

The Microsoft Acquisition of Activision: Neither **Horizontal nor Vertical**

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The Microsoft Acquisition of Activision: Neither Horizontal nor Vertical

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Abstract

We study the Microsoft-Activision acquisition through the lens of a complementary-product merger. When two complementary good producers consolidate, the merger is not horizontal because the two firms do not produce substitutable goods. Nor is the merger vertical, as neither firm supplies the other. We develop an economic model to study these types of mergers that allows for the possibility of rivals exiting the market. Three main conclusions flow from our analysis. (1) The welfare effects of the Microsoft-Activision acquisition are ambiguous; they depend on several industry factors. (2) One will not obtain the correct welfare effects using an incorrect vertical structure; harm to consumers will typically be larger in a complementary-product merger relative to a vertical one. (3) Consumer harm associated with rivals' exit due to the merger might substantially reduce welfare even if it is a welfare-enhancing merger absent exit. Our analysis provides an analytical roadmap for the antitrust enforcement authorities regarding the theories of harm in complementary-good mergers.

Keywords: Antitrust, Competition Policy, Regulation, Complementary Mergers, Vertical Mergers, Merger Identification.

JEL Codes: K21, K41, L13, L42, L44, L52.

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1. Introduction

There has been a growing concern in recent years with the antitrust and regulatory implications of rising prices and increases in industry concentration.¹ In many cases, these changes have resulted from horizontal, vertical, and complementary mergers. In some instances, the Department of Justice (DOJ) and the Federal Trade Commission (FTC) allowed mergers to be consummated that probably should have been blocked.² For example, in retrospect, Facebook's acquisition of Instagram, the Ticketmaster/Live Nation merger, and the T-Mobile/Sprint merger seem undesirable.³ Assessing the probable competitive effects of a proposed merger is complex. Horizontal mergers involve head-to-head competition, so competition is obviously reduced. But only substantial reductions in competition run afoul of §7 of the Clayton Act.⁴ Distinguishing between lawful and unlawful horizontal mergers before they are consummated is not trivial.

Vertical mergers are more challenging to assess because the merging parties did not compete with one another before the merger. Instead, they stood in a buyer-supplier relationship. To the extent that the merger eliminates double marginalization or reduces transaction costs, it generates procompetitive effects. But vertical mergers may pose competitive risks associated with raising rival's costs and market foreclosure.⁵ Due to possibly conflicting effects, assessing the competitive effects of a vertical merger is typically more complicated than for a horizontal merger.

Mergers of complementary-good producers are even more complicated to evaluate. Those mergers are neither horizontal nor vertical. The merging firms did not engage in head-to-head competition before the merger, nor did one firm supply a good or service to the other. Instead, both firms sell their complementary goods to the consumer. A key distinction is that in complements mergers, the merging parties have no direct business relationship pre-merger, whereas they do in vertical mergers. Neither firm

¹ See, e.g., Gutiérrez and Philippon (2017), De Loecker, Eeckhout and Unger (2020), Autor, Dorn, Katz, Patterson and Van Reenen (2020), Eeckhout (2022), and the references therein.

² Lancieri, Posner, and Zingales (2022) discuss the decline in antitrust enforcement in the United States since the 1960s. Kwoka (2015) presents a thorough analysis of merger retrospectives and finds unambiguous evidence that most of the studied mergers resulted in higher prices and competitive harm. For additional discussions, see Shapiro (2018), Shapiro (2019), and the references therein.

³ See, e.g., Argentesi et al. (2021), Baker (2013), and Wang and Scott Morton (2021).

⁴ "No person engaged in commerce or in any activity affecting commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no person subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another person engaged also in commerce or in any activity affecting commerce, where in any line of commerce or in any activity affecting commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly." 15 U.S.C. § 18.

⁵ For seminal works, see Allen (1971), Salop and Scheffman (1983), and Ordover *et al.* (1990). Rey and Tirole (2007), Lee, Whinston, and Yurukoglu (2021), and Asker and Nocke (2021) provide surveys on foreclosure, vertical markets, and antitrust issues, respectively. See Salop (2018) for a discussion. Donna and Pereira (2024) discuss structural presumptions for non-horizontal mergers.

buys from or sells to the other firm. They both sell to the consumer. This feature has implications for the substitution patterns that arise to evaluate the potential harm. In a differentiated-product oligopolistic industry, the compensating variation and diversion ratios will typically differ in complementary and vertical mergers, as we show in Sections 4, 5, and 6. Thus, while the main economic effects are similar between vertical and complementary-good mergers, one will not obtain the correct substitution and welfare effects in a complementary merger using an incorrect vertical structure. Distinguishing such effects is paramount for antitrust evaluation.

In January 2022, Microsoft informed the FTC that it intended to acquire Activision for nearly \$69 billion. Microsoft is the producer of the Xbox game console and Activision is the producer of some popular games. Microsoft's Xbox game console and Activision's library of games are complements in consumption.⁶ Thus, Microsoft's acquisition of Activision is a complementary merger.

Nevertheless, the FTC refers to the Microsoft acquisition as "vertical" in its Complaint and never identifies it as "complementary." Furthermore, the Agencies ignore the potential harm due to rivals' exit, which can be substantial, as we show in Section 5. Several additional factors could have been considered in the FTC analysis regarding the complementary nature of the acquisitions, as discussed below.

The economic analysis would be straightforward if Microsoft and Activision were monopolists in their respective markets, but they were not. Microsoft is one of three major console producers. Activision is one of four major AAA video game producers.⁷ Both markets are differentiated product oligopolies. The effects of the proposed acquisition might alter the structure of the console and video game markets, and it can provide incentives for anticompetitive conduct, as we show in our model.

The FTC challenged the proposed acquisition pursuant to §7 of the Clayton Act, which forbids mergers and acquisitions that *may* substantially lessen competition or tend to create a monopoly. The language of §7 does not demand that the FTC prove with certainty that a merger will generate adverse economic consequences. The burden is to show that the ill effects are reasonably probable, which should require proof that they are consistent with profit maximization. Section 4 presents a model showing that the firms' conduct might generate adverse welfare effects depending on several industry factors.

⁶ The Federal Trade Commission and the European Commission call the transaction an "acquisition," while the CMA calls it a "merger." Henceforth, we use the terms "acquisition" and "merger" interchangeably and maintain the terminology used by each Agency when appropriate.

⁷ AAA games are the most prominent titles in the market. See Section 2 for a discussion.

It is not uncommon to observe the production of complements by a single firm. Wilson sells tennis shoes, racquets, balls, string, and grip; Acushnet, Calloway, and Taylor Made all sell golf clubs and golf balls; Smuckers sells peanut butter and jelly. If two independently owned and operated producers of complements merge, the economic results may be simple or complex. A straightforward case is when both producers are monopolists. Augustin Cournot analyzed the economic effect of a merger of monopolists providing complementary goods in his influential book, *Recherches Sur Les Principes Mathématiques De La Théorie Des Richesses* (1838). He found that the price of each good would fall following the merger. The economic problem is more complicated when the firms are oligopolists in their respective markets before the merger and products are differentiated. This is the focus of our analysis.

Following the industrial organization literature studying the effects of vertical integration and vertical arrangements (Mortimer, 2008; Houde, 2012; Lee, 2013; Crawford *et al.* 2018; Donna *et al.* 2023; *inter alia*), in Section 4, we present a theoretical framework to study complementary-product mergers and apply it to the specifics of the Microsoft-Activision acquisition.

We are not the first to examine these types of mergers. Church (2008) provides a useful summary on conglomerate (or what we call complementary) mergers. In particular, this chapter provides a useful summary of the history of prosecution of conglomerate merger cases in the US and Europe, as well as the potential costs and benefits of such mergers. Choi (2008) examines the proposed merger of General Electric and Honeywell in the early 2000s. They develop a model to examine a merger of complementary goods, but unlike our model they focus on the effects of bundling. Similarly to our results, they find that when the merged entity adopts some form of mixed bundling to divert demand from rival producers, this can have an ambiguous impact on consumer welfare. Etro (2019) expands on this premise by looking at the effects of a complementary good merger on investment in R&D and finds that there can be harm downstream if the investment decisions of the merging incumbent firms may deter investment by entrant firms, which may result in increased expected prices if the demand is inelastic enough.

The pre-merger conditions are extremely important in trying to assess the complex effects of a complementary merger, as is very clear in our setting. Masson, Dalkir, and Eisenstadt (2014) provide a clear theoretical analysis of this in a case with two price-setting firms where "each firm sells one of the components and competes against multiple firms that have no individual market power and price at marginal cost".⁸ This differs from our model in that each of our three firms have market power of some kind. Additionally, one of our most important findings is that the effects of a complementary merger can

⁸ See Masson, Dalkir, and Eisenstadt (2014) at 61.

be quite ambiguous, and depend on a variety of factors. More recently, Kadner-Graziano (2023) has attempted to develop a merger test for the antitrust authorities to use when they are attempting to predict the effects of a competitive merger. Again, we see the repeated theme: "when a competition authority reviews a merger of complements, it is thought that any potential negative merger effect ought to be weighed against at least the positive effect from internalising Cournot externalities. This complicates the work of competition authorities. The trade-off can be difficult to ascertain. It may be ambiguous."⁹

We identify the evidentiary problems confronting the FTC and suggest an approach for evaluating the theory of harm in these mergers, which incorporates the possibility and consequences of rivals' exit. The aim of the model is to identify the antitrust evidentiary standards in such a merger of complementary-good producers.¹⁰

The model features a differentiated product oligopolistic industry with two types of goods, consoles and video games, that are gross complements. We first derive the industry equilibrium conditions and proceed by deriving a series of results showing the economic effects of the Microsoft-Activision acquisition, the conditions under which exclusionary conduct is profit-maximizing, and the role of the cloud market in the evidentiary standard.

Three main conclusions follow from the model. The first is that the welfare effects of the Microsoft-Activision Acquisition are ambiguous, a well-known result acknowledged by the Agencies evaluating the Acquisition. They depend on several factors, including the diversion ratios and switching behavior of the consumers and the size of the markups.

The second relates to the complementary nature of the industry. In a differentiated-product industry with an oligopolistic market structure, the compensating variation and substitution patterns will typically differ in complementary and vertical mergers. Harm to consumers will typically be larger in a complementary-product merger relative to a vertical one, as we explain in Subsection 6.4. Thus, while the main economic effects are similar, one will not obtain the correct substitution and welfare effects in a complementary merger using an inappropriate vertical structure. Our model shows that such effects are fundamental in evaluating the merger's competitive effects, given the ambiguity of the welfare results.

⁹ See Kadner-Graziano (2023) at 11.

¹⁰ Rey and Tirole (2019) study price caps as an alternative to mergers. They show that price caps help firms solve Cournot's multiple-marginalization problem. Unlike mergers, these instruments do not stifle price competition in the case of substitutes nor facilitate foreclosure in the case of complements. For a recent analysis of complementary product mergers see, e.g., Akgün *et al.* (2020).

The third is perhaps the most fundamental point and it was not considered by the Agencies. Consumer harm associated with rivals' exit due to the merger might substantially reduce welfare even if it is a welfare-enhancing acquisition absent exit. The magnitude of the harm depends on the rivals' entry and fixed costs. These points illustrate the complexity of the setting. We argue that careful evaluation of these conclusions is fundamental for assessing the competitive effects of a merger of complements through the lens of the Microsoft-Activision Acquisition.

The rest of the paper is organized as follows. Section 2 examines the industry for consoles, video games, and cloud gaming, as well as the background regarding the proposed Acquisition by Microsoft. Section 3 discusses the antitrust challenges posed by the European Commission, Competition and Markets Authority, and Federal Trade Commission. Section 4 focuses on the economic assessment of the antitrust challenges. We discuss the cloud gaming market in Section 5. Section 6 discusses the challenges of proving the competitive effects of permitting the acquisition. Section 7 concludes.

2. The Video Game Industry

As of 2022, gaming has become a multi-billion-dollar industry, with estimated global revenues reaching \$170 billion in 2023.¹¹ Given the size of the gaming market, mergers within this industry can arouse competitive concerns by the antitrust Agencies.¹² The FTC appears to be concerned about the possible competitive effects of the acquisition in three markets: (1) game consoles, (2) video games, and (3) cloud gaming services. These markets were also examined by the European Commission in the E.U. and the Competition and Markets Authority in the U.K., as we discuss below. In this section, we provide some background information on each market.

2.1. Video Game Consoles

In August 1972, the first home video game console was brought to market. The Magnavox Odyssey could be played on a television set, and had detachable controllers, light gun accessories, and interchangeable game cartridges. In 1975, the more commonly known Atari made its debut, and in 1977 Nintendo entered the market for video game consoles with its Color TV-Game 6.

Since these introductory home consoles in the 1970s, there has been a vast improvement in the quality of video game consoles. While many companies have attempted to enter and maintain a presence

¹¹ FTC Complaint at ¶22.

¹² We use the term *Agencies* to refer collectively to all government agencies and regulators that might review the acquisition.

in this segment of the entertainment space, there are only three major players in the current video game console market – Microsoft, Nintendo, and Sony.

Nintendo entered the video game console market in the late 1970s and has been a prominent participant ever since. After developing the Color TV-Game console series, they developed the Nintendo Entertainment System (NES). The development and production of this console were accompanied by the creation of many iconic game franchises, including *The Legend of Zelda* and *Super Mario Bros*. Additional development included the creation of the GameCube, the Game Boy series, the Wii, and the Nintendo DS series, until they finally reached their current major console – the Nintendo Switch. As of 2021, Nintendo earned 20 to 30 percent of total console revenues globally.¹³

On December 3, 1994, Sony Interactive Entertainment (Sony) released the original PlayStation for sale, with a second console launched a few years later in the spring of 2000. The PlayStation was initially intended as an add-on to the Nintendo NES, but that plan fell through. Rather than scrap the console altogether, Sony released the product as a standalone design. The original model of the PlayStation did not differ significantly from the NES, but subsequent models of the PlayStation began to diverge from the Nintendo consoles. While Nintendo increased its focus on handheld devices, PlayStation maintained the standard television-connected model.

A similar product was introduced by Microsoft in 2001 called the Xbox. At its release, the Xbox was in direct competition with Nintendo's GameCube and Sony's PlayStation 2. One of the major video games released with the Xbox was the original *Halo*. Since its release, Microsoft has produced nine main console models.

As of 2021, Microsoft accounted for between 20 and 30 percent of global console revenue, while Sony accounted for the remaining 40 to 50 percent of revenues.¹⁴ Like PlayStation, Microsoft's Xbox consoles have maintained their style of play. Both of these consoles are still intended to be played with a television set and cannot be played in a handheld capacity because they have no built-in screens. Thus, because Nintendo has significantly differentiated its console, Microsoft and Sony are closer competitors in the console market.

¹³ See CMA Appendices at Table 6. For more specific estimates, see Rousseau (2023).

¹⁴ Id.

2.2. Video Games

All three major console producers are also involved in the market for video game production. Unlike the console market, however, the video game market is somewhat less concentrated.

Video games are generally divided into one of three classifications – AAA (triple-A) games, AA (double-A) games, or indie games. These classifications depend significantly on the game's quality and the time and funding provided throughout game development. Indie games are generally low-budget games produced by a small team or individual game developers, such as *Stardew Valley* or *Hollow Knight*. AA games tend to be of higher production quality than indie games, and tend to have larger teams and more funding. These include games like *Dishonored* and *The Witcher 3: Wild Hunt*. Finally, AAA games are the most prominent titles in the market. These receive the highest budgets and the largest development teams.¹⁵ Examples of AAA games include *Grand Theft Auto V, Red Dead Redemption 2*, and *Call of Duty: Modern Warfare*.

While there may be many smaller producers of indie and AA games, there are four major producers of AAA games – Activision, Electronic Arts, Take-Two, and Ubisoft.¹⁶ These four producers are often referred to as the "Big 4."¹⁷

Microsoft, Nintendo, and Sony also develop their own games, including AAA games. There are additional AAA game producers, but many of these producers are owned, at least in part, by one of the video game console producers. For example, *The Last of Us*, a popular postapocalyptic AAA video game released in 2013, was developed by Naughty Dog, LLC, which Sony owns. Similarly, Microsoft released *Gears of War 4* in 2016. The Coalition, a studio within Xbox Game Studios, developed this AAA game.

The major console producers regularly acquire video game makers. For example, Sony recently purchased Bungie, Inc. for \$3.6 billion.¹⁸ In the past few years, Microsoft has also attempted to boost its game production through acquisitions of well-known and well-established game developers. Microsoft

¹⁵ "AAA games are costly to produce because of the creative talent, budgets, and time required for development." (FTC Complaint at ¶3). "The term "AAA" is frequently used by industry participants to refer to highly anticipated games bearing similar characteristics: high development costs, superior graphical quality, and expectations of high unit sales and revenue, typically from a studio with large development and publishing content [...]." (FTC Complaint at ¶43).

¹⁶ "These publishers reliably produce AAA games for high-performance consoles and collectively own a significant portion of the most valuable IP in the gaming industry. These high-profile franchises include, for example, Call of Duty (Activision), FIFA (EA), Grand Theft Auto (Take-Two), and Assassin's Creed (Ubisoft)."(FTC Complaint at ¶46). ¹⁷ Epic Games is also a major AAA game producer. See FTC Complaint at ¶47.

¹⁸ This company produced the *Halo* and *Destiny* franchises, and was once owned by Microsoft. In 2007, Bungie split from Microsoft and has since been an independent company. Sony will be treating Bungie as an independent subsidiary, so they are not required to make any game exclusive to the PlayStation.

has purchased Mojang, the developer of the worldwide sensation *Minecraft*, as well as ZeniMax, creator of *The Elder Scrolls* series, for \$2.5 billion and \$7.5 billion, respectively (Mackie 2020).

2.3. Cloud Gaming Services

In addition to the well-established markets for consoles and video games, the FTC is concerned about the development of a dynamic new market: cloud gaming services. According to the CMA, Cloud gaming "provides gamers [with] the opportunity to play technologically complex games on less powerful devices – such as mobile devices – that may otherwise lack the computing power or storage to support them."¹⁹

Cloud gaming acts as an additional console that provides gamers with an alternative to the mainstream consoles currently available. Rather than purchasing one console that must be connected to a television set, cloud gaming allows gamers to play their favorite games, like *Call of Duty* or *Grand Theft Auto V*, on other devices they may already own by paying a subscription fee instead of buying a console. For example, Microsoft's cloud gaming platform, Xbox Cloud Gaming (or xCloud), is available to gamers "as a bundled offering with its Xbox Game Pass Ultimate (XGPU) multi-game subscription service."²⁰ Here, a player can play their favorite games with a phone or tablet instead of a console without needing to revamp the technology of their previously owned devices.

Because these services act as an alternative console, cloud gaming is a substitute for consoles like the Xbox and PlayStation. This feature further complicates the Microsoft-Activision acquisition analysis, as we show in Section 5.

2.4. The Microsoft – Activision Acquisition

On January 18, 2022, Microsoft announced its plan to acquire Activision for approximately \$69 billion in cash. While this is not the first major purchase of a video game producer by a console producer, this acquisition is the largest in the history of the video game market. Microsoft and Activision are significant players in their respective industries, bringing this proposed merger under intense Agency scrutiny.

¹⁹ CMA Final Report at 45.

Microsoft produces the Xbox console and owns 23 video game producers.²¹ By purchasing Activision, Microsoft would significantly expand the quantity and quality of games it produces, including AAA games. Activision owns the *Call of Duty* franchise, whose most recent game, *Call of Duty: Modern Warfare II*, accounted for \$1 billion in sales in its first ten days on the market.²² It quickly became the best-selling game of 2022 in the U.S., despite being released to the market on October 28, 2022.²³

The acquisition provides Microsoft with access to a major game in the industry in terms of market share, as documented in the FTC Complaint. Before the merger, Activision did not allow its games to be streamed on any cloud gaming service. Now that the merger has been consummated, a question that arises is whether Microsoft's incentives will change in the cloud gaming service regarding the *Call of Duty* franchise. For instance, will it also introduce these games to cloud gaming services of other major console producers, like Sony?²⁴ Will Microsoft exclude *Call of Duty* from rival cloud gaming service providers?

Similar questions also arise in the market for standard consoles.²⁵ Consequently, the primary competitive concerns surround Microsoft's post-merger ability to exclude its rival console producers from Activision's blockbuster games, most noteworthy the *Call of Duty* franchise, in the console and cloud gaming markets. It has caused the antitrust authorities in the E.U., U.K., and U.S. to examine the merger more closely with mixed results.

²¹ Microsoft appears to be interested in building its library of video games. For a list of the development studios currently under Xbox Game Studios, see the Xbox Studio List. In addition to its blockbuster effort to acquire Activision, Microsoft is pursuing other targets. See D'Anastasio (2023).

²² See Activision Press Release.

²³ *Ibid.* For a list of the top 20 best-selling games of 2022, see Kain (2023). In comparison, the second-highest-grossing game of 2022 in the U.S., *Elden Ring*, was released on February 25, 2022, as reported on the Elden Ring Official Website.

²⁴ Sony is already attempting to enter the cloud gaming space. See Maguire (2023).

²⁵ At a District Court hearing, Microsoft pledged to make *Call of Duty* available to gamers on Sony's PlayStation. See Nayak (2023). Since these promises are not binding, they may amount to nothing more than "cheap talk." For example, the FTC Complaint documents that Microsoft does not always honor its promises: "Microsoft's past conduct provides a preview of the combined firm's likely plans if it consummates the Proposed acquisition, despite any assurances the company may offer regarding its plans. In March 2021, Microsoft acquired ZeniMax Media Inc. ("ZeniMax"), the parent company of the well-known game developer and publisher Bethesda Softworks LLC ("Bethesda"). Microsoft assured the European Commission ("EC") during its antitrust review of the ZeniMax purchase that Microsoft would not have the incentive to withhold ZeniMax titles from rival consoles. But, shortly after the EC cleared the transaction, Microsoft made public its decision to make several of the newly acquired ZeniMax titles, including Starfield, Redfall, and Elder Scrolls VI, Microsoft exclusives." (FTC Complaint at ¶12.)

Enforceability of promises is a matter of contract law. However, enforceability and monitoring is a complex task, as noted by the CMA: "[...] there are significant risks of disagreement and conflict between Microsoft and cloud gaming service providers. Given the information asymmetry between Microsoft and any monitoring trustee or the CMA, it would be difficult to monitor and enforce this remedy, even with significant information gathering." (CMA Final Report at ¶78)

The FTC can still challenge mergers even after consummation.

3. Antitrust Challenges

The proposed acquisition of Activision by Microsoft for nearly \$69 billion aroused the interest of the Federal Trade Commission (FTC) in the U.S., the European Commission (EC) in the E.U., and the Competition and Markets Authority (CMA) in the U.K. The EC initially opposed the acquisition but ultimately granted conditional approval based on guarantees offered by Microsoft. Similarly, the CMA opposed the merger, but subsequently permitted the acquisition based on concessions and changes made by Microsoft. The FTC, however, continues to oppose the merger as a violation of Section 7 of the Clayton Act in spite of the fact that its appeal for a temporary injunction was denied by the District Court.²⁶

3.1. European Commission

In the E.U., a proposed merger is evaluated to determine its effect on competition. After defining both product and geographic markets, and considering the relevant economic factors, if the merger impedes effective competition, it is deemed *incompatible* with the internal market. If the merger does not have this proscribed effect, it must be cleared.

Following its preliminary investigation, the European Commission (EC) was concerned that the merger could harm competition for consoles and PC video games. This concern included multi-game subscription services and cloud game streaming services. It was also concerned that Microsoft could impair competition in PC operating systems. Following its in-depth review of the proposed acquisition, however, the EC concluded that Microsoft would not have the incentive to harm the distribution of games in the console market because Sony's PlayStation outnumbers Microsoft's Xbox by four to one.²⁷

Because Activision currently does not offer its games to multi-game subscription services, the merger would not affect this market. The EC did find, however, that Microsoft could impede competition in the distribution of games for cloud game streaming, and that its position in the PC market would be strengthened. To offset these competitive concerns, Microsoft offered several guarantees that would

²⁶ "[The] District Court for the Northern District of California denied the FTC's request for a preliminary injunction; the FTC appealed that decision to the United States Court of Appeals for the Ninth Circuit; and that appeal is still pending. FTC v. Microsoft Corp., 2023 U.S. Dist. LEXIS 119001 (N.D. Cal. July 10, 2023). On October 13, 2023, Microsoft and Activision closed the Transaction." Obtained from (pp. 1-2):

https://www.ftc.gov/system/files/ftc_gov/pdf/609321_order_denying_motion_of_respondent_microsoft_to_certi fy_request_for_court_enforcement.pdf

²⁷ "[T]he Commission found that: Microsoft would have no incentive to refuse to distribute Activision's games to Sony, which is the leading distributor of console games worldwide, including in the European Economic Area ('EEA') where there are four Sony PlayStation consoles for every Microsoft Xbox console bought by gamers" (EC Press Release). The full decision can be found in the references under EC Full Decision.

prevent opportunistic anticompetitive conduct: (1) for consumers who have a license to any current or future Activision game, Microsoft would issue a free 10–year license that would permit cloud game streaming on the service of the consumer's choice, (2) providers of cloud game streaming services will get a license to stream any Activision game, and (3) Activision's games will have the same quality and content when provided on a cloud game streaming service as that provided for traditional downloads. These guarantees resolved the EC's competitive concerns and, therefore, the EC cleared the merger.

3.2. Competition and Markets Authority

The CMA is the U.K.'s antitrust regulator and watchdog. It has evaluated the proposed acquisition of Activision by Microsoft, along with Microsoft's assurances that it will not foreclose competition following the merger.

Interestingly, the CMA's initial decision to bar the merger did not center on consoles or game development. Instead, the CMA was concerned that Microsoft could harm rivals in the cloud gaming market by making its games exclusive. To address the concerns raised by the CMA in the cloud gaming market, Microsoft restructured the acquisition by divesting the cloud gaming rights for Activision games to Ubisoft. Due to the FTC's failure to obtain a preliminary injunction in the U.S., the CMA reconsidered its decision. Upon reconsideration, the CMA was persuaded that competition in cloud gaming would not be impaired and, therefore, permitted the acquisition to go forward.

3.3. Federal Trade Commission

In the U.S., the FTC observed that the acquisition could impair competition in three markets: consoles, video games, and cloud gaming services. In its Complaint, the FTC alleged that Microsoft would have the incentive and the ability to withhold Activision's games, including *Call of Duty*, from rival console suppliers and degrade the quality of the game's experience on alternative devices supplied by rivals. The FTC was also concerned that Microsoft could alter the pricing of Activision's games to disadvantage its rivals in the console market. In contrast, the FTC alleged that Activision has an independent incentive to distribute its games widely as that would maximize its profits. In its Complaint, the FTC alleged that: "[t]he Proposed Acquisition is reasonably likely to substantially lessen competition and/or tend to create a monopoly in both well-developed and new, burgeoning markets, including high-performance consoles, multi-game content library subscription services, and cloud gaming subscription services."²⁸

²⁸ FTC Complaint at ¶14.

The ill effects of Microsoft's anticipated anticompetitive conduct include: "[...] dampened innovation, diminished consumer choice, higher prices and/or lower quality products, and harm to the millions of Americans who benefit from competition in video game consoles and subscription services."²⁹

For purposes of the suit, the FTC has defined the relevant geographic market as the United States. The closing date for the acquisition, which was July 18, fell several weeks before the FTC's final decision. The FTC requested an injunction from the District Court to forestall the closing, but the Court cast considerable doubt on the FTC's prospects of prevailing at trial and therefore denied the FTC's request. In October 2023, Microsoft completed the acquisition of Activision in spite of the FTC's continuing objections.

4. Economic Framework: Mergers of Complementary-Good Producers

We present a theoretical framework adapting the one in Donna and Pereira (2023) to a complementary-product setting using the specifics of the Microsoft-Activision acquisition.

4.1. Setup

We consider a differentiated product oligopolistic industry. There are two types of goods in the industry: consoles and video games. We assume that consoles are gross substitutes; similarly, video games are gross substitutes.³⁰ We assume that consoles and video games for the same console are gross complements.³¹ We define a consumer product as a combination of a console and video games. This definition means that two versions of the same video game for two different consoles are two different products for the consumers.³² Similarly, two consoles that offer the same video game to a consumer are different products.³³ These assumptions imply that consumer products, as previously defined, are

²⁹ *Ibid.* at ¶21.

³⁰ Two products are gross substitutes if the increase in the price of one of them raises the demand for the other.
³¹ Two products are gross complements if the increase in the price of one of them reduces the demand for the other.
Henceforth, we adopt the terminology that consoles and video games are (gross) complements, and discuss the economic forces at play looking at the Microsoft acquisition of Activision as a complementary-product acquisition.
³² For example, a (license) of the game *Call of Duty* (manufactured by video-game firm Activision) for the PlayStation (manufactured by console-firm Sony) is a different product than the same game *Call of Duty* (manufactured by the same video-game firm Activision) for the Xbox (manufactured by a different console-firm Microsoft).

³³ When consumers purchase a console they consider several characteristics of the consoles, such as the number and type of games available for that console. They might also form expectations about these future characteristics, such as the future availability of a specific game, like *Call of Duty*, for that console.

imperfect substitutes and that firms producing consoles compete with each other. Similarly, firms producing video games compete with each other.

Following the industry description in Section 2, we consider an industry with three firms producing consoles, Microsoft (M), Sony (Y), and Nintendo (N). Following the FTC complaint, we focus on the market for high quality games, referred to in the industry as "AAA" games.³⁴ More specifically, we focus on four major AAA game publishers, Activision (A), Electronic Arts (E), Take-Two (T), and Ubisoft (U).³⁵ We index firms selling consoles with superscript $c, f^c \in \mathcal{F}^c = \{M, Y, N\}$, and firms selling video games with superscript $v, f^v \in \mathcal{F}^v := \mathcal{A} = \{A_1, A_2, A_3, A_4\}$. Hybrid firms might sell both consoles and video games.

The timing is as follows. First, Microsoft acquires Activision; denote this firm by MA. Second, firms set prices simultaneously. That is, firms producing consoles (including MA) set console consumer prices, p^c , through a Nash-Bertrand game; simultaneously, firms producing video games (including MA) set video-game consumer prices, p^v , also through a Nash-Bertrand game. Denote the vector of stacked consumer prices by $p: = (p^c, p^v)$. Third, consumers observe all prices, p, and choose the products that maximize their utility, thus determining the market shares. Finally, firms observe all preceding actions, and profits are realized. The equilibrium concept is subgame perfection.

Firms maximize profits when setting consumer prices. The profit function of a firm f^c producing consoles, indexed by j^c , is:

$$\Pi_{f^c} := \sum_{j^c \in \Omega_{f^c}} (p_{j^c}^c - mc_{j^c}^c) m^s s_{j^c}^c (p^c, p^v) - \kappa_{f^c},$$
(1)

where $p_{j^c}^c$, $mc_{j^c}^c$, and $s_{j^c}^c$ are, respectively, the price, marginal cost, and market share of the console j^c ; Ω_{f^c} is the set of products of firm f^c ; m^s is the market size; p^c , without subscripts, denotes the vector with the prices of all consoles; p^v , without subscripts, denotes the vector with the prices of all video games;³⁶

³⁴ "AAA games are costly to produce because of the creative talent, budgets, and time required for development." (FTC Complaint, ¶3). "The term "AAA" is frequently used by industry participants to refer to highly anticipated games bearing similar characteristics: high development costs, superior graphical quality, and expectations of high unit sales and revenue, typically from a studio with large development and publishing content [...]." (FTC Complaint, ¶43). ³⁵ "The gaming industry recognizes a limited top tier of independent game publishers, sometimes referred to as the "Big 4" or simply the AAA publishers: Activision, Electronic Arts, Take-Two, and Ubisoft. These publishers reliably produce AAA games for high-performance consoles and collectively own a significant portion of the most valuable IP in the gaming industry. These high-profile franchises include, for example, Call of Duty (Activision), FIFA (EA), Grand Theft Auto (Take-Two), and Assassin's Creed (Ubisoft)."(FTC Complaint, ¶46).

³⁶ A decrease in the price of video game $p_{j^v}^v$ for console c generates a weak increase in the demand for console j^c , $s_{i^c}^c(\cdot)$, because consoles and video games for the same console are gross complements. By weak increase we mean

and κ_{f^c} is the fixed cost of the firm f^c . As mentioned, consumer prices are denoted by the stacked vector of prices p.

The profit function of a firm f^{ν} that produces video games, indexed by j^{ν} , is:³⁷

$$\Pi_{f^{\nu}} := \sum_{j^{\nu} \in \Omega_{f^{\nu}}} (p_{j^{\nu}}^{\nu} - mc_{j^{\nu}}^{\nu}) m^{s} s_{j^{\nu}}^{\nu} (p^{\nu}, p^{c}) - \kappa_{f^{\nu}},$$
⁽²⁾

where $p_{j^{\nu}}^{\nu}$, $mc_{j^{\nu}}^{\nu}$, and $s_{j^{\nu}}^{\nu}$ are, respectively, the price, marginal cost, and market share of the video game j^{ν} ; and $\Omega_{f^{\nu}}$ is the set of products of the firm f^{ν} ; and $\kappa_{f^{\nu}}$ is the fixed cost of the firm f^{ν} .

The profit of Microsoft-Activision, MA, is:³⁸

$$\Pi_{MA^{H}} \coloneqq \Pi_{M^{c}} + \Pi_{A^{v}}$$

$$= \sum_{j^{c} \in \Omega_{M}} (p_{j^{c}}^{c} - mc_{j^{c}}^{c}) m^{s} s_{j^{c}}^{c} (p^{c}, p^{v}) + \sum_{j^{v} \in \Omega_{A}} (p_{j^{v}}^{v} - mc_{j^{v}}^{v}) m^{s} s_{j^{v}}^{v} (p^{v}, p^{c}) - \kappa_{M} - \kappa_{A},$$
(3)

where we used the superscript H to denote that the MA firm is a hybrid firm selling both consoles, c, and video games, v.

There are two points to consider. The first is that we have explicitly distinguished with superscripts c the market share of the product j^c produced by console manufacturer f^c , denoted by $s_{j^c}^c(\cdot)$, and with superscripts v the market share of product j^v produced by video-game manufacturer f^v , denoted by $s_{j^v}^v(\cdot)$. We use a similar notation for prices, denoted $p_{j^c}^c$ and $p_{j^v}^v$, and marginal costs, denoted $mc_{j^c}^c$ and $mc_{j^v}^v$. This notation eases the discussion in the following subsections. The second is that, for the notation of the market share functions, $s_{j^c}^c(p^c, p^v)$ and $s_{j^v}^v(p^v, p^c)$, we have omitted their dependence on the other

that the demand increases (*e.g.*, a popular game produced for the same type of console, c) or is not affected (*e.g.*, a game produced for a different type of console, $c' \neq c$).

³⁷ We define below the profit function of a firm producing both consoles and video games. In Subsection 4.3, we assume that, after the acquisition, the firm Microsoft-Activision is the only "hybrid" manufacturer; that is, the only firm selling both consoles and video games. It is straightforward to allow for multiple hybrid manufacturers; see Donna *et al.* (2022, section 3.2).

³⁸ We discuss acquisition-specific technological efficiencies in Subsection 4.3. It is straightforward to allow Sony and Nintendo to also sell video games. See the previous footnote.

characteristics of the goods.³⁹ This simplification helps to keep the notation compact; however, the market share functions are also a function of these characteristics.⁴⁰

4.2. Price setting

Consumer prices are given by the Nash-Bertrand equilibrium. The necessary first-order conditions (FONCs) for the console firms are:

$$s_{j^c}^c(p^c, p^v) + \sum_{k^c \in \Omega_{f^c}} \left(p_{k^c}^c - mc_{k^c}^c \right) \frac{\partial s_{k^c}^c(p^c, p^v)}{\partial p_{j^c}^c} = 0, \qquad \forall (j^c, k^c) \in \Omega_{f^c}, \quad f^c \in \mathcal{F}^c.$$
(4)

The FONCs for the video-game firms are:

$$s_{j^{\nu}}^{\nu}(p^{\nu},p^{c}) + \sum_{k^{\nu}\in\Omega_{f^{\nu}}} \left(p_{k^{\nu}}^{\nu} - mc_{k^{\nu}}^{\nu} \right) \frac{\partial s_{k^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{j^{\nu}}^{\nu}} = 0, \qquad \forall (j^{\nu},k^{\nu}) \in \Omega_{f^{\nu}}, \quad f^{\nu} \in \mathcal{F}^{\nu}.$$
(5)

The FONCs for the hybrid MA firm are:

$$s_{j^{c}}^{c}(p^{c},p^{v}) + \sum_{k^{v} \in \Omega_{M}} (p_{k^{c}}^{c} - mc_{k^{c}}^{c}) \frac{\partial s_{k^{c}}^{c}(p^{c},p^{v})}{\partial p_{j^{c}}^{c}} + \sum_{k^{v} \in \Omega_{A}} (p_{k^{v}}^{v} - mc_{k^{v}}^{v}) \frac{\partial s_{k^{v}}^{v}(p^{v},p^{c})}{\partial p_{j^{c}}^{c}} = 0,$$

$$\forall (j^{c},k^{c},j^{v},k^{v}) \in \Omega_{MA^{H}} := \Omega_{M} \cup \Omega_{A}.$$

$$s_{j^{v}}^{v}(p^{v},p^{c}) + \sum_{k^{v} \in \Omega} (p_{k^{v}}^{v} - mc_{k^{v}}^{v}) \frac{\partial s_{k^{v}}^{v}(p^{v},p^{c})}{\partial p_{j^{v}}^{v}} + \sum_{k^{v} \in \Omega} (p_{k^{c}}^{c} - mc_{k^{c}}^{c}) \frac{\partial s_{k^{c}}^{c}(p^{c},p^{v})}{\partial p_{j^{v}}^{v}} = 0,$$

$$(6)$$

$$\forall (j^c, k^c, j^v, k^v) \in \Omega_{MA^H}.$$

$$(F_{k^v}, M_{k^v}) = \partial p_{j^v}$$

$$\forall (j^c, k^c, j^v, k^v) \in \Omega_{MA^H}.$$

$$(7)$$

³⁹ Examples of console characteristics are the central processing unit, the graphical processing unit, the total number of AAA video games available compatible with that console, and the number of games exclusive to the console. Examples of video-game characteristics include the quality of the sound and graphics, the game duration, game control and dynamics, and multi-player features.

⁴⁰ More generally, let J^c and J^v be, respectively, the total number of differentiated console and video-game goods, J^c and J^v be, respectively, the set of differentiated console and video-game goods, and let $x_{j^c}^c$ and $x_{j^v}^v$ be, respectively, the S^c - and S^v -dimensional row-vectors of characteristics of each console and video-game good, $j^c \in J^c$ and $j^v \in J^v$. Finally, let $x^c \in \mathbb{R}^{S^c \times J^c}$ and $x^v \in \mathbb{R}^{S^v \times J^v}$, without subscripts be, respectively, the stacked vector with the S^c and S^v characteristics for each of the J^c consoles and each of the J^v video-game products. Then, $s_{j^c}^c(p^c, p^v, x^c, x^v)$ and $s_{j^v}^v(p^v, p^c, x^c, x^v)$.

The system of equations in (4), (5), (6), and (7) characterizes the equilibrium vector of prices in the industry, p.

4.3. Economic effects of the Microsoft-Activision Acquisition

We now discuss the main economic effects arising from the Microsoft-Activision acquisition using an example. We discuss how the acquisition might affect prices, rivals' profits, and market structure.

Suppose the three console (four video-game) firms produce only one console type (AAA video game). Call Microsoft and its console, M and m^c , respectively. Call the other console firms (their consoles), Sony and Nintendo, Y and N (y^c and n^c), respectively. Call the AAA video-game firms and their games $\mathcal{A} = \{A_1, A_2, A_3, A_4\}$ and $a = \{a_1^v, a_2^v, a_3^v, a_4^v\}$, respectively. Let Activision be A_1 and the video game *Call of Duty* be a_1^v . The FONCs (4), (5), (6), and (7) simplify as follows. For Sony and Nintendo, respectively:

$$s_{y^{c}}^{c}(p^{c},p^{v}) + \left(p_{y^{c}}^{c} - mc_{y^{c}}^{c}\right) \frac{\partial s_{y^{c}}^{c}(p^{c},p^{v})}{\partial p_{y^{c}}^{c}} = 0, \quad \text{for firm } Y.$$
(8)

$$s_{n^{c}}^{c}(p^{c},p^{v}) + \left(p_{n^{c}}^{c} - mc_{n^{c}}^{c}\right)\frac{\partial s_{n^{c}}^{c}(p^{c},p^{v})}{\partial p_{n^{c}}^{c}} = 0, \quad \text{for firm } N.$$
(9)

For the video-game firms other than Activision, A_2 , A_3 , A_4 :

$$s_{a_{i}^{\nu}}^{\nu}(p^{\nu},p^{c}) + \left(p_{a_{i}^{\nu}}^{\nu} - mc_{a_{i}^{\nu}}^{\nu}\right) \frac{\partial s_{a_{i}^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{a_{i}^{\nu}}^{\nu}} = 0,$$

$$\text{for firm } f^{\nu} \in \mathcal{A} \setminus \{A_{1}\} \text{ and } a_{i}^{\nu} \in \mathcal{A} \setminus \{a_{1}^{\nu}\}.$$

$$(10)$$

For the new Microsoft-Activision firm, MA^H , that produces the console m^c and video game a_1^v :

$$s_{m^{c}}^{c}(p^{c},p^{\nu}) + \left(p_{m^{c}}^{c} - mc_{m^{c}}^{c}\right)\frac{\partial s_{m^{c}}^{c}(p^{c},p^{\nu})}{\partial p_{m^{c}}^{c}} + \left(p_{a_{1}^{\nu}}^{\nu} - mc_{a_{1}^{\nu}}^{\nu}\right)\frac{\partial s_{a_{1}^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{m^{c}}^{c}} = 0.$$
 (11)

$$s_{a_{1}^{\nu}}^{\nu}(p^{\nu},p^{c}) + \left(p_{a_{1}^{\nu}}^{\nu} - mc_{a_{1}^{\nu}}^{\nu}\right) \frac{\partial s_{a_{1}^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{a_{1}^{\nu}}^{\nu}} + \left(p_{m^{c}}^{c} - mc_{m^{c}}^{c}\right) \frac{\partial s_{m^{c}}^{c}(p^{c},p^{\nu})}{\partial p_{a_{1}^{\nu}}^{\nu}} = 0.$$
(12)

We now analyze the Microsoft-Activision acquisition to make the discussion less abstract. Before the acquisition, the FONC of Microsoft is given by equation (11) with the third term on the left-hand side (LHS) equal to zero. After the acquisition, that term is negative because video games and consoles are gross complements $(\partial s_{a_1^v}^v(\cdot)/\partial p_{m^c}^c < 0)$, and firms have market power $(p_{a_1^v}^v - mc_{a_1^v}^v > 0)$. Thus, after the acquisition, FONC (11) of Microsoft becomes negative. Similarly, with FONC (12); after the acquisition, the FONC (12) becomes negative because the third term is negative and it was zero before the acquisition. So there is an incentive to decrease the price of the Xbox and the price of game Call of Duty for the Xbox as a consequence of the incentive of MA^H to balance these FONCs. The stronger the complementarity between the Xbox and *Call of Duty*, the stronger these effects.⁴¹

Result 1 (Complementarity of the acquisition). After the acquisition, there is an incentive to decrease the price of the Xbox $(p_{m^c}^c)$ and the price of game Call of Duty for the Xbox $(p_{a_1^v}^v)$, relative to their pre-acquisition levels.

After the acquisition, the decrease in MA^{H} 's prices, $p_{m^c}^c$ and $p_{a_1^v}^v$, cause a diversion of sales from the rivals' substitute products to MA^{H} 's products, m^c and a_1^v . This result is a consequence of console goods being gross substitutes and video game goods being gross substitutes. It generates an imbalance in the rivals' FONCs, equations (8), (9), and (10), due to the (weak) decrease in $s_{y^c}^c(\cdot)$, $s_{n^c}^c(\cdot)$, and $s_{a_i^v}^v(\cdot)$, $a_i^v \in a \setminus \{a_1^v\}$. There is an incentive to decrease prices by the rivals of Microsoft-Activision, which gives us the following industry result. These effects will be stronger for consoles that consumers consider closer substitutes to the Xbox, and for video games that consumers consider closer substitutes to *Call of Duty*.

Result 2 (Acquisition industry effects without rivals' exit). After the acquisition and absent rivals' exit, consumer prices will decrease. Microsoft-Activision's profit increases, and the rivals' profits decrease.

The resulting decrease in rivals' profits might cause some rivals to exit the market. To see this, consider the profit functions in equations (1) and (2). A console firm will exit the market if it cannot cover

⁴¹ These are well-known results dating back to Cournot (1838). Intuitively, before the acquisition, Microsoft and Activision do not account for the effect of their markup on the other firm, thus reducing the demand of the other firm's complementary product. After the acquisition, Microsoft-Activision internalizes such reductions. Microsoft-Activision internalizes the reduction in the demand of Xboxes caused by the increase in the price of *Call of Duty*, and *vice versa*. The resulting increase in efficiency is similar to the one resulting from elimination of double marginalization in a vertical merger. See Donna and Pereira (2023) for a recent discussion.

its fixed costs after the acquisition, $(p_{j^c}^c - mc_{j^c}^c)m^s s_{j^c}^c(p^c, p^v) < \kappa_{f^c}$ for $j^c \in \{y, n\}$ and $f^c \in \{Y, N\}$.⁴² Similarly, a video-game firm will exit the market if it cannot cover its fixed costs after the acquisition, $(p_{j^v}^v - mc_{j^v}^v)m^s s_{j^v}^v(p^v, p^v) < \kappa_{f^v}$ for $j^v \in a \setminus \{a_1^v\}$ and $f^v \in A \setminus \{A_1\}$. A rival with high fixed costs, κ_{f^c} or κ_{f^v} , and highly variable profits is more likely to exit because, in that case, even a small demand diversion (Result 2) might generate the profit imbalance that drives the rival out of business.⁴³

Result 3 (Rivals' exit possibility). After the acquisition, some rivals might exit the market.

If some rivals exit the market, the welfare analysis changes relative to Result 2. Overall, consumer prices increase relative to the situation without exit (and post-acquisition) due to FONCs (8) through (12). Depending on the size of the firm(s) exiting the market (magnitude of their market shares) and the degree of substitutability of the exiting products (diversion ratios), prices might increase or decrease relative to the pre-acquisition level. As Donna and Pereira (2023) emphasized, an exit-inducing acquisition might reduce welfare even if it is a welfare-enhancing acquisition absent exit. Consumer and total welfare might decrease in such cases. This situation is more likely to occur when the acquisition might induce the exit of a large rival in terms of market shares. We obtain the following result.⁴⁴

Result 4 (Acquisition industry effects with rivals' exit). If one or more rivals exit the market after the acquisition, there is a reduction in product variety to consumers and a reduction in the number of competitors that would otherwise exert downward pricing pressure, which might substantially lessen competition. Prices might increase, and welfare might decrease relative to the pre-acquisition levels.

The acquisition might induce technological or organizational efficiencies.⁴⁵ For example, it might reduce contractual frictions and improve the productivity of Microsoft-Activision. Technological

⁴² We focus on a simultaneous-move exit game similar to Bresnahan and Reiss (1990; Subsection 3.1). Our model focuses on the time horizon considered by the Agencies (medium term or, *e.g.*, a five-year period). Thus, we define the fixed costs, κ_{f^c} and κ_{f^v} , as the non-variable costs that the firm would not incur if it exits the market. Thus, we abstract from dynamic equilibrium considerations.

⁴³ A small diversion in such case, might make the *highy* variable profits substantially lower than the fixed costs. Result 3 emphasizes the *possibility* of exit. Similarly, Result 4 (and subsequent results) emphasize the *possibility* of harm. The model, however, does not argue that exit or harm will necessarily occur, which is ultimately an empirical question. See Section 6 for details.

⁴⁴ For examples of Results 4, 8, and 10 in a complementary-product setting, see the Supreme Court's Opinion in *FTC v. Procter & Gamble Co.*, 386 U.S. 568 (1967), and the discussion in Donna and Pereira (2023).

⁴⁵ We explicitly distinguish the technological efficiencies discussed here (reduction in the marginal cost of the merged firms) from the increase in efficiency due to the internalization of the complementarity discussed in footnote 41 (the internalization of the reduction in the demand of Xboxes caused by the increase in the price of *Call of Duty* and *vice versa*).

efficiencies can be rationalized in the model as a reduction in the marginal costs of the Microsoft-Activision firm after the merger; that is, as a reduction in $mc_{m^c}^c$ and $mc_{a_1^\nu}^{\nu}$ relative to the pre-acquisition levels. Inspection of Microsoft-Activision's FONCs (11) and (12) shows that technological efficiencies exacerbate results 1 and 2, thus, also exacerbating results 3 and 4. Therefore, we obtain the following result:

Result 5 (Technological efficiencies). The presence of acquisition-specific technological efficiencies exacerbates, rather than mitigates, results 3 and 4.

The welfare effects from Result 4 may also depend, in part, on whether a rival that initially finds it unprofitable to operate in the short run eventually returns to the market or is replaced by a new entrant after Microsoft-Activision increases their prices. If re-entry is both timely and likely, it could reduce or even counteract the negative welfare impact of a firm's exit. However, the adverse effects of exit are likely to be more significant in industries with high barriers to entry. Notably, industries where mergers raise competition concerns tend to be highly concentrated, and high concentration levels often indicate the presence of entry barriers. In such cases, the potential for re-entry may have little effect in mitigating competitive harm. In terms of the model, entry barriers mean that entry costs for entrant console and video-game firms, denoted by $\kappa_{f^c}^e$ and $\kappa_{f^v}^e > \kappa_{f^v}$ are larger than fixed costs for firms that have already entered the market; that is, $\kappa_{f^c}^e > \kappa_{f^c}$ and $\kappa_{f^v}^e > \kappa_{f^v}$. The presence of entry barriers is an empirical issue that varies by industry. See Donna and Pereira (2023, Section IV) for details. We summarize this discussion in Result 6:

Result 6 (Re-entry possibility and entry barriers). If there are no entry barriers, timely and sufficient re-entry could mitigate or reverse the harmful welfare effects of an exit from Result 4. If there are entry barriers, however, the negative impact of exit from Result 4 is likely to be more pronounced.

4.4. Exclusionary conduct

Thus far, our analysis abstracts from raising rivals' cost, foreclosure, and predatory conduct (henceforth, exclusionary conduct) on the part of Microsoft-Activision. That is, results 1 through 6 do not require exclusionary conduct. However, they do not preclude such conduct either. We now incorporate it into the analysis.

Following our previous analysis, we incorporate exclusionary conduct for the Microsoft-Activision acquisition. One way to rationalize exclusionary conduct using the profit-maximizing behavior in our

model is to allow Microsoft-Activision to produce the video game *Call of Duty* for two different consoles, its own platform, Xbox, and a rivals' console, PlayStation. This extension implies that Activision (and, thus, Microsoft-Activision after the acquisition) has two games now $a_{1m^c}^v$ and $a_{1y^c}^v$, respectively, *Call of Duty* for the Xbox and PlayStation. Now, without exclusionary conduct, Microsoft-Activision's FONCs (11) and (12) become:⁴⁶

$$s_{m^{c}}^{c}(p^{c},p^{v}) + \left(p_{m^{c}}^{c} - mc_{m^{c}}^{c}\right)\frac{\partial s_{m^{c}}^{c}(p^{c},p^{v})}{\partial p_{m^{c}}^{c}} + \left(p_{a_{1m^{c}}}^{v} - mc_{a_{1m^{c}}}^{v}\right)\frac{\partial s_{a_{1m^{c}}}^{v}(p^{v},p^{c})}{\partial p_{m^{c}}^{c}} = 0.$$
(13)

$$s_{a_{1mc}^{\nu}}^{\nu}(p^{\nu},p^{c}) + \left(p_{a_{1mc}^{\nu}}^{\nu} - mc_{a_{1mc}^{\nu}}^{\nu}\right) \frac{\partial s_{a_{1mc}^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{a_{1mc}^{\nu}}^{\nu}} + \left(p_{mc}^{c} - mc_{mc}^{c}\right) \frac{\partial s_{mc}^{c}(p^{c},p^{\nu})}{\partial p_{a_{1mc}^{\nu}}^{\nu}} + \left(p_{mc}^{\nu} - mc_{mc}^{c}\right) \frac{\partial s_{mc}^{\nu}(p^{\nu},p^{\nu})}{\partial p_{a_{1mc}^{\nu}}^{\nu}} = 0.$$
(14)

$$s_{a_{1yc}^{\nu}}^{\nu}(p^{\nu},p^{c}) + \left(p_{a_{1yc}^{\nu}}^{\nu} - mc_{a_{1yc}^{\nu}}^{\nu}\right) \frac{\partial s_{a_{1yc}^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{a_{1yc}^{\nu}}^{\nu}} + \left(p_{m^{c}}^{c} - mc_{m^{c}}^{c}\right) \frac{\partial s_{m^{c}}^{\mu}(p^{c},p^{\nu})}{\partial p_{a_{1yc}^{\nu}}^{\nu}} + \left(p_{m^{c}}^{c} - mc_{m^{c}}^{c}\right) \frac{\partial s_{m^{c}}^{\mu}(p^{c},p^{\nu})}{\partial p_{a_{1yc}^{\nu}}^{\nu}} + \left(p_{m^{c}}^{c} - mc_{m^{c}}^{c}\right) \frac{\partial s_{m^{c}}^{\mu}(p^{c},p^{\nu})}{\partial p_{a_{1yc}^{\nu}}^{\nu}} = 0$$
(15)

As before, FONC (13) becomes negative after the acquisition because the Xbox and *Call of Duty* for the Xbox are gross complements, thus creating an incentive to decrease the price of the Xbox, $p_{m^c}^c$.

Before the acquisition, the third and fourth terms on the LHS of equation (14) are zero. After the acquisition, the third term is positive (the Xbox and *Call of Duty* for the Xbox are gross complements) and the fourth term is negative (video games are also gross complements). There might be an incentive to

⁴⁶ We are assuming that $\partial s_{a_{1yc}^{v}}^{v}(p^{v},p^{c})/\partial p_{m^{c}}^{c} = 0$ to keep the example more tractable. This assumption implies that the increase in the price of the Xbox has a negligible effect on the demand of *Call of Duty* for the PlayStation (Activision's game in the rival console). This assumption is sensible for small changes in the price of the Xbox. Alternatively, if $\partial s_{a_{1yc}^{v}}^{v}(p^{v},p^{c})/\partial p_{m^{c}}^{c} \neq 0$ there is an additional term on the LHS of equation (13) given by $\left(p_{a_{1yc}^{v}}^{v} - mc_{a_{1yc}^{v}}^{v}\right)\partial s_{a_{1yc}^{v}}^{v}(p^{v},p^{c})/\partial p_{m^{c}}^{c}$, as can be seen in equation (6). Similar results are obtained if the sum of this additional term and the last term on the LHS of equation (13) is negative after the acquisition, what is more likely to happen for small changes in $p_{m^{c}}^{c}$.

decrease or increase the price of *Call of Duty* for the Xbox, $p_{a_{1m}^{\nu}c}^{\nu}$, depending on whether the sum of these two terms is negative (third term dominates) or positive (fourth term dominates), respectively. For small changes in the price $p_{a_{1m}^{\nu}c}^{\nu}$, the third-term effect is more likely to dominate because the diversion between *Call-of-Duty* games between consoles is likely to be small;⁴⁷ that is, $\partial s_{a_{1yc}^{\nu}}^{\nu}(p^{\nu}, p^{c})/\partial p_{a_{1m}^{\nu}c}^{\nu} \cong 0$ if the change in $p_{a_{1m}^{\nu}c}^{\nu}$ is small.

The main difference arises from (15), which characterizes the price of *Call of Duty* for the PlayStation (the rival console), denoted by $p_{a_{1yc}^{\nu}}^{\nu}$. Before the acquisition, the third and fourth terms on the LHS of equation (15) are zero. Both terms are positive after the acquisition.⁴⁸ In general, there is an ambiguous effect on $p_{a_{1yc}^{\nu}}^{\nu}$, because the second term is negative (own-price effect). So depending on whether the negative (first- and second-term) or positive (third- and fourth-term) effect dominates, there might be an incentive to increase or decrease, $p_{a_{1yc}^{\nu}}^{\nu}$, respectively.

The analysis changes if there is exclusionary conduct. One can think of exclusionary conduct as a large increase in the price of *Call of Duty* for the PlayStation (the rival console) after the acquisition.⁴⁹ Formally, assume that if $p_{a_{1yc}}^{v} = \infty$, Microsoft-Activision does not supply video game a_{1yc}^{v} (*Call of Duty* for the PlayStation), thus earning zero profit from this product.⁵⁰ We say there is *exclusionary conduct* if $p_{a_{1yc}}^{v} = \infty$.

Microsoft-Activision sets $p_{a_{1\nu}^{\nu}}^{\nu} = \infty$ if, after the acquisition:⁵¹

⁴⁷ In other words, consumers are unlikely to switch to the PlayStation console (the rival console from Sony) in response to a small change in the price of one game of the Xbox console from Microsoft.

⁴⁸ The forth term is positive after the acquisition because video game goods are gross substitutes. We have made no assumption regarding the sign of $\partial s_{m^c}^c(p^c, p^v) / \partial p_{a_{1y^c}}^v$; that is, between consoles and the price of video games for

the rival console. In our case, Microsoft's *Call of Duty* for the Xbox and *Call of Duty* for the PlayStation (rival console) are likely to be gross substitutes, according to the survey commissioned by the U.K. Competition and Markets Authority (see Hinde *et al.* 2022).

⁴⁹ We focus our analysis on total foreclosure. Alternatively, one can define exclusionary conduct as a degradation in the quality of the *Call of Duty* for the PlayStation. This feature can be captured as a degradation in the characteristics of the that game, $x_{a_{1yc}^{\nu}}^{\nu}$. See footnote 40.

⁵⁰ When $p_{a_{1y}c}^{\nu} = \infty$, consumer demand for product a_{1yc}^{ν} is zero and $s_{a_{1y}c}^{\nu} = 0$. This situation is compatible with the product not being supplied.

⁵¹ See Ordover *et al.* (1990) for a model where profit-maximizing vertical foreclosure arises in equilibrium. Their model incorporates many of the classic objections to the theory of exclusionary conduct, such as several counterstrategies of the rivals, the potential holdout problem, and the fact that foreclosure has to increase the profitability of the integrated firms (rational foreclosure). See also Hart and Tirole (1990).

$$(p_{m^c}^c - mc_{m^c}^c) \frac{\partial s_{m^c}^c(p^c, p^v)}{\partial p_{a_{1y^c}}^v} + (p_{a_{1m^c}}^v - mc_{a_{1m^c}}^v) \frac{\partial s_{a_{1m^c}}^v(p^v, p^c)}{\partial p_{a_{1y^c}}^v}$$

MB from additional Xbox consoles MB from

MB from additional Call of Duty for Xbox games

$$> \underbrace{-\underbrace{s_{a_{1yc}}^{\nu}(p^{\nu}, p^{c})}_{MC \text{ from market share of } Call of Duty for PlayStation}}_{Call of Duty for PlayStation} - \underbrace{\left(p_{a_{1yc}}^{\nu} - mc_{a_{1yc}}^{\nu}\right)}_{MC \text{ from less Call of } Duty for PlayStation}} \underbrace{\frac{\partial s_{a_{1yc}}^{\nu}(p^{\nu}, p^{c})}{\partial p_{a_{1yc}}^{\nu}}}_{Duty for PlayStation}}, \quad \forall p_{a_{1yc}}^{\nu}.$$
(16)

Equation (16) provides a sufficient condition for rational foreclosure, $p_{a_{1y^c}}^{v} = \infty$. The intuition is simple. The marginal benefit of the exclusionary conduct is greater than its marginal cost. The marginal benefit is given by the product of the markup and the increase in the market share of the Xbox consoles, plus the product of the markup and the increase in the market share of *Call of Duty* for the Xbox. The marginal cost is given by the losses from not supplying *Call of Duty* for the PlayStation. By setting $p_{a_{1y^c}}^{v} = \infty$, and excluding *Call of Duty* from the PlayStation, Microsoft-Activision loses the sales of *Call of Duty* for the PlayStational sales of *Call of Duty* for the Xbox.

There are three comments that flow from the above analysis. The first is that even if Microsoft-Activision sets $p_{a_{1y}c}^{\nu} = \infty$ after the acquisition, Activision typically would not do so before the acquisition because it does not capture the additional Xbox consoles sold, which is the main benefit of such strategy. The second is that condition (16) states that exclusionary conduct is profitable when the Marginal Benefit from the additional sales of consoles and games exceeds the Marginal Cost from the foregone profit due to the reduced sales caused by the exclusionary price. This situation occurs if enough consumers switch to the Xbox when *Call of Duty* is no longer available on the PlayStation. In the extreme case, when all consumers switch, it is obviously a profitable strategy because the Marginal Benefit is positive (additional consoles sold), but the Marginal Cost is zero.⁵² The third comment is that it is an empirical issue whether

⁵² The markup terms for *Call of Duty* for the Xbox and the PlayStation might differ. But there might be acquisitionspecific technological efficiencies that decrease the marginal cost of *Call of Duty* for the Xbox relative to the PlayStation. For example, one can think that the acquisition might eliminate the contractual frictions between two divisions of Microsoft and Activision, the one producing the console and the one producing the games. Similarly, one can think that the acquisition might increase the contractual frictions between the subdivision of Microsoft and

enough consumers will switch to the Xbox if *Call of Duty* is no longer available on the PlayStation. We discuss this point in Section 6.⁵³ We obtain the following results.

Result 7 (Exclusionary conduct). If enough consumers switch to the Xbox when Call of Duty is no longer available on the PlayStation (condition 16), then it is profit-maximizing for Microsoft-Activision to exclude Call of Duty from the PlayStation.

Result 8 (Acquisition industry effects with exclusionary conduct). The presence of exclusionary conduct exacerbates results 3 and 4.

5. Cloud Gaming Market

The cloud gaming market is in its infancy, but it has enormous potential for future growth. Following its acquisition of Activision, Microsoft could engage in exclusionary conduct but would have competition. The CMA concluded in a detailed report that the exclusionary conduct by Microsoft-Activision in the cloud gaming market might substantially harm competition.⁵⁴ In this section, we investigate the cloud market and discuss the related competitive concerns.

5.1. Economic Framework

One way to incorporate the cloud gaming market into the analysis is to think of cloud gaming as playing on a console that is sufficiently differentiated from the non-cloud consoles (Xbox, PlayStation, and Nintendo). By *differentiated* we mean that the characteristics of the cloud console are substantially different from the ones of the non-cloud consoles. Because cloud gaming uses a different type of technology, it is reasonable to think that consumers value these characteristics differently.⁵⁵

Activision producing *Call of Duty* and Sony. In the model, it means that $mc_{a_{1m}^{\nu}}^{\nu}$ decreases relative to $mc_{a_{1v}^{\nu}}^{\nu}$ after

the acquisition. In such case, the markup loss from *Call of Duty* for the PlayStation is likely to be smaller than the markup gain from *Call of Duty* for the Xbox.

⁵³ According to a survey commissioned by the U.K. Competition and Markets Authority, approximately 24 percent of U.K. users would switch to the Xbox if *Call of Duty* were no longer available on the PlayStation (Hinde *et al.* 2022). While such magnitude might tend to favor condition (16), one would also need information about the markups to evaluate it.

⁵⁴ CMA Final Report.

⁵⁵ Cloud or online gaming is played on remote servers. The servers stream the games on the players' devices, which could be a video-game console, a computer, or cell phone. It differs from traditional gaming, where the games run on the player's own console.

Consider the same setup as in the previous section and assume that there are two firms offering cloud gaming, Microsoft and Amazon.⁵⁶ To ease the exposition, assume that there is only one price for cloud gaming, which includes access to both the cloud console and all the games from the firm in that cloud console. The number of games might differ across cloud-gaming firms, which is captured by the characteristics of the cloud consoles, as before.⁵⁷

Denote the cloud product of Microsoft by m^{c_0} and the one by Amazon by z^{c_0} , where the subscript "o" refers to online gaming. Microsoft-Activision's console FONC (13) becomes:

$$s_{j^{c}}^{c}(p^{c},p^{v}) + \sum_{k^{c}\in\Omega_{M}=m^{c},\ m^{c_{o}}} \left(p_{k^{c}}^{c} - mc_{k^{c}}^{c}\right) \frac{\partial s_{k^{c}}^{c}(p^{c},p^{v})}{\partial p_{j^{c}}^{c}} + \sum_{k^{v}\in\Omega_{A}=\{a_{1m^{c}}^{v},\ a_{1y^{c}}^{v}\}} \left(p_{k^{v}}^{v} - mc_{k^{v}}^{v}\right) \frac{\partial s_{k^{v}}^{v}(p^{v},p^{c})}{\partial p_{j^{c}}^{c}} = 0, \ j^{c}\in\Omega_{M} = \{m^{c},\ m^{c_{o}}\}.$$
(17)

Start by comparing (17) to its counterpart in the absence of a cloud market, (13). There are two main differences. First, we have an additional equation for the cloud product, m^{c_o} , included in the system (17). Second, relative to (13), we have an additional term in the FONC for the Xbox console. If cloud gaming and the Xbox are (gross) substitute products for consumers, then $\partial s^c_{m^{c_o}}(p^c, p^v)/\partial p^c_{m^c} > 0$. This inequality generates an incentive to increase the price of the Xbox (relative to a situation without the cloud market). The reason is simple. By increasing the price of the Xbox, Microsoft loses some of the Xbox consumers (those who switch from the Xbox to other consoles), but it re-gains a fraction of those Xbox consumers who switch to Microsoft's cloud product. Similarly, the additional FONC for Microsoft's cloud product, m^{c_o} , reflects an incentive to increase the price of the cloud product relative to a situation without the Xbox.

For the video games Call of Duty, FONCs (14) and (15) now become:

$$s_{a_{1j}^{\nu}}^{\nu}(p^{\nu},p^{c}) + \sum_{k^{\nu}\in\Omega_{A}=a_{1m^{c}}^{\nu},a_{1y^{c}}^{\nu}} \left(p_{k^{\nu}}^{\nu} - mc_{k^{\nu}}^{\nu}\right) \frac{\partial s_{k^{\nu}}^{\nu}(p^{\nu},p^{c})}{\partial p_{a_{1j}^{\nu}}^{\nu}}$$
(18)

⁵⁶ Other cloud gaming firms are Nvidia and Google, although Alphabet Inc. announced that it is discontinuing its cloud gaming subscription service, Stadia. (FTC Complaint, ¶42).

⁵⁷ See footnote 40.

$$+\sum_{k^{c}\in\Omega_{M}=\{m^{c},\ m^{c_{o}}\}}\left(p_{k^{c}}^{c}-mc_{k^{c}}^{c}\right)\frac{\partial s_{k^{c}}^{c}(p^{c},p^{v})}{\partial p_{a_{1j}^{v}}^{v}}=0, \quad a_{1j}^{v}\in\Omega_{A}=\{a_{1m^{c}}^{v},a_{1y^{c}}^{v}\}.$$

As before, there is an additional term in (18), $(p_{m^{c_0}}^c - mc_{m^{c_0}}^c) \partial s_{m^{c_0}}^c (p^c, p^v) / \partial p_{a_{1j}^v}^v$. If the games *Call of Duty* for non-cloud consoles⁵⁸ are (gross) substitutes with cloud gaming, then $\partial s_{m^{c_0}}^c (p^c, p^v) / \partial p_{a_{1j}^v}^v > 0$.⁵⁹ This inequality is more likely to be satisfied if *Call of Duty* is part of the games offered by Microsoft-Activision in the cloud console.⁶⁰ We assume the latter for the remaining analysis in this section.

Next, consider what happens with FONCs (17) and (18) after the acquisition. First, consider the price of the Xbox, $p_{m^c}^c$. On the one hand, there is an incentive to decrease the price of the Xbox because the Xbox and *Call of Duty* for the Xbox are gross complements, as in the previous section. On the other hand, the decrease in the price of the Xbox generates a decrease in the demand for Microsoft's cloud product. The net effect on the price of the Xbox is ambiguous.

Consider now the price of the cloud product. Before the acquisition, the second line in (17) is zero. After the acquisition, this line is positive because cloud gaming and the games *Call of Duty* for non-cloud consoles are (gross) substitutes. However, a decrease in the price of the cloud product generates two opposite effects, an increase in the own demand for the cloud product and a decrease in the demand for the non-cloud *Call-of-Duty* games. Thus, the net effect on the price of the cloud product is ambiguous.

Regarding the price of *Call of Duty* for non-cloud consoles, there might be incentives to increase or decrease the prices depending on the magnitude of the effects, as in the previous section.

In sum, when we incorporate the cloud market, the effect of the acquisition on the prices of the Xbox, the cloud product, and the price of *Call of Duty* for non-cloud consoles are less clear as they might move in different directions.

Finally, consider what happens when there is exclusionary conduct. Microsoft-Activision sets $p_{a_{1yc}^{\nu}}^{\nu} = \infty$ if, after the acquisition:

⁵⁸ *I.e., Call of Duty* for both, the Xbox and PlayStation.

⁵⁹ We assume that Microsoft-Activision does not offer *Call of Duty* in the competing cloud console. See footnote **Error! Bookmark not defined.** for an extension.

⁶⁰ This feature is captured by the characteristics of the cloud consoles. See footnote 40.

$$\sum_{\substack{k^{c} \in \Omega_{M} = m^{c}, m^{c_{o}}}} (p_{k^{c}}^{c} - mc_{k^{c}}^{c}) \frac{\partial s_{k^{c}}^{c}(p^{c}, p^{v})}{\partial p_{a_{1y^{c}}}^{v}} + (p_{a_{1m^{c}}}^{v} - mc_{a_{1m^{c}}}^{v}) \frac{\partial s_{a_{1m^{c}}}^{v}(p^{v}, p^{c})}{\partial p_{a_{1m^{c}}}^{v}} + (p_{a_{1m^{c}}}^{v} - mc_{a_{1m^{c}}}^{v}) \frac{\partial s_{a_{1m^{c}}}^{v}(p^{v}, p^{c})}{\partial p_{a_{1m^{c}}}^{v}} + (p_{a_{1m^{c}}}^{v} - mc_{a_{1m^{c}}}^{v}) \frac{\partial s_{a_{1m^{c}}}^{v}(p^{v}, p^{c})}{\partial p_{a_{1m^{c}}}^{v}} + (p_{a_{1m^{c}}}^{v} - mc_{a_{1m^{c}}}^{v}) \frac{\partial s_{a_{1m^{c}}}^{v}(p^{v}, p^{c})}{\partial p_{a_{1m^{c}}}^{v}}} + (p_{a_{1m^{c}}}^{v} - mc_{1m^{c}}^{v}) \frac{\partial s_{a_{1m^{c}}}^{v}(p^{v}, p^{c})}{\partial p_{a_{1m^{c}}}^{v}}} + (p_{a_{1m^{c}}}^{v} - mc_{1m^{c}}^{v}$$

Comparing (19) to (16), there is an additional marginal benefit on the LHS summation, the marginal benefit from additional subscriptions to Microsoft's cloud gaming, $(p_{m^{co}}^c - mc_{m^{co}}^c) \partial s_{m^{co}}^c (p^c, p^v) / \partial p_{a_{1yc}}^v > 0$. Condition (19) is more likely to be satisfied than (16) due to this additional marginal benefit, holding everything else constant. It is therefore more likely that Microsoft-Activision sets $p_{a_{1yc}}^v = \infty$ and excludes *Call of Duty* from the PlayStation when we incorporate the cloud market into the analysis.

The analysis in this section assumes that Microsoft-Activision does not offer *Call of Duty* in the competing cloud console from firm Amazon. But it is straightforward to incorporate it. The FONC from the cloud-gaming firm Amazon is given by (4). Thus, excluding *Call of Duty* from the competing cloud console from firm Amazon adds an additional marginal benefit and an additional marginal cost to (19) analogous to the ones in (16).

Formally, assume that if $p_{a_{1y^c}}^v = \infty$, Microsoft-Activision does not supply *Call of Duty* for the PlayStation or *Call of Duty* for the competing cloud console from the firm Amazon (henceforth, *complete exclusion*), thus earning zero-profit from both products. Then, a complete exclusion ($p_{a_{1y^c}}^v = \infty$) adds an additional MB to the LHS of condition (19) from the additional consoles (most likely cloud subscriptions, but also potentially Xbox consoles and *Call of Duty* for the Xbox). It also adds an additional MC to the RHS of condition (19) from selling fewer subscriptions of *Call of Duty* for the competing cloud console from the firm Amazon.

Therefore, we obtain the following result.

Result 9 (Cloud market and exclusionary conduct). Exclusionary conduct from Microsoft-Activision is more likely when we incorporate the cloud market into the analysis, thus exacerbating results 7 and 8.

In addition, there is a possibility that the competing cloud firm (Amazon in the model) might exit the cloud market.⁶¹

Result 10 (Rivals' exit possibility in the cloud market). Rivals in the cloud market might exit the market after the acquisition. In such case, results 3, 4, 5, and 6 extend to the cloud market without foreclosure or exclusionary conduct. Competition might be lessened, prices might increase, and welfare might decrease in the cloud market.

5.2. Effects of Total Exclusion

Following its acquisition of Activision, Microsoft could harm its rivals by making the Activision games, such as *Call of Duty*, exclusive to Microsoft. This competitive concern can be analyzed formally. Assume that if $p_{a_{1y}^{v}}^{v} = \infty$, Microsoft-Activision does not supply *Call of Duty* for the PlayStation or *Call of Duty* for the competing cloud console from the firm Amazon (henceforth, *complete exclusion*), thus earning zero-profit from both products. Then, a complete exclusion $(p_{a_{1y}^{v}}^{v} = \infty)$ adds an additional marginal benefit to the LHS of condition (19) from the additional consoles (most likely cloud subscriptions, but also potentially Xbox consoles and *Call of Duty* for the Xbox). It also adds an additional Marginal Cost to the RHS of condition (19) from selling fewer subscriptions of *Call of Duty* for the competing cloud console from the firm Amazon.

6. Summary and Conclusions

Before two complementary good producers may merge, they must alert either the DOJ or the FTC. The responsible agency then has 30 days to analyze the competitive effects of the merger. If the merger may substantially lessen competition or tend to create a monopoly in the relevant antitrust market, it will be challenged.

Evaluating the likely competitive effects of a merger of complementary good producers is extremely complex because such mergers have both procompetitive and anticompetitive consequences.

⁶¹ Analogous to the discussion leading to Result 3.

To compound the analytical difficulties, these economic effects are ambiguous even under the simplifying assumptions that we have employed in our analysis.

6.1 Procompetitive Effects

Our model shows the possibility of two well-known procompetitive effects. The first is the industry-wide effect that might arise from Microsoft-Activision internalizing the reduction in the demand for the complementary product after the acquisition, which might result in a reduction in consumer prices absent rivals' exit (Results 1 and 2). The second might be the presence of acquisition-specific technological efficiencies (Result 5).

It is ultimately an empirical question whether these effects are present and their magnitude. The caveats of the complementarity effects are similar to the ones from the elimination of double marginalization in vertical mergers.⁶² Technological efficiencies might need to be proved in the context of the industry and need to be specific to the merger to be legally cognizable.⁶³

6.2 Anticompetitive Effects

Our model emphasizes two possible harms. The first is well-known and arises from the possibility of exclusionary conduct (Results 7 and 9).⁶⁴ The second theory of harm, harm due to exit, involves the exit of rivals after the merger of complementary good producers (Results 4, 8, and 10).⁶⁵

While our results show that the acquisition might substantially lessen competition, we do not argue that it necessarily will. As with the procompetitive effects, it is an empirical question related to the specifics of the industry. Several factors might make the results more or less likely. They include the diversion ratios and switching behavior of the consumers, the size of the markups, the magnitude of the entry and fixed costs, and the response of rivals.

The rivals most likely to exit are those producing consoles and video games that are closer substitutes to the Xbox and *Call of Duty* (Results 2 and 3). The stronger the complementarity effect between the Xbox console and the video game *Call of Duty*, the more pronounced these effects will be. The exit of rivals might substantially lessen competition due to the reduction in product variety to

⁶² See Kwoka and Slade (2019), and the references therein, for a recent discussion.

⁶³ See Farrell and Shapiro (2000) for a discussion.

⁶⁴ As in the previous section, by *exclusionary conduct* we mean the possibility of raising rivals' cost, foreclosure, and/or predatory conduct.

⁶⁵ For examples see the Supreme Court's Opinions in *Brown Shoe Co. v. U.S.*, 370 U.S. 294 (1962) and *FTC v. Procter* & *Gamble Co.*, 386 U.S. 568 (1967). Additional examples are in Donna and Pereira (Section II, 2023).

consumers and a reduction in the number of competitors that would otherwise exert downward pricing pressure (Result 4). Acquisition-specific technological efficiencies exacerbate the previous effects (Result 5). Similarly, the presence of barriers to entry makes the negative results more pronounced (Result 6).

Result 4 shows that the acquisition might substantially lessen competition and potentially violate Section 7 of the Clayton Act. A foreclosure strategy by Microsoft exacerbates the possibility of harm (Results 7 and 8). However, it is not required under the conditions discussed in Result 4. If enough consumers switch to the Xbox when *Call of Duty* is no longer available on the rival console, the PlayStation, exclusionary conduct is more likely.

Similarly, incorporating the cloud market into the analysis increases the likelihood of exclusionary conduct from Microsoft-Activision both in the cloud and console-game markets, thus also exacerbating the negative impact of the acquisition (Result 9). As with the foreclosure strategy, incorporating the cloud market analysis is not necessary for Result 4. But the presence of the cloud market might exacerbate Result 4, absent any foreclosure (Result 10).⁶⁶

Evaluating the industry factors above should be an essential element when analyzing the effects of the acquisition. We argue that careful evaluation of these factors is paramount for evaluating the competitive effects of the Microsoft-Activision acquisition. Remedies might be difficult to implement if an exit is considered likely.

Finally, the Schumpeterian idea of efficient production reallocation merits a discussion.⁶⁷ Under certain circumstances, forcing inefficient companies out of the market might enhance welfare. This argument raises three points. The first is that, from an antitrust standpoint, the issue is not whether the acquisition could lead to a more efficient industry reconfiguration. Instead, the issue is that the market power and efficiencies from the acquisition might directly lower social and consumer welfare and decrease rivals' profits, perhaps leading to rivals' exit from the market. In such a situation, the acquisition might significantly reduce competition according to the statutory provisions of the United States antitrust law.⁶⁸

⁶⁶ Rivals in the cloud market might exit the market after the acquisition causing a reduction in product variety to consumers and a reduction in the number of competitors that would otherwise exert downward pricing pressure, which might substantially lessen competition. Prices might increase and welfare might decrease in the cloud market relative to the pre-acquisition levels.

⁶⁷ Schumpeter (1942).

⁶⁸ Section 7 of the Clayton Act, 15 U.S.C. § 18; Sections 1 and 2 of the Sherman Act, 15 U.S.C. §§ 1–2; and Section 5 of the Federal Trade Commission Act, 15 U.S.C. § 45.

The second is that it should not be assumed that the acquisition and subsequent rivals' exit will necessarily result in a more efficient industry structure. It could. But it is an issue that must be proved rather than assumed. The efficiency gains must be quantified, or it must be explained which industry features would enable them.

The third point relates to the dynamic component of the efficiencies. If present, the efficient production reallocation would likely materialize in the long run. Our analysis shows that, as discussed in the previous two paragraphs, the acquisition might substantially lessen competition, thus reducing social welfare in the short and medium term.⁶⁹ The longer the time horizon, the more difficult and uncertain it is to perform the evaluation credibly. This point indicates caution for a long-run review. In addition, Result 5 from our model showed that, if present, acquisition-specific efficiencies exacerbate the adverse welfare effects rather than mitigate them.

6.3 The Bottom Line

Not accounting for the complementary nature of the products in the industry and incorrectly treating it as a "vertical merger" might preclude a proper evaluation of the competitive effects of the acquisition. Our model shows that the economic effects arising from a complementary-product merger are notoriously complex. Even using the simplifications in Subsections 4.3, 4.4, and 5.1, the model shows many ambiguous effects that depend on the industry factors described in the previous subsection.

In spite of the added complexity, it is important to recognize the differences between vertical mergers and complementary good mergers. The firms involved do not purchase from or sell to one another; they sell to the consumer. This feature has implications for the substitution patterns arising from the potential harm.

Harm to consumers will typically be larger in a complementary-product merger relative to vertical merger. For example, consider a vertical merger and the resulting welfare loss to consumers from completely excluding an unintegrated distributor from the input supplied by the upstream manufacturer of the merged firm. After the merger, consumers can no longer purchase the differentiated product that the unintegrated distributor sold (before the merger) using the input from the integrated manufacturer.⁷⁰ In a complementary-product merger, such product is also no longer available (e.g., if Microsoft-Activision

⁶⁹ The time horizon considered by the Agencies, *e.g.*, a five-year period.

⁷⁰ They might still be able to purchase other differentiated products from the unintegrated distributor but not the one from the excluded input.

excludes *Call of Duty* from the PlayStation, consumers cannot purchase *Call of Duty* for the PlayStation). However, there is a difference in the complementary setting: Consumers might still purchase the PlayStation *alone* because it complements other products (video games). In the vertical merger, consumers cannot purchase the input *alone* from the unintegrated manufacturer because this firm only sells to the distributor, not to consumers.⁷¹ Thus, excluding the complementary product might generate an additional decrease in the demand for the rival's complementary product (the PlayStation) if enough consumers substitute to the rival product (that is, if enough consumers substitute to the Xbox).⁷²

More generally, in a differentiated-product, oligopolistic industry,⁷³ the compensating variation and substitution patterns will typically differ in complementary and vertical mergers. Thus, while the main economic effects are similar, one will not obtain the correct substitution and welfare effects in a complementary merger using an incorrect vertical structure. Our model shows that such effects are fundamental in evaluating the merger's competitive effects, given the ambiguity of the welfare results.

In this paper, we have analyzed mergers of complementary good producers. To make the analysis less abstract, we have used a stylized depiction of Microsoft's acquisition of Activision. The results of a merger between complementary-good producers may feature both pro and anticompetitive effects. These possibly conflicting economic consequences pose a complex enforcement problem. Our economic model identifies the sources and harm theories in these mergers and provides an analytical roadmap for the enforcement authorities.

⁷¹ See Donna *et al.* (2023) for a discussion of vertical integration when direct sales by manufacturers are present.

⁷² See footnote 48 for a discussion of this effect in the context of our model.

⁷³ To be specific, by "differentiated-product, oligopolistic industry" we mean a setting similar to the one described in our model in a complementary-product merger; and a setting with differentiated products and oligopolistic structure *both* at the upstream and downstream level in a vertical merger.

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