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Copyright Protection in the Digital Single Market

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Copyright Protection in the Digital Single Market

Abstract

This paper scrutinizes the effects of the European Directive on Copyright in the Digital Single Market on platform competition in media markets. Platforms that are Online Content-Sharing Service Providers must have a license agreement with collective management organizations that control the content platform users may (or must not) upload to the platform. The paper shows that the new directive may imply market concentration and an aggregate welfare loss. The reason is that only users of the large platform will be allowed to upload content if the content asset controlled by a collective management organization is sufficiently valuable and if network effects are strong.

JEL-Codes: D430, F120, L860.

Keywords: copyright protection, IPRs, content platforms, trade in services, digital services.

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1 Introduction

Arguably, no other intellectual property right (IPR) discussion has stirred the EU as much as the new Directive on Copyright in the Digital Single Market (CDSM).[1] Critics accuse it of threatening internet freedom, or even imposing a form of censorship (see Stolton, 2019), whilst proponents see it as an important step in ensuring the protection of IPR in the digital world.[2] Central to this discussion has been the so-called "upload filter" – a mechanism purportedly advanced by Art. 17 of the CDSM Directive and potentially employed by so-called Online Content-Sharing Service Providers (OCSSPs). These are *content platforms* that are a "... provider of an information society service whose main or one of the main purposes is to store and give the public access to a large amount of copyright protected works or other protected subject-matter uploaded by its users ..." (Art. 2, Section 5).

Under the CDSM, content platforms are required to have the consent from rightholders of protected content or should have an agreement with so-called collective management organizations (CMOs). This affects not only Facebook, YouTube and Instagram but any forum that is financed by advertisements, and is not confined to file uploads, but could include any content. The EU Collective Management Directive (CMD) defines CMOs as organizations that manage the IPRs of rightholders and, importantly, represent all rightholders of a domestic industry as long as an individual rightholder does not opt out.[3]

Thus, CMOs are *de facto* monopolists in European markets, and the CDSM Directive imposes a burden of proof on the content platforms that they have sought an agreement with CMOs for any kind of content that may be uploaded by their users.[4] Under Art. 12 of

[1] See Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC OJL 130/92.

[2] For example, Commissioners Ansip and Gabriel expressed this as follows: "This Directive protects creativity in the digital age and ensures that the EU citizens benefit from wider access to content and new guarantees to fully protect their freedom of expression online" in: European Commission Statement, 'Copyright reform: the Commission welcomes European Parliament's vote in favour of modernised rules fit for digital age' (Luxembourg, 26 March 2019).

[3] See Directive 2014/26/EU of the European Parliament and of the Council of 26 February 2014 on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market, for which we use the acronym CMD for Collective Management Directive.

[4] For more details, we offer a thorough and comprehensive overview of the CDSM Directive, the new role

the DSM Directive,[5] Member States may grant CMOs a presumed mandate as rightholders; this effectively elevates them to a one-stop-shop for certain authorizations and makes them *de facto* monopolists in certain European markets. Subject to this legislative option, content platforms of all sizes will need to seek authorization from CMOs for communications to the public. This has raised the concern that content platforms may use upload filters to control online content, and these upload filters are also seen as a restriction of internet freedom, in particular if their algorithm also blocks content that is not violating IPRs.

We will not deal with potential unwarranted side effects, but we will scrutinize the potential anti-competitive role of CMOs in this new IPR regulation set-up. In this context, there is a substantial literature on the role of IPRs in digital markets due to the non-rival nature of digital information, in particular on the music industry (see, for example, Section 4.3 in Goldfarb and Tucker, 2019, and the cited literature).[6] While potential exclusion has been extensively discussed in the literature in different contexts (see for example, Motta, 2015, Chapter 7), there is no analysis yet on the role of CMOs as representatives of rightholders vis-à-vis content platforms. This paper fills this gap.

Our analysis contributes to the literature on platform competition in media markets, and many papers have investigated their performance in two-sided markets.[7] We focus on the network externality of media markets, and we do so to be able to investigate the role of the CMO as a monopolist controlling an intangible asset that contributes to the quality of the platform. In this respect, our analysis is close to papers that consider the role of quality in media markets.[8] However, in these papers, quality provision is an endogenous choice of a platform; in our case, it is the CMO that either has a contractual

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of the CMOs and its potential implications for competition policies in Appendix A.1.

[5]See Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC, for which the acronym DSM for Digital Single Market Directive is used. Most Member States have adopted Article 12.

[6]There is also an older literature on the role of CMOs, but we will take the existence of CMOs as a fact of life. See, for example, Besen *et al* (1992) and Hollander (1994). CMOs are regarded as natural monopolies due to decreasing average costs of managing content, but this view has been challenged by Katz (2005).

[7]See for instance Anderson and Coate (2005), Armstrong (2006), Caillaud and Jullien (2001, 2003), Crampes, Haritchabalet and Jullien (2005), Hagiu (2006) and Rochet and Tirole (2003, 2006).

[8]See for example Armstrong and Weeds (2007), Battaggion and Drufuca (2019), Li and Zhang (2016), Lin (2011) and Kind *et al* (2013).

arrangement with a platform or not, and at least in the short run, the size and quality of these assets are given.[9] There is also a similarity with media platforms that hold exclusive broadcasting rights, for example, for sport events. Copyright protection is not an issue in this case as the platform has acquired the broadcasting rights. The difference is that the CDSM Directive deals with content platforms that allow users to *upload* potentially copyright-protected content.

While the CDSM Directive is one of the first legal frameworks in this context,[10] the political debate has gained momentum also in other countries, in particular in Australia and the US.[11] Australia has introduced legislation under which Facebook and Google have to compensate media outlets for news content they use. Also in the US, there is a growing concern that these platforms do not compensate media outlets properly. In response to a study by the News Media Alliance that claims that Google made USD 4.7 billion by using news content of media outlets for free,[12] the US Congress has introduced a bill that would grant news publishers an antitrust exemption for four years so that they can negotiate collectively with content platforms about models of compensation and revenue sharing which would put them in a similar position as the CMOs in Europe.[13] Google and Facebook have responded by claiming that they are redirecting to media outlets to their benefit, and that those media outlets actually benefit from this.

Of course, the CDSM Directive can be expected to increase the share of the surplus that accrues to the CMOs. While this would have a distribution effect only, the CDSM Directive may increase the market power of a strong content platform, even if the CMO does not in

[9] In this sense, it makes a difference whether a media platform offers high-quality content, that is, can produce by itself or source from somewhere, or whether its users are allowed to upload news, videos, photos, etc. to share on a platform. It is the latter case the CDSM Directive deals with, while platforms also offer self-produced or free content at the same time.

[10] The Berne Convention for the Protection of Literary and Artistic Works was the first international copyright agreement that came already into force in 1886, but its last reform took place in 1971. While all WTO member have to be members of the Berne Convention, it has thus not yet been adapted to digital markets. For a discussion of the impact of digitization on (service) trade, see WTO (2018).

[11] See New York Times, 'Australia Moves to Force Google and Facebook to Compensate Media Outlets', April 20, 2020, and New York Times, 'Big Tech Has Crushed the News Business. That's About to Change' May 10, 2020.

[12] See "Google Benefit from News Content", Economic Study by News Media Alliance, June 2019.

[13] See New York Times, 'Google Made $4.7 Billion From the News Industry in 2018, Study Says', June 9, 2019, and for the bill introduced, see Journalism Competition and Preservation Act of 2019, 116th Congress (2019-2020).

principle refuse to license to other content platforms. If a license agreement is profitable only for a large platform, small-scale content platforms may have to make provisions that copyright-protected content is not uploaded, reducing their platform benefit. It is this issue that we scrutinize in this paper, and we show in particular that a most-favored customer provision may make an alliance of a CMO with a single, large content platform stronger, while reducing aggregate welfare at the same time.

Our results will not depend on the specific type of contracts that are offered by the CMO, as long as the most-favored customer provision will guarantee that both platforms are offered the same menu of contracts. The difficulty to monitor the detailed content that is uploaded by users may imply a fixed fee.[14] We will consider so-called blanket licenses such that any agreement will allow users of the platform to use all content managed by the CMO, and not only part of it. Blanket licenses are universal in these markets, also because it is impossible or at least very costly to control for content selection in digital markets.[15]

The remainder of this paper is organized as follows. Section 2 develops a Hotelling model of content platform competition that is extended to include network externalities and the benefits for users if they have access to licensed content controlled by a CMO. Section 3 shows how the CDSM Directive may lead to substantial industry concentration, and section 4 scrutinizes the effect on aggregate welfare. Section 5 concludes.

2 A model of content platform competition

In order to model the effects of the CDSM Directive on potential competition, we employ a Hotelling model of two-sided platform competition that is extended to include platform externalities and the quality of allowed content upload. We use a Hotelling model because these models imply only moderate social welfare effects, if any, if the market is fully

[14]There is a literature on fees versus royalties for patent licensing, see, for example, Kamien and Tauman (1986). There is also a literature considering licensing in vertical product markets that considers exclusion versus non-exclusion, see Li and Wang (2010).

[15]Even before digitization, CMOs offered blanket licenses only. For example, CMOs managing music rights would employ a model of royalties per music track, and radio stations would have to produce a play list, but CMOs did not offer to use only a subset of the rights they manage. This practice has also been ruled compliant with antitrust law in the US, see Broadcast Music v. Columbia Broadcasting System, 441 U.S. 1 (1979).

covered, and thus our analysis stacks the deck against negative welfare effects which we nevertheless will find. In the main body of the paper, we use a single-homing model of two-sided platform competition in which platforms attract users on one side by offering free access and sell advertisements to firms on the other side.[16]

There are two content platforms, platform 1, located at location 0, and platform 2, located at location 1. Platform users are uniformly distributed between 0 and 1, and their size is normalized to unity. Users can switch without cost from one platform to the other,[17] and their payoff from using the platform depends on their location, the number of users of the platform, the disutility of being exposed to advertising and whether the platform has an agreement with a CMO. We consider the case that a platform has to deal with a single CMO only in the main model, but we discuss at the end of Section 3 how our results extend to the case in which the platforms have to deal with several national CMOs and/or different CMOs controlling different types of content.

As usual in this strand of the literature, the location determines the disutility of the platform not being a perfect match for the user. In particular, a user at location $x, x \in (0,1)$, using platform 1 enjoys a net payoff of

$$u_1(x) = v + \mu y - \frac{\mu y^2}{2} + \theta C_1 - t_1 x - a_1. \tag{1}$$

In order to keep the analysis as simple as possible, we have chosen a utility specification in the tradition of Hotelling models in which utility is additive.[18] $v, v \geq 0$, denotes the gross payoff of using any platform irrespective of the number of users and may include information services provided by the platform and purpose-created content, for example, by social media stars and influencers.

In the first part of our analysis, we assume that v is large enough to imply full coverage and competition; later on, we will consider $v = 0$. C_1 is the content level the agreement with the CMO allows platform 1 to use where θ measures the marginal utility of this

[16] Appendix A.3 shows how our results extend to user prices, monopolization and multi-homing.

[17] De Bijl and Goyal (1995) develop a model in which duopolists decide on innovation and compatibility, but they assume a fixed customer base for each (incompatible) standard. Content platforms are internet-based platforms, and hence incompatibilities cannot play a role in this context.

[18] Although our model allows platforms to attract users even without any content, our model will imply two important features: (i) network effects make competition more fierce, and (ii) an increase in content will increase the maximized profits of a platform and decrease those of the rival platform.

content. Hence, C_1 can be regarded as an intangible asset that is owned and managed by the CMO and is of benefit for platform 1 users such that θC_1 adds a vertical differentiation dimension to the horizontal dimension of Hotelling models. We could consider the CMO also as a platform as it is the stronger the more content it manages, but since CMOs are *de facto* monopolists, they do not have to fight for market shares as content platforms have to.[19]

Platform 1 realizes revenues on the other side of the market on which it sells ads to firms. The level of ads, denoted by a_1, is a nuisance for users, and the disutility from the match incompatibility is given by $t_1 x$. Finally, $\mu y - \mu y^2/2$ measures the platform's network externality for all users where y, to be determined endogenously, denotes the number of users of platform 1. Note that the marginal effect of an additional user is positive, but decreasing with y and maximal for $y = 1$, that is, if the platform is a monopolist, and μ measures the contribution of this positive network externality to the user's payoff. Similarly, a user at location x using platform 2 enjoys a net payoff of

$$u_2(x) = v + \mu(1-y) - \frac{\mu(1-y)^2}{2} + \theta C_2 - t_2(1-x) - a_2. \tag{2}$$

Note that we allow the two platforms to have different match qualities for users. In particular we assume that $\mu < t_1 \leq t_2$ and $t_1 + t_2 - 3\mu > 0$, which means (i) that network effects are not too strong to imply a natural monopoly and (ii) that platform 1 has a natural cost advantage in reaching out to more users. This will allow us to consider asymmetries in market sizes; platform 2 could then be regarded as a niche platform, for example a forum, that aims to serve only some users with special interests while platform 1 is a standard platform like Facebook, YouTube or Instagram.[20] The Commission will have to review the impact of the CDSM Directive on content platforms with a turnover below €10 million, and our model thus has to accommodate differences between platforms in terms of their market potential.

We now consider a three-stage game in which the CMO's objective is to maximize the revenues from license agreements with one or both platforms. A CMO represents its

[19] Thus, issues of network interconnectivity and pricing in the context of two-sided platform competition as discussed for example by Armstrong (1998) and Calzada and Valletti (2008) do not arise here.

[20] Note that these well-known platforms are not monopolists. For example, there are a number of alternative video sharing platforms that compete with YouTube, but their market shares are comparably small.

members or owners (and foreign rightholders through representation agreements) such that it returns all proceeds net of administration cost to rightholders, but it has no direct control over the quality and size of the content. While this qualifies CMOs as not-for-profit organizations, their objective is clearly to maximize the income for the rightholders they represent.

In particular, the CMO negotiates with both platforms, and the outcome is a set of offers in the first stage. Without a most-favored customer (MFC) provision, the CMO can make different offers to both platforms, and can do so in private conversation with each platform. With an MFC provision, however, all offers must be made to both platforms. In the second stage, each platform accepts an offer or none, and in the third stage the two platforms compete by selling ads and attract users. Table 1 show the structure of the game.

Table 1: Game structure

Stage I: The CMO negotiates with both platforms and makes one or more offers to each platform.
Stage II: Each platform accepts one offer or declines them all.
Stage III: Both platforms sell ads and realize demands.

We solve the game in the usual backward induction fashion, and we do so for stage 3 for given content agreements (C_1, C_2) in this section where no agreement means $C_i = 0$: in this case, platform i will have to make provisions that guarantee that its users do not violate the CMO's and possibly the other platform's copyrights. Since the CMO offers a blanket license, any agreement implies $C_i = C$.

We start with the case in which both platforms have strictly positive demands, that is, $0 < y < 1$. All users will use either platform 1 or 2 if the market is completely covered. For this case, y is determined by the indifferent consumer $\bar{x}$ for whom $u_1(\bar{x}) = u_2(\bar{x})$ and which yields

$$\bar{x} = y(a_1, a_2) = \frac{2t_2 - \mu + 2\theta\,(C_1 - C_2) - 2\,(a_1 - a_2)}{2\,(t_1 + t_2 - \mu)}. \tag{3}$$

y is the demand of platform 1, and $1-y$ is the demand of platform 2. Eq. (3) shows that each platform demand depends positively on the difference in its content access compared to the rival and negatively on the difference between its ad level and the rival's ad level.

W.l.o.g. we set marginal platform costs equal to zero. Furthermore, we consider a competitive advertising market in which advertisers can choose among a large number of outlets (newspapers, TV stations, etc.) in addition to the two platforms such that the ad price is fixed. This assumption allows us to focus on the role of network externalities, and we do not have to take a stance on the details how advertisers and consumers interact on the advertising market, in particular whether the level of advertising is socially too small or too large.[21]

However, we extend the model in Appendix A.2 to flexible ad pricing such that each platform faces a downward-sloping demand curve, and we show that our results generalize if demand is not too elastic. Appendix A.2 shows that a too elastic demand leads to small ad levels and platform profits (even for platform 1) and thus reduces the exclusion incentive, but makes monopolization more likely. Since small platform profits are not of much interest for our analysis, we keep the analysis simple and normalize the ad price per unit and user to unity.

Consequently, platform 1 maximizes its profit $\pi_1 = y(a_1, a_2)a_1$ w.r.t. a_1 and platform 2 maximizes its profit $\pi_2 = [1 - y(a_1, a_2)]a_2$ w.r.t. a_2, respectively, leading to equilibrium ad levels

$$\begin{aligned} a_1^*(C_1, C_2) &= \frac{1}{6}\left(2\theta(C_1 - C_2) + 2t_1 + 4t_2 - 3\mu\right), \\ a_2^*(C_1, C_2) &= \frac{1}{6}\left(2\theta(C_2 - C_1) + 4t_1 + 2t_2 - 3\mu\right), \end{aligned} \tag{4}$$

respectively. Note that the aggregate advertising level does not depend on C_i, but is given by $a_1^* + a_2^* = t_1 + t_2 - \mu$. What happens if network effects become larger? If μ increases, both platforms fight more fiercely for market shares by reducing the effect of ad nuisance for users, implying a smaller ad level. The equilibrium market share of platform 1 is given by

[21] In general, this welfare effect would require a model of market power and further assumptions on the effect of advertising, that is, whether advertising is informative like in Peitz and Valletti (2008) or can be excessive. For a model on excessive versus too small ad levels, see Becker and Murphy (1993).

$$y^*(C_1, C_2) = \frac{1}{2} + \frac{2\theta\,(C_1 - C_2) - (t_1 - t_2)}{6\,(t_1 + t_2 - \mu)}. \tag{5}$$

Eq. (5) allows us to be more precise on our assumption of strictly positive market shares of both platforms. In what follows, we will show that the CMO will always make a deal with platform 1 as this platform can reach out further than platform 2. Hence $C_1 - C_2$ is either equal to C for a *de facto* exclusive deal with platform 1 or equal to zero if both platforms get a deal. Thus, $y^* \geq 1/2$, and the condition $y^* \leq 1$ for $(C_1, C_2) = (C, 0)$ requires

$$C \leq \overline{C} = \frac{4t_1 + 2t_2 - 3\mu}{2\theta} \geq 0. \tag{6}$$

If condition (6) is fulfilled, platform 2 will stay active in the market if the CMO has a deal with platform 1 only. If condition (6) is not fulfilled, platform 2 will stay active only if the CMO is willing to come to an agreement with both platforms. If it will not have an agreement with platform 2, platform 2 will leave the market. This case is equivalent to platform 1 monopolizing the market. We will not consider this case further in the main body of the paper, but deal with it in Appendix A.3.

So far, our analysis has assumed that v is large enough to guarantee full coverage. It may be held against this assumption that these platforms are of any value for users only if other users can be reached. Thus, we now consider the case that $v = 0$ such that a platform can only be beneficial for users if these users (rationally) expect other users to join the same platform. $v = 0$ does not exclude full coverage, but requires that the user who is indifferent between using platform 1 or platform 2 realizes a positive payoff. Let $u(\bar{x}) = u_1(\bar{x}) = u_2(\bar{x})$ denote the payoff of the indifferent user, so full coverage requires $u(\bar{x}) \geq 0$. We have relegated the details to Appendix A.5 where we develop the minimum size of the content assets such that full coverage of the market by both platforms will emerge. We find:

Lemma 1. *Assume $v = 0$. If $C_1 = C_2 = C$, the market will be fully covered by both platforms if*

$$C \geq \widetilde{C} = \frac{(6(t_1 + t_2) - 7\mu)(2t_1 + 4t_2 - 3\mu)(4t_1 + 2t_2 - 3\mu)}{72\theta(t_1 + t_2 - \mu)^2} < \overline{C}.$$

If $C_1 = C$ and $C_2 = 0$, the market will not be fully covered by both platforms but monopolized by platform 1.

Proof. See Appendix A.5. □

Lemma 1 shows that full coverage and activity of both platforms are only possible for $v = 0$ if both platforms have access to content and C is not too small, but also not too large to imply monopolization. If it is only platform 1 that has access to content, we show in Appendix A.5 that demand for platform 2 will be zero for any $C \leq \overline{C}$. Platform 1 will then either cover the whole market or part of the market while the network effect is too small for platform 2 to attract any user. If $C > \overline{C}$, we already know that platform 1 will monopolize the market even if $v > 0$. Thus, the game is changed more substantially in favor of platform 1 when it is only platform 1 that has an agreement with the CMO if we include the possibility that the market may not be fully covered.

Without any copyright protection, both platforms would be active and allow users to upload content. If $C_1 = C_2 = C \in [\widetilde{C}, \overline{C}]$, the market share of platform 1 would be equal to $1/2 + (t_2 - t_1)/(6(t_1 + t_2 - \mu)) \geq 1/2$. This is the benchmark for platform competition without the CDSM Directive, and both platforms will be able to appropriate also the surplus that arises from content use. We now explore when and how this directive does not only change the surplus division, but may also lead to a shift in market power.

3 Licensing incentives under the CDSM Directive

We now turn to the first two stages of the game after which each platform either comes to an agreement with the CMO or has to make provisions that prevent the upload of copyright content on this platform. The CMO is in no way bound to offer deals that will be accepted by all platforms. It should be clear that a platform not allowing to upload copyright-protected content will be at a disadvantage. In what follows, we assume that the size of the assets the CMO controls does not change with the CDSM Directive, that is, we do not consider that rightholders may want to increase C in order to make content more attractive for platforms. We will discuss at the end of section 4 how an endogenous response may change our results.

The CDSM Directive would have no effect on the market performance if the CMO came to agreements with both platforms. In this case, the directive would have an effect only on the surplus division. Without the directive, the platforms could appropriate all surplus, and if they both come to an agreement, they will have to share part of the surplus with

the CMO, but nothing would change for users. Thus, the CDSM Directive will have an effect beyond distribution only if one platform comes to an agreement with the CMO, but the other does not.

We now scrutinize under which conditions the CDSM Directive may lead to a larger industry concentration as a result. Most importantly, the CMD Directive imposes a most-favored customer (MFC) provision:[22] any offer, or any set of offers, must be made to both platforms. We now compare the surplus that the CMO can create with platform 1 with the surplus it can create with both platforms. Importantly, we will show that the MFC provision will actually support the shift in market power if the CMO prefers to have an agreement with platform 1 only. Thus, we will be able to show that an agreement with platform 1 will be *de facto* exclusive even if it could also be accepted by platform 2 under the same terms.[23]

Both the CMO and the two platforms anticipate the maximized profits correctly as they may arise from the different licensing arrangements. We conduct our analysis for $v > 0$; if $v = 0$, any *de facto* exclusive deal will imply monopolization. From (4) and (5), the maximized profits are given by

$$\begin{aligned} \pi_1^*(C_1, C_2) &= \frac{\left(2\theta\left(C_1 - C_2\right) + 2t_1 + 4t_2 - 3\mu\right)^2}{36\left(t_1 + t_2 - \mu\right)}, \\ \pi_2^*(C_1, C_2) &= \frac{\left(2\theta\left(C_2 - C_1\right) + 4t_1 + 2t_2 - 3\mu\right)^2}{36\left(t_1 + t_2 - \mu\right)}, \end{aligned} \tag{7}$$

respectively. Since the CMO can realize revenues only if it will have a license agreement with either platform, we will never find $C_1 = C_2 = 0$ in equilibrium. Suppose for now that the CMO is able to have an exclusive agreement with platform 1 only. The maximum willingness of platform 1 to pay for this exclusive deal is given by

$$\pi_1^*(C, 0) - \pi_1^*(0, 0) = \frac{\theta C\left(\theta C + 2t_1 + 4t_2 - 3\mu\right)}{9\left(t_1 + t_2 - \mu\right)}. \tag{8}$$

In this case, platform 1's outside option is to reject this deal and realize a profit for which $C_1 = C_2 = 0$. Eq. (8) also proves that such an exclusive deal will be with the stronger

[22] CMD Article 16(2): "Licensing terms shall be based on objective and non-discriminatory criteria."

[23] In a different context of oligopoly, MFC provisions are known to lead to less competition. See, for example, Schnitzer (1994). An MFC provision is also a commitment device for a monopolist that produces a durable good, so as to escape from the outcome of the Coase Conjecture.

platform 1 if the bargaining protocol implies that a larger surplus will also give the CMO a larger revenue: since $2t_1 + 4t_2 \geq 2t_2 + 4t_1$, $\pi_1^*(C,0) - \pi_1^*(0,0) \geq \pi_2^*(0,C) - \pi_2^*(0,0)$.

Of course, $\pi_1^*(C,0)$ can be realized only if platform 1 can trust that the other platform will not accept any deal. If the CMO licenses to both platforms, the maximum willingness of the platforms to pay for a deal with the CMO when the rival platform also has one are respectively given by

$$\begin{aligned} \pi_1^*(C,C) - \pi_1^*(0,C) &= \frac{\theta C\left(2t_1 + 4t_2 - 3\mu - \theta C\right)}{9\left(t_1 + t_2 - \mu\right)}, \\ \pi_2^*(C,C) - \pi_2^*(C,0) &= \frac{\theta C\left(2t_2 + 4t_1 - 3\mu - \theta C\right)}{9\left(t_1 + t_2 - \mu\right)}. \end{aligned} \tag{9}$$

Note that the assumption of positive market shares implies that these expressions are positive. In that case, the outside option of each platform is not to have a deal with the CMO, while the other platform has. The surplus that the CMO can create with both platforms is given by $[\pi_1^*(C,C) - \pi_1^*(0,C)] + [\pi_2^*(C,C) - \pi_2^*(C,0)]$.

If the CMO could credibly commit itself to not selling to the other platform, it would be able to create an even larger surplus than (8). For example, auctioning off exclusive rights would yield $\pi_1^*(C,0) - \pi_1^*(0,C) > \pi_1^*(C,0) - \pi_1^*(0,0)$. But this is not credible: without an MFC provision, the CMO can create only surplus (9) as platform 1 would correctly anticipate that the CMO will also make a deal with platform 2 as long as this yields a positive surplus, which it does given that $\pi_2^*(C,C) - \pi_2^*(C,0) > 0$. With an MFC provision, the CMO has to offer the same deal(s) to both platforms, and platform 1 will correctly anticipate whether platform 2 accepts any deal or not. Thus, the surplus comparison is between (8) and (9). We find:

Proposition 1. *The surplus of an exclusive agreement under an MFC provision is larger than the surplus of agreements with both platforms if*

$$C > \underline{C} = \frac{4t_1 + 2t_2 - 3\mu}{3\theta}.$$

Proof. An exclusive deal with platform 1 only yields a larger profits than a deal with both platforms if $\pi_1^*(C,0) - \pi_1^*(0,0) - [\pi_1^*(C,C) - \pi_1^*(0,C)] - [\pi_2^*(C,C) - \pi_2^*(C,0)] > 0$ which requires

$$\frac{\theta C\left(3\theta C + 3\mu - 4t_1 - 2t_2\right)}{9\left(t_1 + t_2 - \mu\right)} > 0.$$

Note that this condition and condition (6) are not mutually exclusive because $\underline{C} < \overline{C}$. $\square$

Proposition 1 shows that the joint surplus is maximal for the CMO and platform 1 if $C > \underline{C}$. Note that the requirement for $C > \underline{C}$ is less binding with an increase in μ. Thus, an exclusive deal is more attractive when the content asset is larger and the network effect is stronger.

Whether and how the CMO can achieve this outcome depends on the bargaining protocol of the game. Instead of going into the details of different bargaining protocols, we want to emphasize the role of the MFC provision.[24] The MFC provision enables the CMO to credibly commit to an offer that will be accepted by the large platform, correctly anticipating a *de facto* exclusive deal, but rejected by the small platform.

In particular, suppose that the CMO wants to have an agreement with platform 1. On the one hand, with a binding MFC provision, if the CMO wants to include platform 2 as well, it will receive a maximum revenue of $\pi_2^*(C,C) - \pi_2^*(C,0)$ from platform 2 and would have to offer the same deal to platform 1. Hence the maximum revenue of the CMO is given by $2[\pi_2^*(C,C) - \pi_2^*(C,0)]$ if it were to license to both platforms under the MFC provision. On the other hand, any larger revenue it can get from platform 1 only will make the CMO prefer an exclusive licensing agreement with platform 1, and since the license fee must be larger than $2[\pi_2^*(C,C) - \pi_2^*(C,0)]$, platform 2 will find accepting the same agreement unprofitable. Thus, we find:

Lemma 2. *If (i) $C > \underline{C}$, (ii) an MFC provision applies, and (iii) the bargaining protocol implies that the CMO realizes a revenue not smaller than $2[\pi_2^*(C,C) - \pi_2^*(C,0)]$ in a licensing agreement with platform 1, platform 1 will be the sole license holder.*

Note carefully that Lemma 2 gives a sufficient condition: it determines an upper bound as it assumes that the CMO could get the maximum surplus when it deals with both platforms. Furthermore, if the CMO realizes a revenue larger than $2[\pi_2^*(C,C) - \pi_2^*(C,0)]$, it can still claim that it does not refuse to license as it offers the same license agreement to both platforms, but it is quasi-exclusive as it is not profitable for the smaller platform to accept it. Platform 1 will benefit from such a deal as $2[\pi_2^*(C,C) - \pi_2^*(C,0)] < [\pi_1^*(C,C) - \pi_1^*(0,C)] + [\pi_2^*(C,C) - \pi_2^*(C,0)] < \pi_1^*(C,0) - \pi_1^*(0,0)$ (see Proposition 1). Excluding

[24] One simple bargaining protocol could be that the CMO makes a take-it-or-leave-it-offer to both platforms, but this not the only bargaining protocol that may lead to *de facto* exclusion.

platform 2 can be done in different ways that are not confined to a fixed fee. It could also be done by a more complex fee structure, for example, based on platform traffic, as long as the best offer for platform 1 implies a CMO revenue not smaller than $2[\pi_2^*(C,C)-\pi_2^*(C,0)]$ and the best offer for platform 2 is still unacceptable for this platform.

4 Welfare effects

What are the welfare implications of a potential shift in market power? In symmetric Hotelling models, all users are served, prices do not distort demand but shift profits from users to firms and the indifferent user is located exactly in the middle in equilibrium and thus the aggregate match incompatibility costs are minimized. Therefore, these standard symmetric models are Pareto-optimal, but this is not true in our asymmetric model. Appendix A.4 shows that a social planner would reduce the market share of platform 2 and increase the market share of platform 1 compared to the laissez-faire with $C_1 = C_2 = C$. The reason is that platform 2 has an incentive to make up for its match disadvantage by reducing its ad level a_2 substantially, and this effect leads to an excessive market share of platform 2.

Thus, when considering the potential welfare effects of the CDSM Directive, we compare two distorted outcomes with each other. We have relegated the details of welfare changes to Appendix A.4 where we show:

Proposition 2. *Assume that $v > 0$ and both platforms are active. If $t_2 < 4t_1 - 3\mu/2$, aggregate welfare declines if only platform 1 has an agreement with the CMO. If $t_2 > 4t_1 - 3\mu/2$, a critical*

$$C' = \frac{14t_1 + 4t_2 - 9\mu}{5\theta} \in [\underline{C}, \overline{C}]$$

exists such that aggregate welfare decreases (increases) if only platform 1 has an agreement with the CMO if $C < (>)C'$.

If the matching cost for the smaller platform is not too large, welfare will unambiguously decline. An effectively exclusive deal with the CMO corrects the distortion that the market share of platform 1 is too small. For t_2 not too large, it implies that this market share is now too large and platform 2 users have no access to C anymore. If t_2 is very large,

welfare increases if and only if C is large as well, because the large platform can host all users more efficiently when the content asset is large.

How are the licensing incentives if $v = 0$? We assume that $C \geq \widetilde{C}$ such that the market will be fully covered and both platforms are active if $C_1 = C_2 = C$. In this case, *de facto* exclusive licensing leads to monopolization, either without or with full coverage of the market. In Appendix A.5, we show that the maximized profit of platform 1 is larger compared to the case of competition; thus, the incentive to have an exclusive deal with the CMO is even stronger for both platform 1 and the CMO compared to the case of a large v. Furthermore, we show that aggregate welfare declines if t_2 is not too large, even if platform 1 serves all users. We may thus conclude:

Proposition 3. *If $v = 0$, a critical $\widehat{C}$ exists for which $\widetilde{C} \leq \widehat{C} < \underline{C}$ holds. If (i) $C > \widehat{C}$, (ii) an MFC provision applies, and (iii) the bargaining protocol implies that the CMO realizes a revenue not smaller than $2[\pi_2^*(C, C) - \pi_2^*(C, 0)]$ in a licensing agreement with platform 1, platform 1 will be the sole license holder and will monopolize the market. If $t_2 < 4t_1 - 3\mu/2$, aggregate welfare will unambiguously decline if only platform 1 has an agreement with the CMO.*

Proof. See Appendix A.5. □

Note that $t_2 < 4t_1 - 3\mu/2$ is a sufficient condition for negative welfare effects as it is in Proposition 2 (for details see Appendix A.5).

For both the case of full coverage by both platforms due to a sufficiently large v and the case of $v = 0$, the negative welfare result is even emphasized when the platforms have to deal with several CMOs at the same time if t_2 is not too large. Suppose that two CMOs control content assets, say C and D. Without modelling multilateral bargaining, it is already clear that the surplus that can be realized with a single strong platform is again larger if C and D are not too small. Proposition 1 and Proposition 3 apply to $C + D$ now that has to be larger than $\underline{C}$ or $\widehat{C}$, respectively, and not C (or D) alone.

Hence, if platforms have to deal with several CMOs at the same time, the individual requirement of Proposition 1 for the minimum size of the content asset applies now to the size that all CMOs control. Thus, while an individual small CMO controlling less than $\underline{C}$ (or $\widehat{C}$) would not want to license with one platform only, this will change if several CMOs, say from different countries, join forces as the representation agreements indicate.

Our analysis has taken the size of the content asset controlled by the CMO as given. A common case for IPR protection is that it may incentivize rightholders to increase content. The effect of this will depend on how the CMO will redistribute its revenue to individual rightholders and how strong the incentive will thus be for each rightholder to increase C. We do not explicitly model this effect, but it should be clear that an increase of C will also come with a cost to be carried by rightholders. If C increases as a consequence and both platforms have an agreement, aggregate welfare will increase because C will increase only if the additional cost is smaller than the additional CMO revenue.

However, if $C > \underline{C}$ or may even be lifted beyond $\underline{C}$ and t_2 is not too large, only platform 1 users will benefit. Let $C^0(C^1)$ denote the content quality level before (after) the CDSM Directive. We find:

Proposition 4. *If $\underline{C} < C^0 < C^1 < \bar{C}$, an aggregate welfare improvement requires*

$$\frac{C^1}{C^0} > \frac{36(t_1 + t_2 - \mu)}{33(t_1 + t_2 - \mu) - 5(t_1 - t_2)}.$$

Proof. See Appendix A.4. □

Proposition 4 defines a necessary condition as it assumes zero additional costs of the increase from C^0 to C^1. Furthermore, it takes into account that the increase from C^0 to C^1 should not imply $C^1 > \bar{C}$ as this increase would lead to welfare-reducing monopolization. In particular, the requirement is even substantial if $t_1 = t_2$ which warrants $C^1/C^0 > 36/33 = 1.091$. Thus, in order to improve aggregate welfare, the CMO has to incentivize rightholders such that the content quality level will increase at least by 9.1 %. As rightholders have been active before the CDSM Directive, we may not expect that their share of the CMO revenue will become the main source of income, so this is a substantial requirement.

This leaves us with the question of why the CDSM Directive has given CMOs as representatives of rightholders so much market power. First, it is obvious that many platforms are not located within Europe and thus their profit is not relevant for European welfare. Second, European users who may be negatively affected are only a certain fraction of all users. At the same time, however, small local platforms may be marginalized or may even have to leave the market, so it is not clear whether the CDSM Directive will increase at least European welfare without *ex post* intervention by competition policies.

5 Concluding remarks

While former EU Commission President Juncker claimed: "With today's agreement, we are making copyright rules fit for the digital age (...)",[25] this paper has shown that the European Directive on Copyright in the Digital Single Market may lead to more industry concentration in digital platform markets. This may even imply an aggregate welfare loss if the increase in content as a response to the Directive is not substantial. Our analysis could confirm concerns that smaller platforms may be marginalized. It is thus not true that this directive will only imply a "fair" redistribution from platforms to content producers. In particular, if the content is very valuable for users and if the network effects are strong, a welfare loss is more likely. It also shows that the case for European competition policies has become more complex, as the Commission will have to investigate the behavior of CMOs in the near future.

One CMO has already attempted to break new ground on this frontier. Germany-based Corint Media (the former VG Media) has suggested an agreement with Google that would imply an annual license fee of € 420 million for using press content.[26] These cases have yet to fully develop, but they raise questions at the core of this discussion: If Google agreed to these terms, would this constitute a new precedent for "objective and non-discriminatory criteria" observable by content platforms of all sizes? Some have argued that content platforms of greater means will be able to "quietly consolidate their position through a *de facto* alliance with rightholders rather than fearing entrepreneurs".[27] If other and smaller content platforms find these or similar terms unacceptable, would a refusal to license under different conditions by Corint Media constitute an abuse of its dominant position? Would smaller content platforms have failed the "best effort" criterion by finding the terms proposed by Corint Media objectionable?

Our analysis has shown that MFC provisions can have strong anti-competitive effects

[25] European Commission Press Release, 'Copyright reform clears final hurdle: Commission welcomes approval of modernised rules fit for digital age' (Luxembourg, 15 April 2019).

[26] See 'Corint Media offers Google a licence agreement,' Corint Media press release, October 20, 2021. Furthermore, France has already transposed the CDSM Directive into national law, and French competition authorities have fined Google € 500 million for failing to negotiate a deal with French publishers; see New York Times, 'France fines Google $593 million for not negotiating 'in good faith' with news publishers.', July 13, 2021.

[27] See Nicolas Colin, 'The EU Copyright Directive Won't Kill The Internet But It Will Kill Startups', Forbes, September 17, 2018.

by marginalizing small platforms. The Commission is charged with reviewing the impact of Article 17 on content platforms with a turnover below € 10 million by five years after the CDSM Directive's entry into force, and this seems to be of utmost importance given our findings. With this stipulation, it is clear that the Commission must take the lead in the next formative developments of the CDSM Directive in this context, as our economic analysis has shown very clearly that more guidance is needed as to avoid further industry concentration in media markets. At minimum, the new directive is likely to require an active competition policy.

Appendix

A.1 The Directive on Copyright in the Digital Single Market and the Role of Collective Management Organizations

The CDSM Directive advances a legal framework for copyright in the digital environment, and in doing so seeks to address the complexity of the online content market. *Inter alia*, it creates rules encouraging the authorisation by copyright rightholders to content-sharing service providers for the usage of content, seeking to "foster the development of the licensing market between rightholders and online-content sharing providers,"maintaining that "rightholders should not be obliged to give an authorisation or to conclude licensing agreements." A corollary problem is presented by competition law: many rightholders are represented by CMOs which can wield significant market power. The CDSM Directive provides that rightholders should not be obliged to conclude licensing agreements, but a refusal to license by a dominant CMO can constitute a form of abuse prohibited by the Treaties. On the other hand, online providers need an authorisation, and may be confronted with terms determined by a CMO or face a refusal to license.[28]

Concretely, Article 102 TFEU provides that "[a]ny abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States."[29] Forms of collective management are addressed under EU law by the Collective Management Directive (CMD).[30] The CMD provides that CMOs are "any

[28]For a discussion how to deal with refusals to license in general, see Hovenkamp *et al* (2006), Katsoulacos (2009) and Kwok (2011).

[29]This outlines three core elements: (1) abuse, (2) a dominant market position and (3) an effect on trade between Member States. The following will consider the position of CMOs under competition law as dominant undertakings in the licensing market (including the effect on trade concept).

[30]The CMD lays down different rules for CMOs and what are called "independent management entities" (IMEs). Both CMOs and IMEs are "any organisation which is authorised by law or by way of assign-

organisation which is authorised by law or by way of assignment, licence or any other contractual arrangement to manage copyright or rights related to copyright on behalf of more than one rightholder, for the collective benefit of those rightholders, as its sole or main purpose" and must be either owned or controlled by its members or organised on a not-for-profit basis. The CMD makes references to the applicable competition rules for CMOs, which underline the fact that the CMD does not preclude competition rules. Specifically, CMOs inhibit (quasi-)monopolistic positions in the market for the management of certain copyrights.

Under the CDSM Directive, CMOs are elevated to a stronger position of influence. Art. 12(1)(a) of the CDSM stipulates that where a CMO enters into a "licensing agreement for the exploitation of works (. . .) such an agreement can be extended to apply to the rights of rightholders who have not authorised that [CMO] to represent them." This greatly extends the responsibility of CMOs as any CMO thus "has a legal mandate or is presumed to represent rightholders who have not authorised the organisation accordingly" (Art. 12(1)(b)). Art. 12(3) elaborates on further safeguards, most notably that rightholders that have not authorised the CMO "may at any time easily and effectively exclude their works (. . .) from the licensing mechanism." Nonetheless, the fact that CMOs are presumed to represent rightholders that may not have granted a mandate to that CMO strengthens the presumed position of CMOs in the licensing market, and CMOs will continue to be subject to EU competition rules as dominant undertakings in a position to affect trade between Member States or be subject to equivalent national rules. CMOs further enjoy a strong position internationally as they are allowed to collect license fees on behalf of foreign CMOs on the basis of representation agreements.[31]

A dominant position under Art. 102 TFEU is not unlawful as such. The Court of Justice (CJEU) has upheld that undertakings enjoying a dominant position also bear a special responsibility not to "allow [their] conduct to impair genuine undistorted competition on the internal market." Such conduct is substantiated by an abuse: one abuse that is unique to licensing arrangements is the refusal to license, which refers to a situation in which the owner of the intellectual property denies a third party a license. This abuse has been recognised by the jurisprudence of the CJEU, namely, the Court has repeatedly highlighted that the exercise of an exclusive right attached to an IPR may involve abusive conduct in "exceptional circumstances." The case law of Magill and IMS Health has

ment, licence or any other contractual arrangement to manage copyright or rights related to copyright on behalf of more than one rightholder, for the collective benefit of those rightholders, as its sole or main purpose."(Art. 3 CMD) IMEs must be neither owned nor controlled, directly or indirectly, wholly or in part, by rightholders and organised on a for-profit basis.(Art. 3(b) CMD) The distinction is made here in order to ensure certain management entities do not escape certain key obligations of transparency and accountability, but it is of no relevance for our economic analysis. See Guibault and van Gompel (2016).

[31] See CMD Directive, Art. 14: "Member States shall ensure that a collective management organisation does not discriminate against any rightholder whose rights it manages under a representation agreement [. . .]".

clarified that it is sufficient for a refusal to license to be considered an abuse if four cumulative conditions are fulfilled: (1) access to the material protected by an IPR is "indispensable" in order to carry out a particular business, (2) the refusal prevents the emergence of a "new product" for which there is potential consumer demand, (3) the refusal is "incapable of being justified by objective considerations," and (4) the refusal is "likely to exclude any competition on a secondary market." It is not clear whether the CMO does not refuse to license when it offers the same agreement to different content platforms, possibly knowing that it will be acceptable for one, but not for another content platform. Naturally, these conditions are subject to judicial assessment, and have been argued by the General Court to be a non-exhaustive list of criteria that can demonstrate sufficiency.[32]

The controversial so-called "upload filters," or "effective content identification technologies" as they were labelled *verbatim* in the Commission Proposal for the CDSM Directive, have been removed in the adopted CDSM Directive. Instead, the Parliament and the Council have opted to reform the liability regime applicable to content platforms (OCSSPs).[33] Art. 17 replaces the liability regime of the E-Commerce Directive (ECD). Explicitly, Art. 17(3) of the CDSM Directive stipulates that "the limitation of liability established in Art. 14(1) of [the ECD] shall not apply to situations covered by this Article." What does this mean? Art. 14(1) of the ECD provides for a so-called "notice and take-down" regime (see OECD, 2011). Under this regime a host is not liable for stored information where they do "not have actual knowledge of illegal activity or information and, as regards claims for damages, is not aware of facts or circumstances from which the illegal activity or information is apparent," and "upon obtaining such knowledge or awareness, acts expeditiously to remove or to disable access to the information."[34] Under the CDSM Directive, notice and take-down is suspended. This means that where content platforms perform an "act of communication to the public," i.e. when they give "the pub-

[32] *Microsoft Corp. v Commission of the European Communities* (Case T-201/04) [2007] ECLI:EU:T:2007:289 para 303. Further, in Microsoft, the General Court merited the "new product" criterion, arguing that it ought to be considered under the 'limiting production, markets or technical developments to the ... prejudice of consumers' form of abuse stipulated by Art. 102(2)(b) TFEU. Reinterpretation of the criteria for establishing exceptional circumstances has been interpreted as controversial, yet it leaves the door open for a fresh concretisation by the CJEU for a different *ex ante* context, given that "no substantive theory drives the relationship between *ex ante* IPR policy and *ex post* competition enforcement."

[33] Art. 2(6) CDSM: "'online content-sharing service provider" means a provider of an information society service of which the main or one of the main purposes is to store and give the public access to a large amount of copyright-protected works or other protected subject matter uploaded by its users, which it organises and promotes for profitmaking purposes.' Art. 1(1)(b) Directive 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services [2015] OJ L241/1: information society service "any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services".

[34] See Art. 14(1)(a) ECD and Art. 14(1)(b) of the E-Commerce Directive (ECD), respectively.

lic access to copyright-protected works or other protected subject matter," a different *ex ante* liability regime is in place under Art. 17(4).[35]

Liability of the content platform is a rebuttable presumption under the CDSM. In *ex post* competition analysis, whether or not "upload filter" technologies are used to satisfy this burden by an content platform is insubstantial. However, the potential for an exploitative abuse of a CMO's dominant position is arguably greater: the new liability regime imposes further obligations owed by a content platform to the CMO. Crucially, the CDSM imposes the requirement for online providers to be able to demonstrate that they have "made best efforts to obtain an authorisation" for the "communication to the public" of protected works. This imposes a burden of proof on content platforms of having sought a license agreement or similar arrangement with rightholders, even on content platforms which have an annual turnover below € 10 million, meaning that a vast range of potential licensees are affected by CMO conduct. Regarding such licensing agreements between management organisations and users, the CMD outlines key principles that should be observed. Art. 16(1) stipulates that parties conduct negotiations for the licensing of rights in good faith. Art 16(2) to (4) CMD outline more concrete obligations borne by CMOs, namely, Art. 16(2) requires licensing terms to be based on objective and non-discriminatory criteria. Interestingly, the CDSM Directive mentions explicitly that a CMO could refuse to licence.[36]

Given that the CDSM Directive prescribes the acquisition of authorisations, refusals by CMOs of granting such an authorisation will naturally be subject to scrutiny as a form of a refusal to license. Some legal scholars have argued that a "refusal to license at all" or "a refusal to license otherwise than on terms the rightholder knows to be unacceptable" may be less clear forms of abuse, whilst "discrimination of trading partners" or "unjustified foreclosure of competition" may be more clear violations of Art. 102 TFEU (see for example Lamping, 2015). Given this legal background, we may expect that CMOs will not openly refuse to license with the goal to restrict competition, but may make offers to different content platforms such that some of them will be *de facto* excluded.

The CDSM Directive will catalyse the licensing market and extend the breadth of

[35]This stipulates the following: If no authorisation is granted, online content-sharing service providers shall be liable for unauthorised acts of communication to the public, including making available to the public, of copyright-protected works and other subject matter, unless the service providers demonstrate that they have: (a) made best efforts to obtain an authorisation, and (b) made, in accordance with high industry standards of professional diligence, best efforts to ensure the unavailability of specific works and other subject matter for which the rightholders have provided the service providers with the relevant and necessary information; and in any event (c) acted expeditiously, upon receiving a sufficiently substantiated notice from the rightholders, to disable access to, or to remove from, their websites the notified works or other subject matter, and made best efforts to prevent their future uploads in accordance with point (b).

[36]CMD Article 16(3): "[...]the collective management organisation shall [...] either offer a licence or provide the user with a reasoned statement explaining why it does not intend to license a particular service."

authorised copyright consumption to the digital frontier. In stepping forward with this legislation, however, it is crucial to recognise the key issues: the new *ex ante* dominance of CMOs, the clarity of refusals to license under *ex post* competition analysis, and the possibility of *de facto* exclusion through MFC provisions. The Commission has been charged with "[issuing] guidance on the application of [Article 17], in particular regarding the cooperation referred to in paragraph 4" (see Article 17 (10) of the CDSM Directive). Thus, the Commission is in a unique position to reconcile the lack of an obligation to license by CMOs with the anticompetitive abuse of (*de facto*) refusing to license. Guidance published in June 2021 highlights proactive contact on behalf of content platforms and that "fair terms" will be determined on a case by case basis (see COM/2021/288).[37]

Further input can be crucial in highlighting enforcement priorities, codes of conduct for CMOs and content platforms, and providing clarity for national legislators in the forthcoming transposition of the Directive. In particular, this should include scrutinizing the role of MFC provisions in this context under Article 101 of the TFEU, which also deals with licensing restraints. MFC provisions are investigated on a case-by-case basis and have not been the focus of European competition policies.[38]

A.2 Flexible pricing in the advertising markets

Suppose that each two-sided platform faces flexible ad prices such that the revenue per user depends on the level of advertising. Similar to Anderson and Coate (2005) and Peitz and Valletti (2008), we assume a downward-sloping demand curve for advertising per user. In particular, the advertisers' willingness-to-pay per user is given by $\omega_i(a_i) = Aa_i^\epsilon$ where $0 \leq \epsilon < 1$. In the main body of the paper, we assume $A = 1$ and $\epsilon = 0$. Each platform maximizes $y_i(a_i, \cdot)\omega_i(a_i)a_i$ implying the first-order conditions

$$\begin{aligned} y_i(a_i^*, \cdot)\left[\omega_i'(a_i^*)a_i^* + \omega_i(a_i^*)\right] + \frac{\partial y_i(a_i^*, \cdot)}{\partial a_i}\omega_i(a_i^*)a_i^* = 0 \\ \Leftrightarrow \frac{\partial y_i(a_i^*, \cdot)}{\partial a_i}a_i^* + (1-\epsilon)y_i = 0. \end{aligned}$$

where $y_i(a_i, \cdot)$ denotes the market share of platform i. The first-order conditions imply equilibrium ad levels

[37] European Commission, Communication from the Commission to the European Parliament and the Council: Guidance on Article 17 of Directive 2019/790 on Copyright in the Digital Single Market, COM/2021/288.

[38] MFC rules are not necessarily regarded as anti-competitive, and only a few investigations, for example on hotel online bookings and on E-books, have led to an elimination of MFC provisions. See Colino (2019), Section 9.4.1.7, and Vandenborre and Frese (2014). Certain types of MFC provisions employed by digital platforms acting as "gatekeepers", not CMOs, have been addressed by the Digital Markets Act Proposal in Art. 5 (b), see COM/2020/842.

$$a_i^* = \frac{(1-\epsilon)\left[2\theta\left(C_i - C_j\right) + 2(1-\epsilon)t_i + 2(2-\epsilon)t_j - \mu(3-2\epsilon)\right]}{2(3-2\epsilon)}$$

and an equilibrium market share

$$y_i^*(C_i, C_j) = \frac{1}{2} + \frac{2\theta\left(C_i - C_j\right) - \left(t_i - t_j\right)}{2(3-2\epsilon)\left(t_i + t_j - \mu\right)}$$

of firm i. Both expressions converge (4) to and (5) for $\epsilon = 0$, respectively. $y_1^*(C_1, C_j)$ increases with ϵ (unless $C_1 < C_2$) which shows that flexible pricing on ad markets makes the large platform relatively stronger compared to the small platform. More importantly, a_i^* decreases with ϵ:

$$\frac{\partial a_i^*}{\partial \epsilon} = -\frac{(1-\epsilon)2\left(t_1 + t_2 - \mu\right)}{2(3-2\epsilon)} - \frac{2\theta\left(C_i - C_j\right) + 2(1-\epsilon)t_i + 2(2-\epsilon)t_j - \left(\mu(3-2\epsilon)\right)}{2(3-2\epsilon)^2} < 0.$$

Platforms now also face a substantial decline in ad prices if their ad level is too large. When demand becomes very flexible such that $\epsilon \to 1$, $a_i^* \to 0$. In this case, platforms would only realize a small or zero revenue as they can attract users away from the rival only with small ad levels, and thus also the CMO will receive only some share of this very small revenue. Eq. (6) generalizes to

$$C \leq \overline{C} = \frac{2t_1(2-\epsilon) + 2t_2(1-\epsilon) - \left(\mu(3-2\epsilon)\right)}{2\theta} \geq 0.$$

Note carefully that $\partial\overline{C}/\partial\epsilon = -(t_1 + t_2 - \mu)/\mu < 0$: a larger ϵ makes monopolization more likely. We now define

$$B_1 = \frac{2t_1(1-\epsilon) + 2t_2(2-\epsilon) - \left(\mu(3-2\epsilon)\right)}{2\theta} = \overline{C},$$
$$B_2 = \frac{2t_1(2-\epsilon) + 2t_2(1-\epsilon) - \left(\mu(3-2\epsilon)\right)}{2\theta},$$

where $B_1 \geq B_2$ because $t_1(1-\epsilon) + 2t_2(2-\epsilon) \geq 2t_1(2-\epsilon) + 2t_2(1-\epsilon)$ which also allows us to write equilibrium profits as

$$\pi_i^*(C_i, C_j) = \frac{A(1-\epsilon)^{1-\epsilon}(2\theta)^{2-\epsilon}}{(2(3-2\epsilon))^{2-\epsilon}\left(t_i + t_j - \mu\right)}\left[B_i + \left(C_i - C_j\right)\right]^{2-\epsilon}.$$

The first term is a constant and does not depend on C_1 and C_2. As was detailed in Proposition 1, an exclusive deal with platform 1 only yields a larger profits than a deal

with both platforms if $\pi_1^*(C,0)-\pi_1^*(0,0)-[\pi_1^*(C,C)-\pi_1^*(0,C)]-[\pi_2^*(C,C)-\pi_2^*(C,0)]>0$ which is equivalent to

$$\Delta=(B_1+C)^{2-\epsilon}-B_1^{2-\epsilon}-\left[B_1^{2-\epsilon}-(B_1-C)^{2-\epsilon}\right]-\left[B_2^{2-\epsilon}-(B_2-C)^{2-\epsilon}\right]>0.$$

If $\epsilon=0$, $\Delta>0$ requires $C(3C-2B_2)>0$ which implies $C>3B_2/3=(2t_2+4t_2)/(3\theta)$ and confirms Proposition 1. For large elasticities, firms set low ad levels and cannot cash in much on content, and thus exclusion becomes less profitable. In particular, suppose that both platforms are symmetric such that $B=B_1=B_2$ and $B=C=\bar{C}$ holds, that is, C is so large that a marginally larger C implies monopolization. In this case $\Delta=2^{-\epsilon}\left(4-3\times 2^{\epsilon}\right)B^{2-\epsilon}$ which is positive if $4-3\times 2^{\epsilon}>0$ or $\epsilon>0.415037$. Thus, $\epsilon>0.415037$ is a sufficient condition for a range of C to exist for an exclusive deal with platform 1. If $\epsilon<0.415037$, the market is monopolized by platform 1 to begin with or ad revenues are so small that exclusion does not pay off. The last case is uninteresting for our analysis.

A.3 User prices, monopolization and multi-homing

Now assume that the platforms can also charge user prices in addition to selling ads. In this case, a user at location x using platform 1 enjoys a net payoff of

$$u_1(x)=v+\theta C_1-a_1-p_1-t_1x+\mu y-\frac{\mu y^2}{2},$$

and for using platform 2 of

$$u_2(x)=v+\theta C_2-a_2-p_2-t_2(1-x)+\mu(1-y)-\frac{\mu(1-y)^2}{2}.$$

Since

$$y=\frac{2\theta\left(C_1-C_2\right)-2\left(p_1-p_2\right)-2\left(a_1-a_2\right)+2t_2-\mu}{2\left(t_1+t_2-\mu\right)},$$

this model can explain when platforms will offer their services for free, but sell ads to firms or compete by user prices only. Let $\beta>0$ denote the sales price of an ad per user and unit of a_i. In the main body of the paper, $\beta=1$. Since $\partial y/\partial p_i=\partial y/\partial a_i$, it depends on the size of β which business model each platform chooses. For example, the profit of platform 1 is now given by $\pi_1=yp_1+y\beta a_1$, and if $\beta>(<)1$, platform 1 is better off by running a two-sided (one-sided) platform that sells ads (charges a user price) because $\partial\pi_1/\partial p_1<(>)\partial\pi_1/\partial a_1$ for all $p_1=a_1$. In general,

$$\beta>(<)1\implies p_i=(>)0, a_i>(=)0.$$

Our model is thus strategically equivalent to a model in which one-sided platforms charge user prices.

These models and our model in the main body of the paper in which v is sufficiently large assume that both platforms are active irrespective of the CMO policy. If $C > \overline{C}$, platform 2 will leave the market in case of an exclusive deal of the CMO with platform 1 because it cannot even attract users if it does not sell ads (or charges a zero price in case of a one-sided platform). In this case, the optimal ad level is no longer given by (4) for platform 1. Platform 1 will set a_1 such that platform 2 is kept out of the market, that is, $y = 1$ holds for $a_2 = 0$, which implies

$$a_1^{**} = \pi_1^{**} = \theta C + \mu/2 - t_1 > a_1^* + a_2^* = t_1 + t_2 - \mu$$

because $C > \overline{C}$. We know from Proposition 2 that welfare decreases with an exclusive deal between the CMO and platform 1 if $4t_1 - t_2 - 3\mu/2 > 0$. Welfare will not change if C increases beyond $\overline{C}$: all users will be served by platform 1, and the increase in ads due to an increase in C is a redistribution from users to platform 1. Consequently, it should be clear that monopolization can never be welfare-improving if t_2 is not too large.

The case of monopolization can be extended to allow for multi-homing. Suppose that some users are willing to accept ads (or to pay) also from (for) the small platform 2 in addition to platform 1. In this case, the two platforms are not substitutes, but the small platform 2 complements platform 1 for some users. For this case, the network externality is already maximized by platform 1 so that a user of platform 1 only at location x realizes

$$u_1(x) = v + \theta C_1 - a_1 - t_1 x + \frac{\mu}{2}.$$

Platform 2's additional services have a value of $\gamma v, 0 < \gamma < 1$, as a similar service is already offered to all users by platform 1 (which will materialize only if $v > 0$, that is, if both platforms offer some stand-alone value to consumers). Thus, a user who subscribes to both platforms and is located at x realizes a payoff

$$u_{12}(x) = (1+\gamma)v + \theta C_1 - a_1 - a_2 - t_1 x - t_2(1-x) + \frac{\mu}{2}.$$

Now the indifferent user is the one that is indifferent between using both platforms or only platform 1 and given by $\tilde{y}$ such that

$$\gamma v - t_2(1-\tilde{y}) - a_2 = 0 \Leftrightarrow 1 - \tilde{y} = \frac{\gamma v - a_2}{t_2},$$

if $v > 0$. As well-known from the literature (Anderson *et al*, 2017, Foros *et al*, 2019), multi-homing implies that the small platform's demand depends only on its strategic variable a_2 but not on a_1. The reason is that a user who considers using the complementary small platform 2 in addition to the large platform 1 will only consider the additional ad level a_2 she has to bear. Thus, platform 2 maximizes $(1-\tilde{y})a_2$ w.r.t. a_2 which implies $a_2^{***} = \gamma v/2$.

Multi-homing implies that the dominant platform 1 can even increase ad levels if $v > 0$: it has to set a_1 such that platform 2 does only complement platform 1, but does not substitute it. Setting a_1 such that platform 2 does not replace platform 1, that is, that $y = 1$ holds for $a_2^{***} = \gamma v/2$, implies

$$a_1^{***} = \pi_1^{***} = \theta C + + \frac{\mu}{2} - t_1 + \frac{\gamma v}{2} > a_1^{**} = \pi_1^{**}.$$

Consequently, multi-homing makes the incentive to monopolize the market through an exclusive deal with the CMO stronger.

A.4 Social welfare and welfare comparisons

As for welfare, we apply the Hicks-Kaldor concept such that aggregate welfare is defined by the sum of payoffs of users, of the two platforms and of the CMO. This concept can be rationalized by assuming that all users do not know their locations at the start of the game, and all users own the two platforms and the CMO. Since we assume a competitive ad market, we do not need to include the welfare effects on advertisers and consumers. Note, however, that C does not change if both platforms stay active. Since we assume that marginal costs are zero, revenues are equal to profits, and since revenues are equal to user nuisance costs, they cancel out when computing aggregate welfare. Consequently, aggregate welfare is given by

$$\begin{aligned} W(C_1, C_2, y(C_1, C_2)) &= v + \int_0^{y(C_1,C_2)} \left(\theta C_1 - t_1 x + \mu y - \frac{\mu y^2}{2}\right) dx \\ &+ \int_{y(C_1,C_2)}^1 \left(\theta C_2 - t_2(1-x) + \mu(1-y) - \frac{\mu(1-y)^2}{2}\right) dx, \end{aligned}$$

where $y(C_1, C_2)$ denotes the demand for platform 1 that depends on the assets both platforms are allowed to use under platform competition. The first best obviously wants all users to be able to use the CMO asset, so $C_1 = C_2 = C$ must hold. Let

$$\Omega(y) = W(C, C, y) = v + \frac{1}{6}\left(6\theta C - 3t_1 y^2 - 3t_2(y-1)^2 + \mu(9(y-1)y + 5)\right)$$

give the aggregate welfare as a function of the market share of platform 1 for $C_1 = C_2 = C$. Differentiation yields

$$\frac{d\Omega(y)}{dy} = -\frac{3\mu}{2} - (t_1 + t_2)\, y + t_2 + 3\mu y, \frac{d^2\Omega(y)}{dy^2} = -(t_1 + t_2 - 3\mu) < 0$$

such that the socially optimal market share, denoted by $\tilde{y}$, is given by

$$\tilde{y} = \frac{2t_2 - 3\mu}{3(t_1 + t_2 - 3\mu)} \geq y^*(C, C) = \frac{1}{2} + \frac{t_2 - t_1}{6\,(t_1 + t_2 - \mu)} \tag{A.1}$$

because

$$\tilde{y} - y^*(C,C) = \frac{t_2^2 - t_1^2}{3\left(t_1 + t_2 - \mu\right)\left(t_1 + t_2 - 3\mu\right)} \geq 0.$$

Thus, eq. (A.1) shows that the socially optimal market share of platform 1 is larger than the one under platform competition if $C_1 = C_2 = C$.

We now compare aggregate welfare under the alternative licensing environments. If the CMO has an agreement with both platforms, welfare is equal to

$$W(C,C,y^*(C,C)) = v + \frac{1}{72}\left(8\left(9C\theta + 4\mu - 3t_1\right) + \frac{5\left(2t_1 - \mu\right)^2}{t_1 + t_2 - \mu} - 4t_2\right), \tag{A.2}$$

and if it has one only with platform 1, welfare is given by

$$W(C,0,y^*(C,0)) = v + \frac{1}{72}\left(8\left(7C\theta + 4\mu - 3t_1\right) + \frac{5\left(2C\theta + \mu - 2t_1\right)^2}{t_1 + t_2 - \mu} - 4t_2\right).$$

Taking the difference yields

$$W(C,C,y^*(C,C)) - W(C,0,y^*(C,0)) = \frac{\theta C\left(14t_1 + 4t_2 - 5\theta C - 9\mu\right)}{18\left(t_1 + t_2 - \mu\right)},$$

which is positive if

$$C \leq C' = \frac{14t_1 + 4t_2 - 9\mu}{5\theta}.$$

Thus, if $\overline{C} \leq C'$, welfare will unambiguously decline with exclusion. $\overline{C} \leq C'$ if $4t_1 - t_2 - 3\mu/2 \geq 0$.

For the case of a content quality increase from C^0 to C^1, the change in aggregate welfare is given by

$$W(C^1,0,y^*(C^1,0)) - W(C^0,C^0,y^*(C^0,C^0)) = \frac{\theta C^1\left(14t_1 + 4t_2 + 5\theta C^1 - 9\mu\right)}{18\left(t_1 + t_2 - \mu\right)} - \theta C^0,$$

which is positive if

$$\frac{C^1}{C^0} > \frac{18\left(t_1 + t_2 - \mu\right)}{14t_1 + 4t_2 + 5\theta C^1 - 9\mu} > \frac{36(t_1 + t_2 - \mu)}{33(t_1 + t_2 - \mu) - 5(t_1 - t_2)},$$

where the last inequality follows from the requirement that $C^1 < \bar{C} = (4t_1 + 2t_2 - 3\mu)/(2\theta)$ in order to avoid welfare-reducing monopolization.

A.5 The case of no base utility ($v = 0$)

Let $u(\bar{x}, C, C)$ denote the payoff of the indifferent user if both platforms have access to the content of the CMO, and let $u(\bar{x}, C, 0)$ denote this payoff if only platform 1 has a deal with the CMO. Using (4) and (5), we find that

$$u(\bar{x}, C, C) = \theta C + \frac{17\mu}{18} - t_1 - \frac{2t_2}{3} + \frac{\left(5\mu^2 + 6t_1\left(2t_1 - 3\mu\right) + 4t_2\left(3t_1 - \mu\right)\right)\left(2t_1 - \mu\right)}{72\left(-\mu + t_1 + t_2\right)^2},$$
$$u(\bar{x}, C, 0) = \frac{\left(2\theta C + 3\mu - 4t_1 - 2t_2\right)\left(12\left(t_1^2 + 3t_2t_1 + 2t_2^2\right) - \mu\left(2\theta C - 21\mu + 32t_1 + 46t_2\right)\right)}{72\left(-\mu + t_1 + t_2\right)^2}.$$

The market will be completely covered if $u(\bar{x}, C, C) \geq 0$ and $u(\bar{x}, C, 0) \geq 0$, respectively. $u(\bar{x}, C, C) \geq 0$ requires

$$C \geq \widetilde{C} = \frac{(6(t_1 + t_2) - 7\mu)(2t_1 + 4t_2 - 3\mu)(4t_1 + 2t_2 - 3\mu)}{72\theta(t_1 + t_2 - \mu)^2}.$$

$\widetilde{C} < \underline{C}$ because $(6(t_1+t_2)-7\mu)(2t_1+4t_2-3\mu)-24(t_1+t_2-\mu)^2 = -3\mu^2 - 12t_1\left(t_1-\mu\right) - 2t_2\left(t_1-\mu\right) - 4t_1\left(t_2-\mu\right) - 6t_1t_2 < 0$. Setting $u(\bar{x}, C, 0) = 0$ has two solutions $C' = \overline{C}$ and

$$C'' = \frac{\left(6(t_1 + t_2) - 7\mu\right)\left(2t_1 + 4t_2 - 3\mu\right)}{2\theta\mu},$$

where $C'' > C'$ because $\left(6(t_1 + t_2) - 7\mu\right)/\mu > 1$ holds since $6(t_1+t_2) - 8\mu > 0$. Thus, the relevant solution is $C' = \overline{C}$, Furthermore, we observe that

$$\frac{\partial^2 u(\bar{x}, C, 0)}{\partial C^2} = -\frac{\theta^2\mu}{9(t_1 + t_2 - \mu)^2} < 0,$$

that is, $u(\bar{x}, C, 0)$ is concave in C. Consequently, $u(\bar{x}, C, 0) \geq 0$ if $C \in [\overline{C}, C'']$ and $u(\bar{x}, C, 0) \leq 0$ if $C \leq \overline{C}$ or $C \geq C''$. Thus, $u(\bar{x}, C, 0) \leq 0$ in the relevant range and there is no full coverage by both platforms if $C_1 = C$ and $C_2 = 0$.

If there is no full coverage, each platform is a monopolist close to its location and faces a demand y_i that is given by

$$\mu y_i - \frac{\mu y_i^2}{2} + \theta C_i - \bar{u} - t_i y_i - a_i = 0, \tag{A.3}$$

where $\bar{u}$ denotes the outside option of the user which we will use to show that maximized profits are larger compared to competition. It is now more convenient to solve

the maximization problem not w.r.t. a_i, but w.r.t. y_i. Solving for a_i yields the objective function

$$\pi_i(y_i) = y_i \left(\mu y_i - \frac{\mu y_i^2}{2} + \theta C_i - \bar{u} - t_i y_i \right),$$

and maximization w.r.t. y_i gives the first-order condition in case of an interior solution $y_i \leq 1$:

$$-2t_i y_i + \theta C_i - \bar{u} + \frac{\mu(4 - 3y_i)y_i}{2} = 0 \tag{A.4}$$

Further differentiation gives the second-order condition $-2t_i + \mu(2 - 3y_i) < 0$. The first-order condition (A.4) has two solutions, one of them negative and giving a local minimum, and the other relevant solution is given by

$$y_i = \frac{\sqrt{4(t_i - \mu)^2 + 6(\theta\mu C_i - \bar{u})} - 2(t - \mu)}{3\mu}$$

in case of an interior solution (and the second-order condition is fulfilled). Note that $y_i = 0$ if $C_i = 0$ and $\bar{u} = 0$: platform 2 will not be able to attract any users. For $\theta\mu C_i - \bar{u} > 0$, let $\pi_i^{**}(\bar{u})$ denote the maximized profit. Using the envelope theorem, we find that $d\pi_i^{**}(\bar{u})/d\bar{u} = -y_i$ which implies that platform 1 realizes a larger maximized profit without competition by platform 2 since $\bar{u} = 0$ due to $y_2 = 0$, and thus $\pi_i^{**}(\bar{u} = 0)$ is larger than the maximized profit in (7) when $C_1 = C$ and $C_2 = 0$. Consequently, a $\widehat{C}$ for which $\widetilde{C} \leq \widehat{C} < \underline{C}$ must exist for which the surplus of a *de facto* exclusive deal with platform 1 is more profitable for the CMO as $\pi_1^{**} > \pi_1^*(C, 0)$.

Setting $\bar{u} = 0$ and including the corner solution, we find that the optimal market share of platform 1 is given by

$$y_1^{**} = \begin{cases} \frac{\sqrt{4(t_1-\mu)^2 + 6\theta\mu C} - 2(t-\mu)}{3\mu} & \text{if} \quad C < \frac{4t_1 - \mu}{2\theta}, \\ 1 & \text{if} \quad C \geq \frac{4t_1 - \mu}{2\theta}. \end{cases} \tag{A.5}$$

Due to (A.3), $y_1^{**} = 1$ implies an ad level of platform 1 of size $t_1 + \theta C - \mu/2 \geq 3t_1 - \mu$ as $C \geq (4t_1 - \mu)/(2\theta)$. Thus, the ad level will be larger than $a_1^* + a_2^*$ (see (4)) if $2t_1 \geq t_2$.

Social welfare without exclusion is given by (A.2) with $v = 0$. Welfare with exclusion and a platform 1 monopoly is given by

$$\widetilde{W}(y_1) = \int_0^{y_1} \left(\theta C + \mu y_1 - \mu \frac{y_1^2}{2} - t_1 x \right) dx = \frac{y_1(2\theta C + \mu y_1(2 - y_1) - t_1 y_1)}{2}.$$

We now develop – given platform 1's monopoly position – the welfare-maximizing market share. Differentiation of $\widetilde{W}(y_1)$ yields

$$\frac{d\widetilde{W}(y_1)}{dy_1} = \theta C + \frac{\mu y_1(4-3y_1)}{2} - t_1 y_1, \frac{d^2\widetilde{W}(y_1)}{dy_1^2} = \mu(2-3y_1) - t_1.$$

$d\widetilde{W}(y_1)/dy_1 = 0$ has two solutions

$$y_1 = \frac{2\mu - t_1 \pm \sqrt{6\mu\theta C + (t_1 - 2\mu)^2}}{3\mu},$$

and using $d^2\widetilde{W}(y_1)/dy_1^2$ shows that the relevant (unconstrained) maximum is given by

$$\tilde{y}_1 = \frac{2\mu - t_1 + \sqrt{6\mu\theta C + (t_1 - 2\mu)^2}}{3\mu},$$

as $d^2\widetilde{W}(\tilde{y}_1)/dy_1^2 = -\sqrt{6\mu\theta C + (t_1 - 2\mu)^2} < 0$ and thus $\tilde{y}_1$ determines a local maximum while the other solution determines a local minimum. $\tilde{y}_1$ gives the unconstrained maximizer of social welfare. Including the corner solution, we find that the welfare-maximizing market share of platform 1 is given by

$$\tilde{y}_1^{**} = \begin{cases} \frac{2\mu - t_1 + \sqrt{6\mu\theta C + (t_1-2\mu)^2}}{3\mu}, & \text{if} \quad C < \frac{2t_1 - \mu}{2\theta}, \\ 1 & \text{if} \quad C \geq \frac{2t_1 - \mu}{2\theta}. \end{cases} \tag{A.6}$$

Comparing (A.5) with (A.6) shows – as to be expected – that platform 1 will not serve all users as a social planner would do if $C \in [(2t_1 - \mu)/(2\theta), (4t_1 - \mu)/(2\theta)]$. Let $\widetilde{W}^{**} = \widetilde{W}(\tilde{y}_1^{**})$ denote the maximized welfare. Using the envelope theorem, we find that $d\widetilde{W}^{**}/dC = \theta\tilde{y}_1^{**}$ while $dW(C, C, y^*(C, C))/dC = \theta$. Thus, the difference between welfare when the market is served by both platforms with both having access to C and maximized welfare when only platform 1 is active changes with C such that $dW(C, C, y^*(C, C))/dC - d\widetilde{W}^{**}/dC = \theta(1 - \tilde{y}_1^{**})$. The change is positive and smallest and equal to zero if $\tilde{y}_1^{**} = 1$. If we compare $\widetilde{W}^{**}$ for $\tilde{y}_1^{**} = 1$ with $W(C, C, y^*(C, C))$, this will gives us a lower bound of the potentially negative welfare effect of an exclusive deal of the CMO with platform 1 because we consider socially-welfare maximizing welfare and its potentially best outcome. Thus, we now scrutinize when $\widetilde{W}(y_1 = 1)$ will be smaller than expression (A.2). Since

$$\widetilde{W}(y_1 = 1) = \frac{2\theta - t_1 + \mu}{2},$$

$$W(C,C,y^*(C,C)) - \widetilde{W}(y_1=1) = \frac{(4t_1+2t_2-3\mu)(8t_1-2t_2-3\mu)}{72(t_1+t_2-\mu)}$$

if $v=0$. Consequently, welfare declines with exclusion if $8t_1-2t_2-3\mu<0$. This implies the same condition $t_2<4t_1-3\mu/2$ as for the case of a sufficiently large v and full coverage.

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