A Discussion of Antitrust Implications for Future Horizontal Merger Activity within the Tissue Industry
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Abstract: Merger and acquisition activity among tissue producers has significantly altered market concentration. This paper tracks those changes and discusses the potential implications for future antitrust enforcement.

Key Words: antitrust, market efficiency, oligopoly, Herfindahl-Hirschman Index (HHI), elasticity

INTRODUCTION

The core of horizontal merger evaluation is market efficiency. The standard oligopoly theory as advanced by Chamberlain (1933), Fellner (1949), and Stigler (1964) has traditionally been the basis by which federal agencies responsible for regulating competition within the marketplace assess the impacts of increased concentration or decreased competition (White 1987). The Federal Trade Commission and Department of Justice, who are responsible for regulating competition within the United States marketplace, are concerned with efficiency and therefore must show that one of the following two outcomes is possible. The first question concerns concentration and its effects on industry profitability. If these agencies believe market efficiency is suffering because of increased concentration, they must provide proof that further concentrating the industry will have adverse effects such as allowing producers to reap excess economic profits. In the past researchers aggregated firms within an industry by net worth and studied how profitability changed with concentration. Some of these earlier empirical studies of the relationship between firm profitability and industry concentration include Bain (1951), Demsetz (1973), and Kwoka (1979). These papers weakly describe a relationship but call for more detailed research of those conditions that affect the profitability-concentration condition of an industry. Approaches such as these are based on the assumption that meaningful inference can be made from aggregate studies. A more direct approach, and one that is consistent with the empirical renaissance in industrial economics, is to study the individual firm. If the amount of excess economic profits extracted by the individual firm can be obtained from the data, dead weight loss needs to be calculated and compared to the gain seen by stockholders of the firm.

The second question concerns substitutability among firms’ products. Some larger firms spend great sums of money in an effort to differentiate their products in the retail market. If the attempts at differentiation are successful consumers will likely resist changing their product choice when faced with small but significant changes in price. On the other hand, if consumers readily substitute among brands a competitive market is created. This is most relevant in the retail markets since the commercial products are much more homogeneous. Generally speaking though goods in both markets, outside of a few minor differences from product to product, are relatively homogeneous. There are also substantial barriers to entry so that increased concentration could theoretically reduce competition. Despite efforts by tissue producers to differentiate their products at the retail level, it seems logical that consumers will have some

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degree of price sensitivity and therefore substitutes among brands. It is important that this degree of sensitivity be empirically tested.

This paper will highlight changes in market structure within the tissue sector of the pulp and paper industry. Characteristics of the pulp and paper industry that contributed to past merger and acquisition (M&A) activity include historically cyclical financial performance, highly volatile business conditions, and increasing cost of pollution abatement. Producers remaining throughout the late 20th century battled rising energy and raw materials costs, ever-changing supply and demand conditions, as well as obsolete machinery that needed to be replaced. These conditions required increases in capital expansion projects, which for many firms resulted in increased debt load.

Mergers & Acquisitions

The figure below tracks merger and acquisition activity over a 23-year period.

Figure 1. Mergers and Acquisitions of U.S. Pulp and Paper Mill Assets, 1979-2002

Merger and acquisition activity has been highly variable over this 23-year period but increasing nonetheless. An interesting aspect of the above trend is that most of the peaks occurred around periods of very low profitability. For example, during 1982-86, profits were under pressure and the number of mergers and acquisitions reached 15. As the decade continued profitability began to turn around and surged to record levels between the period 1987-89 where we see the activity decrease to somewhere around 10. As the pulp and paper industry entered 1990, the surge in profitability rapidly declined and fell to new lows because of a North American recession. Again, we observe a peak in M&A activity at 34 transactions. Given that peaks in horizontal activity appear to revolve around periods of poor aggregate financial performance, it might suggest that larger incumbent firms are responding to these market “signals” by submitting offers for smaller incumbent or newly entered firms when they are at their weakest financially.
Although financial performance would seem to be the dominant factor influencing past trends in M&A activity, changes in spending for environmental compliance also appear to have had an effect. Beginning in the 1970s, Congress passed an unprecedented amount of environmental legislation that drastically changed the way the paper industry was to treat air and water discharge. Some of the more stringent acts included the passing of and amendments to the Clean Air and Water Acts (1970-1990). Deadlines for compliance by firms came to a head in the late 1980s and early 1990s. The increase in offers made by larger incumbent firms for competitors might have been exacerbated by the costs associated with building facilities to comply with these acts. Increased costs associated with compliance could have been a factor in further weakening already struggling firms, which further explains the peak in M&A activity of the early 1990s.

**Figure 2. Total Environmental Spending v. Quantity of M&A, 1979-1998**

All of this M&A activity begs the question: What are the implications for competition within the marketplace. If perfect competition is the metric for economic efficiency, then the tissue industry needs empirical assessment. Potential competition is important as a mechanism to control market power, as was observed by Clark, Bain, Sylos-Labini and others (Gilbert 1989). This aspect is particularly important in the tissue sector where short-run entry is for all relevant purposes impossible and long-run entry is characterized by substantial barriers in the form of high fixed investment required for plant and equipment. Obviously, a result of the wave of mergers and acquisitions is a reduction in the number of competitors. This suggests that there is less “potential” competition in the tissue industry.

The remaining sections of this paper will provide a description of the guidelines that the Federal Trade Commission (FTC) and Department of Justice (DOJ) use to assess proposed horizontal
ventures, and track changes in tissue-industry concentration levels as measured by the Herfindahl-Hirschman Index (HHI).

REGULATION

The 1992 Horizontal Merger Guidelines, jointly ratified by the FTC and DOJ, outline the criterion used to assess a potential merger between two companies. These two governmental agencies, as in the 1995 case against Kimberly-Clark and the 2000 case against Georgia-Pacific, continue to challenge horizontal mergers within the tissue industry. As Long, Schramm, and Tollison (1973) show, these agencies have sued in the past for various reasons, the most important of which seems to be industry size as measure by sales. The guidelines provide the private sector with the means to understand the agencies’ goal in regulating anticompetitive mergers and the conditions under which enforcement will occur. The document unambiguously provides three significance levels for market concentration and the position taken on each. The agencies divide the spectrum of market concentration as measured by the HHI into three regions that can be broadly characterized as unconcentrated (HHI below 1000), moderately concentrated (HHI between 1000 and 1800), and highly concentrated (HHI above 1800) (1992 Horizontal Merger Guidelines). Each agency considers pre, as well as post merger HHI and provides for the allowable level of increase in concentration for each significance level. For example, if a particular firm proposes a horizontal merger within a moderately concentrated sector, the agencies will consider the merger anticompetitive if it produces a post merger increase in HHI of more than 100 points. This merger would be equivalent to two firms with approximately 8 percent market share each. Within highly concentrated industries, post merger concentration should not increase by more than 50 points for the agency to accept the venture.

The guidelines also provide for those circumstances that either weaken or aggravate the effects from increased market concentration. They include factors affecting the significance of market shares and concentration, potential for adverse competitive effects from mergers, entry analysis, as well as a failure and exiting assets provision. The tissue industry satisfies the condition, as outlined by the FTC and DOJ, such that any horizontal merger could potentially degrade competition. Those factors most responsible include the limited entry hypothesis and the production inputs and product homogeneity hypothesis, which aggravate a situation where many firms are competing and or distinguished by their relevant capacities.

IV. Sector Analysis

Tissue

An excerpt from the 2002 North American Pulp & Paper Fact-book summarizes the relevant markets of the tissue industry:

Tissue paper is used in sanitary products such as bath tissue, paper towels, facial tissue, and napkins, and is sold in both the consumer and commercial/industrial (C&I) markets. Also called the “at home” market, consumer tissue accounts for about two-thirds of the U.S. tissue trade and is purchased at retail outlets such as super markets and drug stores. C&I tissue, also called the “away from home” market, represents most of the remaining shipments and is sold at wholesale to janitorial supply companies, hotels, offices, restaurants, factories, airports, schools, and

\(^2\) For a detailed list, see the “1992 Horizontal Merger Guidelines” published and jointly accepted by the FTC and DOJ.
government offices. A small quantity of tissue is used in absorbent products such as diapers, wipes, and feminine hygiene. Tissue paper is also used for wadding and as base-stock for waxing, wrapping, and miscellaneous uses.

Market concentration is simply the sum of individual firm’s respective market shares squared. This measure is most relevant when the percentage dollar-market-share that a particular firm’s product claims is used in the calculation. This paper reports both the aggregate HHI and individual product class HHI for the tissue industry, the former of which is based on capacity shares and the latter on dollar-market-shares to convey the idea that measures based on the former can understate the degree of concentration within a market. The retail market for tissue is important to study because of the ability of “at home” tissue producer’s output decisions to have a direct impact on shelf prices and consequently consumer welfare. At first glance it would seem that the degree of concentration would allow producers to have substantial pricing power; however, that may not be the case. The accurate estimation of own and cross-price elasticities of demand would prove invaluable in determining producer pricing power. On the other hand, manufacturers of C&I tissue products sell at the wholesale level and in large quantity to individual customers. This allows those producers to pass price increases along because of the inability or costs to the institutional customer of switching their account to another supplier. This suggests that the price elasticities of demand for institutional customers are somewhat lower than those associated with the retail market. More cases have been brought against the C&I, or “away from home” market than the “at home” market in the past, which, at least superficially, suggests that the pricing power of firms is more apparent in the C&I market.

Figure 3. Trends in North American Tissue Industry Concentration

Starting in the early 1990s, branded producers faced increasing competition from Kimberly-Clark’s entry into the bath tissue segment and from the increase in private label producers’ market shares. This caused a temporary decrease in concentration (potential increase
in competition) where we observe HHI in figure 3 bottoming out at around 1000 points. Kimberly-Clark’s acquisition of Scott Paper in 1995 marked the beginning of a wave of mergers that would continue to increase market shares of the top firms. Mergers contributing to this consolidation include the 1997 purchase of James River Corp. by Fort Howard Corp., a merger between Wausau Paper Mills Co. and Mosinee Paper Corp., purchase of Fort James Corp. by Georgia-Pacific in 2000, and finally Canadian company Cascade’s purchase of bankrupt American Tissue Inc. in 2002. Whatever the reason, the impacts on concentration levels have been enormous and deserve further analysis.

As exhibited in figure 3, all of this consolidation has doubled the concentration level since 1995 and placed the industry in the highly concentrated range as measured by the HHI. This has very strong implications for future horizontal M&A within the tissue industry, because the regulatory agencies will likely prevent any future proposals that result in a post-merger increase in HHI by more than 50 points unless sufficient assets are divested. Figure 3 is based on capacity share data for the aggregate tissue industry and does not discriminate between product classes. Discriminating between individual product classes and each producer’s respective dollar-market-share of the “at home” market draws a much different picture.

Figure 4: Industry Trends in AH Tissue Industry Concentration

Figure 4 exhibits the recent trends in three retail tissue markets. An important change that occurred during this period was the claim of market share by firms with branded products either by acquiring other firm’s assets and product brands or developing superior branded products early on. This at least seems to be consistent with the logic behind a product’s life cycle. Market concentrations have only recently succumbed to the increase in private label producer’s dollar-market-share. This share is treated as one producer in the above graph, which can overstate HHI.

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3 For a discussion of product life cycle and the logic of a model that describes this cycle, see Klepper (1996).
by a maximum of 300 points. If the dollar-market-shares of the private label producers were removed, the sectors would all remain highly concentrated.

An important question that has not been answered is what level of profitability the firms in this market have been able to secure because of the substantial barriers to entry, and further what impact this has had on efficiency and or consumer welfare. The idea of excess economic profits is feasible if, for no other reason, than the very substantial barriers to entry within the tissue industry. Producers must purchase and build tissue machines that produce parent rolls, which are bulky and consequently costly to transport. (This is the only comment I have on geographic market definition of the tissue industry. It is implied here that the market is regional with respect to the plant and consequently products are rarely shipped long distances.) Many integrated producers have converting facilities so that large markets can be secured. This strengthens the incumbent firm’s position, allowing for some degree of price flexibility. Rivals are limited in their ability to respond to decreased output decisions of their competitors since most produce at or near full capacity. Again, when figure 3 is compared to 4, we see that actual concentration can be understated.

Although it is important to aggregate each firm’s dollar-market-share, it is equally important to assess individual product characteristics. Quantifying elasticity of demand for a product allows the dollar-market-share to be put in perspective. For instance, many firms are characterized by owning branded products that can range in quality and value depending on price. This product differentiation increases total sales and consequently market share. The elasticity of demand for each product eludes to the degree of flexibility firms have in terms of taking advantage of products with relatively low elasticity of demand (less resistant to price change) with the understanding that the lost sales could be picked up through the higher elasticity (more resistant to price change) brand. Inferring the degree to which this can occur is at best speculative when looking only at a firm’s aggregate dollar-market-share.

CONCLUDING REMARKS

A myriad of factors contribute to an analysis of a proposed merger, the most important of which are a set of own and cross-price elasticities (Wu 2003). The concentration-profitability hypothesis is important, but does not allow one to look at the merged firm’s impact on prices. Elasticity, if indeed accurate, supersedes all other measures because it unveils the true degree of pricing power that individual firms have. This implies that future research should be directed toward developing econometric models that accurately estimate elasticities as mentioned above. Elasticity allows the effects of barriers to entry, market structure, firm behavior, and other similar questions pertaining to the tissue industry to be placed in perspective.

Although future research is needed in all relevant areas, it does not alter the fact that the regulatory authorities rely heavily on the Herfindahl-Hirschman Index as a signal of the potential for degradation of competition. It is for this reason that party’s interested in future horizontal mergers in the tissue industry should pay close attention to the impact that the proposed venture would have on this measure of market concentration.

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4 For an alternative to the complex econometric approach, see Epstein and Rubinfeld (2002).
LITERATURE CITED


