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NASDAQ MARKET STRUCTURE AND COLLUSION HYPOTHESES

Two recently published academic articles have triggered intense scrutiny of The Nasdaq Stock Market, Inc. ("Nasdaq"). In the first paper, Professors W.G. Christie and P.H. Schultz conclude that Nasdaq market makers collude to quote in even-eighth price fractions. A follow-up paper claims to have confirmed the initial findings. An examination of market structure, entry conditions, instability of market shares and other factors, however, indicates that the Nasdaq marketplace is competitively structured and the collusion conclusion is incorrect.

In the first paper, Christie and Schultz observe that many Nasdaq stocks are seldom quoted on odd-eighth price fractions. The authors consider whether factors such as stock price, trading volume, risk or negotiation costs can explain the low incidence of odd eighths. Failing to find a sufficient explanation, they claim that Nasdaq market makers must be colluding to quote in even-eighth price fractions. In a follow-up paper, Christie, J.H. Harris and Schultz find that following the first popular press publication of the original results, market makers in four large-volume Nasdaq stocks (Amgen, Cisco, Microsoft and Apple) switched from quoting predominantly in even eighths to quoting in both even and odd ("mixed") eighths. From this, they conclude that the collusion hypothesis identified in the first paper had been confirmed.

Christie and Schultz concede that the avoidance of odd eighths by market makers in certain stocks does not prove the existence of collusive behavior. Rather, they explicitly embrace the collusion hypothesis because of their failure to find another plausible one. The authors fail to examine, however, whether collusion is a plausible economic explanation for the observed quoting patterns. In particular, neither paper assesses whether market conditions would support the type of sustained coordination that is alleged to have occurred on Nasdaq.

In order to evaluate the collusion hypothesis, it is necessary to examine the market structure of and market conditions on Nasdaq and determine whether these factors are consistent with successful collusion. Among the relevant issues are (1) market structure and concentration for a variety of plausible market definitions; (2) conditions of entry, exit and expansion by market makers; (3) stability of market shares and market concentration over time and (4) other factors that affect the likelihood of successful coordination.

Inquiry into these issues demonstrates that by any measure Nasdaq is characterized by unconcentrated markets with large numbers of competitors. The results are consistent across all volume ranges, for retail and wholesale trading activity, and for various time periods. Notably, the data show unconcentrated, highly competitive markets both in stocks that are predominantly quoted in even eighths and in those predominantly quoted in mixed eighths. Christie and Schultz fail to address this fundamental similarity. Nothing in the structure of the marketplace, however measured, points to collusion as the explanation for even-eighth quoting behavior on Nasdaq.

The market share and concentration measures show that (1) no single firm or small group of firms is dominant in any plausible market or markets, no matter how broadly or narrowly defined; (2) there are many active market makers in each stock (especially the most active stocks) and (3) concentration as measured by the Herfindahl-Hirschman Index is generally below 1000, the level that antitrust authorities consider to be presumptively competitive for enforcement purposes. Alternative concentration measures

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provide confirmation. For example, four-firm and eight-firm concentration measures for the most active Nasdaq stocks show that, even for individual stocks, the largest firms collectively control only a small share of the trading activity.

Additionally, Nasdaq market makers' shares and rankings change substantially over time, whether measured on a monthly, quarterly or annual basis. In particular, there is significant turnover in the identity of the firms comprising the top four and top eight market makers in most stocks, and this turnover is not limited to the largest market makers or most active stocks.

Entry conditions also support the interpretation of a competitive market. Actual entry by market makers is frequent and expansion is rapid in virtually all Nasdaq stocks. Entrants, moreover, can obtain a significant volume of trades within a relatively short period of time. Thus, market makers have the capability of engaging in "hit and run" entry in response to supracompetitive prices. Taken as a whole, these results demonstrate that there are virtually no barriers to entry or expansion on Nasdaq.

Finally, the ability to negotiate transactions at prices other than at the quoted prices and through mechanisms that cannot easily be monitored by other market makers would make it difficult to detect deviations from any alleged price coordination. In addition, a cartel would need to police about 40 firms in each allegedly rigged stock as well as the 300 or more other Nasdaq firms that are potential market makers in that stock to ensure no deviations from the cartel price.

These characteristics of Nasdaq demonstrate a competitively structured market, contrary to the collusion hypothesis. This conclusion is particularly compelling given that these results are virtually identical for stocks predominantly quoting in even eighths (stocks presumed to be subject to collusion) and those quoting in mixed eighths (stocks presumed to be competitive). The striking similarity in the competitive structure of the two groups of stocks, and the competitive structure of the Nasdaq market as a whole, compel the rejection of collusion as the explanation for any differences in observed quoting patterns.

Former Senior Economist Dean Furbush has recently become Chief Economist for the Nasdaq Stock Market, Inc. He and Senior Economist Paul Godek, Senior Vice-President Margaret Guerin-Calvert and Principal Bruce Snapp were retained by the National Association of Securities Dealers, Inc. on this matter.

MERGERS BETWEEN CLOSE COMPETITORS OF DIFFERENTIATED PRODUCTS

Determining the likely competitive effect from a merger involving differentiated products is often much more difficult than from a merger among homogeneous products. In its simplest form, a differentiated products merger may involve a large number of customers for whom the products are not very close substitutes. The more complicated circumstances, involving close substitutes, usually require some form of price discrimination for a competitive problem to arise. Even price discrimination, however, is unlikely to be the source of a problem if one of the products in the merger is a pre-eminent brand.

In a market for homogeneous goods, all firms compete directly and to the same extent with one another. The effect of a merger is to remove one among a number of producers of the standardized product. Competitive effects are likely to be directly related to the total number of firms in the market and their relative sizes. In contrast, when competing products are highly differentiated, the products sold by different participants in the market are not perfect substitutes for one another. Since different products vary in their degree of substitutability, competition is likely to be non-uniform or localized, with individual sellers competing more directly with rivals selling close substitutes. According to the U.S. DOJ/FTC Merger Guidelines, "a merger between firms in a market with differentiated products may diminish competition by enabling the merged firm to profit by unilaterally raising the price of one or both products above the pre-merger level...The price rise will be greater the closer substitutes are the products of the merging firm." If two products are close substitutes, raising the price of one will induce consumers to purchase the other. If a merger combines producers of close substitutes, the merged entity could, in principle, raise the price of one product and earn higher profits on the reduced volume of sales of that product while capturing those sales that shifted to the other product.

If the Merger Guidelines are interpreted too liber-

ally, however, they becomes a prescription for challenging every merger between closely substitutable products even if there is a larger group of competitive products that would constrain pricing in a properly defined relevant market. While the products of the merging firms might be the closest substitutes for some customers, the choice set may be much larger for many others. If so, then the hypothesized price increase from the merger of closest substitutes will only occur through price discrimination.

When is price discrimination likely to be plausible, implying that it would make sense to focus on potential unilateral effects against a subset of price-insensitive customers (those with inelastic demand)? This is an empirical question. The plausibility of price discrimination may be established if there are many consumers with inelastic demand relative to ones with elastic demand and those customers with elastic demand would have a minor effect in any profit-maximizing calculus. Failing this, one would have the difficult task of demonstrating that a small set of price-insensitive customers could be identified and charged a higher price and that price-sensitive customers could not resell to price-insensitive customers.

An expectation of anticompetitive effects from a merger of close substitutes is even more problematic if one of those products is a pre-eminently successful brand. Even if price discrimination were possible against consumers who choose from a narrow range of products, there is no reason to assume that products most obviously similar to the pre-eminent brand would impart any more discipline to the pre-eminent brand than would more successful products that are less obviously similar. Accordingly, a merger that removes the most obviously similar competitor of a pre-eminent brand may not increase the price of the pre-eminent brand even if price discrimination against a narrow range of consumers were possible.

Likewise, it is not clear that a competitively meaningful *future* challenge to the "niche" dominated by the pre-eminent product will necessarily come from any of the smaller products that currently appear most similar to it. A brand that has been pre-eminent for some time probably dominates a niche because it continues to provide what consumers want at a price they are willing to pay. Less successful but closely substitutable products are not likely to take market share from the pre-eminent product unless the pre-eminent product stops performing at this level. Further, when and if the pre-eminent brand starts to lose market share, it cannot be predicted which of the presently "close" brands will begin to gain share or indeed if any of them will. The share loss may go to a completely new product free of the "baggage" of older marginally successful brands.

The economic literature is not unanimous on the competitive impact of mergers between two brands that are close substitutes. Nevertheless, there are strong arguments that these types of mergers are likely to raise competitive problems only if (a) neither brand caters to large numbers of customers who view a whole range of products as substitutes or (b) price discrimination is possible against price-insensitive customers of the product niche. Even if price discrimination is possible, mergers of pre-eminent brands and "neighboring" minor brands are unlikely to raise competitive problems because it is more likely that the pre-eminent brand is limited in the price it can charge by potential new brands or strong brands that are less obviously similar.

Senior Economist Robert D. Stoner previously worked at the Federal Trade Commission. He has recently worked on many mergers involving differentiated products.

COMPETITION POLICY IN THE BALTIC COUNTRIES

The establishment of competition laws has been an important part of the Baltic countries' transition from centralized to market-based economies. These countries, Lithuania, Latvia, and Estonia, passed competition laws to control the large regional monopolies created under the centralized economies, to limit the creation of additional market power and to further their goal of eventually joining the European Union (EU). Although the competition laws of the three countries are similar in principle, the specific provisions and the enforcement of these laws vary among the countries due in part to differences in privatization and trade liberalization programs.

The Lithuanian Parliament passed the Law on Competition in 1992 and revised it in October 1993. The Law on Competition forbids agreements among competitors, abuse of dominant position, unfair competition, and transactions leading to undue concentration of economic entities. The original law follows a model of competition law that is common in Eastern

Europe. The 1993 revisions added elements of EU competition law enforcement, OECD definitions on competition issues, and the U.S. DOJ/FTC Merger Guidelines. The law establishes a Price and Competition Office (PCO) and empowers it to bring complaints to the Competition Council, which enforces the law. Companies and individuals may appeal Council decisions in court, but private suits are not allowed. The PCO has drafted procedures for prior notification of mergers and large stock purchases, including purchases of firms being privatized.

Unlike U.S. and EU antitrust authorities, the PCO has the authority to limit price increases. The office enforces the Law on Prices, which imposes price margin regulations on certain Lithuanian products, typically staples. Moreover, under the Law on Competition, the PCO may declare a price or a profit increase above a certain level to be an abuse of a dominant position. The Lithuanian government's decision to give the PCO power over prices stemmed in part from concern that rapid price increases during privatization would harm consumers, especially those with small pension allowances. Furthermore, the Lithuanian government often imposes restrictions on imports and foreign investment, thus weakening the price-restraining influence of foreign competition.

The basic structure of the Law on Competition and Restriction of Monopolistic Practices in Latvia is similar to that of the Lithuanian competition law. The main provisions of the current law forbid agreements among competitors, abuse of dominant position and undue concentration of economic entities. The law also provides for review of pricing by firms that the Latvian Parliament considers to be natural monopolies. The Latvian Antimonopoly Committee is currently revising the law to address inadequate provisions for enforcement against cartel agreements and to reduce its regulatory oversight of natural monopolies. The law currently bestows final decision authority on the Chairperson of the Antimonopoly Committee; the revisions may create a commission to which the Antimonopoly Committee would bring complaints.

In both Lithuania and Latvia, the competition agencies can enforce the competition laws against other government entities and their agreements with private companies. The Latvian Antimonopoly Committee has pursued an international sugar company for violating the competition law despite an agreement between the Latvian Parliament and the company. The sugar company was granted exclusive selling rights for one year in return for buying all of Latvia's sugar beets. The Antimonopoly Committee claims that the sugar company created monopoly power and abused it by increasing sugar prices. The lack of a consistent government policy may discourage further foreign investment in Latvia. As it revises the competition laws, the Antimonopoly Committee is reconsidering its authority over other government entities and the agreements they make.

The Estonian Law on Competition, which was passed in 1993, is more heavily influenced by Finnish law than by the Eastern European model followed by Lithuania and Latvia. Estonia's law, which is enforced by the Competition Board, is less restrictive on price and profit increases for dominant firms and it does not include merger enforcement. The less restrictive nature of Estonian competition law is due in part to the more advanced transition to a market-based economy in Estonia. Of the three Baltic countries, Estonia has most rapidly privatized its state enterprises and most extensively liberalized its trade policy. In omitting a merger enforcement provision, the Estonian Parliament apparently believed that restrictions on mergers would be unnecessary because foreign competition could restrain price increases.

Recent consolidation in the banking industry has led some Estonians to suggest that restrictions on mergers may be necessary after all. The Competition Board does not have the authority to evaluate these mergers even though an open trade policy is not likely to result in imports of banking services, and foreign bank entry faces regulatory hurdles. Thus, the Competition Board, as part of the effort to address these concerns and assimilate into the EU, is likely to modify the law to include merger provisions.

The Baltic countries are likely to continue revising their competition laws as they move to more market-oriented economies. Their desire to join the EU will impel these countries to align their laws more closely with current EU law. Furthermore, the regulatory approach of their current laws can cause significant inefficiency. Less restrictive laws with greater reliance on market forces will allow these emerging economies to evolve more efficiently. Firms will have more flexibility to respond to supply and demand changes and will have more incentives to innovate when price and profit regulations are removed from the competition laws.

Senior Economist Stephanie M. McAree was part of a team of Department of Justice/Federal Trade Commission competition advisors in the Baltic states from April through November 1994.