



Exclusion through speculation[☆]

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ABSTRACT

We demonstrate how an incumbent producer of commodities can use cash-settled derivatives contracts to deter entry and extract rents from a potential competitor. By selling more derivatives than total demand, the producer commits to low prices and forces the entrant to price low upon entry. By setting a high upfront derivatives price, the producer can extract the consumer's gains from those low prices. This exclusionary scheme becomes more difficult when the buyer becomes more risk averse and with multiple buyers.

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1. Introduction

There is strong empirical evidence that the introduction of a commodity derivatives markets can make commodity spot markets more competitive (Wolak, 2000; Bushnell et al., 2008; Brandts et al., 2008; van Eijkel and Moraga-González, 2010). That result is consistent with the mechanism suggested by Allaz and Vila (1993): Strategic producers sell commodity derivatives to commit to a more aggressive behavior in the spot market and steal market share from competitors. This leads to a prisoners' dilemma among producers and a more competitive spot market. However, Newbery (1998) argues that firms in the England and Wales electricity market have used derivatives contracts to limit entry. His model relies on the theory of contestable markets, and shows that firms can *efficiently* deter entry with financial contracts, by lowering the electricity price to the entry limit price.

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In this paper we investigate whether dominant firms can use standard financial contracts to *inefficiently* discourage entry by new competitors, as they can do with (more conspicuous) exclusivity contracts. Firms might rely on standard financial contracts to avoid scrutiny by competition authorities, who often curb the use of exclusivity contracts. Derivatives contracts are often cash-settled, hence avoid physical delivery, and might be traded through an intermediary so as to prevent direct contractual relationships between the contracting firms.¹ In this setting, we show that entry deterrence, although harder, is still a distinct possibility.

Our paper proposes a mechanism that is reminiscent of the one in the seminal Aghion and Bolton (1987, henceforth AB) model. In AB, an incumbent convinces a large buyer to sign a sales contract that specifies penalties for contract breach, forcing an entrant to charge a low price upon entry. Indeed, in order to remain competitive and make the sale, the entrant must compensate the buyer for those penalties by posting a lower price. This price reduction discourages entry but, through the transfers specified in the contract, accrues to the incumbent in those

¹ Most derivatives settle in cash rather than *in natura*. For instance on EUREX only 2% of transactions are physically settled (Deutsche Börse, 2008; p. 15). Only a small number of derivatives, mainly the ones concerning agricultural products or metals, provide for physical delivery. Even then, very few contracts are finally executed, for it is customary for traders to close their position ahead of maturity by entering into an offsetting contract and relying on netting provisions.

cases where entry does occur. In contrast to the sales contract in AB, the contract used in our paper is a cash-settled option contract.

Key and Tirole (2007; footnote 91) already note that the contract in AB is isomorphic to a physically settled option contract: the buyer pays a fixed fee at the contracting stage in order to acquire the right to acquire the good from the incumbent at a pre-specified low price in the future. However, we show that a *cash-settled* option contract is not equivalent to the AB contract, because the settlement of the financial contract and the actual (physical) procurement of the good become independent decisions.

Nonetheless, we proceed to demonstrate that an incumbent firm can still deter entry by selling a very large volume of cash-settled derivatives contracts, i.e., more than total demand. In this way, the incumbent firm commits to future prices that are sufficiently low to lead to aggressive spot pricing regardless of whether entry occurs. This reduces the likelihood of entry. The reason that this mechanism is profitable for the incumbent is that in exchange for the options for lower prices in the future, the buyer is willing to pay an upfront fee. Thus, the rent extracted from the entrant finally accrues to the incumbent. The scheme, however, leads to price variability. Therefore, although entry deterrence remains possible, the incumbent finds it less profitable than in the original AB mechanism, as he has to compensate a risk-averse buyer for additional risk.²

Competition authorities do not routinely monitor the financial positions taken by dominant firms on derivatives markets, or the associated movements in spot market prices. We believe that in concentrated commodity markets this may be necessary to counter the incentives for incumbents to use commodity derivatives so as to manipulate market outcomes.

The *KeySpan* antitrust case run by the US Department of Justice (DoJ) is, to our knowledge, the first one to involve the anticompetitive use of derivatives instruments.³ *KeySpan*, one of the few electricity producers on the New York City market, allegedly used a financial derivative product to commit itself to lax competition. On this market, prices are determined by regulated auctions where generators can bid capacity up to a price cap. From 2003 to 2005, market conditions were tight and *KeySpan* could bid the price cap and still make a sale on many occasions. This situation was forecast to end in 2006 with the entry of an additional 1000 MW capacity. *KeySpan* then entered into an agreement with an investment bank (Morgan Stanley) that would provide it with financial payments derived from the local market-clearing price for a capacity roughly equivalent to competitor *Astoria's* capacity (1800 MW).⁴ The bank had indicated that the execution of the contract was contingent on them finding a counterparty, which they did in the person of *Astoria*. The deal allegedly provided *KeySpan* with an incentive to bid high so as to benefit from the financial transaction, even if it did not get contracted as a consequence, and resulted in higher wholesale prices from 2006 to 2009.⁵

For many observers, the case indicates that the DoJ is prepared to challenge ostensibly financial arrangements it believes achieve anticompetitive effects.⁶ However, beyond the specifics of the case, it is

² Although the mechanism is different, our outcome resonates with *Joskow and Tirole (2000)*. They show in the context of transmission congestion pricing that financial transmission rights are less harmful to social welfare than physical transmission rights in the presence of market power.

³ For the initial complaint, see civil complaint no. 10-cv-1415, District Court for the Southern District of New York, 22 February 2010, available at <http://www.justice.gov/atr/cases/f255500/255507.htm>. We thank Patrick Bolton for first pointing our attention to this case.

⁴ In practice, the bank agreed to pay the difference between the market price and \$7.57/kW-month, should the first price be higher, and conversely.

⁵ The DoJ claims that *KeySpan* considered acquiring some of competitor *Astoria's* assets but gave up in view of the predictable antitrust challenge that the transaction would face.

⁶ See, for instance, *Stroock Special Bulletin*, 26 July 2010: "Enforcement Outlook: What the Department of Justice's Antitrust Suit against *KeySpan* Means for Swaps (U.S. vs. *KeySpan* Corporation)", *Stroock, Stroock, and Lavan LLP*. Available at <<http://www.stroock.com/SiteFiles/Pub956.PDF>>.

not clear exactly which other practices might be problematic. We show that beyond committing to lax spot competition so as to elevate prices, incumbent firms can commit to aggressive price competition in order to deter entry. A dominant firm taking very large financial positions, and spot prices that increase following entry might be indications of such abusive practices. However, cash settlement of option contracts and the presence of multiple buyers make such abuses less likely.

The anticompetitive effects of financial derivatives might be most pronounced in commodity markets. Many of them cover concentrated, capital-intensive sectors with significant market power (e.g., electricity, gas, oil, steel). The use of commodity derivatives has recently exploded,⁷ and a significant fraction of those instruments is held by large non-financial firms.⁸ In some specific industries such as gold mining (*Tufano, 1996, 1998*) and energy (*Haushalter, 2000*), their usage is widespread.⁹

The paper is structured as follows. We review the relevant literature in the next section. We present our model in *Section 3*. In *Section 4*, we conduct the main analysis. *Section 5* extends the model by assuming that the identity of the parties to the financial contract may not be observable, and by looking at multiple buyers. *Section 6* concludes.

2. Related literature

This paper relates to several strands of economic literature. First, there is now a voluminous literature on corporate risk management.¹⁰ It is typically interested in explaining the hedging behavior of firms, in spite of the possibility for shareholders (and other claimants) to diversify their portfolio. Leading explanations resort to conflicting objectives between managers and shareholders (*Stulz, 1984, 1990*), agency problems between firms and investors leading to credit rationing, thus providing firms with an incentive to smooth out their cash flow (*Campbell and Kracaw, 1990; Froot et al., 1993*), or tax distortions (*Smith and Stulz, 1985; MacMinn, 1987*). At the same time, it is known that some factors lead firms not to hedge their income flow. Market power is one of them. Forward sales reduce monopoly power and, in the absence of reinvestment needs, a monopolist would find it optimal never to hedge income.¹¹ We push the logic one step further by showing that a monopolist can actually favor taking a *risky* position for the sake of deterring entry.

Second, a growing literature looks at the interaction between derivatives markets and product markets in oligopoly settings. The main message in this literature is that firms may use financial derivatives strategically to affect the equilibrium in the spot market and increase their overall profit. The precise strategy depends on the nature of competition. If oligopolists compete à la Cournot, then they will sell forward contracts (or integrate vertically) to compete more aggressively in the market, in an attempt at increasing their market share at the expense of the other participants (*Allaz and Vila, 1993*).¹² Those results do not only hold for forward contracts but also for option contracts (*Willems, 2005*). On the other hand, if oligopolists compete à la Bertrand, then

⁷ See *Basu and Gavin (2011)*. In June 2013 the notional value of outstanding OTC commodity derivatives worldwide was 2458 billion USD. For exchange-traded commodity derivatives notional values are not available, but more than 39 million contracts were outstanding (*BIS, 2013; Table 22A & 23B*).

⁸ Non-financial firms hold 70% of European OTC commodity derivatives (*Deutsche Börse, 2008; p. 9*).

⁹ For additional empirical evidence on the use of commodity derivatives by firms, see, *inter alia*, *Nance et al. (1993)*, *Mian (1996)*, *Berkman and Bradbury (1996)*, *Hentschel and Kothari (2001)*, *Graham and Rogers (2002)*, *Guay and Kothari (2003)*, *Adam and Fernando (2006)*.

¹⁰ It is impossible to do justice to all contributors. For a state-of-the-art survey of corporate finance theory, see *Tirole (2006)*.

¹¹ See *Tirole (2006; Section 5.4)*.

¹² *Hugues and Kao (1997)* extend the analysis to the case where forward contracts are not observable and show that they can still be used for strategic purposes. *Adilov (2012)* adds a capacity investment stage prior to the opening of the forward market and show that investment decisions can help firms commit not to use forward contracts strategically in case demand uncertainty is small enough.

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