

The market power requirement in antitrust enforcement and its usefulness

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Abstract In competition law the concept of “significant existing market power” is often considered as a prerequisite to examining whether a business conduct gives rise to liability and, traditionally, the value of the Lerner index (the proportional price–cost margin) is used to measure the size of market power. In this paper we discuss in detail the role of the size of existing market power as a predictor of the size of the reduction in welfare generated by anticompetitive actions/conducts. We concentrate on monopolization or abuse of dominance conducts in which an exclusionary action by the dominant firm eliminates one of the rival firms. The main point which emerges from our analysis is that the source of market power is very important in understanding how changes in the size of extant market power affect the size of the reduction in welfare. We consider vertical and horizontal product differentiation and market structure as alternative sources of market power. We show that in contrast to Kaplow (Goals of competition law, Edward Elgar, pp 3–26, 2012), a significant extant market power requirement can be justified if either a Total Welfare Standard (TWS) or a Consumer Surplus Standard (CSS) is used and that this will be the case if the market power is the result of horizontal product differentiation or the result of a smaller initial number of competing firms. Further, we show, again in contrast to Kaplow (Goals of competition law, Edward Elgar, pp 3–26, 2012), that such a requirement may not be justified under either a CSS or a TWS—as when the market power is the result of vertical product differentiation. We also examine how extant market power and market share vary with the degree of product differentiation and market structure. We show that market shares vary inversely with the Lerner index as horizontal differentiation increases and directly as vertical differentiation increases and as the number of firms decreases, thus

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proving the irrelevance in many cases of market share as a predictor of market power.

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1 Introduction and brief review of related literature

While the standard textbook definition of market power is that of the ability of an undertaking to, increase price above the marginal cost (i.e. above the competitive levels), in antitrust it is generally presumed that an undertaking with market power will also have the ability and incentive to harm the process of competition, for example by excluding competitors, raising entry barriers or affecting the competitive process in general.¹ Indeed, in antitrust law the significance of the notion of market power is rooted in the fact that it “is frequently used as a screen: a firm (or group of firms) must be shown to have some level of market power as a prerequisite to considering whether the conduct in question gives rise to antitrust liability. As a result, antitrust investigations and adjudications devote substantial attention² to whether or not the requisite (existing or initial or extant³) market power exists”.⁴

A number of reasons are usually offered in order to justify the market power requirement in Competition Law enforcement. First, “If one were minimizing a loss function in which there was uncertainty about the practices under scrutiny, and if the degree of harm conditional on the practices being detrimental was rising with the extent of market power, an optimal rule could be stated as entailing a market power requirement that was highly contextual”,⁵ in order to minimize false positives. Second, the high costs of litigation have to be constrained and, third, to avoid adverse deterrence effects (“chilling routine competitive behavior”^{6,7}).

However, a number of important issues are raised by the market power requirement, the first of which concerns the issue of how high the market power

¹ OFT Report 402 (2004), “Abuse of a dominant position”.

² The significant expansion of the concept of market power and its integration in competition law through the years is demonstrated by Lianos (2009), who measured the total number of citations to market power in court cases, Commission’s decisions, guidelines and regulatory texts relevant to competition law and saw an extensive increase over the last decades.

³ Following Kaplow (2012), below we will use the term “extant”.

⁴ Kaplow and Shapiro (2007), p. 20.

⁵ *Ibid.*, p. 20 (our italics).

⁶ *Ibid.*, p. 101.

⁷ Another way of putting this is to say that when firms lack significant market power or any serious prospect of acquiring it then “there is likely to be little benefit from examining in detail the effects of their conduct, whereas substantial costs of administration, mistaken prohibition and inhibition of competitive rigor can be avoided by in essence granting them immunity” (*ibid.*, p. 101). For a more recent significant contribution by the same author of the importance of the market power requirement in antitrust, in the context of the market definition paradigm is that of Kaplow (2015).

requirement should be.⁸ How much market power constitutes what the US and EU laws describe as “monopoly power” or “dominance”, respectively? The law does not provide an answer. Even if a quantitative answer was given it would, in any case, be very difficult to obtain direct estimates in any specific investigation and, from very early on, the legal approach has relied on market share to provide an (albeit, indirect) answer to the question of what constitutes monopoly power or dominance.⁹ In order to better apprehend this limitation we first have to consider the determinants of market power. It is often argued that a firm’s market power is related to its market share. However, share is not necessarily equivalent to market power. Product differentiation and market concentration (that depends on rivals’ share distribution) account for much of an undertakings exercise of market power. As Kaplow points out “...the inferences drawn from market shares in relevant markets generally contain less information and accordingly can generate erroneous legal conclusions¹⁰”.

Notwithstanding the above issues, for many practices, as Kaplow and Shapiro (2007) conclude “it may make sense both to insist that the firm possess some significant level of market power and that the challenged practices contribute importantly to it. Regarding the former, it often would not much matter whether the overall level of market power was measured with or without the challenged practices”.¹¹ Regarding the latter, while it would seem that, beyond a possible de minimis level, any increment should be condemned, again the need to avoid false positives and, very importantly, the fact that mergers as well as many monopolization practices can have also significant efficiency effects, imply that for a liability finding one would need to balance anticompetitive (market power enhancing) effects with efficiency effects and that balance “would importantly depend on whether the standard is limited to consumer surplus or is defined in terms of total welfare”.¹²

In relation to the latter question, there is currently great controversy over the proper antitrust substantive standard. Among those who have recently reviewed the debate concerning whether consumer surplus or total surplus should be the substantive standard for competition authorities, we can include Farrell and Katz

⁸ Also, the cost and potential for error in the market power inquiries themselves—Kaplow and Shapiro (2007), p. 102.

⁹ Thus in the famous US (1945) *Alcoa case*, a prominent group of judges pronounced that a 90 % market share “is enough to constitute a monopoly; it is doubtful whether sixty or sixty-four per cent would be enough; and certainly thirty three per cent is not”. As Kaplow and Shapiro (2007, p. 106) note “The difficulty in interpreting this statement is that two distinct issues are conflated: how much market power was thought to exist in that case? (a fact question distinctive to that industry under the then-existing conditions), and how much market power is deemed sufficient to constitute monopoly power? The standard procedure for obtaining estimates of market shares is to first define the “relevant” antitrust market.

¹⁰ Kaplow (2012). See also Kaplow (2015).

¹¹ Unless they had a very large impact in which case it usually makes sense to consider power with the practices. If practices “have had time to take effect and the result is substantial market power, it hardly seems sensible to excuse the defendant that asserted its power would be small without the practices, for that would be admission of large anticompetitive effects” (ibid. p. 103–104).

¹² Ibid, p. 104.

(2006) and Salop (2010). Kaplow (2012), examines an important issue that bears on this choice. He looks at how the extant market power (or, initial price elevation) in a market affects the change in Consumer Surplus (ΔCS) and the change in Total Welfare (ΔTW) of a given price increase. He notes that, the higher the initial price elevation, the smaller the ΔCS and the larger the ΔTW generated by a given price increase. He uses this observation to question the current approach in competition law enforcement (for mergers and monopolisation cases) which, as mentioned above, imposes “stricter scrutiny” in the cases where the initial price elevation (or market power) is high, since, as he mentions, “This approach is rational if a total welfare standard is embraced.....By contrast, if consumer welfare standard were the objective, priorities should be reversed.....” (p. 17). Thus, according to Kaplow (2012) the initial significant market power requirement cannot, *ceteris paribus*, be justified if a *CSS* is used but can be justified if a *TWS* is used.

In this paper, we extend Kaplow’s analysis and also examine in detail the role of the size of extant market power (or size of the initial Lerner index) as a predictor of the size of the reduction in welfare generated by anticompetitive actions. We concentrate on monopolization or abuse of dominance cases in which an exclusionary action by the dominant firm eliminates one of the rival firms. We emphasize the point, which emerges from our analysis, that the source of market power is important in understanding how changes in the size of extant market power affect the size of the reduction in welfare, distinguishing between Consumer Surplus and Total Welfare, generated by anticompetitive actions. We consider the type of product differentiation, vertical and horizontal, and market structure as alternative sources of market power.¹³

Given that it is important,¹⁴ in order to justify the market power requirement, that the degree of harm conditional on the practices being detrimental is rising with the extent of market power, we show in contrast to Kaplow (2012) that a significant extant market power requirement can indeed be justified if either a *TWS* or a *CSS* is used¹⁵ and this will be the case if the market power is the result of horizontal product differentiation or the result of a smaller initial number of competing firms. Further, we show that an initial significant market power requirement cannot be justified under either a *CSS* or a *TWS* when the market power is the result of vertical differentiation.

We also discuss the relationship between the degree of extant market power and the market share under different market configurations relating to product differentiation and market structure as well as the extent to which the market share can be a reliable indicator of the change in welfare induced by anti-competitive (exclusionary) conduct. We show that market shares vary inversely with the Lerner index as horizontal differentiation increases and directly as vertical differentiation increases and as the number of firms in the equilibrium decreases

¹³ We assume throughout an exogenously given level of entry barriers that sustain market power—we recognize of course that product differentiation and the determinants of market structure can affect entry barriers.

¹⁴ As noted above, given the objective to minimize false positives.

¹⁵ Contradicting Kaplow (2012), who argued that the market power requirement is justified only when a total welfare standard is embraced.

proving the irrelevance in many cases of market share as a predictor of market power.¹⁶

The structure of the paper is as follows. In the next section we describe in detail our model, while in Sect. 3 we derive and discuss our results on the relations between extant market power, market share and the effects on *CS* and *TW* of exclusionary actions. Section 4 offers concluding remarks.

2 Description of the model

To examine the effects of exclusionary actions and relate these effects to the level and sources of extant market power we construct a linear model of oligopolistic competition with product differentiation, similar to those used in the analysis of the impact of mergers. The main innovation, relative to these alternative models, which assume some form of horizontal product differentiation, is the presence in the model below of both horizontal and vertical product differentiation. Indeed in our model, while there is some degree of horizontal differentiation between the products of all firms, it is vertical differentiation that distinguishes one of the firms, the dominant firm, from the other firms in the market and that is ultimately responsible for the difference in market shares between firms in market equilibrium. Vertical differentiation, implying that for equal prices all consumers show a preference for a product relative to the other products, can be the result in practice of objective quality differences but also the result of perceived differences supported by investments in advertisement. Exclusionary actions and their effects can be modeled “as-if” the degree of vertical differentiation between the firm taking these actions and other firms increased. Thus, in our model, market power is affected by the number of firms, the degree of horizontal product differentiation and the degree of vertical product differentiation. Firms are assumed to be symmetric in terms of costs.

¹⁶ See also Kaplow (2015). An early predecessor to our analysis, in terms of modeling assumptions, is that of Häckner (2001). He, analysed the implications of applying the standard procedure for market delineation and examined whether a positive relation between actual and assessed market dominance can be justified. In order to address these issues, he extends the Dixit (1979) model to allow for an arbitrary number of firms as well as for vertical and horizontal product differentiation. He concludes that “actual market power is positively related to quality and to horizontal product differentiation and negatively related to the number of firms active in the market”. On the other hand, “the assessed degree of market dominance (i.e. market power) may be negatively related to product quality” and in this case “the results are ambiguous with respect to the total number of firms”. Combining these results suggests that “the correlation between actual market power and assessed market dominance is likely to be weak and that the procedure for market delineation discriminates strongly among different sources of market power.” Despite some similarities, the ultimate objectives and hence much of the analysis contained in Häckner and in this paper are very different. His objective is to examine the extent to which the use of the standard market delineation procedures lead to outcomes in which market power is correlated with assessed market dominance independently of the sources of market power related to product differentiation. We have nothing to say about issues of market definition. Instead we wish to examine in detail the role of the size of extant market power (measured by the size of the extant Lerner index) as a predictor of the size of the reduction in welfare generated by anticompetitive actions and the implications of this for the choice of substantive standard used by Competition Authorities. The latter is not examined at all by Häckner (2001).

As just noted, to model exclusion of rivals, we assume that the dominant firm can take some action that, in the context of the model, can be said to enhance the vertical differentiation gap between its product and the product of rival firms. That is an action leading to a shift in consumers' purchases towards its product for any given prices. This action can be the offering of a scheme of retroactive (loyalty) rebates or of exclusive contracts to the products' distributors. As a result, a smaller number of rivals can survive in the market. We examine the Bertrand-Nash equilibrium before and after the exclusionary action.

More specifically, let us assume that four firms are producing differentiated products.¹⁷ Following Vives (1999) the utility function for the products of the four firms 1, 2, 3 and 4 is as follows:¹⁸

$$u(x) = \sum_{i=1}^4 a_i x_i - \frac{1}{2} \left(\sum_{i=1}^4 x_i^2 + 2s \sum_{j \neq i} x_i x_j \right)$$

where s , $0 < s < 1$, measures the degree of horizontal differentiation among the products of the four firms—assumed symmetric. The higher the value of the parameter s the smaller the degree of horizontal differentiation. Parameters a_i , $a_{i \neq 1} < a_1$, are demand-shift parameters that can also be thought of as measuring the degree of vertical differentiation between the products of firm 1 and its competitors.

We simplify by assuming that: $a_1 = \alpha$, $a_{i \neq 1} = \tilde{\alpha}$. So, for firm 1 we get the inverse demand function:

$$p_1 = \frac{\partial u}{\partial x_1} = \alpha - x_1 - s \sum_{j \neq 1} x_j$$

$$0 < \alpha, 0 < s < 1$$

Similarly for firms 2, 3 and 4, so we have the demand functions:

$$p_1 = \alpha - x_1 - s \left(\sum_{j \neq 1} x_j \right)$$

$$p_{j \neq 1} = \tilde{\alpha} - x_j - s \left(\sum_{i \neq j} x_i \right) \quad (1)$$

$$0 < \tilde{\alpha} < \alpha, 0 < s < 1$$

where s , $0 < s < 1$, measures the degree of horizontal differentiation among the products of the four firms—assumed symmetric. The higher the value of the parameter s the smaller the degree of horizontal differentiation. Parameters α and $\tilde{\alpha}$, $\tilde{\alpha} < \alpha$, are demand-shift parameters that can also be thought of as measuring the degree of vertical differentiation between the products of firm 1 and its competitors. Given that $\tilde{\alpha} < \alpha$ if prices are the same, consumers will prefer to purchase a

¹⁷ The analysis is easily extended to markets with a different number of firms.

¹⁸ See Vives (1999) "Oligopoly Pricing" MIT Press, pp. 146. See also Häckner (2000), Journal of Economic Theory and Hsu and Wang (2005), Review of Industrial Organization.

relatively greater quantity of product 1 than any of the other products and the strength of this preference increases as the difference between $\tilde{\alpha}$ and α increases [Eq. (2) below]. We will call firm 1 the “dominant” firm.

From (1) we can obtain the demand functions (2):

$$\begin{aligned}
 x_1 &= \gamma \left[A - p_1(1 + 2s) + s \left(\sum_{j \neq 1} p_j \right) \right] \\
 x_{j \neq 1} &= \gamma \left[\Gamma - p_j(1 + 2s) + s \left(\sum_{i \neq j} p_i \right) \right] \\
 \gamma &= \frac{1}{1 + s(2 - 3s)} > 1
 \end{aligned}
 \tag{2}$$

where:

$$\begin{aligned}
 A &= [\alpha(1 + 2s) - 3\tilde{\alpha}s] \\
 \Gamma &= [\tilde{\alpha} - \alpha s]
 \end{aligned}$$

From Eq. (2) we can define the CS, which is given by:¹⁹

$$CS = \left(\frac{1 - s}{2} \right) \sum_{i=1}^4 x_i^2 + \left(\frac{s}{2} \right) \left(\sum_{i=1}^4 x_i \right)^2
 \tag{3}$$

and the *TW*, as the sum of CS and profits.

2.1 Bertrand Nash Equilibrium (BNE) prices and market shares

We assume that all firms have a constant marginal cost of c . So the profit of firm $i = 1, 2, 3, 4$ is given by:

$$\Pi_i = (p_i - c)x_i - F$$

where $F \geq 0$ is the fixed cost, the same for all firms. Profit maximization with price competition requires that:

$$\frac{\partial \Pi_i}{\partial p_i} = x_i - \gamma(1 + s)(p_i - c) = 0$$

From the last condition, we have for each firm:

$$\begin{aligned}
 A - 2(1 + 2s)p_1 + s \left(\sum_{j \neq 1} p_j \right) + c(1 + 2s) &= 0 \\
 \Gamma - 2(1 + 2s)p_{j \neq 1} + s \left(\sum_{i \neq j} p_i \right) + c(1 + 2s) &= 0
 \end{aligned}
 \tag{4}$$

¹⁹ See also Hsu and Wang (2005), Review of Industrial Organization.

From the last three of equations (4), clearly the prices of firms 2, 3 and 4 will be the same, say:

$$p_{j \neq 1} = \tilde{p}^B = \frac{\Gamma + (1 + 2s)c + sp_1}{2(1 + s)} \quad (5)$$

So, from the first of Eqs. (4) using (5) we get the Bertrand-Nash Equilibrium value of price for firm 1 (the Dominant firm):

$$p_1^B = \frac{2A(1 + s) + 3s\Gamma + (1 + 2s)c(2 + 5s)}{(2 + s)(2 + 5s)} \quad (6)$$

and substituting back in (5) we get the BNE price of firms 2, 3 and 4:

$$\tilde{p}^B = \frac{As + 2\Gamma(2s + 1) + (1 + 2s)c(2 + 5s)}{(2 + s)(2 + 5s)} \quad (7)$$

We can also write the BNE quantities as follows:

$$\begin{aligned} x_1^B &= \gamma[A - (1 + 2s)p_1^B + 3s\tilde{p}^B] \\ x_{j \neq 1}^B &= \gamma[\Gamma - \tilde{p}^B + sp_1^B] \end{aligned} \quad (8)$$

Thus, using (5), (6) and (8), we can define the shares of the 4 firms as follows:

$$ms_i = \frac{p_i^B x_i^B}{\sum_{i=1}^4 p_i^B x_i^B} \quad (9)$$

and the profit in BNE:

$$\Pi_i^B = (p_i^B - c)x_i^B - F \quad (10)$$

From (3) and (10) we can calculate the CS and the profit arising in the BNE, and therefore also Total Welfare.

3 Relations between extant market power, market shares and the effects of exclusionary actions

3.1 Market share as a predictor of extant market power

- (a) We start by examining how extant market power and market share vary with the degree of horizontal differentiation for given vertical differentiation and number of firms.

Considering the BNE under alternative levels of horizontal differentiation for given vertical differentiation ($\alpha = 10$, $\tilde{\alpha} = 9$) and number of firms (see Table 1), we observe that if the degree of horizontal differentiation is low, say $s = 0.9$, the

Table 1 BNE with four firms: firm 1 and firms 2, 3, 4 ($c = 2$)

	$s = 0.4$		$s = 0.5$		$s = 0.6$		$s = 0.7$		$s = 0.8$		$s = 0.9$	
	$\alpha = 10$	$\tilde{\alpha} = 10$	$\alpha = 10$	$\tilde{\alpha} = 9$	$\alpha = 10$	$\tilde{\alpha} = 9$	$\alpha = 10$	$\tilde{\alpha} = 10$	$\alpha = 10$	$\tilde{\alpha} = 9$	$\alpha = 10$	$\tilde{\alpha} = 10$
P_1	4.2	4.0	3.9	3.6	3.6	3.5	3.2	3.2	2.9	2.9	2.7	2.3
$P_{2,3,4}$	3.7	4.0	3.3	3.6	3.6	3.0	3.2	2.7	2.9	2.4	2.1	2.3
L_1	0.53	0.5	0.48	0.44	0.44	0.43	0.38	0.38	0.31	0.32	0.25	0.12
$L_{2,3,4}$	0.46	0.5	0.40	0.44	0.44	0.33	0.38	0.25	0.31	0.16	0.22	0.12
MS_1	33.7 %	25 %	35.7 %	25 %	25 %	38.4 %	25 %	42.7 %	25 %	50.9 %	25 %	25 %
$MS_{2,3,4}$	22.1 %	25 %	21.4 %	25 %	25 %	20.5 %	25 %	19.1 %	25 %	16.4 %	9.1 %	25 %

Lerner index of Firm 1 is quite small (25 %) and its market share appears to be substantially high. When the degree of horizontal differentiation is increased ($s = 0.4$), the Lerner index increases to 53 %, and the market share of Firm 1 decreases. On the other hand, concerning the Lerner index and market shares of the other firms we can see that they both increase as horizontal differentiation increases. So we have:

Result 1 Given the degree of vertical differentiation and the number of firms, as horizontal differentiation increases (s is smaller), on the one hand market shares become much more symmetric while on the other hand the Lerner index increases. Thus, market shares vary inversely with the Lerner index as horizontal differentiation increases.

Result 2 Vertical differentiation operates as a force that increases significantly market share when horizontal differentiation is low while, given the degree of vertical differentiation, market shares become much more symmetric with high horizontal differentiation. To illustrate this, we juxtapose the above findings with data from the extreme case where we assume complete absence of vertical differentiation (Table 1). As we can see, market share shows massive increase due to the existence of vertical differentiation, when horizontal differentiation is low ($s = 0.9$)—up to 190 % compared to the symmetric case. On the other hand, when horizontal differentiation is high ($s = 0.4$) the market share increase due to the existence of vertical differentiation is much smaller (about 50 %).²⁰

Thus, in markets where vertical differentiation is the main source of differentiation (horizontal differentiation is low) market share is a particularly unreliable proxy of market power. Further as we see below, it is a very unreliable proxy for the harm generated by anticompetitive actions.

- (b) Next we examine how extant market power and market share vary with vertical differentiation for given horizontal differentiation and market structure.

In this case we assume a constant level of horizontal differentiation (s) and allow the degree of vertical differentiation (α and $\tilde{\alpha}$) to vary. The results are summarized in Table 2. Here, we notice that as vertical differentiation increases the Lerner index and market share of Firm 1 increase as well, while the Lerner index and market share of the rivals decrease. Thus we have:

Result 3 For given horizontal differentiation and market structure, as vertical differentiation increases the dominant firm's Lerner index increases likewise and market shares become more asymmetric. In other words, market shares vary directly with the Lerner index as vertical differentiation increases.

- (c) Finally, we examine how extant market power and market share vary with changes in the number of firms for given horizontal and vertical differentiation

²⁰ To simplify the presentation of results in the tables that follow we consider a range of s values between 0.4 and 0.9. The results are not affected by considering, for example, lower values of s .

Table 2 BNE with four firms: firm 1 and firms 2, 3, 4 ($c = 2, s = 0.4$)

	$\alpha = 10$ $\tilde{\alpha} = 9$	$\alpha = 10$ $\tilde{\alpha} = 8$	$\alpha = 10$ $\tilde{\alpha} = 7$	$\alpha = 10$ $\tilde{\alpha} = 6$	$\alpha = 10$ $\tilde{\alpha} = 5$	$\alpha = 10$ $\tilde{\alpha} = 4$
p_1	4.2	4.5	4.7	4.9	5.1	5.4
$p_{2,3,4}$	3.7	3.4	3.0	2.7	2.4	2.1
L_1	0.53	0.55	0.57	0.59	0.61	0.63
$L_{2,3,4}$	0.46	0.40	0.34	0.26	0.16	0.02
ms_1	33.7 %	44.6 %	57.3 %	71.5 %	85.7 %	98.3 %
$ms_{2,3,4}$	22.1 %	18.5 %	14.2 %	9.5 %	4.8 %	0.6 %

Table 3 BNE for various numbers of firms ($c = 2, \alpha = 10, \tilde{\alpha} = 9, s = 0.4$)

	BNE with 5 firms	BNE with 4 firms
p_1	4.0	4.2
p_{others}	3.4	3.7
L_1	0.50	0.53
L_{others}	0.42	0.46
ms_1	28.5 %	33.70 %
ms_{others}	17.9 %	22.10 %

As standard industrial organization predicts and as already mentioned, except of product differentiation, market structure, is another alternative source of market power. This is of course a prediction that also holds with the current model. As Table 3 indicates the Lerner index and the market shares of both the dominant firm and its rivals increase when the number of firms in the equilibrium is smaller. That is:

Result 4 The higher the number of firms active in the market, the lower their market share and Lerner index, i.e. market shares and the Lerner index vary directly as the number of firms in the BNE decreases. We show that this holds for all firms and regardless of the degree of differentiation (horizontal or vertical).

3.2 Extant market power and the effects of exclusion

We turn now to an examination of how the level of extant market power (or of the initial price elevation) affects the magnitude of the change in *CS* and of the change in *TW* that is produced by an anticompetitive action that results in the exclusion of a rival firm.

As noted above, this issue was stressed by Kaplow (2012). He looked at how the initial price elevation in a market affects the ΔCS and the ΔTW of a given price increase. He noted that the higher the initial price elevation the smaller the ΔCS and the larger the ΔTW generated by a given price increase. He used this observation to question the current approach in competition law enforcement (for mergers and monopolisation cases) which on the one hand imposes “stricter scrutiny” in the cases where the initial price elevation is high and on the other relies on a *CS*

standard. As he mentions, the market power requirement “is rational if a total welfare standard is embraced.....By contrast, if consumer welfare standard were the objective, priorities should be reversed.....” (p. 17).

The insight of Kaplow (2012), concerning the importance of the initial price elevation is very important. However, in practice, the initial price elevation will be associated to many different factors, for example, differences in costs, demand factors or differences in the market structure (different number of rivals) or in competitive behaviour. For each case the welfare implications of price increases cannot be deduced in the manner that Kaplow (2012) proposes. The source of the initial price elevation can be important to the result. Further, in practice competition authorities will be concerned with the implications for prices of specific conduct or actions and, the same anticompetitive action, is unlikely to produce the same price increase across these different cases.

Here, we consider the implications of the extant market power or the initial price elevation, in the context of monopolisation cases, but we do so by considering different sources of market power and looking at how the initial price elevation across markets with different degrees of horizontal and/or vertical differentiation and different market structures affects ΔCS and ΔTW produced by the exclusion of a rival firm. In contrast to Kaplow (2012) we show that depending on the source of the extant market power its size can vary directly or inversely with the effects of exclusion on CS and TW and a significant initial market power requirement can either be justified for both a CSS and a TWS or for neither of them.

More specifically, our main results are as follows:

Result 5 The greater is the extant market power, as measured by the Lerner index, due to higher horizontal differentiation, for given market structure and degree of vertical differentiation, the greater the ΔCS and the ΔTW due to the exclusion of a rival firm. Note also that in this case the market share of the dominant firm varies inversely with the welfare effects of exclusion. These can be seen by inspection of Table 4.

Thus when the extant market power is the result of horizontal differentiation its size varies directly with the harm (as measured either in terms of ΔCS or in terms of ΔTW) that is generated by the exclusionary action and so an initial significant market power requirement can be justified if either a TWS or a CSS is used, in contrast to Kaplow (2012) contention.

Result 6 The greater the extant market power due to a higher degree of vertical product differentiation, for given market structure and degree of horizontal differentiation, the smaller the ΔCS and the ΔTW due to the exclusion of a rival firm. Thus, when the initial market power is due to vertical differentiation, the higher this is the smaller the welfare effects of exclusion. Note also that in this case the market share of the dominant firm varies directly with its extant market power (the Lerner index) and so inversely with the welfare effects of exclusion. See Table 5.

Thus when the extant market power is the result of vertical differentiation its size varies inversely with the harm, both in terms of ΔCS and ΔTW , generated by the exclusionary action and so an initial significant market power requirement cannot be justified under either a TWS or a CSS —in contrast again to Kaplow (2012) contention.

Table 4 Effects of exclusion—4 to 3 firms for various degrees of horizontal differentiation ($c = 2, \alpha = 10, \tilde{\alpha} = 9$)

	$s = 0.4$	$s = 0.5$	$s = 0.6$	$s = 0.7$	$s = 0.8$	$s = 0.9$
BNE with four firms: firm 1 and firms 2, 3, 4						
p_1	4.2	3.9	3.5	3.2	2.9	2.7
$p_{2,3,4}$	3.7	3.3	3.0	2.7	2.4	2.1
L_1	0.53	0.48	0.43	0.38	0.32	0.25
$L_{2,3,4}$	0.46	0.40	0.33	0.25	0.16	0.05
ms_1	33.7 %	35.7 %	38.4 %	42.7 %	50.9 %	72.7 %
$ms_{2,3,4}$	22.1 %	21.4 %	20.5 %	19.1 %	16.4 %	9.1 %
BNE with three firms: firm 1 and firms 2, 3						
p_1	4.6	4.2	3.9	3.5	3.1	2.8
$p_{2,3}$	4.0	3.6	3.3	2.9	2.5	2.2
ms_1	42.2 %	43.8 %	46.1 %	49.7 %	56.4 %	74.3 %
$ms_{2,3}$	28.9 %	28.1 %	26.9 %	25.1 %	21.8 %	12.8 %
Percentage differences in CS and TW						
ΔCS	-18.3 %	-15.7 %	-12.7 %	-9.5 %	-5.9 %	-2.3 %
ΔTW	-9.0 %	-6.4 %	-4.1 %	-2.2 %	-0.7 %	-0.1 %

Table 5 Effects of exclusion—4 to 3 firms for various degrees of vertical differentiation ($c = 2, s = 0.4$)

	$\alpha = 10$ $\tilde{\alpha} = 9$	$\alpha = 10$ $\tilde{\alpha} = 8$	$\alpha = 10$ $\tilde{\alpha} = 7$	$\alpha = 10$ $\tilde{\alpha} = 6$	$\alpha = 10$ $\tilde{\alpha} = 5$	$\alpha = 10$ $\tilde{\alpha} = 4$
BNE with four firms: firm 1 and firms 2, 3, 4						
p_1	4.2	4.5	4.7	4.9	5.1	5.4
$p_{2,3,4}$	3.7	3.4	3.0	2.7	2.4	2.1
L_1	0.53	0.55	0.57	0.59	0.61	0.63
$L_{2,3,4}$	0.46	0.40	0.34	0.26	0.16	0.02
ms_1	33.7 %	44.6 %	57.3 %	71.5 %	85.7 %	98.3 %
$ms_{2,3,4}$	22.1 %	18.5 %	14.2 %	9.5 %	4.8 %	0.6 %
BNE with three firms: firm 1 and firms 2, 3						
p_1	4.6	4.8	4.9	5.1	5.3	5.5
$p_{2,3}$	4.0	3.6	3.2	2.9	2.5	2.1
ms_1	42.2 %	52.6 %	64.3 %	76.5 %	88.4 %	98.4 %
$ms_{2,3}$	28.9 %	23.7 %	17.9 %	11.7 %	5.8 %	0.8 %
Percentage differences in CS and TW						
ΔCS	-18.3 %	-16.0 %	-13.2 %	-10.1 %	-6.9 %	-4.2 %
ΔTW	-9.0 %	-6.7 %	-4.3 %	-2.2 %	-1.1 %	-1.3 %

Result 7 The greater the extant market power due to a smaller initial number of firms, for given degree of vertical and horizontal differentiation, the greater the ΔCS and the ΔTW due to the exclusion of a rival firm. Thus, ceteris paribus, when the

Table 6 Effects of exclusion

	BNE with 5 firms	BNE with 4 firms
p_1	4.0	4.2
p_{others}	3.4	3.7
L_1	0.50	0.53
L_{others}	0.42	0.46
ms_1	28.5 %	33.70 %
ms_{others}	17.9 %	22.10 %
Exclusion	BNE with 4 firms	BNE with 3 firms
p_1	4.2	4.6
p_{others}	3.7	4.0
ms_1	33.70 %	42.2 %
ms_{others}	22.10 %	28.9 %
Percentage differences in CS and TW		
ΔCS	-3.9	-18.3 %
ΔTW	-2.8	-9.0 %

Various numbers of firms
($c = 2, \alpha = 10, \tilde{\alpha} = 9, s = 0.4$)

Table 7 Results summary

Effect when:	On market share	On $\Delta CS, \Delta TW$	
Lerner index increases due to:			
$\uparrow H. Diff.$	<0: Result 1	>0: Result 5	As in Kaplow (2012) for ΔCS /extends Kaplow for ΔTW
$\downarrow V. Diff.$	>0: Result 3	<0: Result 6	New result
Reduction in the number of firms	>0: Result 4	>0: Result 7	As in Kaplow (2012) for ΔCS /extends Kaplow for ΔTW

extent of the initial market power depends on market structure, the more concentrated the market structure the greater the welfare effects of exclusion (Table 6).

Thus when the extant market power is the result of a smaller number of rivals, its size varies directly with the harm, both in terms of ΔCS and ΔTW , generated by the exclusionary action and so an initial significant market power requirement can be justified if either a *TWS* or a *CSS* is used, again in contrast to Kaplow’s (2012) contention.

A summary of the results is provided in the Table 7 below.

4 Concluding remarks

In this paper, we first examine how extant market power and market share vary with the degree of product differentiation and market structure and we show the irrelevance in many cases of market share as a predictor of market power. More specifically, we demonstrate that market shares vary inversely with the Lerner index as horizontal differentiation increases and directly as vertical differentiation increases and as the number of firms in the BNE decreases. We also note that the market share of the dominant firm varies inversely with the welfare effects of exclusion and therefore it cannot be a reliable indicator of the change in welfare induced by anti-competitive (exclusionary) conduct.

We also examine how the level of extant market power (or of the initial price elevation) affects the magnitude of the change in *CS* and of the change in *TW* that is produced by an anticompetitive action that results in the exclusion of a rival firm. We show that, depending on the source of the extant market power, its size can vary directly or inversely with the effects of exclusion on harm and a significant initial market power requirement can be justified either for both a *CSS* and a *TWS* or for neither of them, thus contradicting Kaplow (2012), who argued that the market power requirement is justified only when a total welfare standard is embraced.

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