

Van Cayseele, Patrick; Bovin, Andreas

**Working Paper**

## By object or by effect? The collusive potential of first refusal contracts

LICOS DiscussioPaper, No. 430

**Provided in Cooperation with:**

LICOS Centre for Institutions and Economic Performance, KU Leuven

*Suggested Citation:* Van Cayseele, Patrick; Bovin, Andreas (2022) : By object or by effect? The collusive potential of first refusal contracts, LICOS DiscussioPaper, No. 430, Katholieke Universiteit Leuven, LICOS Centre for Institutions and Economic Performance, Leuven

This Version is available at:

<https://hdl.handle.net/10419/297792>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



LICOS Centre for Institutions and Economic Performance

Centre of Excellence

## LICOS Discussion Paper Series

Discussion Paper 430/2022

### **By Object or by Effect? The Collusive Potential of First Refusal Contracts**

*Patrick Van Cayseele and Andreas Bovin*

**KU LEUVEN**

Faculty of Economics and Business

LICOS Centre for Institutions and Economic Performance

Waaistraat 6 – mailbox 3511

3000 Leuven

BELGIUM

TEL: +32-(0)16 32 65 98

<http://www.econ.kuleuven.be/licos>



# By object or by effect?

The collusive potential of first refusal contracts

Patrick Van Cayseele

Andreas Bovin\*

December 14, 2022

## Abstract

This article examines the collusive potential of first refusal contracts, which are contracts that grant one party, the buyer, a right of first refusal on the output of another party, the seller. When two parties enter into this type of contract, the seller is obligated to offer any output she wishes to sell to the buyer first. It is only after a ‘first refusal’ by the buyer that output can be offered to third parties. We compare the outcomes which arise under first refusal contracts with those resulting from explicit cooperation. Our findings suggest that these contracts can result in an identical distortion of competition, while remaining under the radar of antitrust authorities.<sup>1</sup>

**keywords:** Right of first refusal, contracts, theory of harm, abuse of bargaining power.

**JEL classification:** L4, L40, L41, L42

---

\*Corresponding author.

<sup>1</sup>This research was financially supported by the KU Leuven (Long term structural funding - Methusalem funding by the Flemish Government).

## 1 Introduction

Cartel enforcement distinguishes between so-called hardcore infringements, which refer to agreements that involve collusive practices that are forbidden by object, and infringements that rely on other practices which are *prima facie* not collusive, but nonetheless result in a similar effect. Regarding practices that are forbidden by object, art. 101 TFEU explicitly refers to price fixing agreements, production quotas or geographical division of markets.

Economists have since long questioned the viability and market impact of hardcore agreements, see for instance [Stigler \(1964\)](#), [Osborne \(1976\)](#) or [Porter \(2005\)](#). We investigate contracts that are not forbidden by object, but in many respects result in a similar outcome while avoiding some of the pitfalls which inhibit collusive agreements. In particular, we investigate first refusal contracts, henceforth FRCs, which require one producer to offer his output to a competitor before entering it into the market.

When it comes to agreements which are not prohibited by object, economic analysis is required to demonstrate how they might result in a distortion of competition. FRCs have been investigated in the past by [Van Cayseele & Furth \(1996, 2001\)](#) for a duopoly competing in prices. In the present article, we present a theory of harm by investigating a simple Cournot industry in which homogenous products are sold and contrast the outcome under cooperation with those that arise when firms have concluded FRCs. Doing so allows us to address issues about the willingness to participate in collusive agreements compared to the inclination to engage in FRCs.

More specifically, we compare outcomes arising under a FRC to those resulting from joint-profit maximization between two firms. The results are remarkable in that they show that FRCs result in an identical outcome while simultaneously remaining a blind spot to antitrust authorities. In this sense, we relate FRCs to mergers, which are always scrutinized by competition authorities. At the core of merger analysis lies the trade-off between higher market power due to increased concentration and lower costs due to efficiency gains ([Perry & Porter \(1985\)](#)). Following [Farrell & Shapiro \(1990\)](#), mergers which do not result in productive efficiencies are assumed to decrease consumer welfare. If FRCs result in outcomes similar to (or worse than) mergers, this would suggest that they require at least the same level of scrutiny.

Lastly, we introduce bargaining power as a possible source of concern, as FRCs are

predominantly concluded when one party obtains some type of bargaining advantage over the other. In doing so, we relate potential distortions of competition resulting from FRCs to abuses of bargaining power and contribute to the debate on whether or not such abuses qualify as part of competition law. If bargaining asymmetries allow one party to improve its position at the expense of another, it is not always clear if this qualifies as a distortion of competition or simply ‘competition on the merits’ (Vickers (2005)). This is especially the case when alleged abuses can not be linked directly to a loss in consumer welfare, as the stated goal of competition law is to protect competition, not competitors. If firms use a superior bargaining position to impose first refusal clauses, the loss in consumer welfare follows from the proposed theory of harm.

The rest of this article is structured as follows. Section 2 discusses the workings of FRCs using the Russian diamond industry as a lead example, after which section 3 presents a theory of harm. Anti-competitive effects are investigated using a buyout game and compared with the outcomes which arise when firms cooperate. Section 4 expands the scope of the effects of FRCs to abuses of bargaining power, followed by a discussion on enforcement in section 5. Sections 6 and 7 conclude

## 2 The Right of First Refusal

A right of first refusal is a contractual agreement between two parties, which we will refer to as the (female) buyer and the (male) seller. Under this type of agreement, the seller is obligated to offer its business to the buyer before he can engage in transactions with a third party.<sup>2</sup> An example is given by Van Cayseele & Furth (1996):

“They are well known to exist in the diamond industry, where De Beers has this type of contract with the Russian Precious Metals Committee (PMC). In 1991, the central diamond selling organization of De Beers (CSO) reached an agreement with PMC that for a five-year period all uncut Russian diamonds not intended for industrial use would be offered first to CSO. It is only after a ‘first-refusal’ by CSO that PMC can offer these diamonds to other parties.”

---

<sup>2</sup>Alternatively, a right of first refusal is also used to refer to agreements where the buyer is offered the opportunity to match the offer of a third party. The agreements we consider are sometimes referred to as rights of first offer.

The Russian diamond industry offers insights into why FRCs, which grant the buyer a right of first refusal on the output of the seller, might result in a distortion of competition. De Beers was known for artificially creating scarcity and inflating prices. [Bergenstock & Maskulka \(2001\)](#) note that “De Beers’ operating strategy has been pure and simple: to restrict the number of diamonds released into the market in any given year and perpetuate the myth that they are scarce and should therefore command high prices”. FRCs facilitated this strategy by offering the CSO the opportunity to buy stones before they were entered into the market. [Van Cayseele & Furth \(1996\)](#) note that FRCs might therefore be considered a ‘facilitating practice’ (see [Salop \(1986\)](#) or [Kalai & Satterthwaite \(1994\)](#)).

Artificially pushing up prices by buying up large quantities of a good on the spot and futures market is a risky practice as it encourages suppliers to produce and sell more. Examples of attempts to corner the market turning disastrous for the undertaking firm include Transworld oil on the Brent crude market and Marc Rich + Co’s cornering of the zinc market, see [Blas & Farchy \(2021\)](#). Clearly, FRCs could play a facilitating role. They can be compared to a call option, where a buyer obtains the right to a certain volume of output produced by a seller at a pre-specified price, which is a crucial financial instrument to any firm trying to corner the market.

The key difference lies in the fact that an options contract gives the buyer a right to purchase a pre-specified volume at a certain point in time, whereas a FRC grants the buyer an option on all of the seller’s output, both present and future, as it forces the seller to offer any output to the buyer first. In this sense, option contracts give a seller much more leeway on how to handle its output, potentially to the detriment of a buyer attempting to control the market.

**Empirical evidence** As an (empirical) illustration of the effect of FRCs on prices, we consider the aforementioned Russian diamond industry. In the 1990s, Russian diamonds accounted for over a quarter of the total trade by value, with almost all of them produced in the autonomous republic of Sakha-Yakutia in Northeastern Siberia. However, the Russian Federation’s financial troubles following the dissolution of the Soviet Union encouraged some of its leaders to illicitly leak diamonds onto the market in violation of this agreement. In 1992, the PMC lost control over its Siberian diamond mines as local governments began selling these diamonds directly to the market, bypassing De Beers.

[Bergenstock et al. \(2006\)](#) study the effect of the Russian leaks on the diamond price and De Beers' purchasing behavior. These leaks were done in a clandestine fashion, meaning there is no data available on either timing or size. To circumvent this issue, the authors use Russia's government deficit as a proxy for the state of the Russian economy. As these leaks were economically motivated, the authors assume that their size and frequency increased when the economy struggled, increasing the need for hard currency.

They find that the Russian budget deficit is positively correlated with CSO inventory, with a one billion dollar increase in the deficit corresponding to a 1% increase in inventory. In order to keep prices at their inflated level, De Beers reacted by increasing both its diamond purchases on the open market and its inventory size, which was its policy at the time when faced with market setbacks in order to maintain price stability ([Montpelier \(1994\)](#)). Some players directly offered their output onto the market, which exerted downward pressure on the diamond price. In turn, this incentivized De Beers to further limit supply and artificially prop up prices, illustrating how the FRC between Russia and De Beers resulted in higher prices.

### 3 A Theory of Harm

#### 3.1 A Lead Example

In this section, we contrast the gains from buying out competitors under a right of first refusal with those obtained when firms maximize joint-profits using an  $n$ -firm Cournot oligopoly model with symmetric firms producing homogenous goods. To present the intuition underlying our main results, we start from a simple linear example. Let the inverse demand function equal  $p = a - Q$ , where  $Q$  is aggregate supply in the market. Each firm's objective function is its individual profit  $\pi_j = q_j(p - c)$ . In equilibrium, it is easily shown that

$$q_j(n) = \frac{a - c}{n + 1}, \quad (3.1)$$

for each  $j = 1, 2, \dots, n$ , which yields the market-clearing price

$$p(n) = \frac{a + nc}{n + 1}, \quad (3.2)$$

and individual profits

$$\pi_j(n) = \left( \frac{a - c}{n + 1} \right)^2. \quad (3.3)$$

Let  $a = 1$  and  $c = 0$ , meaning (3.2) reduces to the inverse of the number of players in the market plus one. Table 1 depicts the equilibrium price and associated sales under a duopoly, a cartel and a FRC. Under a Cournot duopoly, the per firm profits are  $1/9$ . A cartel agreement which maximizes joint profits is implemented by agreeing on a production quatum of  $q_j = 1/4$ , with the resulting industry profit to be divided equally, thus increasing individual profits by 12.5% compared to the competitive outcome.

Table 1: Lead Example

	<b>Duopoly</b>	<b>Cartel</b>	<b>FRC</b>
$p$	$1/3$	$1/2$	$1/2$
$Q$	$2/3$	$1/2$	$1/2$
$\pi_j$	$1/9$	$1/2 \times 1/4$	$1/4 - 1/9$

Whenever firms enter into a FRC, the buying side becomes the sole supplier in the market earning her the industry monopoly profit. To do so, she has to buy out the other player in the market. The amount at which this will be done depends on the stipulations of the contract. If the selling party offers his supply directly to the market, a profit of  $1/9$  is made. Therefore, if supply is offered to the buying party first, the seller's profits should at least equal  $1/9$ . He only has this alternative, hence it constitutes his threat point. As the selling party agreed to enter into a FRC with the buyer, we may assume that the buying party has all the bargaining power in this agreement, allowing her to keep the seller at the threat point.

This results in an outcome where the buying party now earns both more than under Cournot competition and a hardcore cartel with a production quatum, increasing individual profits by 25% compared to the duopoly outcome. The resulting equilibrium implements a monopoly outcome even though the duopolists behave non-cooperatively. Hence, it is obvious that whenever a buying party can find a weak selling party she will not hesitate. The FRC increases her profits by much more than what she could obtain under a cartel agreement, while remaining under the radar of an antitrust authority who cannot appeal to an offense by object.

The intuition behind the consumer harm inflicted by a RFR is straightforward. From



equation (3.2), it follows that

$$\lim_{n \rightarrow \infty} (p - c) = 0, \quad (3.4)$$

as increased concentration leads to higher market power, allowing firms to set higher markups. When one firm buys out another under a right of first refusal, this can equivalently be seen as a reduction in the number of players on the market. In this sense, a comparison can be made with both cartel formation and horizontal mergers. However, whereas merger analysis consists of weighing the gains from efficiencies against the losses due to higher market power, such efficiencies might be largely absent in the case of FRCs. [Farrell & Shapiro \(1990\)](#) show that, absent any cost efficiencies or synergies, a merger under Cournot competition must increase price.

### 3.2 The Buyout Game

**The rules** We generalize the analysis by considering an  $n$ -player symmetric Cournot market with homogenous goods and constant marginal costs, but impose no specific functional form on demand. Denote the inverse demand function as  $p(Q)$ , with  $p'(Q) < 0$  over its domain. In the  $n$ -firm equilibrium, each player's output and profit are identical and denoted  $q(n)$  and  $\pi(n)$  respectively.

We consider the effect of FRCs by introducing a seller, denoted by subscript  $s$ , who agreed to a FRC with a buyer, denoted by subscript  $b$ . After production - but before output is entered into the market - the buyer has the option to purchase the output produced by the seller. The price at which this is done depends on the stipulations of a previously agreed upon contract. The buyout game therefore consists of two phases: (i) a contracting phase and (ii) a market phase in which firms simultaneously compete in quantities. As all firms are identical, we abstract from any adverse selection issues due to incomplete information, meaning the only requirement imposed on the contract is that it satisfies the seller's participation constraint ([Salanié \(2005\)](#)).

The seller will only agree to a contract which makes him no worse off compared to the status quo. In other words, the price the seller receives for his output as stipulated by the FRC should not result in a lower profit for the seller compared to his profit in the  $n$ -firm equilibrium. Let the contract be given by a mapping  $\varphi : q_s \mapsto p_s$ , which determines the price  $p_s$  the seller receives for his output  $q_s$  as dictated by the FRC. The participation

constraint is satisfied if

$$\underbrace{\tilde{q}_s \left( \varphi(\tilde{q}_s) - (1 - \delta)c \right)}_{\pi_s(\tilde{q}_s)} \geq \pi(n), \quad (3.5)$$

where

$$\arg \max_{q_s} \pi_s(q_s) = \tilde{q}_s, \quad (3.6)$$

and  $\delta \in (0, 1]$  denotes the fraction of marginal costs incurred when selling output. Similar to [Mitraille & Moreaux \(2013\)](#) who study a Cournot oligopoly with inventories, we differentiate between total marginal cost  $c$  and overhead incurred when selling the product  $\delta c$ , which excludes production costs.<sup>3</sup>

Formally, the buyer's strategy  $\sigma_b$  is a 3-tuple, such that  $\sigma_b = \{\tilde{q}_s, \hat{q}_b, \tilde{q}_b\}$ , with  $\hat{q}_b$  and  $\tilde{q}_b$  denoting the amount of produced and purchased output the buyer enters into the market respectively, with  $q_b = \hat{q}_b + \tilde{q}_b$ . Her optimization problem can be stated as

$$\begin{aligned} \max_{\sigma_b} \quad & \pi_b \equiv \left\{ \hat{q}_b(p - c) + \tilde{q}_b(p - \delta c) - \tilde{q}_s \varphi(\tilde{q}_s) \right\} \\ \text{s.t.} \quad & \begin{cases} \pi_s(\tilde{q}_s) \geq \pi(n), \\ \tilde{q}_b \leq \tilde{q}_s. \end{cases} \end{aligned} \quad (3.7)$$

In the optimum, both constraints will hold with equality. If the buyer behaves as an optimizing agent, the contract  $\varphi$  which determines the seller's output  $\tilde{q}_s$  makes the seller indifferent between competing in the market or being bought out. Moreover, in a one-shot setup, she gains no advantage from keeping purchased output off the market.<sup>4</sup> After buying out her competitor, the buyer can enter purchased output into the market at a lower marginal cost  $\delta c$ . However, doing so will incur a fixed cost equal to the last term of the maximand.

### 3.2.1 Optimal strategies

**Output** This section analyses the buyer's optimal strategy in the buyout game, denoted  $\sigma_b^* = \{\tilde{q}_s^*, \hat{q}_b^*, \tilde{q}_b^*\}$ . This does not mean that buying out the seller is the buyer's optimal

---

<sup>3</sup>In accounting terms, this could be thought of as the distinction between cost of goods sold (COGS) and selling, general and administrative expenses (SG&A).

<sup>4</sup>As a result, we abstract from any storage costs as discussed by [Arvan \(1985\)](#), although the De Beers example shows that maintaining a fluctuating stockpile can be a viable strategy. Within the confines of a static model, optimizing behaviour will always result in the buyer entering all purchased output into the market.

decision. It is simply her optimal strategy in the buyout game, which does not preclude the option that she will prefer not to trigger the first refusal clause. Buying out the seller will only be her equilibrium strategy if  $\pi_b(\sigma^*) \geq \pi(n)$ .

We start by considering the market phase by deriving  $q_b^* = \hat{q}_b^* + \tilde{q}_b^*$  as a function of the buyer's inventory  $\tilde{q}_s$ , which is the amount she purchased from the seller under the stipulations of the FRC. Provided that purchasing costs are sunk, the possession of inventories changes the buyer's strategy insofar as it changes her marginal cost. If marginal costs are firm-specific and an interior Nash-Cournot equilibrium  $\mathbf{q}^* = \{q_1^*, \dots, q_n^*\}$  exists, the following first-order condition is satisfied for each  $i = 1, \dots, n$

$$\frac{\partial \pi_i}{\partial q_i}(q_i^*, q_{-i}^*, c_i) = p(Q^*) - c_i + q_i^* p'(Q^*) = 0, \quad (3.8)$$

with  $Q^* = q_i^* + q_{-i}^*$ . Solving for  $q_i^*$  yields

$$q_i^* = \frac{p(Q^*) - c_i}{-p'(Q^*)}, \quad (3.9)$$

meaning market shares decrease in marginal cost. If one firm suddenly experiences a cost decrease, it also follows that in the new equilibrium her output will increase. For a formal proof of this statement, see [Bergstrom & Varian \(1985\)](#) or [Dixit \(1986\)](#). For a discussion on the conditions under which a unique Nash equilibrium exists in a generalized (non-linear) Cournot setting with asymmetric costs, see [Harris et al. \(2010\)](#).

We use this property to investigate the buyer's optimal behaviour when she possesses a certain amount of inventory, which she can enter into the market at a lower marginal cost. Denote the individual equilibrium output of each player  $i$  in function of costs as  $q_i^*(c_i, c_{-i})$ . Suppose the buyer possesses an amount of inventory  $\tilde{q}_s$  such that  $\tilde{q}_s \geq q_b^*((1 - \delta)c, c)$ , i.e. the equilibrium amount she would produce if she faces a lower marginal cost  $(1 - \delta)c$  whereas all other firms' costs stayed unchanged. Importantly, as  $\delta \in (0, 1]$ , it follows that  $q_b^*(c, c) < q_b^*((1 - \delta)c, c)$ .

For the buyer, her best action is to enter purchased output into the market until  $q_b = q_b^*((1 - \delta)c, c)$ . The buyer operates on the reaction curve of a firm facing a lower marginal cost as long as  $q_b < \tilde{q}_s$ , meaning she faces the following cost function

$$c_b(q_b) = \begin{cases} c & \text{if } q_b > \tilde{q}_s, \\ (1 - \delta)c & \text{if } q_b \leq \tilde{q}_s. \end{cases}$$

As long as she possesses inventory, she will not be incentivized to produce herself. However, once the new equilibrium is reached, she will have no reason to enter additional output into the market as well.

Should she possess an amount of inventory such that  $\tilde{q}_s < q_b^*(c, c)$ , she will still opt to enter inventories into the market before producing herself as she can do so at a lower marginal cost  $(1-\delta)c$ . However, once all inventory is entered into the market, her marginal cost switches to  $c$ . As a result, she will produce output herself and  $\hat{q}_b^* = q_b^*(c, c) - \tilde{q}_s$ . Lastly, should  $q_b^*(c, c) \leq \tilde{q}_s < q_b^*((1-\delta)c, c)$ , she will enter all output into the market as  $\tilde{q}_s < q_b^*((1-\delta)c, c)$ , at which point she faces a switch in marginal cost such that  $q_b^* = q_b^*(c, c)$ . However, as her output already is greater than or equal to this amount, she will opt not to produce herself.

The buyer's optimal behavior as a function of the seller's output (her inventory) can be summarized as

$$q_b^*(\tilde{q}_s) = \begin{cases} q_b^*((1-\delta)c, c) & \text{if } \tilde{q}_s \geq q_b^*((1-\delta)c, c), \\ \tilde{q}_s & \text{if } q_b^*(c, c) < \tilde{q}_s < q_b^*((1-\delta)c, c), \\ q_b^*(c, c) & \text{if } \tilde{q}_s \leq q_b^*(c, c), \end{cases}$$

which can be disaggregated along the lines of produced output  $\hat{q}_b^*$  and purchased output  $\tilde{q}_b^*$  entered into the market as

$$\hat{q}_b^*(\tilde{q}_s) = \begin{cases} 0 & \text{if } \tilde{q}_s \geq q_b^*((1-\delta)c, c), \\ 0 & \text{if } q_b^*(c, c) < \tilde{q}_s < q_b^*((1-\delta)c, c), \\ q_b^*(c, c) - \tilde{q}_s & \text{if } \tilde{q}_s \leq q_b^*(c, c), \end{cases}$$

and

$$\tilde{q}_b^*(\tilde{q}_s) = \begin{cases} q_b^*((1-\delta)c, c) & \text{if } \tilde{q}_s \geq q_b^*((1-\delta)c, c), \\ \tilde{q}_s & \text{if } q_b^*(c, c) < \tilde{q}_s < q_b^*((1-\delta)c, c), \\ \tilde{q}_s & \text{if } \tilde{q}_s \leq q_b^*(c, c), \end{cases}$$

meaning the buyer only produces output herself if  $\tilde{q}_s < q_b^*(c, c)$ , which in the homogenous

Cournot model after buying out the seller simplifies to  $\tilde{q}_s < q(n-1)$ .<sup>5</sup>

**Graphical illustration** To present some visual intuition as to the effect of inventories on equilibrium outcome, figure 1 depicts a Cournot duopoly with linear demand, in which player One possesses a certain amount of inventory. A similar figure can be found in the literature dealing with capacity constraints, in which firms face a switch in marginal cost depending on output, e.g. Dixit (1980), Schmalensee (1981) or Tirole (1988).

1. Without inventories, equilibrium is given by the intersection of the reaction curves  $r_1(q_2)$  and  $r_2(q_1)$ , yielding equilibrium output  $q_1^*, q_2^*$ . Let the inventory of player One be  $\alpha$  (fig. 1a). As purchasing costs are sunk, she will enter inventory into the market until marginal revenue equals  $\delta c$ . However, the amount she can enter into the market is limited, resulting in a switch in marginal cost. Introducing inventories therefore generates a kinked reaction function which is given by the line segment ABEG. Between B and E, player One's reaction curve is locally inelastic, after which it runs parallel to the original reaction curve. If inventory is below the prior equilibrium amount, firm one will produce output until the original equilibrium is reached.

---

<sup>5</sup>In the case of the linear Cournot model as defined in section 3.1, this yields

$$q_b^*(\tilde{q}_s) = \begin{cases} \frac{a+(n-1)(1-\delta)c-c}{n} & \text{if } \tilde{q}_s \geq \frac{a+(n-1)(1-\delta)c-c}{n}, \\ \tilde{q}_s & \text{if } \frac{a-c}{n} < \tilde{q}_s < \frac{a+(n-1)(1-\delta)c-c}{n}, \\ \frac{a-c}{n} & \text{if } \tilde{q}_s \leq \frac{a-c}{n}, \end{cases}$$

where  $\frac{a-c}{n}$  equals individual equilibrium output in an  $(n-1)$ -player market, as the buyer reduces the number of players on the market by buying out the seller. If inventory is below this amount, the buyer will produce up to equilibrium. Should  $\tilde{q}_s \geq \frac{a-c}{n}$ , then  $q_b^* = \tilde{q}_s$ , unless  $\tilde{q}_s > \frac{a+(n-1)(1-\delta)c-c}{n}$ , which is the profit maximizing amount of inventory. Should all costs be incurred during the selling phase such that  $\delta = 1$ , then this amount reduces to  $\frac{a-c}{n}$ . To see that this is the case, note that in a  $(n-m)$ -firm Cournot oligopoly with heterogenous marginal costs, each firm  $j = 1, \dots, n-m$  produces

$$q_j(n-m) = \frac{1}{n-m+1}a + \frac{(n-m)(\bar{c}-c_j)-c_j}{n-m+1}, \quad (3.10)$$

with  $\bar{c}$  denoting average marginal cost. Consequently, if all other firms possess zero inventory such that  $c_j = c$  for all  $j \neq i$  and  $c_i = \delta c$  as she does not produce herself, it is easily seen that

$$\frac{a+(n-m)(1-\delta)c-c}{n-m+1}. \quad (3.11)$$

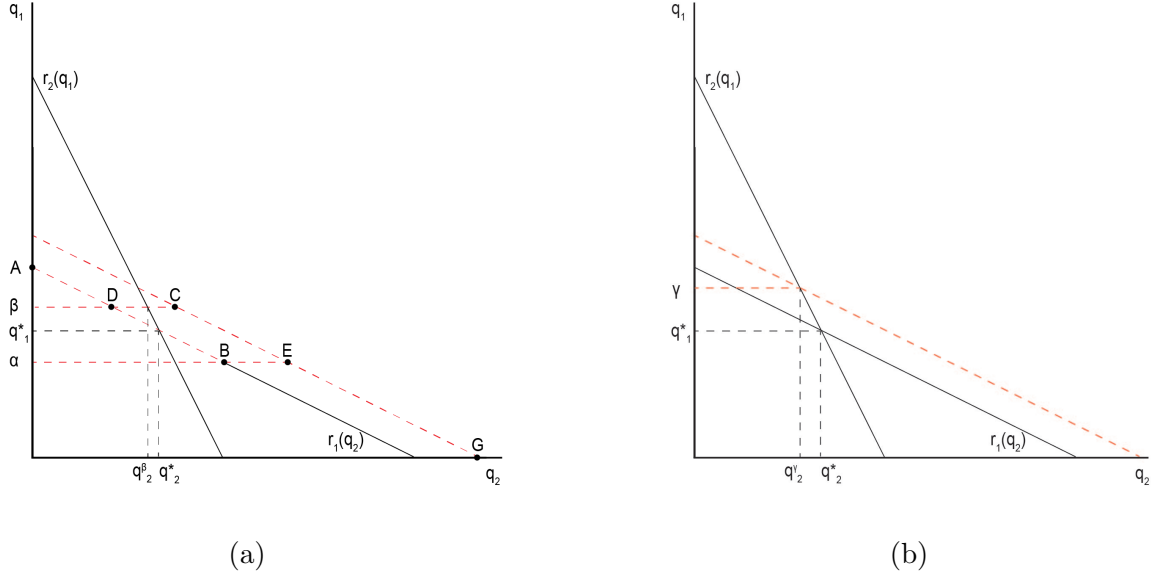


Figure 1: Cournot duopoly with inventory

2. Let her inventory be  $\beta$  (fig. 1a). Player One's reaction curve is now given by the line segment ADCG, meaning she no longer produces output herself and instead offers her entire inventory to the market. Her reaction function is inelastic up to point C, meaning it mimics the behavior of a Stackelberg leader, see [Mittraile & Moreaux \(2013\)](#). The output of player One (Two) expands (contracts) in the new equilibrium.
3. Lastly, let her inventory be greater than  $\gamma$  (fig. 1b). Player one's reaction curve is given by shifting the original reaction curve outward, as it operates at a lower marginal cost  $\delta c$ . It is optimal to keep some fraction of inventory off the market unless inventory is exactly equal to  $\gamma$ . Again, the output of player One (Two) expands (contracts) in the new equilibrium.

**The contract** The previous section derived optimal output as a function of inventories, but does not discuss the optimal level of inventories, which in turn depends on the contract stipulations. We will however abstract from discussing the optimal contract  $\varphi$ , as this would require imposing a functional form on demand (and, realistically speaking, introducing the seller's capacity constraints). It suffices to say that the buyer can devise a contract which both implements any  $\tilde{q}_s$  she desires and satisfies the seller's participation constraint with equality.

We therefore simply denote the amount produced by the seller under the optimal

contract as  $\tilde{q}_s^*$ , which in turn determines the maximum amount of inventory the buyer can enter into the market. The optimal contract amount  $\tilde{q}_s^*$  then satisfies

$$\pi_b(\tilde{q}_s^*, q_b^*(\tilde{q}_s^*)) \geq \pi_b(\tilde{q}_s, q_b^*(\tilde{q}_s)), \quad \text{for each } \tilde{q}_s \neq \tilde{q}_s^*. \quad (3.12)$$

As stated before, if  $\tilde{q}_s^* \geq q(n-1)$ , the buyer will not produce output herself, which seems to be an unrealistic situation. We therefore restrict attention to scenarios where  $\tilde{q}_s^* < q(n-1)$ , meaning that should the buyer trigger the first refusal clause, she will produce an amount of output equal to the difference  $\hat{q}_b^* = q(n-1) - \tilde{q}_s^*$  herself.

### 3.3 Buyout or joint-profit maximization?

Based on the previously described buyout game, we compare the gains from a strategy consisting of buying out a single competitor under a FRC with those obtained from joint-profit maximization between two firms, which is prohibited by object unless approved under merger regulation. In doing so, we demonstrate that the outcomes are identical, both with respect to the gains of the undertaking firm(s) and the corresponding decrease in output and loss in consumer welfare.

Define a function  $g_b(n, \sigma^*)$  which yields the gain (loss) for the buying side after buying out the seller

$$g_b(n, \sigma^*) = \pi_b(\sigma^*) - \pi(n). \quad (3.13)$$

The second term on the right-hand side denotes the buyer's opportunity cost, which equals foregone profit in the  $n$ -firm equilibrium. [Salant et al. \(1983\)](#) use a similar function  $f(n, m)$  to examine the gain (loss) from  $m+1$  firms maximizing their joint profits

$$f(n, m) = \pi(n-m+1) - (m+1)\pi(n), \quad (3.14)$$

which is used as a point of comparison. The net gain from cooperation equals joint profits in the new equilibrium, minus the opportunity costs for each of the cooperating firms.

Suppose the contract induces the seller to produce an amount identical to the one he would produce in the  $n$ -firm equilibrium, such that

$$\arg \max_{q_s} \pi_s = q(n) \equiv \tilde{q}_s^* \quad \text{and} \quad \pi_s(\tilde{q}_s^*) = \pi(n). \quad (3.15)$$

This can be thought of as the simplest setup of the contract, in which the price the

buyer pays to the seller is the same as the one he would receive on the market.<sup>6</sup> In this case, it is optimal for the buyer to produce a certain amount of output herself, such that  $\hat{q}_b^* = q(n-1) - q(n)$  and

$$g_b(n, \sigma^*) = \left(p(n-1) - c\right)\left(q(n-1) - q(n)\right) + \left(p(n-1) - \delta c\right)q(n) - \left(p(n) - c\right)q(n) - \left(p(n) - \delta c\right)q(n). \quad (3.19)$$

The buyer sells her entire inventory at the market-clearing price  $p(n-1)$  while incurring a selling expense equal to  $\delta c$ . When selling produced output, she incurs a higher cost  $c$  which includes production expenses. The third and fourth term on the right hand side of (3.19) equal the buyer's foregone profit in the  $n$ -firm equilibrium and the cost at which she bought out the seller respectively.

Equation (3.19) can be re-written to obtain

$$g_b(n, \sigma^*) = \left(p(n-1) - c\right)q(n-1) - 2\left(p(n) - c\right)q(n) \quad (3.20)$$

$$= \pi(n-1) - 2\pi(n) = f(n, 1). \quad (3.21)$$

The gain from buying out one firm under a right of first refusal is equal to the gain from two firms cooperating. We can extend this result to show that as long as  $\tilde{q}_s^* \leq q(n-1)$  and the participation constraint holds with equality, the total gain from joint-profit maximization is equal to that of a buyout:

**Proposition 1.** *If  $\tilde{q}_s^* \leq q(n-1)$  and  $\pi_s(\tilde{q}_s^*) = \pi(n)$ , then  $g_b(n, \sigma^*) = f(n, 1)$ .*

---

<sup>6</sup>Staying within the linear Cournot model, if the buyer wants to induce the seller to produce a certain amount equal to the Cournot amount  $q(n)$ , the pricing rule could for instance consist of a simple linear function

$$\varphi(q_s) = \gamma - q_s. \quad (3.16)$$

It is easily calculated that

$$\arg \max_{q_s} \pi_s(q_s) = \frac{a-c}{n+1} \iff \gamma = 2\frac{a-c}{n+1} + (1-\delta)c, \quad (3.17)$$

such that

$$\pi_s(\tilde{q}_s^*) = \left(\frac{a-c}{n+1}\right)^2, \quad (3.18)$$

meaning the pricing rule implements the equilibrium outcome and the seller's participation constraint holds with equality.



*Proof.* If  $\tilde{q}_s^* \leq q(n-1)$  and  $\pi_s(\tilde{q}_s^*) = \pi(n)$ , then

$$g_b(n, \sigma^*) = \left(p(n-1) - c\right) \left(q(n-1) - \tilde{q}_s^*\right) + \left(p(n-1) - \delta c\right) \tilde{q}_s^* - \left(p(n) - c\right) q(n) - \varphi(\tilde{q}_s^*) \tilde{q}_s^*. \quad (3.22)$$

As the participation constraint holds with equality, we know that

$$\varphi(\tilde{q}_s^*) = \frac{\pi(n)}{\tilde{q}_s^*} + (1 - \delta)c, \quad (3.23)$$

meaning (3.22) can be rewritten as

$$g_b(n, \sigma^*) = \left(p(n-1) - c\right) \left(q(n-1) - \tilde{q}_s^*\right) + \left(p(n-1) - \delta c\right) \tilde{q}_s^* - \left(p(n) - c\right) q(n) - \left(p(n) - c\right) q(n) - \tilde{q}_s^* (1 - \delta)c, \quad (3.24)$$

which can be further re-written to obtain

$$g_b(n, \sigma^*) = \left(p(n-1) - c\right) q(n-1) - 2\left(p(n) - c\right) q(n) = f(n, 1). \quad (3.25)$$

■

Consequently, a FRC can result in an outcome identical to the one that arises when two firms maximize joint profits, both in terms of the buyer's gain and the loss in consumer welfare, as total output and prices are identical. However, as mentioned in the lead example, when symmetric firms cooperate, any gains are presumably split in half. Hence, for the buyer, gains are doubled in comparison.

#### 4 Bargaining power

Although buying out a competitor under a right of first refusal can yield equal gains to joint-profit maximization, [Salant et al. \(1983\)](#) demonstrate that - using a linear model as described in section 3.1 - the gain from cooperation is negative as long as the number of firms account for less than 80% of all firms on the market. As a consequence, two-firm mergers are not profitable unless duopolists merge to monopoly, despite industry profits increasing as  $n \rightarrow 1$ . This result is often referred to as the Cournot merger paradox.

There exist several articles which demonstrate how this negative result can be overcome. [Hennessy \(2000\)](#) shows that it derives from strong assumptions imposed on the demand function, demonstrating that under different (non-linear) demand specifications

two-firm mergers can be profitable. The same goes for [Hsu & Wang \(2010\)](#), who introduce a degree of product differentiation, [Huck et al. \(2001\)](#), who investigate mergers between Stackelberg leaders and followers, or [Deneckere & Davidson \(1985\)](#), who look at supermodular games. For a good overview, see [Gelves \(2014\)](#). When it comes to FRCs, there is an additional aspect which could be of importance: bargaining power.

Given that the results of [Salant et al. \(1983\)](#) hold for an industry where FRCs exists, this might lead to a stark conclusion. Previously, the assumption was maintained that the seller's outside option was the  $n$ -firm equilibrium profit. Clearly, FRCs benefit the buyer more when she finds a weak seller, allowing her to price below this threat point. For instance, bargaining advantages could arise when a seller faces a liquidity crisis, allowing the buyer to negotiate a lower price in exchange for advance payment. Although the contract specifications between De Beers and the PMC are unknown, the deal was made at a time when Russia was “desperate for hard currency” and coincided with De Beers providing a 1 billion USD loan to Russia.<sup>7</sup>

A more recent example is given by the European zinc industry in which FRCs were known to exist between zinc smelter Nyrstar (seller) and commodity trader Trafigura (buyer) for Nyrstar's finished zinc metal. In 2015, Nyrstar had accumulated significant debt, causing serious liquidity constraints. At the same time, it needed to purchase zinc ore in order to keep its operations going. This led the company to search for a concentrate supplier who could also guarantee the necessary liquidity - which came in the form of advance payments (prepayment) for its finished metal - in order to fund concentrate purchases and debt repayment:

“[...] Trafigura came out as the only realistic option that could provide the security of supply and offtake Nyrstar needed in terms of quantity and quality in the longer term as well as other terms that smelters commonly seek such as prepayment.”<sup>8</sup>

Nyrstar minority shareholders argue that the resulting deals were set at terms which were highly disadvantageous. Nyrstar's board admitted that they were in a weak bar-

---

<sup>7</sup>Possehl, S. 14/05/1994, [Diamond Deal Stirs Regret in Russia](#), NY Times, Section 1, Page 37. Last accessed 26/10/2022.

<sup>8</sup>See Nyrstar, 26/06/2020, [Written questions for annual general meeting and extraordinary general meeting to be held on 30 June 2020](#), p. 3. (Last accessed 26/10/2022).

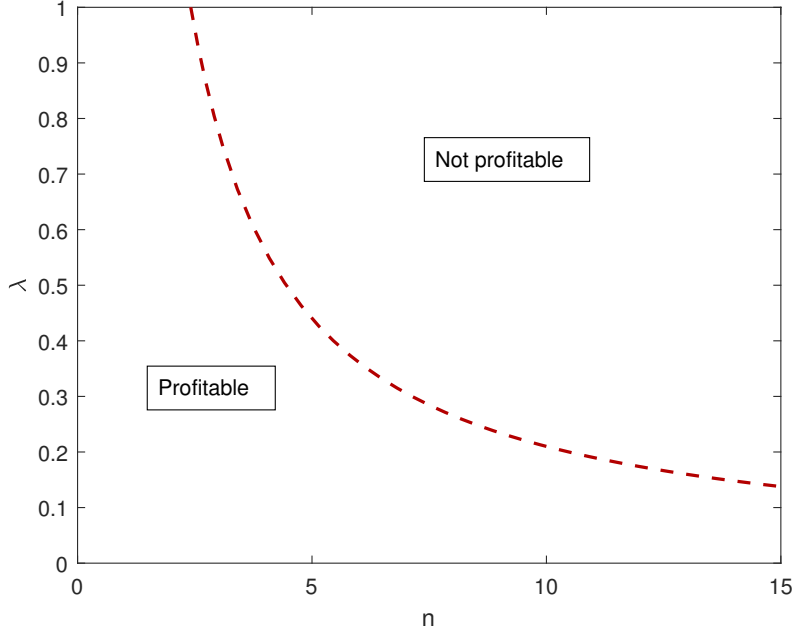


Figure 2: Profitable FRCs in the  $(n, \lambda)$  grid

gaining position:

“[...] arm’s length in terms of negotiation is something that also represents the relative strengths of the counterparties. Nyrstar was not in a strong position at the end of 2015. [...] There were very stark choices at the time.”<sup>9</sup>

Indeed, the price paid for Nyrstar’s finished zinc metal by Trafigura came at a “significant discount to prevailing spot-market rates”.<sup>10</sup>

We can introduce a measure of bargaining advantage  $\lambda \in (0, 1]$  by changing the seller’s threat point

$$\tilde{q}_s^* \left( \varphi(\tilde{q}_s^*) - (1 - \delta)c \right) \geq \lambda \pi(n), \quad (4.1)$$

which is comparable to the parameter governing asymmetries in two-person bargaining problems, see for instance [Kalai \(1977\)](#). If  $\tilde{q}_s^* \leq q(n - 1)$  and (4.1) holds with equality the buyer’s gain equals

$$g_b(n, \sigma^*) = \pi(n - 1) - (1 + \lambda)\pi(n). \quad (4.2)$$

<sup>9</sup>Ibid., p. 4.

<sup>10</sup>Bloomberg, 09/09/2019, [Trafigura accused of throttling Nyrstar with lopsided zinc deals](#), (Last accessed 26/10/2022).

Staying with the linear model employed by [Salant et al. \(1983\)](#) and plugging (3.3) into (4.2),  $g_b(n, \sigma^*) > 0$  iff

$$\left(\frac{a-c}{n}\right)^2 - (1+\lambda)\left(\frac{a-c}{n+1}\right)^2 > 0, \quad (4.3)$$

which reduces to

$$\frac{n+1}{n} > \sqrt{1+\lambda}. \quad (4.4)$$

As  $n > 0$ , this inequality is satisfied if

$$\lambda \in \left[0, \frac{2n+1}{n^2}\right), \quad \text{with} \quad \lim_{n \rightarrow \infty} \frac{2n+1}{n^2} = 0. \quad (4.5)$$

When  $n$  increases, a steeper discount is required in order for the FRC to remain profitable. Figure 2 plots the locus for which (4.4) is satisfied with equality, demarcating the region over which FRCs are profitable.

Previously, we examined the effects of FRCs under the presumption that they could constitute an infringement of art. 101 TFEU. However, shifting attention to bargaining power might also necessitate a re-orientation towards art. 102 TFEU, which prohibits abuses by dominant firms ([Vickers \(2005\)](#)). Alternatively, competition authorities are increasingly scrutinizing abuses of economic dependence (or a superior bargaining position). In contrast to an abuse of dominance as prohibited by art. 102, this type of abuse results from one party obtaining a superior bargaining position relative to another, shifting attention from absolute to relative market power.

[Wakui & Cheng \(2015\)](#) note that, in the debate on abuse of bargaining power as part of competition law doctrine, “[t]he obvious criticism [...] is that these abuses in most cases do not seem to result in harm to competition or loss in consumer welfare”. However, if firms use a superior bargaining position to impose FRCs at disadvantageous terms, potential consumer harm follows from the previously derived results.

## 5 Enforcement

Buying output from a competitor under an FRC benefits the buyer more compared to explicit cooperation with that competitor. Moreover, cooperation is prohibited by object unless approved under merger regulation. Firms can attempt to cooperate illicitly, but there are a large number of factors which inhibit such collusive schemes, see for instance [Osborne \(1976\)](#). As mentioned previously, FRCs can therefore be seen as a facilitating

practice, as they result in a similar outcome, while avoiding the pitfalls which hinder cooperation.

Most importantly, collusive agreements cannot be contractually enforced and need to be self-enforcing. As a result, the theoretical literature regarding cartel stability often assumes the existence of one or more punishment strategies such as Nash reversion and costly price wars, e.g. [Friedman \(1971\)](#), [Green & Porter \(1984\)](#), [Abreu \(1986\)](#), [Rotemberg & Saloner \(1986\)](#) and [Slade \(1989\)](#). In the case of FRCs, contracts are court enforceable agreements which act as a deterrent towards cheating, whereas cartel members have no legal recourse when faced with price-cutting.

Firms can attempt to cheat on a FRC and offer output directly to the market, as evidenced by the Russian diamond industry. Indeed, the Russian case could be regarded as analogous to the classic cartel problem as posed by [Friedman \(1971\)](#), with profits from deviating exceeding those from adherence. In principle, contractual enforcement should prohibit deviation. This would however require the presence of adequately strong institutions, which were notably absent in Russia after the dissolution of the Soviet Union.

Contractual enforcement also avoids another problem which might destabilize collusive agreements: distribution of the spoils. For instance, [Levenstein \(1997\)](#) describes a bromine cartel which experienced six price wars over this question. Moreover, side payments which maintain cartel stability are often prohibited under antitrust law ([Porter \(2005\)](#)). Should an FRC result in positive net profits in the absence of bargaining advantages, side payments could be considered embedded in the agreement, as the seller might contractually receive a percentage of this gain as part of his buyout.

## 6 Further discussion

### 6.1 FRCs as barriers to entry

One of the few examples of FRCs being scrutinized under competition law is given by the poultry sector in Zambia. A dominant firm had imposed clauses which obligated another poultry farmer to offer some of its assets to the dominant firm first, should they be put up for sale. Intervention by competition authorities resulted in both increased competition and higher entry into the Zambian poultry sector.<sup>11</sup>

---

<sup>11</sup>see OECD, 02/10/2001, [OECD Global Forum on Competition, Zambian contribution](#), p. 5-7. (last accessed 26/10/2022)

This case touches upon another concern raised by a FRC, which can result in a form of exclusivity resulting in barriers to entry. In this sense, a right of first refusal can be related to exclusive dealing, which generally refers to the situation where a manufacturer prohibits distributors from selling output produced by its competitors ([Bernheim & Whinston \(1998\)](#)) and the larger literature dealing with contracts as a barrier to entry ([Aghion & Bolton \(1987\)](#)). FRCs can be considered the upstream equivalent, as they have the potential to prevent new distributors from entering the market should the buyer have a first option on manufacturer supply.

Alternatively, entry could be hindered under a slightly altered contract. In general, a right of first refusal is a blanket term which, aside from the contracts discussed in the present article, also concerns contracts which allow the holder to match offers made by a third party. After a refusal to do so, the third party's offer can be considered. As an example, consider the telecommunications industry in which wireless carriers lease cell towers. Should the lessees (wireless carriers) agree to a right of first refusal with the lessor (property owner), this allows them to block any attempt by a third party from acquiring the lease by matching their offer. Examples of cases debating similar issues include the Oklahoma Gas and Electric Company,<sup>12</sup> Bangor Hydro-electric company<sup>13</sup> and T-mobile UK Limited.<sup>14</sup>

### 6.1.1 Double marginalization

Double marginalization refers to the externalities resulting from market power in vertical supply chains, where each link in the chain receives a positive markup on the price it paid, resulting in a reduced consumer surplus. The outcomes resulting from FRCs could be re-interpreted as a form of double marginalization. In the initial model absent bargaining asymmetries, the gain from FRCs resulted from the buyer receiving a markup on the price he paid to the seller. Consequently, FRCs can be regarded as the horizontal equivalent.

---

<sup>12</sup>[Oklahoma Gas and Electric Co. v. FERC, No. 14-1281 \(D.C. Cir. 2016\)](#), (last accessed 26/10/2022)

<sup>13</sup>[Emeran Maine, Formerly known as Bangor Hydro-electric company, et al. v. Federal energy regulatory commission](#), (last accessed 26/10/2022)

<sup>14</sup>[Case COMP/ 38.370 - O2 UK Limited / T-Mobile UK Limited \("UK Network Sharing Agreement"\)](#), (last accessed 26/10/2022)

### 6.1.2 Poison pill clauses

Lastly, should this type of contract exist between a weak seller and a buyer, FRCs could contribute to the seller being kept in a state of dependence. In this sense, we relate it to poison pill strategies, which refer to tactics employed to prevent outsiders from acquiring a large or controlling stake in a company, see for instance [Velasco \(2003\)](#). Similarly, an FRC could prevent outside investment from taking place in a weak competitor. As investors realize that these contracts result in a form of exclusivity between buyer and seller, this could dissuade them from stepping in.

## 7 Conclusion

The present article investigated the collusive potential of FRCs. If the buyer enters into this type of agreement willingly, it leads to the following conclusion: any benefit she derives could come at the expense of the consumer, the seller, or both. It could therefore constitute an infringement of article 101 TFEU by effect, an infringement of article 102 TFEU in the case of dominance or an abuse of economic dependence in the case of relative dominance. This conclusion would suggest that scrutinizing such contracts is not without merit. After all, competition authorities agree that approval of a merger should hinge on whether or not the benefits due to efficiencies outweigh any losses due to higher market power. If similar dynamics are at play whenever a FRC is concluded, this could call for a similar procedure.

## References

- Abreu, D. (1986). Extremal equilibria of oligopolistic supergames. *Journal of Economic Theory*, 39(1), 191–225.
- Aghion, P., & Bolton, P. (1987). Contracts as a barrier to entry. *The American Economic Review*, 388–401.
- Arvan, L. (1985). Some examples of dynamic cournot duopoly with inventory. *The Rand Journal of Economics*, 569–578.
- Bergenstock, D. J., Deily, M. E., & Taylor, L. W. (2006). A cartel’s response to cheating: An empirical investigation of the De Beers diamond empire. *Southern Economic Journal*, 173–189.
- Bergenstock, D. J., & Maskulka, J. M. (2001). The De Beers story: are diamonds forever? *Business Horizons*, 44(3), 37–44.
- Bergstrom, T. C., & Varian, H. R. (1985). When are Nash equilibria independent of the distribution of agents’ characteristics? *The Review of Economic Studies*, 715–718.
- Bernheim, B. D., & Whinston, M. D. (1998). Exclusive Dealing. *Journal of political Economy*, 106(1), 64–103.
- Blas, J., & Farchy, J. (2021). *The world for sale: Money, power, and the traders who barter the earth’s resources*. Oxford University Press.
- Deneckere, R., & Davidson, C. (1985). Incentives to form coalitions with Bertrand competition. *The RAND Journal of economics*, 473–486.
- Dixit, A. (1980). The role of investment in entry-deterrence. *The Economic Journal*, 90(357), 95–106.
- Dixit, A. (1986). Comparative statics for oligopoly. *International Economic Review*, 107–122.
- Farrell, J., & Shapiro, C. (1990). Horizontal mergers: an equilibrium analysis. *The American Economic Review*, 107–126.



- Friedman, J. W. (1971). A non-cooperative equilibrium for supergames. *The Review of Economic Studies*, 38(1), 1–12.
- Gelves, J. A. (2014). Differentiation and cost asymmetry: Solving the merger paradox. *International Journal of the Economics of Business*, 21(3), 321–340.
- Green, E. J., & Porter, R. H. (1984). Noncooperative collusion under imperfect price information. *Econometrica: Journal of the Econometric Society*, 87–100.
- Harris, C., Howison, S., & Sircar, R. (2010). Games with exhaustible resources. *SIAM Journal on Applied Mathematics*, 70(7), 2556–2581.
- Hennessy, D. A. (2000). Cournot oligopoly conditions under which any horizontal merger is profitable. *Review of Industrial Organization*, 17(3), 277–284.
- Hsu, J., & Wang, X. H. (2010). Horizontal mergers in a differentiated cournot oligopoly. *Bulletin of Economic Research*, 62(3), 305–314.
- Huck, S., Konrad, K. A., & Müller, W. (2001). Big fish eat small fish: on merger in Stackelberg markets. *Economics Letters*, 73(2), 213–217.
- Kalai, E. (1977). Nonsymmetric Nash solutions and replications of 2-person bargaining. *International Journal of Game Theory*, 6(3), 129–133.
- Kalai, E., & Satterthwaite, M. A. (1994). The kinked demand curve, facilitating practices, and oligopolistic coordination. In *Imperfections and behavior in economic organizations* (pp. 15–38). Springer.
- Levenstein, M. C. (1997). Price wars and the stability of collusion: A study of the pre-world war I bromine industry. *The Journal of Industrial Economics*, 45(2), 117–137.
- Mitraille, S., & Moreaux, M. (2013). Inventories and endogenous Stackelberg leadership in two-period cournot oligopoly. *Journal of Economics & Management Strategy*, 22(4), 852–874.
- Montpelier, D. J. (1994). Diamonds are forever? implications of United States antitrust statutes on international trade and the de beers diamond cartel. *California Western International Law Journal*, 24(2), 6.

- Osborne, D. K. (1976). Cartel problems. *The American Economic Review*, 66(5), 835–844.
- Perry, M. K., & Porter, R. H. (1985). Oligopoly and the incentive for horizontal merger. *The American Economic Review*, 75(1), 219–227.
- Porter, R. H. (2005). Detecting collusion. *Review of Industrial Organization*, 26(2), 147–167.
- Rotemberg, J. J., & Saloner, G. (1986). A supergame-theoretic model of price wars during booms. *The American Economic Review*, 76(3), 390–407.
- Salanié, B. (2005). *The economics of contracts: a primer*. MIT press.
- Salant, S. W., Switzer, S., & Reynolds, R. J. (1983). Losses from horizontal merger: the effects of an exogenous change in industry structure on Cournot-Nash equilibrium. *The Quarterly Journal of Economics*, 98(2), 185–199.
- Salop, S. C. (1986). Practices that (credibly) facilitate oligopoly co-ordination. In *New developments in the analysis of market structure* (pp. 265–294). Springer.
- Schmalensee, R. (1981). Economies of scale and barriers to entry. *Journal of Political Economy*, 89(6), 1228–1238.
- Slade, M. E. (1989). Price wars in price-setting supergames. *Economica*, 295–310.
- Stigler, G. J. (1964). A theory of oligopoly. *Journal of Political Economy*, 72(1), 44–61.
- Tirole, J. (1988). *The theory of industrial organization*. MIT press.
- Van Cayseele, P., & Furth, D. (1996). Bertrand-Edgeworth duopoly with buyouts or first refusal contracts. *Games and Economic Behavior*, 16(2), 153–180.
- Van Cayseele, P., & Furth, D. (2001). Two is not too many for monopoly. *Journal of Economics*, 74(3), 231–258.
- Velasco, J. (2003). Just do it: An antidote to the poison pill. *Emory LJ*, 52, 849.
- Vickers, J. (2005). Abuse of market power. *The Economic Journal*, 115(504), F244–F261.

Wakui, M., & Cheng, T. K. (2015). Regulating abuse of superior bargaining position under the Japanese competition law: an anomaly or a necessity? *Journal of Antitrust Enforcement*, 3(2), 302–333.