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Mergers in durable-goods industries: A re-examination of market power and welfare effects ☆

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ABSTRACT

An important question from the standpoint of antitrust economics is, how do mergers in durable-goods industries differ from those in nondurable-goods industries from the perspective of welfare effects? Previous papers that have considered this issue employ an approach to modeling durable-goods markets that was popularized by Swan in the early 1970s in which new and used "service units" are perfect substitutes in consumption. We employ a modeling approach similar to those employed in later contributions by Anderson and Ginsburgh (1994), Waldman (1996a), and Hendel and Lizzeri (1999) which, more realistically, do not make the perfect substitutability assumption. Our analysis confirms the main result of the earlier literature which is that a competitively supplied stock of used units typically reduces the welfare loss associated with a durable-goods merger. However, we also show that in most cases this reduction is much smaller than found in Carlton and Gertner's (1989) classic analysis of the topic. The implication is that the antitrust authorities should be more concerned about mergers in durable-goods industries than the previous literature suggests.

1. Introduction

Most of the theoretical literature concerning the effects of mergers focuses on nondurable-goods industries, but in the real world many of the mergers of concern to regulatory authorities are in durable-goods industries.[1] This paper contributes to a small but important literature concerning the effects of mergers in durable-goods industries. In particular, we explore the implications of adopting a more realistic approach to modeling durable-goods markets that has been explored by various authors over the last twenty years. We show that employing this approach yields social-welfare losses associated with durable-goods mergers that are larger than losses found in the previous literature on this topic, which suggests the

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[1] The economic analysis of mergers encompasses a vast and diverse literature spanning oligopoly theory, game theory, and other branches of industrial organization. Texts such as Tirole (1988), Vives (2001), and Carlton and Perloff (2004) all detail much of the foundations of modern merger analysis. Perhaps the most concise summary of widely accepted lessons from this literature is contained in the joint DOJ/FTC horizontal merger guidelines found in U.S. Department of Justice (1997). The guidelines are largely focused on the analysis of non-durable good industries. In fact, mention of durable goods is limited to two sentences related to the evaluation of the timeliness of post-merger competitive entry.

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antitrust authorities should be more concerned about mergers in durable-goods industries than a reading of the previous literature on this topic might indicate.

Earlier theoretical papers such as Carlton and Gertner (1989) that consider durable-goods mergers employ the approach to modeling durable-goods markets popularized by Peter Swan in the early 1970s (see Swan (1970,1971) and Sieper and Swan (1973)).[2] In this approach, each unit of the durable good can be thought of as a bundle of service units that decay over time, where a service unit derived from a used unit of output is a perfect substitute for one derived from a new unit and consumer preferences are modeled as demand for service units. Further, at any point in time, one can think of the flow demand for service units first being satisfied by the existing stock of used units, and new durable units then satisfying the residual demand. As discussed further below, this aspect of this approach to modeling durable-goods mergers is important because, if the speed of decay of durable units is slow, then the residual demand the monopolist faces in the first few periods following a merger will be small which, in turn, limits potential social welfare losses in those first few periods.

Later papers such as Anderson and Ginsburgh (1994), Waldman (1996a) and Hendel and Lizzeri (1999) have criticized Swan's approach and reanalyzed some fundamental issues concerning durable goods in models that employ a distinctly different approach. The criticism is straightforward. In a Swan-type model, a consumer can combine service units derived from a number of used units to create a perfect substitute for a new unit. Although this may be a reasonable assumption for some products, for many durable products such as televisions, refrigerators, and automobiles in which only one physical unit is used at a given time, it is not a realistic assumption. In addition to the lack of realism of the basic modeling assumption, the Swan approach is also problematic because it fails to capture a number of features that characterize most durable-goods markets. For example, the Swan approach does not easily explain why some consumers routinely demand new rather than used units of output.

Anderson and Ginsburgh (1994), Waldman (1996a) and Hendel and Lizzeri (1999) consider models that do not satisfy the Swan assumption but rather in each period each individual consumes either zero physical units or one physical unit of output and used unit depreciation is modeled as a reduction in the unit's quality.[3] The other key assumptions are that consumers vary in terms of their valuations for quality, and there is a frictionless secondhand market so that as a unit's quality deteriorates the unit is traded from individuals with higher valuations for quality to those with lower valuations. They show that employing this alternative approach overturns some basic findings in the durable-goods literature. For example, in contrast to Swan's conclusions, they find that even in the absence of commitment problems a durable-goods monopolist does not typically choose the socially optimal level of durability.

In this paper we consider the welfare effects of durable-goods mergers employing the basic approach to durable-goods modeling explored in this more recent literature. In addition to consumers not being able to combine used units to create a perfect substitute for a new unit and depreciation being modeled as a reduction in a unit's quality, the other main assumptions are that consumers are differentiated with respect to valuation for quality, new units are sold rather than rented, and there is a frictionless secondhand market on which used units trade. Our analysis focuses on an industry that is initially competitive and then a merger leads to a monopoly outcome. Further, the monopoly is assumed to persist for a finite number of periods after which entry causes the market to revert back to a competitive outcome. The impact of this short-lived monopoly is then analyzed and, in particular, compared with the findings in Carlton and Gertner (1989) which is the best known earlier paper on the topic.

Our analysis yields three main results. First, price increases following the merger are both dramatic and immediate – in particular, for the parameterizations we consider we find price changes immediately following the merger that range between 26% and 245% of the competitive price level. Second, if entry occurs a small number of periods after the merger, then consistent with the Carlton and Gertner analysis the present discounted value of welfare losses is smaller than in the analogous nondurable-goods case. However, although this present discounted value is smaller than in the analogous nondurable-goods case, for similar parameter values it is substantially larger than in Carlton and Gertner's analysis. Third, increasing the number of periods till entry not only increases the absolute welfare loss due to the merger, but also moves the welfare loss in the durable-goods case closer (in percentage terms) to the welfare loss in the analogous nondurable-goods case. In summary, we find that in durable-goods industries the presence of a competitively supplied stock of used units will typically reduce the social-welfare loss associated with a merger that increases market power. However, we find the magnitude of this reduction to be much smaller than in Carlton and Gertner's earlier analysis of the subject.

The obvious question is, what causes the differences between our analysis and Carlton and Gertner's, and the answer is that Carlton and Gertner employ the Swan approach to modeling durable goods described above while we do not. Consider what happens after a merger in a Swan-type world. Because of the frictionless secondhand market that reallocates service units to those consumers with the highest valuations, any consumer with a high valuation for the product consumes a new unit or used units that in aggregate are equivalent to a new unit, so with respect to high valuation consumers there is no reduction in social welfare. The aggregate reduction in social welfare is due solely to the existence of consumers whose valuations for the product are above but close to the "marginal" valuation in the competitive case and do not consume the

[2] Swan traces this approach to modeling durable-goods markets back to Wicksell (1934). Also, see Schmalensee (1979) for a survey of the literature that explores this approach to modeling durable-goods markets and Waldman (2003) for a later survey that discusses this literature and later contributions to durable-goods theory.

[3] A related approach is explored in Waldman (1996b) and Fudenberg and Tirole (1998) who assume no used unit depreciation but rather that newer vintages are of higher quality.