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## Mergers in durable goods industries

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### ABSTRACT

This paper is concerned with the study of durability as an aspect of competition and market structure that contributes to determining the incentives for mergers. We find that relative to the incentives in industries that produce non-durable goods the durability of the good produced by an industry enhances the incentive for mergers in the presence of intertemporal consistency problems. Further, the analysis indicates that in durable good markets a good antitrust policy should combine a restriction to rent solely with a prudent merger policy.

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## 1. Introduction

This paper studies the relationship between the durability of the good produced by an oligopolistic industry and the incentives for mergers in the industry. The interactions that may exist between durability and mergers are important for various reasons. Durable goods constitute a very important part of economic production. In 2006, for instance, personal consumption expenditures on durables exceeded 1 trillion dollars in the U.S., and in the manufacturing sector durable goods production constituted roughly 60% of aggregate production. Mergers, on the other hand, have also been the subject of keen interest in an important theoretical and empirical literature in industrial organization. Also, as noted in Pesendorfer (2003), mergers and acquisitions have long been a public policy concern. In the United States, Section 7 of the Clayton Act prohibits mergers that “substantially decrease competition or tend to create a monopoly.” In recent years, the volume of mergers and acquisitions in U.S. industries has increased substantially, reaching an unprecedented number of 47,492 premerger notifications received by antitrust regulators during the decade 1997–2006. Given the importance of durable goods in aggregate production, it is no surprise that many of these mergers involved durable goods firms. These reasons provide initial motivation for the analysis in this paper.

The literature on mergers has studied a number of relevant aspects including short-run price and output effects, welfare and long-run effects, the impact on research and development and shareholder wealth, investment decisions, and others.<sup>2</sup>

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<sup>2</sup> See, for example, Spector (2003), Pesendorfer (2003), Waldman (2007) and other references therein.

From the theoretical perspective, however, it is not clear when mergers are likely to take place. In a non-durable good setting, Kamien and Zang (1990) study the limits of monopolization through acquisition in the absence of any legal barriers but in the presence of firms fully aware of the consequences of acquiring or being acquired by rivals, not susceptible to incredible threats, and behaving strategically with respect to this activity. One of the results they find is that neither complete monopolization nor partial monopolization can be a subgame perfect Nash equilibrium outcome as the number of firms in the industry becomes sufficiently large. Only when the number of firms is sufficiently small is complete or partial monopolization possible. To the best of our knowledge, in a durable goods setting no similar analysis exists in the literature.

Besides the fact that durable goods constitute an important part of production and that many durable goods industries are highly concentrated,<sup>3</sup> an additional motivation to study the feasibility and implications of mergers in durable goods industries is that they have been viewed as *not* posing a threat of significant anti-competitive harm. For instance, the Horizontal Merger Guidelines (Section 3.2) of the United States Department of Justice (1997) indicates that “Where the relevant product is a durable good, consumers, in response to a significant commitment to entry, may defer purchases by making additional investments to extend the useful life of previously purchased goods and in this way deter or counteract for a time the competitive effects of concern.”

Also, Carlton and Gertner (1989) note that there are a number of reasons why durable goods industries may be *more* competitive than non-durable goods industries and why it is difficult to create market power through mergers in durable goods industries. One reason is that the stock of durable goods may limit the increase in prices of the new units produced after the merger. Obviously, the effectiveness of this constraint depends on the specific circumstances of the industry. For example, the 1997 case of the Boeing-McDonnell Douglas merger in commercial aircraft may be quite different from mergers among firms that produce agricultural equipment. The reason is that there is much greater scope for more intensive use in agricultural equipment than in the case of aircraft, and hence there is greater potential for the existing stock of used machines to act as a constraint on the behavior of new equipment manufacturers.<sup>4</sup> A second reason is the possibility of dynamic strategic interactions among rivals. These interactions may induce an oligopolist to choose to *sell* some of its output rather than rent it. Selling production in turn induces more competitive behavior than renting production. Either of these two effects may alleviate any detrimental effects of mergers.

A number of recent papers have been concerned with the *effects* of mergers in durable good industries (see for instance Gerstle and Waldman, 2004; Waldman, 2007, and other references therein). These works study the robustness of the conclusions of the classic paper of Carlton and Gertner. For example, following the analysis of Carlton and Gertner, Gerstle and Waldman analyze the effects of mergers in durable goods industries, considering an industry that is perfectly competitive prior to the merger, becomes monopolistic after the merger, and again is competitive after the subsequent entry of new firms. The key aspect is that they depart from the Swan-type model of durability used by Carlton and Gertner. Instead, they consider that there is no number of used units that could ever serve as a perfect substitute for a new unit. In their setting the authors find that (i) the welfare loss due to monopoly is larger than that indicated by the previous literature, and that (ii) the reduction in social welfare loss due to durability depends critically on the speed of future entry, and hence this speed should be an important determinant of whether or not durable goods mergers may be allowed.

In this paper we address a question that is concerned with the endogeneity of mergers in durable good industries but that has not been considered in the literature, namely to what extent the *incentives* for merging are different between durable and non-durable goods industries. We then study the implications of these differences in incentives. In anticipation of the results, we find that both the possibility of strategic interactions among rivals pointed out by Carlton and Gertner and the classic expectations problem associated with durable goods first identified by Coase (1972) *enhance* the incentives to merge.<sup>5</sup> We argue that this result is relevant in the context of a literature that studies the different aspects of competition and market structure as a determinant of the incentives for mergers.<sup>6</sup>

A standard result in the literature on the durable goods monopoly (e.g., Bulow, 1982; Kahn, 1986) shows that when (i) the inverse rental demand for the good is linear and (ii) the firm may only choose the level of production, social welfare is greater if the monopoly sells its output instead of renting it. In practice, firms such as the United Shoe Company, IBM, Xerox and others began by renting their products but were later required also to sell their output. This paper shows that in the absence of mergers, under assumptions (i) and (ii), social welfare is higher and consumer surplus is lower when renting is allowed than when it is forbidden. This result arises because of the strategic interactions among rivals.

<sup>3</sup> As indicated by Driskill (2001) and others, most durable good producers appear to have market power. For example, 90% of major household appliances are produced by just five companies.

<sup>4</sup> For a detailed analysis of the circumstances that may make the stock of durable goods constrain new durable good prices, see Lexecon (2000).

<sup>5</sup> Coase conjectured that if consumers have perfect information and are rational, then a monopoly seller of an infinitely durable good without some commitment to limit future production would saturate the market with the competitive output “in the twinkling of an eye” (p. 143).

<sup>6</sup> Salant et al. (1983) consider a model of Cournot competition and show that some exogenous change in market structure (exogenous mergers) may reduce the joint profits of the firms that collude. Considering linear demand and costs they show that in order for a merger to be profitable the number of firms that merge must be at least equal to 80% of the industry. Given the empirical evidence on mergers in different industries, this result has motivated the analysis of different aspects of competition that may explain the incentives for merger. In particular, it has been shown that the profitability of a merger is enhanced when, for instance, firms compete in prices (Deneckere and Davidson, 1985), the capital stock affects the marginal cost of production (Perry and Porter, 1985), or when the principal delegates production decisions to managers (González-Maestre and Lopez-Cuñat, 2001; Ziss, 2001). Faulí-Oller (1997) shows in a Cournot model that profitability of mergers is inversely related to the degree of concavity of demand.

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