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# On the competitive effects of multimarket contact☆

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ABSTRACT

Changes in the extent of multi-market contact (MMC) between firms often affect market outcomes – quantities and prices. We show that a strategic but purely competitive effect of changes in MMC can change the quantity provided in a market by a firm by as much as 50%, and the prices a firm sets by as much as 20%. This may have important welfare implications, specifically with regards to horizontal mergers. Studying mergers that span several markets, we show that a myopic merger policy may thwart a surplus-increasing merger wave. The analysis does not rely on any tacit or explicit collusive behavior by the firms.



## 1. Introduction

Large firms are often active in more than one market and commonly compete with each other in many, but not necessarily all, markets. While inconclusive, most empirical work finds a positive correlation between increases in firms' MMC and prices. A common microeconomic explanation for MMC effects on market outcomes is that MMC facilitates mutual forbearance (i.e., tacit collusion). Alternatively, Bulow et al. (1985) show that when one firm has access to markets not served by its rival in the overlapping market then the type of competition (complements or substitutes) and the cost structure of the firms (economies of scale or diseconomies of scale) affect the firm's behavior in the overlapping market.

This paper extends the approach in Bulow et al. (1985) to study an alternative, purely competitive, microeconomic foundation for the relation between MMC and market outcomes. Whenever a firm makes investments that can be then used to serve multiple markets, changes in MMC will affect prices and outcomes by competitive responses of the firms' rivals. We call this the *competitive effect of MMC (*henceforth C-MMC effect*).*

Competition in our framework takes place in two stages. In the first, each firm makes a non-reversible investment (e.g., production capacity) that is transferable across its different markets. In the second stage, firms compete in either prices or

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quantities in several different markets. However, the total quantity sold by a firm over all of its markets cannot exceed the firm's production in the first stage. We model MMC by letting firms serve *overlapping markets* that are also served by rivals and *private markets* that are only served by the firm. We characterize the effect for general differentiated demand functions. For linear demand, we show that changes in MMC can, through the C-MMC effect, change the quantity provided in a market by a firm by as much as 50%, the prices a firm sets by as much as 20%, and the firm's profits by over 10%.

This two stage dynamic, where a sunk transferable investment is shared across the firm's different markets, is common in many industries.[1] Airlines, which have been the subject of MMC studies we discuss below, have the two-stage dynamic where fleet scheduling decisions are made months before the first seat on the flight is offered for sale (see e.g., Barnhart et al. (1999) and Lohatepanont and Barnhart (2004)). However, seats on a direct flight, e.g., from NYC to Miami, FL are sold on multiple markets – all markets from the US Northeast to/from Miami, many markets from Europe to/from Miami, markets to/from South America and the US, etc. The airline faces different rivals in all these different markets. Gate purchasing decisions have exactly the same dynamics.

The two-stage structure also fits settings where firms make a sunk capacity decision for an intermediate input that is then used by the firm in the second stage for one of several different finished products. For example, our setting fits nicely with firms' internal capital market where firms first set a capital budget and then allocate resources across geographical units or product markets. Alternatively, the first stage may capture the firm's decision of the number and size of all production facilities, and subsequently allocate production from all facilities across product lines and geographies, a practice that is common in manufacturing: e.g., automobiles, appliances, cement, steel, etc. The same rationale holds for any specialized input that can be utilized by different units within the firm where the cost of increasing or decreasing the use of the specialized input is prohibitively high.[2]

The key characteristic connecting all these is that once investment is sunk, multi-market firms have the *flexibility* to reallocate the sunk investment across their different markets. If market conditions deteriorate for American Airlines on the route NYC-Miami, for example, it can reallocate more of the seats on the flight from NYC to Miami to the route NYC-Bogota connecting in Miami; the more destinations American Airlines serves in/out of NYC or Miami, the higher its flexibility in reallocating the seats on the NYC-Miami flight.

The C-MMC effect arises when a rival can take advantage of this flexibility. If a rival is aggressive in an overlapping market, a multi-market firm can reallocate a larger share of the sunk investment into markets in which the rival does not operate. Thus, a firm's flexibility to reallocate the sunk investment to non-overlapping markets increases the rival's profit from aggressive deviations.

This strategy requires the rival to *commit* to an aggressive behavior: increase the share of its sunk investments that will be used in the overlapping markets. The fewer markets the firm serves, the stronger its commitment power. We show that in industries with MMC, equilibrium outcome can be defined in terms of the firms' *flexibility* and *commitment power*.

The main welfare implication of the C-MMC effect is that asymmetry in scope between firms improves welfare. Welfare is typically maximized when a large multi-market firm competes with smaller local firms, subject to potential scope-related cost savings. This result is most relevant for horizontal mergers, which we further discuss below.

We derive comparative statics describing the C-MMC effect when second stage competition is either in prices or in quantities, independent of any specific demand form. We show that when firms compete in prices, any increase in MMC increases prices for all firms in the overlapping markets and in *all* other markets served by these firms. That is, an increase in MMC between firms $A$ and $B$ increases equilibrium prices also in markets served *only* by $A$ or $B$. When firms compete in quantities, we show that an increase in a firm's MMC increases its own quantity and decreases its rival's quantity.

The model allows us to also characterize the implications of an increase in overlap between the firms. This describes the changes in market outcomes as two firms gradually enter each-other's markets, possibly to the point that all markets are served by both firms. The C-MMC effect in this case is *non-monotonic* for industries in which firms compete in quantities. If firms overlap in just a few of the markets they serve, an increase in MMC increases quantities (and decreases prices). The effect is reversed if firms overlap in most markets. In industries characterized by price competition, an increase in overlap always increases prices.

There is by now a large empirical literature documenting the relation between the extent of firms' multi-market contact (MMC) and market outcomes. Jayachandran, Gimeno, Varadarajan, 1999 surveys the earlier studies. Earlier and recent examples include (Bilotkach, 2011; Ciliberto and Williams, 2014; Evans and Kessides, 1994; Feinberg, 2015; Fernandez and Marin, 1998; Gimeno and Woo, 1999; Heggestad and Rhoades, 1978; Jans and Rosenbaum, 1997; Parker and Roller, 1997; Pilloff, 1999; Young et al., 2000) for MMC studies on the airline, banking, telecommunication, cement, software, hotel, and cooking oil industries.

Our competitive MMC effect complements the mutual forbearance, or collusive, effect of MMC suggested by Edwards (1955), which states that as firms interact over more markets, the long run returns from collusion are higher, increasing

[1] The formalization of 'invest then produce' dates back to at least (Arrow, 1968) that originally considered capital investment followed labor production costs. Kreps and Scheinkman (1983) and Davidson and Deneckere (1986) study this dynamic in a single market setting. Spence (1977) and Dixit (1980) formalized the economic use of committed investments in capacity or in cost reduction to deter entry and help incumbents achieve a Stackelberg type leadership position in a market.

[2] For examples, see, e.g., Friedman (1983) for car manufacturing, Christens and Caves (1997) for the pulp and paper industry, and Pesendorfer (2003) for a follow-up analysis considering merger effects.