017



Note: Based on a sample of 68 vertical merger cases. The data provided by some competition authorities covers the period 2014-2016 instead of 2015-2017.
Source: ICN & CMA (2018), "ICN Vertical Mergers Survey Results", http://icn2018delhi.in/images/ICN-survey-report-on-vertical-mergers-17-03-18.pdf.

6.1. Structural remedies

59. Structural remedies are **divestiture measures** through which the merging parties sell part of their assets to third parties (OECD, 2011[82]). The divested assets can be tangible (e.g. a radio station) or intangible (e.g. intellectual property), and the third parties may be either current competitors or new entrants. The main purpose of a structural remedy is to restore the level of competition that existed pre-merger, by enabling the competitor or entrant who acquires the divested assets to exert competitive pressure effectively post-merger (ICN, 2016[84]) (Motta, Polo and Vasconcelos, 2007[85]). For that, a structural remedy may involve either divesting an entire stand-alone business entity including all the necessary assets (e.g. a subsidiary), or selling a collection of assets from one or both merging parties.

60. Divesting assets is often considered an appropriate solution to eliminate competition concerns in horizontal mergers (OECD, 2011[82]) (Kwoka and Moss, 2012[20]), because such remedies address a structural problem with a structural solution. Indeed, the main competition risk posed by horizontal mergers is that they directly increase the market power of the merging parties, by causing a permanent change in the structure of a market. By their nature, structural remedies can often address this problem effectively, having the advantage of being clear for the parties, fast and easy to implement, and inexpensive for authorities, as they do not require on-going monitoring (OECD, 2016[81]) (Kwoka and Moss, 2012[20]).

61. It is less clear whether structural remedies are always a well-suited solution to deal with vertical mergers, given that these mergers do not directly increase the concentration level of a market and tend to pose concerns of behavioural nature. A possible application of structural remedies in this context is to require firms to divest critical assets or economic activities that could enable the merging parties to foreclose competitors or to facilitate horizontal collusion (Salop, 2018[9]). In practice, however, competition authorities do not often use structural measures to address vertical concerns, or at least they use a combination of structural and behavioural remedies, as illustrated in the conditional clearance of the *Qualcomm/NXP* merger (Box 6.1).

62. If authorities decide to enforce structural remedies, they should consider their limitations in the context of vertical mergers. Most importantly, divesting assets might be sometimes an impracticable and disproportionate solution to prevent a hypothetical anti-competitive behaviour post-merger (OECD, 2003[83]). Even when the merging parties have substantial market power, thus increasing competitive risks, these are also the situations where excessive structural remedies could forgo important vertical efficiencies. Structural remedies may also increase the risk of collusion by increasing symmetry between competitors after the asset sale (Kwoka and Moss, 2012[20]), therefore reinforcing one of the main competition concerns of vertical mergers. Studies by competition authorities have also found empirical evidence of the limited effectiveness of these remedies in several other circumstances (Papandropoulos and Tajana, 2006[86]).

Box 6.1. The *Qualcomm/NXP* merger

The transaction and the parties

In October 2016, the US-based multinational Qualcomm announced the acquisition of the Dutch company NXP. Qualcomm is a manufacturer of semiconductor components, including baseband chipsets that enable the connection of mobile devices to telecommunication networks. NXP is a supplier of other types of semiconductor components, focusing on the production of near-field communication (NFC) chips, which enable data exchanges between devices that are close to each other, and also on secure element (SE) chips, which provide high security for mobile transactions. NXP also owns MIFARE, a technology brand comprising a series of trademark chips and a proprietary encryption algorithm that are used in contactless smart cards. The merger was reviewed by the authorities of nine jurisdictions, including the European Union, Korea, the United States and China.

Assessment of the case

The authorities of two out of nine jurisdictions, namely the European Commission and the Korean Fair Trade Commission, identified potentially harmful vertical and conglomerate effects of the merger. In terms of vertical effects, the authorities raised the concern that Qualcomm would use its enhanced bargaining power to increase the royalty fees for MIFARE licenses (partial input foreclosure) or to refuse to license the technology to competitors (total input foreclosure). With respect to the conglomerate effects, there was a concern that Qualcomm would tie baseband chipsets to NFC and SE chips, as well as degrade the interoperability between its own components and rivals' components (Girgenson, 2018[87]).

Decision

The merger was unconditionally cleared in six out of the nine jurisdictions, including in the United States. In the European Union and Korea, the merger was conditionally cleared with the following structural and behavioural remedies:

- Qualcomm must divest standard essential patents of NFC chips to a third party, which would grant worldwide royalty-free licenses for a period of three years.
- Qualcomm must grant worldwide royalty-free licenses for non-standard essential patents of NFC chips and not enforce those patent rights against other companies.
- Qualcomm must offer licenses to MIFARE technology and trademarks on terms that are at least as advantageous as those before the merger, for a period of eight years.
- Qualcomm must provide competitors with the same level of interoperability as the level between its own baseband chipsets, and NFC and SE chips, for a period of eight years.

However, as the merger was approved in only eight out of the nine jurisdictions, the parties decided to withdraw the transaction.

Source: Qualcomm/NXP Semiconductors, Case M.8306, Commission Decision of 18/01/2018, http://ec.europa.eu/competition/mergers/cases/decisions/m8306_3479_3.pdf.

6.2. Behavioural remedies

63. Behavioural remedies, also known as non-structural or conduct remedies, aim at regulating the **business conduct** of the merged entity, either by obliging or by prohibiting specific actions (OECD, 2011[82]). Their main objective is to prevent the merged entity from behaving anti-competitively, for instance by excluding competitors or co-ordinating prices. In line with the rationale of merger control, behavioural remedies act ex-ante before harm

to the competitive process takes place (OECD, 2007[15]) and help preventing anti-competitive behaviours that are not illegal outside the context of a merger, such as exclusionary conduct by a non-dominant firm and tacit co-ordination.

64. While behavioural remedies have certain advantages over structural measures, they have also clear limitations when applied in the context of horizontal mergers. The main advantage of behavioural remedies is that they can be tailored to address a specific theory of harm and adapted to rapid changes in the market environment (OECD, 2016[81]). On the other hand, these remedies might not suffice to address the competition concerns associated with a structural change in the market after a horizontal merger. Also, by requiring firms to act in a way that is contrary to their profit-maximisation objective, behavioural remedies may fail to remove incentives to behave anti-competitively and therefore demand constant monitoring by authorities (Lahbabi and Moonen, 2007[88]).

65. Nonetheless, behavioural remedies could be potentially better-suited to address competition risks in vertical mergers (OECD, 2016[81])[27] (DoJ, 2011[89]) (Kwoka and Moss, 2012[20]).[28] This is because the underlying concern in vertical cases is that the merged entity takes advantage of its position upstream or downstream to behave anti-competitively. A behavioural remedy can explicitly forbid such conduct, without necessarily compromising the pro-competitive effects of the merger (FTC, 2018[5]). Moreover, as remedies in vertical mergers often involve prohibiting an action to exclude or raise the costs of a competitor, a violation of the remedy is likely to result in a complaint, thereby facilitating monitoring by the authority.

66. One of the main types of behavioural remedies can be classified as **access remedies** (CMA, 2008[90]), which are commitments to grant competitors' access to an asset, such as an essential input or a customer network. Access remedies may not only reduce the risk of unilateral effects from input and customer foreclosure, but also minimise co-ordinated effects associated to the elimination of a disruptive buyer/seller. The following list identifies some of the most common access remedies (ICN, 2016[84]):

1. **Supply obligations with non-discriminatory clauses**: this remedy imposes on the merging entity the obligation to supply an input or grant customer access to competitors in a non-discriminatory way. Supply obligations can be complemented with ancillary arbitration clauses to resolve conflicts in case of disputes. For instance, in *Google/ITA* (Box 6.2), the remedy involved the establishment of formal mechanisms to report complaints and arbitrate conflicts in the event that Google acts in a discriminatory manner.

2. **Mandatory licensing**: when an important technology or intellectual property right is at stake, another option is to require the merged entity sell licenses to its competitors at *fair*, *reasonable* and *non-discriminatory* terms (commonly known as FRAND terms). For instance, in *Qualcomm/NXP*, Qualcomm committed to license its technology on terms that are at least as advantageous as those available before the merger and to grant worldwide royalty-free licenses for its non-essential patents.

3. **Interoperability provisions**: this type of remedy requires the merging entity to maintain a level of interoperability between its own products and the products of competitors. Examples of interoperability measures can be found, for instance, in *Broadcom/Brocade* (Box 4.1) and in *Qualcomm/NXP* (Box 6.1).

4. **Prohibition of exclusivity agreements**: this remedy prohibits the merging entity from imposing exclusivity clauses that prevent competitors from buying or selling

to a third party. Sometimes the remedy entails eliminating an already existing exclusivity contract and not introducing new exclusivity clauses for an established time period after the merger.

67. In addition to access remedies, there is another important class of remedies known as **firewalls**, which restrict the flow of commercially-sensitive information between the downstream and upstream units of the merging entity (CMA, 2008[90]) (ICN, 2016[84]). The main purpose of firewall remedies is to prevent the merging entity from accessing and misusing confidential information in order to foreclose competitors, or from exchanging such information in a way that enhances horizontal co-ordination. This type of remedy was imposed, for instance, in the clearance decision of the *GrafTech/Seadrift* merger (Box 4.2).

68. The successful implementation of behavioural remedies, whether they consist of access measures or firewalls, may require the introduction of **ancillary clauses** that give competition authorities the powers to monitor and enforce compliance with the remedy. Most important ancillary clauses are *transparency provisions* requiring the merging entity to systematically provide information to the authority about its business conduct; *anti-retaliation provisions* preventing the merging entity from retaliating against competitors who report anti-competitive conduct to the authority; and *arbitration provisions* that foresee an arbitration mechanism in case of disputes about the proper implementation of the remedy (OECD, 2013[91]).

69. If competition authorities use behavioural remedies to deal with problematic vertical mergers – as legal precedent and later vertical merger guidelines seem to suggest – remedies should be carefully designed to effectively address competition concerns without compromising important efficiency effects. For that, when designing behavioural remedies, the following principles should apply:

1. Behavioural remedies should be **simple** and **clear**, allowing the merged entity to comply with the provisions and enabling the authority to monitor compliance.
2. Behavioural remedies should be **easy to monitor**, in order to reduce the burden on both the merging parties and the authority.
3. Behavioural remedies should be **comprehensive**, covering all risks of anti-competitive conduct identified and comprising all necessary ancillary clauses.
4. Behavioural remedies should be **proportional**, not imposing more restrictions than those that are deemed absolutely necessary to prevent anti-competitive conduct.
5. Behavioural remedies should be **merger-specific**, requiring a case-by-case analysis of the industry, regulatory framework and past conduct of the merged entity.
6. Behavioural remedies should seek to **preserve the competitive process**, promoting total or consumer welfare instead of the interests of individual competitors.
7. Behavioural remedies should include **review clauses** to ensure that they can be adjusted to changes in market conditions or abolished when no longer needed.

Box 6.2. The *Google/ITA* merger

The transaction and the parties

In July 2010, Google announced its acquisition of ITA Software, initiating a review process by the US DoJ. Google is a high-technology company that provides a wide range of internet services monetised through internet advertising, including its popular general search engine. ITA Software is a travel software company that owns the airfare pricing and shopping system QPX, which is a critical input for internet travel websites and online travel agencies (OTAs), such as Orbitz, Kayak and Expedia. The QPX system provides OTAs with airline information about flight pricing, schedules and seat availability, amongst other things. With the acquisition, Google sought to expand its search services by launching an internet travel website that provides flight search services.

Assessment of the case

In the assessment of the case, the DoJ considered the risk of both total and partial input foreclosure, concluding that the merged entity would have the ability and incentive to either deny or to degrade access to the QPX system for competing travel websites. On the one hand, total foreclosure could occur if Google refused to renew existing QPX licensing contracts or refrained from signing new contracts in the future. On the other hand, partial foreclosure would be possible if Google signed new contracts on less favourable terms (e.g. higher prices), or degraded the speed and quality of the QPX service to licensees.

Decision

On April 2011, the DoJ conditionally cleared the acquisition, subject to the implementation of the following behavioural remedies:

- Google must extend existing licensing agreements and grant new licenses of QPX to flight search companies. The licences must be fair, reasonable and non-discriminatory, or have similar conditions to the recent licence agreements.
- Google must continue improving QPX, not reduce R&D expenses and make any upgrades available to competitors.
- Google must establish an internal firewall to protect confidential data.
- Google must not tie ITA software to other Google products.

For the purpose of monitoring compliance with the remedies, the DoJ also required Google create a website that allows OTIs to submit complains about unfair treatment in the licensing of QPX.

Source: United States v. Google Inc., Case 1:11-cv-00688 (DDC, 2011), https://www.justice.gov/atr/case/us-v-google-inc-and-ita-software-inc.

7. Concluding remarks

70. Vertical mergers have generated what is likely one of the most interesting and longstanding debates in the history of competition policy. The high complexity and relevance of the topic has attracted some of the best minds in industrial economics and game theory, who have looked at the economic effects of vertical mergers from virtually all possible angles. This debate is constantly refuelled as new high-profile cases challenge competition authorities, including the recent wave of vertical mergers in the TMT sector, whose transaction values sometimes reach the order of billions of monetary units.

71. Despite the contrast of opinions among scholars, after more than half a century of debate, the case for enforcement against vertical mergers is still a weak one. The empirical evidence that vertical mergers are generally pro-competitive is compelling, as ex-post studies have systematically failed to show harmful effects on consumers, even when focusing on cases that were initially suspected to be problematic. This is consistent with the economic notion that the two immediate effects of vertical integration – improving vertical co-ordination and realising economies of scope – are welfare enhancing, unlike horizontal mergers which trade-off harmful horizontal effects against the realisation of economies of scale.

72. The inevitable conclusion is that, if competition authorities decide to enforce against vertical mergers, they should probably focus on exceptional cases where economic theory predicts a substantial risk of foreclosure or horizontal collusion. Enforcement decisions in such cases should not only establish the ability and incentive of the merging entity to harm competition, but also provide evidence of likely harmful effects on consumers, not on competitors. Moreover, if evidence of probable harm is found, authorities may consider designing behavioural remedies to reduce the risk of anti-competitive conduct post-merger without sacrificing important efficiency effects, while adopting prohibition decisions only as a last resort.

73. With a view of supporting merger enforcement with empirical evidence, it would be useful to have ex-post studies testing for the existence of harmful vertical effects under the specific circumstances predicted by economic theory. Some of the recent vertical mergers in the TMT sector can serve as useful case studies, as these mergers might sometimes combine the features that, at least in theory, could raise competition concerns. Until then, it is important that authorities address vertical mergers with caution, to minimise the risk of blocking transactions that could otherwise result in positive effects for consumers, and for competition in general.

Endnotes

[1] "*The fact that the [vertical agreements] are agreements concluded between companies that both fulfil an indispensable function in putting the product on the market suggests that they are primarily used to make the vertical combination more efficient. After all, in a vertical relationship, when one party does a poor job in satisfying consumer demand, this will not only affect the consumer but also the other trading partner. Through this special interdependent relationship, every party in a vertical agreement can, in principle, be considered a natural ally of the consumer."* (Verouden, 2008[67])

[2] *"Horizontal integration may, and frequently does, make for higher prices and a less satisfactory allocation of resources than does pure or workable competition. Vertical integration, on the contrary, does not, as such, serve to reduce competition and may, if the economy is already ridden by deviations from competition, operate to intensify competition."* (Spengler, 1950[8])

[3] Several other authors have criticised the assumptions underlying the single monopoly profit theory (Riordan and Salop, 1995[94]) (Kaplow, 1985[93]).

[4] Ex-post empirical studies can only quantify the welfare effects of vertical mergers that effectively took place. Therefore, these studies do not cover vertical mergers that were blocked by competition authorities.

[5] In the technology industry, semiconductor materials such as silicon, germanium and gallium arsenide play a very important role, due to their properties of electrical conductivity and insulation.

The term semiconductor may also refer to components that are made of semiconductor material, including chips, optical fibres and laser diodes.

[6] *"The term "HHI" means the Herfindahl–Hirschman Index, a commonly accepted measure of market concentration. The HHI is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers. For example, for a market consisting of four firms with shares of 30, 30, 20, and 20 percent, the HHI is 2,600 (302 + 302 + 202 + 202 = 2,600)."* (DoJ, 2018[98])

[7] *"[The judge] rejected the notion ('the economist's assumption', as he put it at trial) that a vertically-integrated firm would consider its entire profit when negotiating carriage decisions with rival distributors, rather than that of each of its business units separately, in favor of testimony from executives claiming that ownership of a distributor plays no role in affiliate fee negotiations. Nonetheless, he accepted the parties' claim of consumer price reductions from EDM (also accepted by the government's economic expert), although this involves consideration of the firm's profit as a whole."* (Caffara, Crawford and Weeds, 2018[37])

[8] The main practical difference between the two welfare standards is that the total welfare standard considers efficiency claims regardless of who would benefit from the increased efficiency, while the total consumer welfare requires the merging parties to prove that the efficiency effects would be passed through to final consumers.

[9] See, for instance, the three following critiques:

> *"Parts of the problem are that the theories have some complicated and controversial game-theoretic features, and offer little guidance for assessing welfare trade-offs when mergers have both efficiency benefits and anticompetitive effects."* (Riordan, 1998[41])
>
> *"These models, however, rely on particular assumptions about contractual arrangements between nonintegrated firms (for example, that pricing must be linear) or about the ability of integrated firms to make commitments (for example, that an integrated supplier can commit not to undercut a rival). Thus at this stage the debate about the conditions under which vertical mergers are anticompetitive is far from settled."* (Hart and Tirole, 1990[42])
>
> *"The theoretical results on vertical foreclosure depend critically on assumptions about strategies and commitments that I find hard to validate empirically. I am left in the undesirable situation of understanding the theoretical possibility of socially undesirable vertical foreclosure, but not being able to identify it when I see it."* (Comment by Dennis W. Carlton to Hart and Tirole, 1990)

[10] One of the surveys (Global Antitrust Institute, 2018[12]) identifies a study that, through simulation, predicts a price fall from vertical divestiture (Cohen, 2013[92]). However, as this study predicts that divestiture would be both profitable and welfare-enhancing, it is not contrary to the view that vertical mergers are welfare enhancing *when undertaken voluntarily by firms*.

[11] Some proponents of vigorous enforcement against vertical mergers have criticised the existing empirical literature, providing some counter evidence of the anti-competitive effects of vertical mergers (Baker et al., 2019, p. 11[54]). However, this counter evidence should be interpreted with caution, because almost all empirical studies quoted are working papers and the only two published papers do not find evidence that vertical mergers decrease consumer welfare. One of the published studies (Houde, 2012[99]), despite identifying a significant and sizable price increase, looks at *"a merger between two of the largest retail gasoline companies in Canada, Ultramar and Sunoco"*, which is in fact a horizontal merger. The other published study (Crawford et al., 2018[39]) finds that *"vertical integration leads to significant gains in both consumer and aggregate welfare"*.

[12] *"[T]he existence of foreclosure is, by itself, insufficient to conclude that vertical integration is pernicious. Indeed, recall that Salinger's (1988) model shows that there are two countervailing factors associated with vertical mergers: an increase in foreclosure or other practices that disadvantage rivals and a lessening of double marginalization or other practices that are inefficient.*

One must therefore balance the two. Two of the papers in the table attempt to assess that trade-off (i.e., Mullin and Mullin 1997 and Tasneem Chipty 2001), and both conclude that efficiency gains outweigh foreclosure costs. The evidence in favor of anticompetitive foreclosure is therefore, at best weak, particularly when one considers that the industries studied were chosen because their vertical practices have been the subject of antitrust investigations." (Lafontaine and Slade, 2007[11])

[13] *"(…) the paucity of vertical mergers analyzed using a coordinated effect theory by both EU and US antitrust authority show a certain degree of discomfort in bringing those cases. In the EU jurisdictions it is worth signalling two relevant cases: Case COMP/M.2389 Shell/DEA and Case COMP/M.2533 BP/EO. In the US jurisdictions the main cases are GrafTech/Seadrift, Merk/Medco and Premdor/Masonite."* (Biancini and Ettinger, 2016[64])

[14] *"A vertical merger might be used to evade price regulation. But, in light of the Supreme Court's analysis in cases like Discon and Credit Suisse, the extent to which evasion of regulation remains a viable theory of harm (and, if so, what its limits are), arguably have become less clear. Revisions to the Vertical Merger Guidelines would need to resolve this issue. This resolution may depend on whether the merger leads to foreclosure or coordination in addition to pure evasion of the price ceilings intended by the regulations."* (Salop and Culley, 2016[21])

[15] *United States v Comcast Corp.*, Case 1:11-cv-00106 (DDC, 2011), https://www.justice.gov/atr/case/us-and-plaintiff-states-v-comcast-corp-et-al.

[16] *Liberty Global/Ziggo*, Case M.7000, Commission Decision of 10/10/2014, http://ec.europa.eu/competition/mergers/cases/decisions/m7000_20141010_20600_4221982_EN.pdf.

[17] *Google Search (Shopping)*, Case AT.39740, Commission Decision of 27/06/2017, http://ec.europa.eu/competition/antitrust/cases/dec_docs/39740/39740_14996_3.pdf.

[18] *Google Android*, Case AT.40099, Commission Decision of 18/07/2018, http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_40099.

[19] *E-book MFNs and related matters (Amazon)*, Case AT.40153, Commission Decision of 04/05/2017, http://ec.europa.eu/competition/antitrust/cases/dec_docs/40153/40153_4392_3.pdf. In this case, the European Commission concluded that Amazon had used its dominant position in the German and UK e-books market to request sensitive information from publishers about the business models and terms agreed with competing e-book retailers. This raised the Commission's concern that competing e-book retailers would not be able to gain a competitive edge and would thus refrain from exercising real competitive pressure on Amazon.

[20] *"A vertical merger can facilitate coordination in the downstream market by weakening maverick or other disruptive competitive behavior of a non-merging downstream firm. If a non-merging firm is a maverick or otherwise disruptive competitive influence in the premerger market, the upstream division of the merged firm might weaken the incentives for that behavior by raising the price it charges to the disruptive firm or by reducing its access to inputs."* (Salop and Culley, 2016[21])

[21] *"When goods and services are complements, price cuts (…) by one company will tend to stimulate demand for complementary products. This effect is again an external effect, and the price-cutting company will normally not take it into account. Thus, each firm has an interest in seeing price cuts by suppliers of complementary products. A joint profit-maximizing agreement between complementary firms will then seek to internalize the price externalities and lead to price reduction. This is exactly in the interest of the consumers. As a result, an agreement entered into by providers of complementary products is unlikely to be bad for welfare."* (Verouden, 2008[67])

[22] The initial literature on theory of vertical integration under variable-proportion inputs (Vernon and Graham, 1971[100]) (Schmalensee, 1973[72]), intended to show that a monopolist can increase profits by integrating downstream, constituting thus an exception to the single monopoly profit theory. Some authors (Warren-Boulton, 1974[101]) (Mallela and Nahata, 1980[102]) have then suggested that, under variable-proportion inputs, vertical integration has an ambiguous effect on

consumer welfare. However, later research showed that these findings resulted from a compound effect of vertical and horizontal mergers and that *"vertical integration is shown accordingly to yield an unambiguous decrease in the final product price – an increase in consumer welfare."* (Abiru, 1988[73])

23 *United States v Comcast Corp.*, Case 1: 11-cv-00 106 (DDC, 2011), Competitive Impact Statement (p. 30), https://www.justice.gov/atr/case-document/competitive-impact-statement-72.

24 *"As compared to arms-length contracting, a vertically integrated firm can more readily realize efficiencies in the form of lower costs or improved quality, conditions that greatly benefit customers of the firm."* (FTC, 2018[5])

25 *"The classic example of this is the vertical integration of pig iron and steel manufacturers. Pig iron is impure raw iron resulting from the smelting of iron ore; it requires further treatment in order to produce steel. By undertaking the production processes in the same factory, the pig iron can be used while still molten, saving on the cost of reheating the input. A similar rationale can be given for the merger of timber pulp and paper makers."* (Bishop et al., 2005[66])

26 *"Imposing remedies or accepting remedies proposed by the parties constitutes the majority of the competition authorities' interventions in mergers, prohibitions being a measure of last resort, only used when the proposed remedies are inadequate."* (OECD, 2016[81])

27 *"Horizontal and vertical mergers generally involve different competitive concerns. These differences must be taken into account when crafting an appropriate remedy. Frequently, competitive concerns in horizontal mergers can be best resolved by a structural remedy, while vertical mergers lend themselves to behavioural remedies or a combination of both. While such generalizations may be a useful starting point, each transaction should be evaluated based on its own merits."* (OECD, 2011[82])

28 *"To the extent possible, structural remedies should be applied. In limited cases, when such remedies are difficult to craft, behavioral remedies may be acceptable (...) These include, but are not limited to, vertical mergers in which efficiencies are large and can clearly be separated from anticompetitive actions by such remedies, cases involving dominant firms with control over essential networks or patented technologies, and instances where identifying a package of "winning" assets and acceptable buyers is difficult."* (Kwoka and Moss, 2012[20])

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Annex

Table 0.1. Empirical evidence of the effects of vertical integration on consumer welfare

Author	Year	Industry	Methodology	Findings	ΔW
Levin	1981	Crude oil and refining	Panel regressions	• Decrease in profits • Fall in profit stability	+
McBride	1983	Cement and concrete	Panel regressions	• Fall in delivered price	+
Spiller	1985	Various	Cross-section regressions	• Increase in financial gains • Decrease in systematic risk	+
Helfat and Teece	1987	Various	Difference in differences	• Decrease in systematic risk	+
Anderson	1988	Electronic component sales	Cross-section regressions	• Fall in index of opportunism	+
Reiffen and Kleit	1990	Railroads and terminals	Descriptive	• No evidence of foreclosure of access to railroad terminals	0/+
Kerkvliet	1991	Coal and electricity	Panel regressions	• Increase in cost efficiency • Fall in monopsony power	+
Muris, Scheffman and Spiller	1992	Soft drinks and bottlers	Panel regressions	• Decrease in retail price	+
Shepard	1993	Gasoline refining and sales	Cross section regressions	• Decrease in in retail price	+
Rosengren and Meehan	1994	Various	Event study	• No foreclosure of unintegrated rivals	0/+
Waterman and Weiss	1996	Cable TV programming and distribution	Cross-section regressions	• Evidence of foreclosure (fewer rival programs carried)	?
Snyder	1996	Crude oil and refining	Event study	• Evidence of foreclosure	?
Ford and Jackson	1997	Cable TV programming and distribution	Cross-section regressions	• Evidence of foreclosure • Decrease in program cost	0
Mullin and Mullin	1997	Iron ore and steel	Event study	• No evidence of foreclosure • Efficiency gains	+
Corts	2001	Film production and distribution	Cross-section tobit regressions	• Fall in release date clustering	+
Mullainathan and Scharfstein	2001	Chemical	Panel regressions	• Decrease in investment responsiveness	?
Chipty	2001	Cable TV programming and distribution	Cross-section and IV regressions	• Evidence of foreclosure (fewer rival programs carried) • Efficiency gains	+
Ciliberto	2005	Physicians and hospitals	Panel regressions	• Increase in investment in health care services	+
Jin and Leslie	2005	Restaurant chains	Panel regressions	• Increase in quality (health scores)	+
Hastings and Gilbert	2005	Gasoline refining and sales	Difference in differences	• Evidence of foreclosure of unintegrated rivals	?
Gil	2006	Movie distribution	Cross-section regressions	• Increase in movie run length	+
Hortaçsu and Syverson	2007	Cement and concrete	Difference in differences	• No evidence of foreclosure • Efficiency gains	+
Suzuki	2009	Multichannel television	Difference in differences	• Evidence of foreclosure • Decrease in cost	?
Hanssen	2010	Motion pictures	Cross-section regressions	• Increase in film run adjustments • No evidence of foreclosure	+

Taylor et al.	2010	Retail gasoline	Difference in differences	• No significant change in price	0
Forman and Gron	2011	Insurance	Panel regressions	• Increase in adoption of information technology	+
Malik	2011	Pharmaceutical	Panel regressions	• Development of new product	+
Ataley et al.	2014	Various	Panel regressions	• Increase in productivity	+
Baker et al.	2014	Hospitals	Panel regressions	• Increase in price and spending • Decrease in hospital admissions • No analysis of quality effects	?
Ashenfelter et al.	2015	Beer	Panel regressions and event study	• No price change	0
Austin	2015	Retail gasoline	Panel regressions	• Decrease in price	+
Gil and Warzynski	2015	Video Games	Panel regressions	• Increase in price • Increase in quality • Increase in output	+
Koch et al.	2017	Hospitals	Difference in differences	• Increase in physician hospital utilisation	?
Crawford et al.	2018	Multichannel television	Panel regressions	• Decrease in price	+

Note: ΔW is the variation in consumer welfare. For studies that find no evidence of foreclosure, the variation in consumer welfare is assumed zero or positive due to potential efficiency effects.
This table excludes a study that, through simulation, predicts a price fall from vertical divestiture (Cohen, 2013[92]). However, as this study predicts that divestiture would be both profitable and welfare-enhancing, it is not contrary to the view that vertical mergers are welfare enhancing when undertaken voluntarily by firms.
Source: Adapted from Lafontaine and Slade (2007), "Vertical Integration and Firm Boundaries: The Evidence", https://www.aeaweb.org/articles?id=10.1257/jel.45.3.629 and Global Antitrust Institute (2018), Vertical Mergers, https://gai.gmu.edu/wp-content/uploads/sites/27/2018/09/GAI-Comment-on-Vertical-Mergers.pdf.