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Working Paper

Exclusionary practices in two-sided markets: The effect of radius clauses on competition between shopping centers

MAGKS Joint Discussion Paper Series in Economics, No. 18-2015

Provided in Cooperation with:

Faculty of Business Administration and Economics, University of Marburg

Suggested Citation: Brühn, Tim; Götz, Georg (2015) : Exclusionary practices in two-sided markets: The effect of radius clauses on competition between shopping centers, MAGKS Joint Discussion Paper Series in Economics, No. 18-2015, Philipps-University Marburg, Faculty of Business Administration and Economics, Marburg

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Exclusionary Practices in Two-Sided Markets: The Effect of Radius Clauses on Competition Between Shopping Centers

By TIM BRÜHN¹ and GEORG GÖTZ²

Abstract: This paper analyzes exclusionary conduct of platforms in two-sided markets. Motivated by recent antitrust cases against shopping centers introducing radius restrictions on their tenants, we provide a discussion of the likely positive and normative effects of exclusivity clauses, which prevent tenants from opening outlets in other shopping centers covered by the clause. In a standard two-sided market model with two competing shopping centers, we analyze incentives to introduce exclusivity clauses and the likely effects on social welfare. We show that exclusivity agreements are especially profitable for shopping centers and detrimental to social welfare if competition is intense between the two shopping centers. We argue that the focus of courts on market definition is misplaced in markets determined by competitive bottlenecks.

Keywords: Platform competition, exclusive dealing, network effects, competitive bottlenecks

JEL codes: D43, D62, L13

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1 Introduction

Exclusionary practices and their evaluation from a competition policy perspective are ongoing topics of academic discussion and of the activity of antitrust authorities and private enforcement. The question whether certain exclusive contracts and arrangements unduly restrain competition increasingly arises in the context of platform or two-sided markets (Armstrong and Wright: 2007, Doganoglu and Wright: 2010). Recently a number of cases have concerned radius clauses in contracts between shopping centers and their tenants. These contracts state that a retail chain operating a store in a shopping center must not open another outlet in a competing shopping center within the radius agreed upon in the exclusivity agreement. The distances specified in the contracts range from a few kilometers to 150 km in the case of so-called factory outlet centers.³ While many of the cases are still pending⁴, there have been a few final decisions. In these cases, the courts typically do not discuss market structure and the economic effects of radius restrictions on it. We provide such a discussion in this article.

Shopping centers operate on markets with specific characteristics. Buyers are typically one-stop shoppers who only visit one shopping center during a shopping trip. Retail chains typically engage in multi-outlet strategies as shopping centers provide exclusive access to their buyers. In such markets with competitive bottlenecks, shopping centers compete for buyers to increase earnings on the seller side. They attract buyers by offering a preferable mix of shops and brands and by subsidizing them as they do not charge entrance fees. On the seller side, they skim off their tenants.

Sellers sign lease agreements as long as their profits are weakly positive. Prices may determine whether a seller signs a lease agreement with a given shopping center or

³ In an Austrian case about a shopping center in the city of Salzburg, the radius is four kilometers (see http://www.ris.bka.gv.at/Dokumente/Justiz/JJT_20111212_OGH0002_0160OK00008_1000000_000/JJT_20111212_OGH0002_0160OK00008_1000000_000.pdf). In the case of a German factory outlet the radius is 150 km (see http://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2015/03_03_2015_Factory_Outlet_Center.html?nn=3591568).

⁴https://www.ris.bka.gv.at/Dokument.wxe?Abfrage=Justiz&Dokumentnummer=JJT_20090325_OGH0002_0160OK00014_0800000_000

not. But if sellers multihome, there is factually no price competition between shopping centers because retail chains do not see shopping centers as substitutes as each shopping center provides access to a unique group of buyers.

In this competitive bottleneck scenario, radius clauses significantly affect the competition between shopping centers because exclusive sellers may help to create a unique mix of shops and brands. As we will show below, this turns out to be decrease social welfare as these clauses keep competitors from creating an optimal mix of brands and shops.

We analyze the welfare effects of radius clauses and the incentives to engage in exclusive dealing dependent on the strength of competition between the shopping centers, i.e., the extent to which catchment areas overlap. We found, that the weaker the competition in the shopping center market and the stronger the indirect network effects, the more harmful are radius restrictions are to society.

While our discussion of platform markets focuses on shopping centers, the analysis is of more general interest for the discussion of exclusivity clauses in platform markets. Similar issues, for instance, arose in the late 1980s in the market for video games, when Atari Corporation sued Nintendo because of exclusivity contracts with game developers (see Gilbert and Shapiro: 1997). We nevertheless keep our discussion focused on shopping centers as they provide a strong example of the spatial Hotelling framework employed in our model.

In what follows, we first describe the economics behind shopping centers (*Section 2*). Based on a standard two-sided market framework (Armstrong and Wright: 2007), we present a model that allows an evaluation of the incentives to engage in exclusionary agreements and the likely effects on the market (*Section 3*). We conclude and briefly comment on the question of market definition (*Section 4*).

2 The Economics of Shopping Centers

The economics of shopping centers are characterized by externalities. On one side of the market, buyers choose their preferred shopping center based on the number and the variety of shops in a shopping center (Crosby et al.: 2004). Their utility typically increases with the number of shops and the fit between the actual and preferred mix of shops (Eisenmann et al.: 2006). On the other side of the market, sellers' utility typically increases with the number of buyers and their spending capacity.

Spillovers from buyers to sellers and from sellers to buyers are called indirect network effects. Shopping centers control and internalize those network effects by setting prices and selecting the mix of brands that matches the preferences of the target group (Gould and Pashigian: 2005). This determines a shopping center as a platform and distinguishes shopping centers from agglomerations like shopping streets and retail parks (Armstrong: 2006, Parker and Van Alstyne: 2005, Rochet and Tirole: 2003, 2006).

Competition between shopping centers is determined by buyers who take advantage of one-stop shopping, i.e., consumers get all they need in one shopping center and do not have to drive or walk around town. The agglomeration of products and services reduces search costs (Messinger and Narasimhan: 1997, Baumol and Ide: 1956).

It is crucial to understand that shopping centers provide monopolistic access to buyers.⁵ Sellers have to operate a shop in a respective shopping center to get access to buyers who visit this shopping center. Otherwise there is no interaction. This situation is known as a competitive bottleneck and typically forces sellers to multihome (Armstrong and Wright: 2007). Retail chains open a shop in a given shopping center if they earn weakly positive profits.

2.1 Cross Subsidization

To attract buyers, shopping centers subsidize them (Gould and Pashigian: 1998). Buyers do not pay for admission although they cause costs. Moreover, the operators

⁵ This is especially true for factory outlet centers.

create an appealing environment for customers (architecture, decoration, olfactive design, shows, music and sounds, etc.) and provide an attractive mix of brands and shops. Competition for buyers is fierce. A marginal buyer attracted by the shopping center increases the revenues on the seller side and thus the average lease prices that can be charged from tenants. In contrast to buyers, sellers are skimmed off. Note that it is profit maximizing for shopping centers to charge sellers their reservation prices. There is no incentive to charge less because this would not have an effect on the number of sellers or buyers.

2.2 Exclusive Dealing

Shopping centers have strong incentives to introduce exclusivity clauses that are typically implemented through radius clauses. ‘A radius clause is a standard shopping center lease provision that prohibits a tenant from opening another similar business within a prescribed radius from its present location [...]’ (Lentzner: 1993). From the shopping center’s viewpoint, radius restrictions are strategic instruments to differentiate themselves from competitors because a tenant mix with “exclusive” sellers and brands may create a unique selling point for buyers.

Radius clauses may be ‘cheap’ to offer because of positive spillovers between sellers and buyers (Armstrong and Wright: 2007). Let us assume that managers of a shopping center convince a retail chain to accept an exclusivity clause. If this retail chain does not open (or closes) outlets in neighboring shopping centers, the shopping center that signs the contract becomes *relatively* more attractive to buyers, and the number of buyers in this shopping center increases. This drives up revenues of existing sellers and eventually the maximal lease prices charged by the shopping center.

However, in order to induce a retail chain to accept a radius restriction, the shopping center must compensate for potential profits in neighboring shopping centers. As

shown below, this compensation decreases with the number of exclusive sellers due to lower attractiveness of rivals.⁶

3 The Model

In this section, we analyze the effect of exclusivity on competition and welfare. We provide an extension of the Armstrong and Wright (2007) model that fits to our application.

The setup is as follows. Potential buyers b visit shops of sellers s in two different shopping centers, labeled by $i = 1, 2$. There is a distance of 1 between the shopping centers. Shopping center 1 is located on position $x^1 = 0$. Shopping center 2 is located on $x^2 = 1$. The mass of $M = 1$ potential buyers is assumed to be evenly distributed between the shopping centers. For expositional purposes we also assume that the mass of $M = 1$ heterogeneous sellers is uniformly distributed between the shopping centers. This assumption will be helpful when discussing exclusivity. We further assume that retail chains multihome. Retail chains open a shop in a certain shopping center whenever they expect to earn weakly positive profits. Buyers singlehome and only visit one shopping center; the one they prefer most.

3.1 Basic Model

When buyer b visits shopping center i , she receives $u_b^i(x_b, n_s^i)$. Utility reads as

$$u_b^i(x_b, n_s^i) = \beta_b n_s^i - t_b |x_b - x^i|.$$

As described above, there is free admission ($p_b^i = 0$) to both shopping centers. The utility of a buyer is the sum of shopping experience and travelling costs. Shopping experience is denoted by the network effect $\beta_b n_s^i$. It is determined by the average utility β_b a buyer b receives from potentially visiting one of n_s^i shops in shopping center i . Travelling and transport costs, respectively, are denoted by $t_b |x_b - x^i|$.

⁶ Divide-and-conquer strategies of firms require economies of scale (and Whinston: 2000, Ramseyer et al. 1991). Due to indirect network effects, there are economies of scale on the demand side in our application.

They arise when a buyer travels from her home located on x_b to shopping center i located at x^i . This distance is multiplied by the travelling costs per unit of distance t_b . If a buyer located on x_b values shopping more than she incurs travelling costs ($\beta_b n_s^i \geq t_b |x_b - x^i|$), she resides in the catchment area of shopping center i . If her residence is located in the catchment areas of both shopping centers, she visits the shopping center she prefers. So, she prefers shopping center 1 over shopping center 2 if $u_b^1(x_b, n_s^1) > u_b^2(x_b, n_s^2)$.

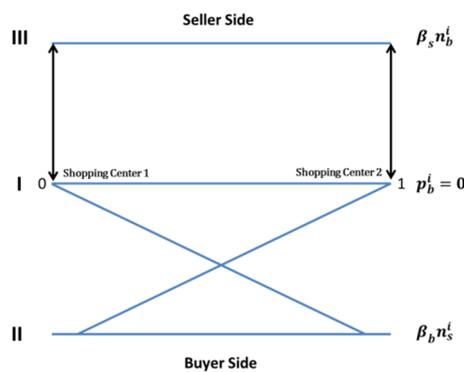
Contrary to buyers, retail chains do not incur transport costs ($t_s = 0$). The utility of a seller $u_s^i(n_b^i, p_s^i)$ reads as

$$u_s^i(n_b^i, p_s^i) = \beta_s n_b^i - p_s^i.$$

Revenues are denoted by $\beta_s n_b^i$, with β_s^i as the spending capacity of each visitor times the number n_b^i of visitors in shopping center i . The lease price is given by p_s^i .

Figure 1 illustrates the basic set up. The two sides of the market are depicted by the areas above and below the central line (I). The central line (I) depicts the distance between shopping center 1 and shopping center 2.

FIGURE 1: BASIC SET UP



The area below the central line represents the buyer side. The vertical distance between the central line (I) and the lines originating at $x^1 = 0$ and $x^2 = 1$ depicts travelling costs for getting from location x_b to the respective shopping center i . The

lower horizontal line (II) shows the utility associated with shopping experience. The distance between the diagonal lines and the lower horizontal line (II) represents the net utility a buyer located on x_b receives when visiting shopping center 1 and 2, respectively.

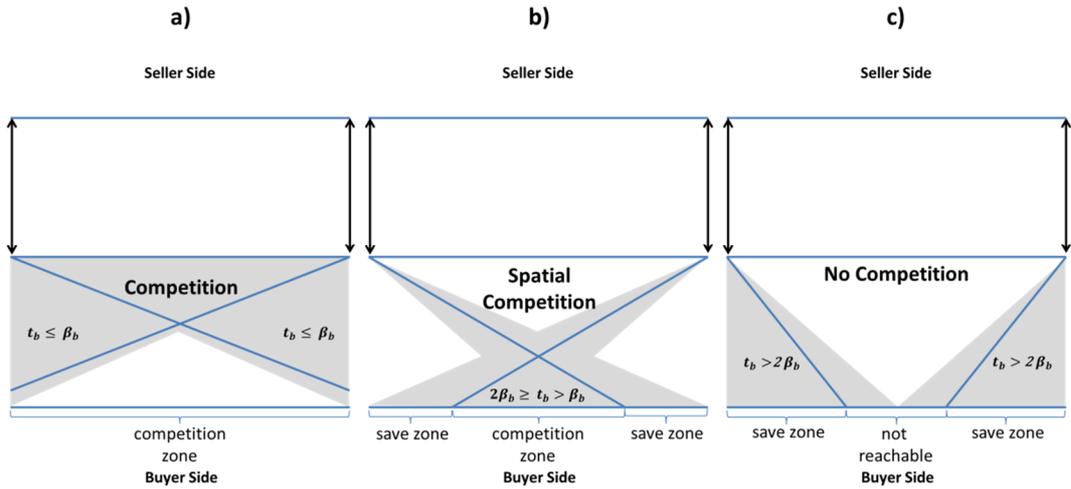
The area above the central line (I) represents the seller side. The upper horizontal line (III) depicts revenues earned by sellers. There are no diagonal lines because sellers transport costs are assumed to be zero.

3.2 Competitive Relation between Shopping Centers

The competitive relation between shopping centers is determined by the extent, to which their catchment areas overlap. Consider two shopping centers that are located nearby. Those shopping centers may rather compete for the same customers than shopping centers located far away from each other.

Catchment areas are defined by the ratio of shopping experience to marginal transport costs $\frac{\beta_b n_s^i}{t_b}$. In a world without exclusivity, we assume multihoming of all sellers ($n_s^i = 1$) and catchment areas that are equal to $\frac{\beta_b}{t_b}$.

FIGURE 2: COMPETITION BETWEEN SHOPPING CENTERS



To simplify the further analysis, we define three scenarios depicted in *Figure 2*.

Figure 2a shows ‘Pure Competition’ ($\beta_b \geq t_b$). If the proportion of indirect network effects to marginal transport costs is $\frac{\beta_b}{t_b} \geq 1$, catchment areas totally overlap and shopping centers compete for the same customers. To see this, let us have a look at the transport cost curves that may appear within the highlighted areas. Among those potential transport cost curves, the blue lines depict specific ones. The interceptions of the transport costs curves with the lower horizontal line (shopping experience) are on the edges or outside the unit interval, i.e., both shopping centers may cover the whole customer market. All customers located between the shopping centers are located in the competitive area, i.e., visiting each shopping center may generate positive surplus.

Figure 2b shows ‘Spatial Competition’ ($2\beta_b \geq t_b > \beta_b$). Given the catchment area has a length of $1 \geq \frac{\beta_b}{t_b} > \frac{1}{2}$. Catchment areas of both shopping centers partially overlap and customers located on the interval $[1 - \frac{\beta_b}{t_b}, \frac{\beta_b}{t_b}]$ are located in the competitive area. Customers on those locations receive a positive utility from visiting each of the shopping centers.

Customers located between $[0, 1 - \frac{\beta_b}{t_b}]$ cannot be reached by shopping center 2, thus the interval determines a save zone for shopping center 1. Customers located between $[\frac{\beta_b}{t_b}, 1]$ are located in shopping center 2’s save zone.

Figure 2c shows ‘Separated Markets’ ($2\beta_b < t_b$). If the proportion of indirect network effects to marginal transport costs is $2\beta_b < t_b$, catchment areas do not overlap and shopping centers do not compete for the same customers. Customers markets are separated.

Given $2\beta_b < t_b$, the catchment area of shopping center 1 is given by $[0, \frac{\beta_b}{t_b}]$ and the catchment area of shopping center 2 reads as $[1 - \frac{\beta_b}{t_b}, 1]$. Catchment areas are save zones as each catchment area does not overlap with the catchment areas of the rival. The area between the save zones shows customers located on positions that are not reachable by either shopping center.

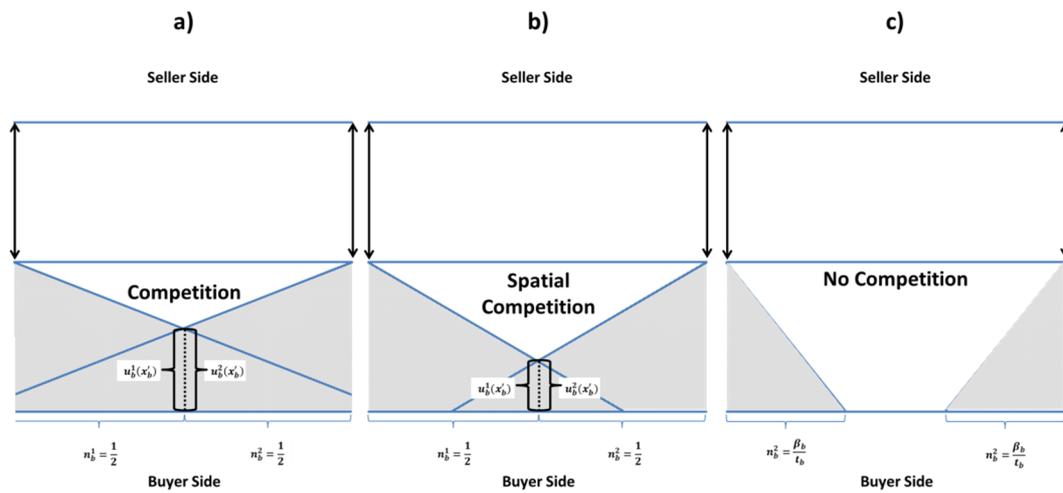
3.3 Competitive Bottleneck

The second factor that determines competition is a competitive bottleneck. Shopping centers are competitive bottlenecks, as they provide multihoming sellers a *monopolistic* access to singlehoming buyers.

It is crucial to realize that price is no competitive factor in this competitive bottleneck market, as we assume that buyers would not accept entrance fees and negative prices are not possible for reasons of arbitrage ($p_b^i = 0$). Due to the provision of monopolistic access to buyers, shopping centers have no incentive to charge sellers less than their reservation price. This is because charging less would not have a quantity effect on both the seller side and the buyer side.

Shopping centers use their market power and set prices equal to the revenues of shops $\pi^i = p_s^i = R_s^i$. Those prices extract all surplus from sellers $CS_s = 0$. On buyer side, surplus CS_b depends on the competitive relation between the shopping centers.

FIGURE 3: COMPETITIVE BOTTLENECK



Buyer surplus CS_b is illustrated by the light grey areas in *Figure 3*. In the scenarios of ‘spatial’ and ‘pure competition’, the market is fully covered as depicted in 3a and 3b.

The demand pattern under ‘pure’ and ‘spatial competition’ is determined by the indifferent buyer, i.e., the buyer who receives the same utility from visiting each

shopping center ($u_b^1(x_b, n_s^1) = u_b^2(x_b, n_s^2)$). Due to symmetry, this buyer is located on $x'_b = \frac{1}{2}$. The number of buyers splits evenly between shopping centers ($n_b^1 = n_b^2 = \frac{1}{2}$). Total buyer surplus reads as $CS_b = 2 * \int_0^{\frac{1}{2}} (\beta_b - t_b x) dx = \beta_b - \frac{t}{4}$. Total seller surplus is given by $CS_s = 0$ and the sum of profits is equal to β_s , with profits equal to $\pi_s^i = \frac{1}{2} \beta_s$ in each shopping center.

If markets are ‘separated’ there is no competition between the shopping centers (*Figure 3 c*), demand on buyer side corresponds to the catchment areas $n_b^1 = n_b^2 = \frac{\beta_b}{t_b}$ and total buyer surplus is reads as $CS_b = 2 * \int_0^{\frac{\beta_b}{t_b}} (\beta_b - t_b x) dx = \frac{\beta_b^2}{t_b}$. Shopping centers earn $\pi_s^i = \frac{\beta_b}{t_b} \beta_s$. Total profit is given $\sum_{i=1}^2 \pi^i = 2 \frac{\beta_b}{t_b} \beta_s$ and sellers are left with no surplus $CS_s = 0$.

Total welfare in a market without exclusivity clauses reads as

$$W = \begin{cases} \beta_b - \frac{t_b}{4} + \beta_s & , \quad \text{for } \frac{\beta_b}{t_b} > \frac{1}{2} \\ \frac{\beta_b^2}{t_b} + 2 \frac{\beta_b}{t_b} \beta_s & , \quad \text{for } \frac{\beta_b}{t_b} \leq \frac{1}{2} \end{cases}$$

If shopping experience is high relative to transport costs ($\frac{\beta_b}{t_b} > \frac{1}{2}$), catchment areas of shopping center 1 and 2 overlap. The market is covered and welfare is equal to $\beta_b - \frac{t_b}{4} + \beta_s$. If catchment areas are smaller than $\frac{1}{2}$, markets are separated and welfare reads as $\frac{\beta_b^2}{t_b} + 2 \frac{\beta_b}{t_b} \beta_s$.

3.4 Exclusive Dealing

To analyze welfare effects of exclusive dealing, we slightly extend the Armstrong and Wright (2007) model by considering a two stage game. In the first stage, shopping center 1 signs radius clauses with a number of σ sellers. Radius clauses *always* include shopping center 2. In the second stage, shopping center 1 and 2 compete.

We solve this game recursively. We first solve stage 2 by calculating welfare for any given σ and we then derive the equilibrium number of exclusivity clauses σ^* .

3.4.1 Second Stage – Welfare Analysis Given a Number of Exclusive Sellers

Assuming a fraction of σ sellers who sign an exclusivity clause, buyers' utility in each shopping center is determined by the number of exclusive and non-exclusive sellers.

Shopping center 1 provides buyers an exclusive access to σ sellers and a non-exclusive access to $(1 - \sigma)$ sellers. Buyers in shopping center 1 get the same utility $u_b^1(x_b) = \sigma \beta_b + (1 - \sigma) \beta_b - t_b x_b = \beta_b - t_b x_b$ as before.

Shopping center 2 only provides access to $(1 - \sigma)$ non-exclusive sellers. Buyers who visit shopping center 2 get a lower utility $u_b^2(x_b) = (1 - \sigma) \beta_b - t_b(1 - x_b)$ due to a lower variety of shops.

Again, welfare on the buyer side depends on the strength of competition relation between the shopping center. If transport costs are relatively low, the number of attracted buyers is high if shopping center 1 signs with a marginal seller. If transport costs are relatively low, a marginal exclusive seller only attracts a small number of buyers.

Pure Competition

With 'pure competition' between shopping centers ($\frac{\beta_b}{t_b} > 1$), the demand pattern on the buyer side is determined by the location of the indifferent buyer. We derive this location by setting equal the utility functions $u_b^1(x_b)$ and $u_b^2(x_b)$ and solving for x_b .

The indifferent buyer x_b' splits consumers into two groups. Buyers to the left of x_b' prefer shopping center 1 over shopping center 2. Buyers to the right of x_b' prefer 2 over 1. The demand pattern reads as

$$n_b^1(\sigma) = x'_b = \begin{cases} \frac{1}{2} + \frac{\sigma \beta_b}{2 t_b}, & \text{for } \sigma < \frac{t_b}{\beta_b} \\ 1, & \text{for } \sigma \geq \frac{t_b}{\beta_b} \end{cases} \quad (1)$$

$$n_b^2(\sigma) = 1 - x'_b = \begin{cases} \frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}, & \text{for } \sigma < \frac{t_b}{\beta_b} \\ 0, & \text{for } \sigma \geq \frac{t_b}{\beta_b} \end{cases}$$

Equation 1 shows the effect of exclusivity clauses on the buyer side. Signing $\sigma < \frac{t_b}{\beta_b}$ sellers leads to $\frac{\sigma \beta_b}{2 t_b}$ additional buyers in shopping center 1 and a minus of $\frac{\sigma \beta_b}{2 t_b}$ buyers in shopping center 2. Signing $\sigma > \frac{t_b}{\beta_b}$ leads to full market coverage of shopping center 1. Shopping center 2 is left with no buyers.

FIGURE 4: THE EFFECTS OF EXCLUSIVITY CLAUSES WITH PURE COMPETITION

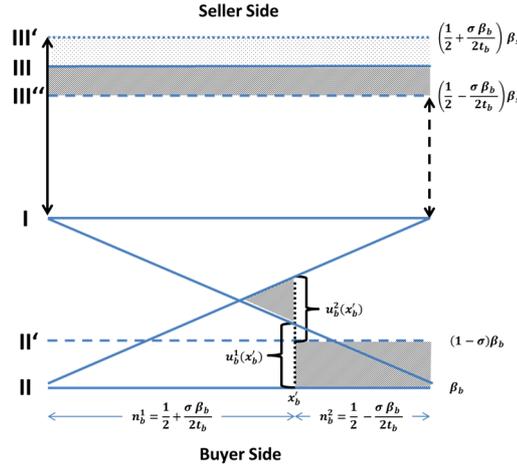


Figure 4 illustrates the effect for $\sigma < \frac{t_b}{\beta_b}$. Due to indirect network effects, the demand pattern on buyer side affect the seller side. For any given $\sigma < \frac{t_b}{\beta_b}$, revenues are $R_s^1 = \left(\frac{1}{2} + \frac{\sigma \beta_b}{2 t_b}\right) \beta_s$ in shopping center 1. They increase by $\Delta R_s^1 = \left(\frac{\sigma \beta_b}{2 t_b}\right) \beta_s$ compared to the initial scenario without exclusive dealing. In shopping center 2, revenues are $R_s^2 = \left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s$. They decrease by $\Delta R_s^2 = -\left(\frac{\sigma \beta_b}{2 t_b}\right) \beta_s$ compared the

initial scenario. The redistribution of revenues is illustrated by the shift from **III** to **III'** and from **III** to **III''**, respectively.

On the buyer side, shopping experiences differ between shopping center 1 and 2 because the variety of stores is lower in shopping center 2 (**II'**) than in shopping center 1 (**II**). Some buyers to the right of $x = \frac{1}{2}$ accept longer journeys to travel to the relatively more attractive shopping center 1. In this asymmetric situation, the indifferent buyer x'_b receives a lower net utility compared to the scenario without exclusivity clauses. This is highlighted by the curly brackets.⁷ Given $\sigma < \frac{t_b}{\beta_b}$, the shaded areas represent the loss of buyer surplus. The triangular area corresponds to a welfare loss $\left(\frac{\sigma^2 \beta_b^2}{4 t_b}\right)$ of buyers who now incur higher travelling costs and have the same shopping experience as before. The rectangular area represents the welfare loss $\left(\frac{\beta_b \sigma}{2} - \frac{\beta_b^2 \sigma^2}{2 t_b}\right)$ of buyers that still prefer shopping center 2. Although buyers incur the same travelling costs, they find a lower variety of shops in center 2. For $\sigma < \frac{t_b}{\beta_b}$, buyers lose

$$\Delta CS_b(\sigma) = \begin{cases} -\left(\frac{\beta_b \sigma}{2} - \frac{\beta_b^2 \sigma^2}{4 t_b}\right), & \text{for } \sigma < \frac{t_b}{\beta_b} \\ -\frac{1}{4} t_b & , \text{ for } \sigma \geq \frac{t_b}{\beta_b} \end{cases}$$

Given a number of $\sigma > \frac{t_b}{\beta_b}$ exclusive sellers, every buyer visits shopping center 1.

The travelling costs of those buyers who visited shopping center 2 before increase by $\frac{1}{4} t_b$.

Between retail chains and shopping centers, rents are redistributed. This is because shopping center 1 must compensate σ sellers for signing an exclusivity agreement and for not having access to shopping center 2.

⁷ The curly brackets capture the net utility/ utilities of the indifferent buyer.

The compensation to a single retail chain is equal to the profit, an exclusive seller would make in shopping center 2, i.e., $\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2$. The term $\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s$ represents potential revenues and p_s^2 shopping center 2's lease price.

Shopping center 1's total transfers read as $\Delta CS_s^1 = \sigma \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2 \right]$. Non-exclusive sellers get no surplus in shopping center 1 and pay lease prices equal to $p_s^1 = \left(\frac{1}{2} + \frac{\sigma \beta_b}{2 t_b}\right) \beta_s$.

The surplus of non-exclusive sellers operating a store in shopping center 2 depends on p_s^2 . For a given p_s^2 , the surplus of nonexclusive sellers reads as $\Delta CS_s^2 = (1 - \sigma) \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2 \right]$.

Note that there will only be positive seller surplus if $\sigma < \frac{t_b}{\beta_b}$ and $p_s^2 < \left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s$.

If the number of exclusive seller is greater than $\frac{t_b}{\beta_b}$ there are no buyers left in shopping center 2 and thus no revenues to compensate. In total, sellers benefit from exclusivity by

$$\Delta CS_s(\sigma) = \sum_{i=1}^2 \Delta CS_s^i = \begin{cases} \left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2, & \text{for } \sigma < \frac{t_b}{\beta_b} \\ 0, & \text{for } \sigma \geq \frac{t_b}{\beta_b} \end{cases}$$

Contrary to sellers, shopping centers may lose in total. For $\sigma < \frac{t_b}{\beta_b}$, shopping center

1's profit is equal to $\pi_s^1(\sigma) = \left(\frac{1}{2} + \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - \sigma \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2 \right]$, with revenues $\left(\frac{1}{2} + \frac{\sigma \beta_b}{2 t_b}\right) \beta_s$ and transfer $\sigma \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2 \right]$. Shopping center 2 earns $\pi_s^2(\sigma) = (1 - \sigma) p_s^2$.

If shopping center 1 signs $\sigma \geq \frac{t_b}{\beta_b}$ sellers, it is able to attract every buyer in the market. Revenues are limited to a maximum of β_s and the compensation is equal to 0.

If we assume compare the total profits in the scenario with and without exclusive dealing, exclusivity clauses decrease total profits by

$$\Delta\pi = \sum_{i=1}^2 \Delta\pi^i = \begin{cases} \left[\left(\frac{1}{2} + \frac{\sigma\beta_b}{2t_b} \right) \beta_s - \sigma \left[\left(\frac{1}{2} - \frac{\sigma\beta_b}{2t_b} \right) \beta_s - p_s^2 \right] + (1-\sigma)p_s^2 \right] - \beta_b, & \text{for } \sigma < \frac{t_b}{\beta_b} \\ 0, & \text{for } \sigma \geq \frac{t_b}{\beta_b} \end{cases}$$

Adding all effects up, total welfare decreases by

$$\Delta W(\sigma) = \begin{cases} - \left(\sigma \left(\frac{1}{2} - \frac{\sigma\beta_b}{2t_b} \right) \beta_s + \left(\frac{\beta_b\sigma}{2} - \frac{\beta_b^2\sigma^2}{4t_b} \right) \right), & \text{for } \sigma < \frac{t_b}{\beta_b} \\ -\frac{1}{4} t_b, & \text{for } \sigma \geq \frac{t_b}{\beta_b} \end{cases}$$

For $\sigma < \frac{t_b}{\beta_b}$, the welfare decreases due to higher transport costs on the buyer side and (partial) singlehoming sellers on the seller side. For $\sigma \geq \frac{t_b}{\beta_b}$, shopping center 1 is a monopolist and welfare decreases only because of higher transport costs.

Spatial Competition

With ‘spatial competition’ between shopping centers $\left(1 \geq \frac{\beta_b}{t_b} > \frac{1}{2}\right)$, the demand pattern is given by

$$n_b^1 = x'_b = \begin{cases} \frac{1}{2} + \frac{\sigma\beta_b}{2t_b}, & \text{for } \sigma < 2 - \frac{t_b}{\beta_b} \\ \frac{\beta_b}{t_b}, & \text{for } \sigma \geq 2 - \frac{t_b}{\beta_b} \end{cases} \quad (2)$$

$$n_b^2 = 1 - x'_b = \begin{cases} \frac{1}{2} - \frac{\sigma\beta_b}{2t_b}, & \text{for } \sigma < 2 - \frac{t_b}{\beta_b} \\ \frac{(1-\sigma)\beta_b}{t_b}, & \text{for } \sigma \geq 2 - \frac{t_b}{\beta_b} \end{cases}$$

We distinguish between two possible market structures on the buyer side: A covered and a separated market, dependent on the number of exclusivity clauses.

due to a lower variety of shops in center 2 and $1 - (\sigma - 2) \frac{\beta_b}{t_b}$ potential buyers decide to not visit any of the shopping centers. The triangular area $\int_{\frac{1}{2}}^{\frac{\beta_b}{t_b}} (t_b - t_b x_b) - t_b x_b d x_b = \frac{(t_b - 2\beta_b)^2}{4t_b}$ captures the decrease in welfare due to the increase of transport costs incurred by visitors of shopping center 1. The rectangular area $\int_0^{\frac{(1-\sigma)\beta_b}{t_b}} \beta_b - (1 - \sigma)\beta_b d x_b = \frac{\beta_b^2 \sigma (1 - \sigma)}{t_b}$ captures the welfare loss due to a lower variety of shops in center 2. The welfare loss of buyers that do not visit any shopping center reads as $\int_{\frac{\beta_b}{t_b}}^{1 - \frac{(1-\sigma)\beta_b}{t_b}} \beta_b - (t_b - t_b x_b) d x_b = \frac{\beta_b^2 \sigma^2 - (t_b - 2\beta_b)^2}{2 t_b}$. In total, buyer lose

$$\Delta CS_b(\sigma) = \begin{cases} -\left(\frac{(t_b - 2\beta_b)^2}{4t_b} + \frac{\beta_b^2 \sigma (1 - \sigma)}{t_b} + \frac{\beta_b^2 \sigma^2 - (t_b - 2\beta_b)^2}{2 t_b}\right) & , for \sigma > 2 - \frac{t_b}{\beta_b} \\ -\left(\frac{\beta_b \sigma}{2} - \frac{\beta_b^2 \sigma^2}{4 t_b}\right) & , for \sigma \leq 2 - \frac{t_b}{\beta_b} \end{cases}$$

Total surplus of sellers is again determined by the transfer that shopping center 1 pays to sellers who sign exclusivity contracts $CS_s^1 = \sigma \left[\frac{(1-\sigma)\beta_b}{t_b} \beta_s - p_s^2 \right]$ and the surplus $(1 - \sigma) \left[\frac{(1-\sigma)\beta_b}{t_b} \beta_s - p_s^2 \right]$ sellers in shopping center 2 receive from a possible decrease in lease prices p_s^2 . In total, sellers may win

$$\Delta CS_s(\sigma) = \begin{cases} (1 - \sigma) \frac{\beta_b}{t_b} \beta_s - p_s^2 & , for \sigma > 2 - \frac{t_b}{\beta_b} \\ \left(\frac{1 - \sigma \beta_b}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2 & , for \sigma \leq 2 - \frac{t_b}{\beta_b} \end{cases}$$

Shopping center 1 makes profits equal to $\pi_s^1 = \frac{\beta_b}{t_b} \beta_s - \sigma \left[\frac{(1-\sigma)\beta_b}{t_b} \beta_s - p_s^2 \right]$, with revenues $R^1 = p_s^1 = \frac{\beta_b}{t_b} \beta_s$ and transfer $T = \sigma \left[\frac{(1-\sigma)\beta_b}{t_b} \beta_s - p_s^2 \right]$. Shopping center 2 earns $\pi_s^1 = (1 - \sigma) p_s^2$. If we compare total profits in the scenario with and without exclusive dealing exclusivity clauses decrease total profits by

$$\Delta\pi(\sigma) = \begin{cases} \left[\frac{\beta_b}{t_b} \beta_s - \sigma \left[\frac{(1-\sigma)\beta_b}{t_b} \beta_s - p_s^2 \right] + (1-\sigma)p_s^2 \right] - \beta_b & , for \sigma > 2 - \frac{t_b}{\beta_b} \\ \left[\left(\frac{1}{2} + \frac{\sigma\beta_b}{2t_b} \right) \beta_s - \sigma \left[\left(\frac{1}{2} - \frac{\sigma\beta_b}{2t_b} \right) \beta_s - p_s^2 \right] + (1-\sigma)p_s^2 \right] - \beta_b & , for \sigma \leq 2 - \frac{t_b}{\beta_b} \end{cases}$$

Summing up buyer surplus $\Delta CS_b(\sigma)$, seller surplus $\Delta CS_s(\sigma)$ and total profits $\Delta\pi(\sigma)$, the effect on social welfare reads as

$$W(\sigma) = \begin{cases} \frac{tb}{4} - 2\beta_b + \frac{\beta_b}{t_b} \left((1-\sigma)p_s^2 + (1-\sigma)\beta_b + \beta_s + \beta_b\sigma^2 \right) & , for \sigma > 2 - \frac{t_b}{\beta_b} \\ - \left(\sigma \left(\frac{1}{2} - \frac{\sigma\beta_b}{2t_b} \right) \beta_s + \left(\frac{\beta_b\sigma}{2} - \frac{\beta_b^2\sigma^2}{4t_b} \right) \right) & , for \sigma \leq 2 - \frac{t_b}{\beta_b} \end{cases}$$

Separated Markets

With ‘separated markets’, the demand pattern is given by⁸

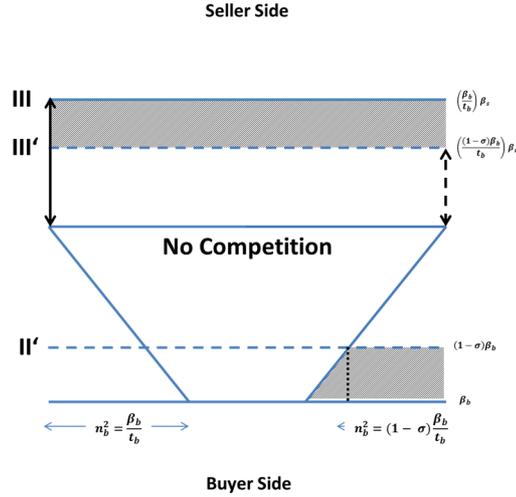
$$n_b^1(\sigma) = x'_b = \begin{cases} \frac{\beta_b}{t_b}, & for \sigma < 1 - \frac{t_b}{\beta_b} \\ \frac{\beta_b}{t_b}, & for \sigma \geq 1 - \frac{t_b}{\beta_b} \end{cases} \quad (3)$$

$$n_b^2(\sigma) = 1 - x'_b = \begin{cases} \frac{(1-\sigma)\beta_b}{t_b}, & for \sigma < 1 - \frac{t_b}{\beta_b} \\ 0 & , for \sigma \geq 1 - \frac{t_b}{\beta_b} \end{cases}$$

Welfare effects are illustrated in *Figure 6*.

⁸ Note that shopping center 1 may not have incentives to introduce exclusivity in separated markets as there is no business stealing from shopping center 2.

FIGURE 6: THE EFFECTS OF EXCLUSIVITY CLAUSES WITH SEPARATED MARKETS



If shopping center 1 introduces exclusivity clauses, there are $(1 - \sigma) \frac{\beta_b}{t_b}$ buyers in shopping center 2, who lose surplus due to the lower variety of shops $\sigma \beta_b$. In addition, $\sigma \frac{\beta_b}{t_b}$ buyers stay home. In total, buyers in shopping center 2 lose

$$\Delta CS_b(\sigma) = -\sigma \left[(2 - \sigma) \frac{\beta_b^2}{2 t_b} \right].$$

The welfare effect on buyers is highlighted by the light grey area.

Shopping center 1 would have to transfer $\Delta CS_s^1 = \sigma \left[(1 - \sigma) \frac{\beta_b}{t_b} \beta_s - p_s^2 \right]$ to compensate σ tenants that sign the exclusivity agreement. In shopping center 2, $(1 - \sigma)$ sellers may benefit if shopping center 2 decides to decrease prices. Seller surplus may increase by $\Delta CS_s^2 = (1 - \sigma) \left[(1 - \sigma) \frac{\beta_b}{t_b} \beta_s - p_s^2 \right]$. In total, sellers gain is given by

$$\Delta CS_s(\sigma) = (1 - \sigma) \frac{\beta_b}{t_b} \beta_s - p_s^2.$$

Given transfers, shopping center 1 would earn $\pi^1 = \frac{\beta_b}{t_b} \beta_s - \sigma \left[(1 - \sigma) \frac{\beta_b}{t_b} \beta_s - p_s^2 \right]$. Shopping center 2 may earn $\pi^2 = (1 - \sigma) p_s^2$ and the effect on total profits is given by

$$\Delta\pi(\sigma) = \left[\frac{\beta_b}{t_b} \beta_s - \sigma \left[(1 - \sigma) \frac{\beta_b}{t_b} \beta_s - p_s^2 \right] + (1 - \sigma) p_s^2 \right] - 2 \frac{\beta_b}{t_b} \beta_s.$$

Summing up all effects, welfare decreases by

$$\Delta W(\sigma) = -\sigma \left[(2 - \sigma) \frac{\beta_b^2}{2 t_b} + (2 - \sigma) \frac{\beta_b}{t_b} \beta_s \right].$$

Buyers lose $\sigma \left[(2 - \sigma) \frac{\beta_b^2}{2 t_b} \right]$ in shopping center 2 due to having access to a lower number of shops. Shopping center 2's profits decrease due to the lower number of buyers. The lease price charged from sellers decreases by $\Delta p_s^2 = -\sigma \left[(2 - \sigma) \frac{\beta_b}{t_b} \beta_s \right]$ due to lower revenues on the seller side.

3.4.2 First Stage – Incentives to Introduce Exclusivity Clauses

Up to this point, we have discussed how exclusive dealing affects welfare for a given number of exclusive sellers. We have not discussed shopping center 1's incentive to introduce exclusivity clauses. This subsection finally analyzes this incentive.

We assume that shopping center 1 introduces exclusivity clauses to retail chains by simultaneous offers. Shopping center 1's decision of how many sellers to sign, is based on a trade-off. On one side, exclusive deals may increase the attraction to buyers. Tenants generate higher revenues that can be skimmed off by a premium in lease prices. On the other side, shopping center 1 must compensate the retail chains for signing exclusivity clauses as they give up their access to a competing shopping center.

Pure Competition

In the scenario of ‘pure competition’ ($\frac{\beta_b}{t_b} \geq 1$), shopping center 1 earns a premium in lease prices equal to $\Delta p_s^1(\sigma) = \frac{\sigma \beta_b}{2 t_b} \beta_s$ and has to pay transfers $T(\sigma) = \sigma \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b} \right) \beta_s - p_s^2 \right]$. Note that shopping center 2 increases shopping center 1’s transfers if it lowers its lease price for tenants p_s^2 . Due to pure competition, shopping center 1 may steal all buyers from shopping center 2 if it introduces exclusivity agreements. Thus, let us suppose that shopping center 2 fights and charges $p_s^2 = 0$.

Given $p_s^2 = 0$, shopping center 1’s profit gain reads as follows

$$\Delta \pi^1(\sigma) = \Delta p_s^1(\sigma) - T(\sigma) = \frac{\sigma \beta_b}{2 t_b} \beta_s - \sigma \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b} \right) \beta_s \right]. \quad (4)$$

For $t_b > 0$, $\beta_s \geq 0$, and $\beta_b \geq 0$, the profit gain (4) is weakly positive if shopping center 1 is able to sign exclusive agreements with $\sigma \geq \frac{t_b}{\beta_b} - 1$ sellers. As $\frac{t_b}{\beta_b}$ is always equal or smaller than 1 in the scenario of ‘pure competition’, it is always beneficial to introduce exclusivity.

See further, that the profit gain function is convex in σ ($\frac{\partial^2 \Delta \pi^1}{(\partial \sigma)^2} = \frac{\beta_b \beta_s}{t_b} > 0$) for $\sigma \leq \frac{t_b}{\beta_b}$. If shopping center 1 signs with $\sigma = \frac{t_b}{\beta_b}$ sellers, it covers the whole market ($n_b^1 = 1$) on buyer side and maximizes lease prices. The transfer $T(\sigma)$ is equal to zero, as there are no buyers who still visit shopping center 2. Any additional exclusive contract has neither an effect on transfers nor on the premium in lease prices as there is no quantity effect on the buyer side. Thus, shopping center maximizes profits if it signs with $\sigma \in \left[\frac{t_b}{\beta_b}, 1 \right]$ exclusive sellers.

Signing $\sigma \in \left[\frac{t_b}{\beta_b}, 1 \right]$ tenants would squeeze out shopping center 2 or deter shopping center 2 from entering the market. In equilibrium, welfare is given by

$W\left(\sigma \in \left[\frac{t_b}{\beta_b}, 1\right]\right) = \beta_b - \frac{t_b}{2} + \beta_s$. It decreases by $\Delta W\left(\sigma \in \left[\frac{t_b}{\beta_b}, 1\right]\right) = -\frac{1}{4}t$ compared to a scenario without exclusivity.

Shopping center 1 achieves a monopoly position and steals all profits from shopping center 2 ($\Delta\pi_b^1 = \frac{1}{2}\beta_b$, $\Delta\pi_b^2 = -\frac{1}{2}\beta_b$). Sellers still get a no surplus of $\Delta CS_b = 0$. Exclusive sellers in shopping center 1 sign exclusive agreements without a compensation, as there are no buyers left in shopping center 2, i.e., sellers are indifferent between signing for free or not signing the exclusivity agreements. Buyers who have visited shopping center 2 in the scenario without exclusivity lose $\Delta CS_b^2 = -\frac{1}{4}t$ as they incur higher transport costs when travelling to shopping center 1.

Spatial competition

In the scenario of ‘spatial competition’ ($1 \geq \frac{\beta_b}{t_b} > \frac{1}{2}$), shopping center 1’s profit gain is again determined by a premium in lease prices $\Delta p_s^1(\sigma) = \frac{\sigma \beta_b}{2 t_b} \beta_s$ and transfers $T(\sigma) = \left[\left(\frac{1}{2} - \frac{\sigma \beta_b}{2 t_b}\right) \beta_s - p_s^2\right]$ paid to sellers that sign an exclusivity agreement. This configuration represents ‘spatial competition’ with covered markets (Section 3.4.1). The market will always be covered because shopping center 1 would never sign with more than $2 - \frac{t_b}{\beta_b}$ exclusive sellers. Signing $\sigma > 2 - \frac{t_b}{\beta_b}$ would decrease profits as an additional exclusive seller would only increase transfers but not attract additional buyers.

Contrary to the ‘pure competition’ scenario, shopping center 2 charges a fighting price p_s^2 greater than 0. The fighting price is determined by an incentive compatibility constraint. If shopping center 2 decides to fight, its profit $\pi_{fight}^2 = (1 - \sigma)p_s^2$ may never be lower than the profit $\pi_{not\ fight}^2$ shopping center 2 earns if it decides not to fight.

If shopping center 2 does not fight, there are $1 - \frac{\beta_b}{t_b}$ buyers who cannot be reached by shopping center 1. Those buyers are located in shopping center 2’s save zone.

Retail chains that still multihome $(1 - \sigma)$, have a positive valuation for interacting with those buyers. The valuation is equal to $(1 - \frac{\beta_b}{t_b})\beta_s$ and the profit of shopping center 2 is $\pi_{not\ fighting}^2 = (1 - \sigma)(1 - \frac{\beta_b}{t_b})\beta_s$.

Solving $(1 - \sigma)p_s^2 = (1 - \sigma)(1 - \frac{\beta_b}{t_b})\beta_s$ for p_s^2 yields lease price $p_s^2 = \beta_s - \frac{\beta_b\beta_s}{t_b}$ that guarantees shopping center 2 the same profits in the ‘fighting’ scenario and in the ‘not fighting’ scenario.

Given $p_s^2 = \beta_s - \frac{\beta_b\beta_s}{t_b}$, shopping center 1’s profit gain reads as

$$\Delta\pi^1(\sigma) = \Delta p_s^1(\sigma) - T(\sigma) = \frac{\sigma\beta_b}{2t_b}\beta_s - \sigma\left[\left(\frac{1}{2} - \frac{\sigma\beta_b}{2t_b}\right)\beta_s - \left(\beta_s - \frac{\beta_b\beta_s}{t_b}\right)\right].$$

For $t_b > 0$, $\beta_s \geq 0$, and $\beta_b \geq 0$, the profit gain is weakly positive if the number of exclusive sellers σ is weakly greater than $1 - \frac{t_b}{\beta_b}$. The condition $\sigma \geq 1 - \frac{t_b}{\beta_b}$ is always true in the scenario of ‘spatial competition’ ($1 \geq \frac{\beta_b}{t_b} > \frac{1}{2}$).

The profit gain is strictly convex in σ ($\frac{\partial^2 \Delta\pi^1}{(\partial\sigma)^2} = \frac{\beta_b\beta_s}{t_b} > 0$) for $\sigma \leq 2 - \frac{t_b}{\beta_b}$. Thus, shopping center 1 signs with $2 - \frac{t_b}{\beta_b}$ sellers to attract all buyers in its catchment area. Shopping center 2 provides access only to $1 - \frac{\beta_b}{t_b}$ buyers in its save zone and skims off sellers by charging a lease price $p_s^2 = \left(\frac{1}{2} - \frac{\sigma\beta_b}{2t_b}\right)\beta_s = \beta_s - \frac{\beta_b\beta_s}{t_b}$. This lease price is equal to the sellers’ revenues in shopping center 2.

Note that shopping center 1’s transfers to $2 - \frac{t_b}{\beta_b}$ exclusive sellers are 0 if shopping center 2 charges $p_s^2 = \beta_s - \frac{\beta_b\beta_s}{t_b}$. Sellers in shopping center 1 and 2 are left with no surplus $CS_s^1 = CS_s^2 = 0$. Thus, sellers do not gain from exclusivity $\Delta CS_s = 0$.

Buyers lose $\Delta CS_b = -2\beta_b + \frac{\beta_b}{t_b} - \frac{3}{4}t_b$ due to higher transport costs and lower variety of shops in shopping center 2.

Shopping center 1 increase profits by $\Delta\pi^1 = \left(\frac{\beta_b}{t_b} - \frac{1}{2}\right)\beta_s$ because shopping center attracts $\frac{\beta_b}{t_b} - \frac{1}{2}$ buyers from shopping center 2. Shopping center 2 loses $\Delta\pi^2 = \left(\frac{\beta_b}{t_b} - \frac{1}{2}\right)\beta_s - \left(2 - \frac{t_b}{\beta_b}\right)\beta_s$. Total profits decrease by $\Delta\pi = -\left(2 - \frac{t_b}{\beta_b}\right)\beta_s + 2\left(\frac{\beta_b}{t_b} - \frac{1}{2}\right)\beta_s$ due to $2 - \frac{t_b}{\beta_b}$ exclusive sellers that multihomed in a world without exclusivity.

Separated markets

In the scenario of ‘separated markets’ ($2\beta_b < t_b$), shopping center 1 has no incentives to introduce exclusive contracts as the marginal exclusive seller does not attract buyers from the rival.⁹ Shopping center 1 and 2 coexist in a world without exclusivity. Welfare is given by $W(\sigma = 0) = \frac{\beta_b^2}{t_b} + 2\frac{\beta_b}{t_b}\beta_s$.

4 Conclusion

Our article analyzes the impact of radius clauses on competition between shopping centers and on social welfare. We show that the shopping center market is determined by competitive bottlenecks, i.e., each (stand-alone) shopping center provides sellers with exclusive access to their visitors. In this competitive bottleneck situation, sellers are skimmed off and buyers are subsidized.

We provide the following results: First, a first mover is able to increase profits by engaging in exclusionary conduct on the seller side if there is competition between shopping centers. Second, exclusive dealing is always detrimental to social welfare, but it typically increases the surplus of the first mover, while it harms the second mover and buyers.

In competition policy, there is considerable discussion whether the way in which SSNIP tests that have been performed in these cases yield an appropriate delineation in two-sided markets. If we believe in one-stop shopping and the competitive bottleneck which is certainly true for business models like factory outlet centers and

⁹ Shopping center 1 would only pay compensations without increasing their price premium on the seller side.

other stand-alone shopping centers, there is one conspicuous implication for market definition: Outlets or rental spaces in competing shopping centers are no substitutes¹⁰ because retail chains open shops whenever a location matches the profitability goals given certain retail prices and customer frequencies.

Against this background, the question arises why courts regularly use the SSNIP method (on the seller side) to define markets in antitrust cases, as the nature of the SSNIP is to define a market as a bundle of relevant substitutes.

In the presence of competitive bottlenecks, shopping centers have artificial market power due to radius restrictions. The outcome of a SSNIP may be hard to interpret. If a tenant closes a store due to a significant increase in lease prices, this may rather be an indicator for a high price level and market power than an indicator for significant competitive constraints due to relevant substitutes (cellophane fallacy problem).

From a regulatory viewpoint there is not much regulation necessary. Just prohibit exclusionary conduct in these markets.

¹⁰ Rental spaces in different shopping centers may rather be strategic complements if we take into account complementarities in logistics, advertising, etc.

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