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Do institutions receive comparable execution in the NYSE and Nasdaq markets? A transaction study of block trades

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Abstract

The trading structure differences between the NYSE and the Nasdaq market could produce different levels of trading liquidity. Several studies have attempted to measure these differences by comparing bid–ask spreads. This paper uses an alternative approach to compare liquidity. We analyze three issues: (1) the frequencies of the sizes and types of block trades found in the two markets, (2) the immediate price effects of the block transactions, and (3) the temporary and permanent price effects of the blocks. We find evidence that the NYSE system provides more liquidity for block transactions.

Keywords: Nasdaq, NYSE, Block transactions, Market structure

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1. Introduction

The different trading structures of the NYSE, which uses a centralized public limit order book and assigns each stock to a single specialist, and the Nasdaq market, which allows many dealers to compete for order flow in each stock, could result in varying levels of market liquidity. It is often thought that the benefits of liquidity accrue mostly to traders of large volumes, typically institutional traders, rather than to small retail traders. The purpose of this paper is to study whether the two principal trading markets provide similar liquidity when transacting block trades of 10,000 or more shares.

Whether institutions receive comparable execution on Nasdaq and the NYSE for their block trades has become increasingly important. Institutional trading and institutional ownership levels in public firms have increased over the past several years (Kothare and Laux, 1995; Schwartz and Shapiro, 1992). Additionally, the NYSE has begun actively courting institutional investors in an effort to obtain new listings (*Wall Street Journal*, 11/1/95). While many Nasdaq-traded firms eventually choose to list on the NYSE, other exchange-eligible firms, including Apple Computers, Intel, and Microsoft, remain on Nasdaq.

Even though block brokers are available to negotiate the placement of large trades in both NYSE and Nasdaq-traded stocks, the two market structures could affect the price impact of the block trades differently.[1] The National Association of Securities Dealers (NASD) offers several reasons why the Nasdaq market can provide high levels of liquidity for block trades (Groth and Dubofsky, 1987). First, the competitive nature of the multidealer system should force spreads to be narrower than those quoted by a 'monopolist' specialist. Second, dealers offer larger minimum depths so that even if the spread is larger it is good for many more shares than if offered by a specialist. Third, dealers can more readily make a market since they can diversify their positions and spread risk among themselves. Fourth, each dealer competes for and generates information, in contrast to a specialist who must act alone and is restricted by NYSE Rule 98. Finally, a specialist who adjusts inventory will affect the quoted price whereas Nasdaq offers a computerized system for dealers to contact each other when adjusting inventories so that prices are maintained.

On the other hand, Cochrane (1993) lists several reasons why the NYSE should offer superior liquidity. First, there is investor-supplied liquidity from the

[1] It is noteworthy that despite the differences in trading mechanisms, block activity is roughly similar across the two markets. During 1990–1993, ratios of block volume to total volume for the NYSE (Nasdaq-NMS) were 49.6% (42.7%), 49.6% (40.2%), 50.7% (44.5%), and 53.7% (48.6%), and the number of block trades per day averaged 3,333 (2,241), 3,878 (2,811), 4,468 (3,884), and 5,841 (5,745). See the NYSE Fact Book 1991–1993 and the 1991–1994 Nasdaq Fact Book & Company Directory.

limit order book. In contrast, Nasdaq does not have a formal process to expose public limit orders and discourages them in many ways. Not until July 1994 did the NASD adopt a proposal to ban dealers from trading ahead of customer limit orders. However, the practice is still allowed if dealers 'pass-off' the limit orders to another dealer. The NYSE banned such practices several years ago (*Wall Street Journal*, 6/30/94). Second, Cochrane cites evidence of better prices and lower execution costs, again because of the limit orders which represent commitments to future prices. Third, designated market makers are committed to taking offsetting positions since each stock is assigned to a single specialist. Fourth, there is strong adherence to last-sale reporting as required by the SEC's 90-second rule and, hence, high levels of transparency. Finally, there is not only the opportunity to seek counterparties off the floor in the 'upstairs market' before bringing a large trade to the floor, but these trades are then offered potential price improvement through exposure to floor traders and limit orders before final execution.[2]

Prior research provides no conclusive answer as to which trading location offers greater liquidity. The pioneering work of Demsetz (1968) spawned the debate over which type of trading system provides liquidity at lower cost. He compares the advantages from economies of scale in centralized trading activity to the disadvantages from a lack of competitive market making. Ho and Stoll (1983) and Ho and Macris (1985) show that the multidealer market could offer more depth as trading volume increases, although at the cost of wider spreads.[3] Reinganum (1990) conducts an empirical investigation of liquidity premiums and concludes that neither the NYSE nor Nasdaq dominates in providing liquidity but that the Nasdaq system may provide greater liquidity than the NYSE for smaller firms. However, he finds no such advantage for larger firms, and his work cannot explain why Apple and others remain on Nasdaq. More recently, Keim and Madhavan (1995a, 1995b) use proprietary trading information for 21 institutions and find that transaction costs are higher in the Nasdaq market for all but the largest firms. Differences in trading

[2] Keim and Madhavan (1996) and Madhavan and Cheng (1996) find a threshold trade size above which negotiated block trades cause smaller price impacts than equivalently sized blocks that originate on the floor. However, they find that a majority of block trades on the NYSE still originate on the floor rather than in the upstairs market. This is supported by Hasbrouck, Sofianos, and Sosebee (1993) who report that on Jan. 12, 1993, 73% of total NYSE block volume originated on the floor of the exchange. Ninety percent of trades between 10,000–25,000 shares, 68% of trades between 25,000–100,000 shares, and 43% of trades over 100,000 shares originated in the downstairs market. Also, Madhavan and Cheng (1996) find for two months (Dec. 1993 and Jan. 1994) that 83% of NYSE block volume originated on the floor and 72% of blocks for more than 50,000 shares originated in the downstairs market.

[3] Other papers that model the influence of alternative trading mechanisms on prices include Easley and O'Hara (1987), Burdett and O'Hara (1987), Seppi (1990), Kyle (1985), Admati and Pfleiderer (1988), Grossman (1992), and Madhavan (1992).

mechanisms gained national attention due to the wide publicity surrounding the research of Christie and Schultz (1994) and Christie et al. (1994), who find that Nasdaq market makers refrain from using odd-eighth quotes for many of the actively traded Nasdaq securities, raising the question of whether Nasdaq dealers implicitly collude to maintain wide spreads.

This paper adds to the debate over market structure and liquidity in a unique way by investigating which trading location offers greater liquidity for block trades. While much research has been conducted on block trades, nearly all of the studies have focused on blocks traded on the NYSE.[4] We focus our attention on those firms that should be especially interested in the effects of market structure on block trades, i.e., firms whose shares are often traded in blocks and can switch trading mechanisms if they so choose. Perhaps, as Amihud and Mendelson (1988) suggest, these highly liquid stocks on Nasdaq would realize little gain in liquidity from listing on the organized exchanges. Large Nasdaq firms eligible to list are not remaining in the over-the-counter market because of prohibitively high listing costs; Sanger and McConnell (1986) find that the present value of initial and continual listing fees is 0.29% of equity for the average stock.

Although spreads are commonly used to measure liquidity, investors (particularly institutional investors) could be concerned with other measures of trading costs, such as obtaining the best price for the transactions. Schwartz and Shapiro (1992) argue that institutions would rather have an accurate price that reflects the true value of the firm than a narrow spread, because mistiming or mispricing can hurt their returns more than paying the bid–ask spread.

Typically, spreads have been interpreted as reflecting the costs of market making and transacting (Huang and Stoll, 1996). However, recent work by Demsetz (1995) shows that while Nasdaq spreads reflect the cost of market making to dealers, NYSE spreads do not. NYSE spreads are most often set by the limit order book which is driven by public interest so that NYSE spreads do not represent transaction and market-making costs for specialists. Furthermore, Nasdaq quotes often do not reflect the cost of trading for institutional traders. Preferencing agreements create no incentives for dealers to post competitive quotes since large order flows will automatically go to them. Keim and Madhavan (1995b) and Chan and Lakonishok (1995) provide evidence that posted quotes do not reflect the cost of trading with institutions due to their bargaining power, different investment styles, and trader reputations. Lastly, Madhavan

[4] The reaction of bid–ask spreads to block trades has been studied by Glosten and Harris (1988), Hasbrouck (1988, 1991), Stoll (1989), and George et al. (1991). Other papers have studied the impact of block trades on transaction prices, including Scholes (1972), Kraus and Stoll (1972), Dann et al. (1977), Mikkelson and Partch (1985), Holthausen et al. (1987, 1990), Ball and Finn (1989), Madhavan and Smidt (1991), Chan and Lakonishok (1993), Choe et al. (1992, 1994), and Madhavan and Cheng (1996).

(1995) shows that the midquote is not the expected value for an asset when there is serial correlation in order flows. This suggests that the midquote may not reflect the 'true price'. In this study, we use changes in transaction prices instead of changes in spreads as an alternative measure of liquidity. We recognize that this method fails to measure the influence of preferencing arrangements and soft-dollar payments, but such proprietary information is difficult to obtain.

This paper investigates the block trades of the ten largest Nasdaq firms (based on 1990 year-end equity capitalization) eligible to list on the NYSE during 1988–1990. Various criteria are used to create seven samples of ten NYSE firms matched to the ten Nasdaq firms. We analyze three issues: (1) the frequencies of the sizes and types of block trades found in the two markets, (2) the immediate price effects of the block transactions, and (3) the temporary and permanent price effects of the blocks. We find that the overall price impact of block trading is smaller for the NYSE-traded issues than the Nasdaq-traded issues; this finding is robust for all matched samples. The findings are similar for several alternative measures of block impact. Expanded samples and alternative methodologies provide additional supportive evidence.

This paper is organized as follows. Section 2 presents the data and explains the matching procedures. The results for various measures of price impact and permanent and temporary price effects are provided in Section 3, which is followed by conclusions and a discussion in Section 4.

2. Data and methodology

We study and compare the price impact of block trades on the NYSE and in the Nasdaq market during 1990 to contrast the liquidity offered by the two trading structures to large trades. Table 1 presents NYSE listing requirements as found in the *NYSE Fact Book*, issues 1989–1991. We use COMPUSTAT files to find Nasdaq firms that met these listing requirements from 1988–1990, yet remained on Nasdaq through 1992. These criteria reduce the noise in our sample since they eliminate companies that qualified to list on the NYSE but either did not have time to move or moved immediately after our sample period. We exclude any firms that delisted from the NYSE to Nasdaq from 1986–1990. A total of 186 firms were eligible to list for three consecutive years, but eight firms had data inconsistencies and 11 more were not straight common stock issues.

We then focus on the ten largest remaining Nasdaq firms (based on 1990 year-end market values) to allow comparisons of highly liquid firms under two different market structures. While Nasdaq-NMS firms have an average of 11 dealers assigned to their stocks, these ten firms each have over 26 dealers making markets in their stocks (*1991 Nasdaq Fact Book*). The large number of dealers should, in theory, result in a highly liquid market for these securities.

Table 1
Listing requirements for the New York Stock Exchange for the years 1988–1990 as given in the *NYSE Fact Book* for each year (dollars in millions)

	1990	1988–89
Pre-tax income:		
current year	$2.5	$2.5
& previous 2 years	$2.0	$2.0
OR		
current yr.	$4.5	$4.5
& last 3 years aggregate	$6.5	$6.5
Net tangible assets	$18.0	$16.0
Market value equity	$18.0	$16.0
Publicly held shares	1.1 million	1.0 million
Round-lot holders	2,000	2,000
OR		
Total Shareholders	2,200	2,200
&		
Avg. monthly trading vol. (most recent 6 months)	100,000 shares	100,000 shares

We use the Center for Research in Security Prices (CRSP) 1990 files to identify all common stock issues on the NYSE for a population of firms from which to draw matches. We exclude closed-end mutual funds, unit and management investment trusts, firms with fewer than 252 block trades for the year, and (to reduce the impact of price discreteness) stocks selling under $10. We calculate average daily trading volumes and year-end market values for the ten Nasdaq firms and the remaining 500 eligible NYSE stocks. The Institute for the Study of Security Prices (ISSM) 1990 tapes provide all trade volumes and prices time-stamped between 9:30 a.m. and 4:00 p.m. We eliminate opening trades on the NYSE (due to its batch procedure for setting prices at the beginning of the day) and trades flagged O, G, or Z (delayed/reopening trades, aggregated trades, and reported out-of-sequence trades).[5] Finally, we distinguish between block trades transacted at prices higher (lower) than the previous transaction, which we label as upticks (downticks), and block trades that had no change in price from the previous trade, labeled as zeroticks.

[5] We attempted to control for those trades which occurred through Instinet, a private brokerage firm that allows traders to place anonymous orders for possible matching by other interested traders. Approximately 15% of all Nasdaq volume, and less of NYSE's, occurs with Instinet. The ISSM database is known for its inconsistency in labeling such trades, and only two trades were flagged as occurring there. Talks with Instinet representatives, however, reveal that very few trades placed with them are done for over 10,000 shares.

As reported by Atkins and Dyl (1993) and Gould and Kleidon (1994), any comparison of trading volumes between Nasdaq and an organized exchange must take into account the dealer effect on reported volume in the over-the-counter market. Suggestions for percentages by which to reduce reported Nasdaq volume vary from 50% to 65%. We mitigate this problem in our matching procedures described below.

Our objective is to isolate the impact of market structure on liquidity. To do so, we need to control for nonmarket determinants of liquidity, such as firm size and flow of information. Prior research suggests that market value and trading volume are proxies for these determinants (see Amihud and Mendelson, 1986; Grossman and Miller, 1988; Baker and Edelman, 1990; Reinganum, 1990, for work in this area). We must also control for any effects caused by the difference in volume reporting procedures. Since there is no single dimension of matching that obviously dominates all others, we create seven matched samples with ten NYSE firms in each sample. These firms are picked without replacement and matched to a particular Nasdaq firm according to one of the following criteria: (1) 1990 year-end market value of equity, (2) annual total trading volume using one-half the Nasdaq annual total trading volume, (3) the minimum combined difference of one-half the annual Nasdaq trading volume and the 1990 year-end market value of equity, (4) 1990 year-end ratio of market value of equity to book value of equity, (5) annual number of block trades, (6) annual number of block trades using one-half the annual number of Nasdaq block trades, and (7) annual block trading volume using one-half the Nasdaq annual block trading volume.[6]

Table 2 lists the firms in each sample and, in parentheses, the percentage difference in the primary matching variable between each pair. Of the 70 matches, almost 70% (49) are matched to within 1% of the Nasdaq variable. There are 59 matches within 5% and 64 are within 10%. Only two matches exceed differences of 20%. The sample created by matching to the annual number of block trades contains three of the four highest percentage differences. No NYSE common stocks had more than 82% of the annual number of block trades reported for Nasdaq-traded Intel, Apple, or MCI. Since this may be due to the inflated volume figures reported by Nasdaq, we create the sample matched to one-half the Nasdaq firms' annual number of block trades.

Mean and median values of descriptive variables are shown in Table 3. The mean market values of the NYSE firms matched according to one-half

[6]We originally created a match based on three-digit SIC codes and market value in an attempt to control for potential differences in the degree of asymmetric information. A more comprehensive measure of this and firm-specific growth opportunities is the ratio of market value of equity to book value of equity. We thank Hersh Shefrin and Meir Statman for this suggestion. We also created a match based on the ratio of annual block volume to total volume, but because five of the ten matches exceeded differences of 30%, we dropped this sample.

Table 2
NYSE firms which compose seven samples matched to the ten largest Nasdaq firms eligible to list on the NYSE durin· 1988-1990

All samples are based on 1990 data. The percentage difference in the primary matching variable between each Nasdaq rm and its matched firm is shown in *parentheses*.

Nasdaq	Market value[a]	½ Trading volume[b]	Market value & ½ Trading volume[c]	Market value/ Book value[d]	Number of block trades[e]	½ Number of block trades[f]	½ Block volume[g]
Microsoft Corp.	Sears Roebuck (1.07)	NCNB Corp. (0.15)	Southern Co. (8.49, 1.74)	Merck Co. (− 2.89)	Coca-Cola Co. (− 0.29)	Rockwell Int'l (0.48)	CMS Energy (− 0.99)
Intel Corp.	Hewlett Packard (0.54)	Pepsico (− 1.92)	Texas Utilities (− 8.88, − 6.13)	Westinghouse Elec. (− 0.47)	AT&T (− 29.41)	Boeing (− 1.45)	Boeing (3.33)
Apple Computer	American Electric Power (0.31)	GTE Corp. (0.31)	Compaq Computer (− 1.38, − 6.01)	Freeport McMohan (− 0.56)	Citicorp (− 19.91)	Bristol Meyers Squibb (− 0.03)	GTE Corp. (0.18)
MCI Comm.	United Telecomm (− 0.22)	General Motors (0.67)	United Telecomm (− 23.90, − 0.22)	Flowers Industries (0.47)	Philip Morris Co. (− 18.86)	American Express (− 2.41)	Federal Nat'l Mortgage Assoc. (− 0.50)
Food Lion, Inc.	Wisconsin Energy (− 0.10)	Edison Brothers (− 0.58)	Knight-Ridder (5.18, 5.28)	Sara Lee Corp. (0.00)	Time Warner (0.00)	Nicor (0.00)	American Stores (0.11)
Sun Microsystems	Merrill Lynch (0.25)	Motorola (− 1.36)	Union Carbide (− 12.28, − 1.87)	Boeing Co. (0.00)	Federal Nat'l Mortg. Assoc. (− 6.17)	Chase Manhattan (0.51)	DuPont de Nemours E.I. (− 0.47)

SAFECO Corp.	Gerber Products (0.11)	DPL Holding Co. (−0.03)	Clorox Co. (2.36, −2.14)	Williams Cos. (0.00)	Marion Merrill Dow (0.21)	Rite Aid Corp. (0.11)	Ecolab Inc. (0.35)
Nordstrom Inc.	Coca-Cola Enterprises (−0.07)	Circuit City Stores (−0.01)	Niagra Mohawk Power (−2.92, −1.68)	USX Corp. (−0.46)	Halliburton Co. (−0.04)	ITT Corp. (−0.07)	Fund American Cos. (−0.01)
CoreStates Fin.	Eaton Corp. (0.37)	Cypress Semiconductor (−0.32)	Super Value Stores (−2.98, 3.57)	Tektronix Inc. (0.00)	Texas Utilities (0.12)	Cray Research (0.42)	Textron Inc. of Delaware (0.09)
Costco Wholesale	Avon Products (−0.02)	Digital Comm. (0.16)	Lubrizol Corp. (3.96, −2.28)	Nalco Chemical (−0.47)	McDermott Int'l (0.22)	Williams Cos. (−0.51)	Capital Holding (−0.34)

[a] Matched on year-end market values of equity.
[b] Matched on annual trading volume using one-half Nasdaq volume.
[c] Matched on minimizing the joint difference in one-half annual Nasdaq trading volume and year-end market value of equity.
[d] Matched on closest ratio of year-end market value of equity to book value of equity.
[e] Matched on the annual number of block trades of Nasdaq firms.
[f] Matched on one-half the annual number of block trades of Nasdaq firms.
[g] Matched on one-half the annual block volume of Nasdaq firms.

Table 3
Mean (median) sample values of selected descriptive variables for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms (See Table 2 for a description of matching methods)

	Nasdaq	Market value[a]	½ Trading volume	Market value & ½ Trading volume	Market value Book value	Number of block trades	½ Number of block trades	½ Block volume
Market value (in $ millions)	3,789 (2,105)	3,804 (2,106)	7,292 (1,829)	3,727 (2,141)	7,975 (4,674)	15,228 (7,832)	7,895 (3,656)	7,841 (2,278)
Share price ($)	34 (32)	30 (29)	27 (24)	32 (32)	39 (33)	40 (36)	36 (33)	29 (26)
Daily trading volume (00's)	8,728 (6,286)	3,122 (2,499)	4,347 (3,140)	3,970 (3,276)	4,038 (3,266)	9,035 (7,737)	5,177 (2,839)	4,420 (1,482)
Block volume/ Total volume (%)	41.62 (40.80)	48.39 (50.28)	48.64 (48.45)	50.16 (50.31)	44.48 (44.99)	50.47 (52.56)	47.85 (44.74)	47.27 (46.37)
Number of block trades	5,515 (2,987)	1,665 (1,136)	2,314 (1,895)	1,807 (1,338)	2,025 (1,649)	4,647 (2,991)	2,732 (1,489)	2,502 (940)
Daily block volume (00's)	4,154 (1,831)	1,569 (1,268)	2,008 (1,786)	2,183 (1,394)	1,737 (1,421)	4,888 (4,307)	2,631 (1,175)	2,087 (908)
Number of all trades	107,795 (116,180)	43,602 (38,811)	67,007 (38,076)	52,862 (48,427)	66,274 (53,167)	121,844 (89,568)	70,918 (43,581)	60,481 (21,161)

Number block trades: Number all trades (%)	5.10 (2.57)	3.82 (2.93)	3.45 (4.98)	3.42 (2.93)	3.06 (3.10)	3.81 (3.34)	3.85 (3.42)	4.14 (4.44)
Relative trade size (%)*	16.8? (18.69)	23.52 (17.48)	21.20 (10.99)	31.82 (17.75)	26.46 (24.63)	25.66 (13.40)	22.15 (15.05)	17.86 (12.26)
Shares outstanding (000's)	117,967 (107,090)	140,126 (108,297)	247,347 (85,607)	129,458 (105,684)	179,414 (144,867)	394,574 (257,931)	195,695 (124,817)	221,220 (83,045)
Institutional ownership (%)	48 88 (56.10)	47.80 (46.49)	54.34 (52.46)	54.91 (58.94)	54.53 (52.55)	53.75 (56.94)	57.40 (57.91)	60.30 (59.76)
Number of institutions	210 (173)	237 (210)	274 (175)	238 (198)	302 (267)	381 (377)	305 (222)	283 (201)
Officer & director ownership (%)	15.06 (4.98)	10.77 (8.59)	4.90 (3.55)	6.72 (0.45)	3.36 (2.21)	2.78 (0.77)	3.06 (1.03)	3.91 (0.79)

*Relative trade size = Average block trade size Average nonblock trade size.

Nasdaq trading volume, market value-to-book value, one-half number of block trades, and one-half annual block volume are twice that of the mean Nasdaq market value, and NYSE firms matched to the average annual number of Nasdaq block trades are nearly five times larger in market value. This is consistent with the notion that reported Nasdaq volume is inflated by at least 50%. Average share prices are very equivalent, however, indicating that for a given block trade size, dollar-volume traded is also equivalent. The mean and median ratios of block volume to total volume are roughly the same across all samples, averaging 40%–50%. These magnitudes suggest that block trade execution should be a concern to both firms and traders. Interestingly, even though on average the Nasdaq sample has two to three times more block trades per year (5,515) than the NYSE samples, the mean number of block trades relative to all trades is 5.10% for the Nasdaq sample. This is only slightly higher than the 3%–4% proportion of block trades found on the NYSE. In addition, while the average Nasdaq block trade is almost 17 times greater than the average nonblock trade, the average NYSE block trade is 18 to 32 times greater. Thus, Nasdaq has higher block volume and more frequent block trading, but the average Nasdaq block trade size relative to nonblock trade size is smaller than that for the NYSE.

We collect several ownership statistics from Compact Disclosure. The Nasdaq sample has on average fewer shares outstanding, but the level of institutional ownership and the number of institutional shareholders are roughly equivalent to that of the NYSE samples. We find considerable overlap of institutions holding shares of both our Nasdaq and NYSE firms. On average, 77% of the institutions that have investments in our sample of ten Nasdaq firms also invest in the NYSE sample firms. Thus, any differences in the impact of block trades are unlikely to be the result of differences in institutional ownership. Finally, the mean percentage ownership of officers and directors is highest for the Nasdaq sample (15.06%). This is the result of high inside ownership for Microsoft (59%) and Costco Wholesale (40%).

3. Results

3.1. Block trades compared to previous trades

We begin our analysis by comparing the price of the block transaction to the price of the previous transaction for that stock. We then expand the analysis to check for potential information leakage by comparing the block price to transaction prices occurring up to one hour prior to the block transaction. Finally, we use an alternative sample and methodology to provide additional evidence on the price impact of block transactions.

3.1.1. Block trade price compared to previous trade price

Panel A of Table 4 shows the frequency of block type (uptick, downtick, or zerotick) determined by the previous trade price for the ten Nasdaq firms and seven samples of matched NYSE firms. Nasdaq stocks experience uptick and downtick block trades in roughly the same proportion (29.20% and 29.55%, respectively), while zerotick block trades occur more frequently (41.25%). Similar to the Nasdaq sample, the NYSE samples experience uptick and downtick block trades in roughly equivalent, but smaller, proportions (about 20%). All seven NYSE samples trade blocks as zeroticks about 50% more often than the Nasdaq sample, averaging about 61% zerotick block trades. Chi-square tests reject the hypothesis that the frequency of block type in the two markets is the same for all seven matched samples.

Panel B of Table 4 shows that the mean block trade volumes are significantly smaller on the Nasdaq for all seven matched samples and median volumes are significantly smaller for six of seven samples. The mean block size for all Nasdaq blocks is 19,000 shares, while NYSE blocks matched to market value average 23,400 shares. The medians are 14,000 and 15,000, respectively. The block volumes for all three types of block trades (downtick, zerotick, and uptick) are usually significantly smaller for Nasdaq block trades compared to NYSE block trades for all seven matched samples.

To better understand the relative sizes of individual block trades in the two markets, Table 5 presents a frequency distribution by block trade size and block type for all samples of matched firms. For Nasdaq firms, 42.10% of all block trades occur at the minimum block trade volume of 10,000 shares. About 31% of all Nasdaq block trades involve 10,001 to 20,000 shares. The frequency of Nasdaq block trades continues to decline as block volume increases, with only 2.52% of the blocks involving more than 50,000 shares.

NYSE block trades occur less frequently at the minimum block size than Nasdaq block trades, averaging only about 33% of block activity. NYSE block trades happen more often at 10,001 to 20,000 shares than at any other block size and represent about 40% of the blocks. The frequency of NYSE block trades also declines as block volume increases. However, blocks of more than 50,000 shares occur about twice as often on the NYSE than on Nasdaq. The demand for block trades by institutional traders cannot explain this finding since the number of institutional owners, the percentage of institutional ownership, and the identity of institutional owners are very similar for the Nasdaq and NYSE samples. Apparently, the NYSE trading mechanisms are capable of handling much larger blocks than the Nasdaq multidealer system.

It is also interesting that the distribution of block types changes with different block volumes. The frequency of zerotick block trades declines with higher block volumes in both markets. However, the NYSE has a higher incidence of zerotick block trades than the Nasdaq for all categories of block volumes. That is, while large block trades are more likely to cause price movements, they

Table 4
Frequency of blocks and block trade volume

Panel A compares the frequency of block type based on the number of block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms. (See Table 2 for a description of the matching methodology.) Block type is determined by the price of the trade prior to the block trade. Panel B compares the mean (median) block trade volume for the firms. Volume is reported in 100's.

Block type		Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value/ Book value	Number of block trades	½ Number of block trades	½ Block volume
Panel A									
Number of blocks		55,150	15,795	22,124	17,200	19,221	45,061	5,169	24,057
Frequency (%)	Downtick	29.20	17.62	20.51	19.14	22.84	19.34	20.94	21.40
	Zerotick	41.25	61.83	60.11	58.71	57.50	63.41	60.90	60.13
	Uptick	29.55	20.55	19.38	22.15	19.66	17.25	18.15	18.48
χ^2 =			2,109.50	2,443.90	1,637.70	1,560.51	4,922.20	2,703.32	2,441.20
Panel B									
Volume	Downtick	205 (150)	279* (150)*	240* (150)*	410* (158)*	242* (150)*	331* (150)*	276* (150)*	228* (150)**
	Zerotick	179 (125)	217* (145)*	193* (132)*	248* (150)*	186* (130)*	215* (140)*	205* (139)*	181 (125)**
	Uptick	190 (150)	247* (150)*	222* (148)*	349* (150)*	206* (147)*	294* (150)*	258* (150)*	214* (147)*
	All blocks	190 (140)	234* (150)*	208* (140)*	301* (150)*	203* (139)*	251* (147)*	229* (146)*	197* (132)*

All chi-square test statistics reject the hypothesis that the frequency of block type in the two markets is the same at the 1% significance level for all seven samples.

*(*) Significantly larger (smaller) than the Nasdaq sample at 1% (two-tailed test).
**(**) Significantly larger (smaller) than the Nasdaq sample at 5% (two-tailed test).

Table 5
Volume frequency distributions of block trades during 1990 (in percent) for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms (see Table 2 for a description of the matching methods); block type is determined by the price of the trade prior to the block trade

		Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value / Book value	Number of block trades	½ Number of block trades	½ Block volume
Volume	Block type	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume
10,000	Downtick	27.07	15.57	17.44	17.25	20.48	17.11	17.95	18.45
	Zerotick	43.89	64.25	63.96	60.89	60.40	66.26	63.89	63.90
	Uptick	29.04	20.18	18.60	21.86	19.11	16.63	18.16	17.64
	ALL	42.10	31.89	33.81	30.53	34.19	33.79	32.21	37.03
10,001–20,000	Downtick	28.63	17.18	20.17	17.90	22.68	19.10	20.65	21.36
	Zerotick	41.42	63.19	61.54	61.11	58.39	64.78	61.81	61.00
	Uptick	29.95	19.62	18.29	20.99	18.93	16.12	17.54	17.65
	ALL	30.78	39.86	40.10	38.46	40.70	39.22	40.62	39.07
20,001–30,000	Downtick	31.58	19.38	22.68	19.83	23.16	19.82	21.93	23.35
	Zerotick	58.20	59.65	59.27	57.59	55.67	62.10	60.27	56.32
	Uptick	30.22	20.98	18.05	22.59	21.17	18.08	17.81	20.33
	ALL	17.55	14.71	13.96	15.39	13.57	14.07	14.32	12.98
30,001–50,000	Downtick	34.52	20.60	26.76	21.26	27.52	22.48	25.72	27.90
	Zerotick	35.30	55.30	53.18	53.61	49.87	56.75	54.84	50.40
	Uptick	30.18	24.11	20.06	25.13	22.61	20.78	19.44	21.70
	ALL	7.03	8.69	7.96	8.88	7.85	7.99	8.35	7.25
> 50,000	Downtick	40.20	24.51	29.24	30.45	35.44	30.13	33.08	31.78
	Zerotick	31.48	52.29	47.50	44.38	43.74	47.54	44.56	45.40
	Uptick	28.31	23.20	23.26	25.17	20.82	22.33	22.36	22.81
	ALL	2.52	4.84	4.16	6.73	3.70	4.93	4.50	3.67

are less likely to have price impacts on the NYSE than on the Nasdaq. For example, zerotick block trades are more common on the NYSE for 30,001 to 50,000 share trades (about 54%) than they are for Nasdaq trades (35.30%). Even for the largest block trades on the NYSE, zerotick trades are more likely than either downtick or uptick trades in all seven samples. Chi-square tests reveal that the frequency of block type is statistically different across markets for each volume category in all seven samples. Lastly, uptick and downtick block types are about equally likely for smaller block volumes in both markets. As the size of the block increases, downticks become more frequent than upticks in both markets.

The raw data in Tables 4 and 5 suggest that there are differences in the nature of block trading between the two markets. The types and sizes of block trades are statistically different. Block trading on the NYSE involves more shares with fewer instances of price changes. To learn more about the impact of block trading on Nasdaq and the NYSE, we conduct statistical tests on the returns for all blocks as well as for the different types of blocks. Results are presented in panel A of Table 6. We measure the return on block trades as the percentage change in stock price from the previous trade to the block trade. Although Porter and Weaver (1995) find evidence that Nasdaq dealers fail to comply with the SEC's 90-second rule for reporting trades more often than do the specialists of organized exchanges, this finding should introduce no systematic bias to our measures.

We find that block trades are absorbed with less price movement on the NYSE compared to Nasdaq. Downtick block trades for the Nasdaq firms have a mean return of -0.55%. Six of the NYSE samples have significantly smaller price impacts, ranging from -0.39% to -0.48%. For uptick block trades, the Nasdaq firms have a mean return of 0.53%. All seven NYSE samples have significantly smaller returns.

We calculate the price effect for all types of block trades by averaging the unsigned returns for all trades. This measures the overall impact of block trades on price movements and reflects the frequency of zerotick blocks. The smaller the absolute return for a firm, the smaller is the overall price movement due to block trading for that firm. Nasdaq blocks have an average absolute price impact of 0.32%. The average absolute price impacts for the seven NYSE samples are all statistically smaller at the 1% level of significance and average 0.18%. The tests for differences in median returns have similar results. In economic terms, this difference results in a potential cost to Nasdaq block traders of approximately \$4.7 million per year per firm or a perpetuity value of \$1.57 billion for all ten Nasdaq firms using a 3% real discount rate.

To investigate the impact of different block trade sizes, panel B of Table 6 presents mean returns by block type across volume categories. For all but the largest volume category (over 50,000 shares), the NYSE samples have significantly smaller price movements for both uptick and downtick trades and

statistically smaller absolute price changes. (Similar results were found for trades of exactly 15, 20, 25, 30, 35, 40, and 45 thousand shares.)

For blocks of over 50,000 shares, the results are mixed. This could be explained by the fact that the NYSE blocks in this size category are much larger and more frequent compared to the Nasdaq blocks. For the Nasdaq sample, only about 0.09% of all block trades involve more than 200,000 shares versus the NYSE samples, which are about eight times as likely to have blocks of this size. Given the absence of very large block trades on Nasdaq, any conclusions from the results of the comparisons of the mean returns of our samples for the largest size category are unwarranted.

One possible explanation for the large incidence of zerotick block trades found on the NYSE can be that blocks are brokenup on the NYSE but not on Nasdaq. To check this possibility, we eliminate any block trade that has a block trade preceding it within 15 seconds. We repeat all calculations and find results that are qualitatively similar to those in Tables 4 through 6.

3.1.2. Block trade price compared to 15-, 30-, and 60-minute prior trade price

Another potential explanation for the higher frequency of zerotick block trades on the NYSE is that information leakage regarding a block trade being shopped in the upstairs market could cause stock prices to move before the block trade is executed. Since both markets have access to block brokers, this could happen with Nasdaq stocks, too. We attempt to control for information leakage by repeating our comparisons between the two markets using transaction prices prevailing 15 minutes, 30 minutes, and 60 minutes before each block trade as benchmarks. The results are qualitatively similar; we present the results for only the 30-minute interval.

Table 7 shows the revised frequencies of block type by volume category based on the trade occurring at least 30 minutes prior to the block trade. Blocks that trade during the first 30 minutes of the day are eliminated. Panel A shows that based on prices prevailing 30 minutes earlier, block trades in both markets occur as downticks and upticks more often than as zeroticks (roughly 35%, 38%, and 27%, respectively). Five of the seven NYSE samples continue to have higher frequencies of zeroticks than the Nasdaq firms. Overall, the frequencies differ from those based on the prior trade, with the number of zerotick blocks dropping dramatically. This supports the notion that there can be market reaction to an upcoming block trade many minutes before it occurs. Panel B of Table 7 reports mean block trade volumes that are still significantly smaller on Nasdaq for all seven samples and median volumes that are significantly smaller for five of seven matched samples.

Table 8 reproduces volume frequency distributions according to trade size and block type determined by prices prevailing 30 minutes before the blocks. As found earlier, blocks trade most often as 10,000 shares on Nasdaq and as 10,001–20,000 shares on the NYSE. The frequency of blocks over 50,000 shares

Table 6
Returns across block type and volume categories

Panel A shows mean (median) returns across block type for block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms. (See Table 2 for a description of the matching methods.) Panel B shows mean returns for block type across volume categories. Returns are measured as the percentage change in stock price from the previous trade to the block trade. The ALL returns are calculated as the average of the unsigned returns for all trades and thus reflects the frequency of zerotick blocks. Block type is determined by the price of the trade prior to the block trade.

Volume	Block type	Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value/ Book value	Number of block trades	½ Number of block trades	½ Block volume
Panel A									
All volumes	Downtick	−0.55	−0.48*	−0.48*	−0.55	−0.39*	−0.45*	−0.47*	−0.39*
		(−0.45)	(−0.44)*	(−0.42)*	(−0.48)*	(−0.35)*	(−0.34)*	(−0.40)*	(−0.35)*
	Uptick	0.53	0.46*	0.43*	0.49*	0.37*	0.40*	0.43*	0.39*
		(0.45)	(0.42)*	(0.34)*	(0.46)*	(0.36)*	(0.33)*	(0.40)*	(0.36)*
	ALL	0.32	0.18*	0.18*	0.21*	0.16*	0.16*	0.18*	0.16*
		(0.31)	(0.00)*	(0.00)*	(0.00)*	(0.00)*	(0.00)*	(0.00)*	(0.00)*

Panel B									
10,000	Downtick	−0.54	−0.47*	−0.44*	−0.47*	−0.35*	−0.41*	−0.39*	−0.37*
	Uptick	0.53	0.44*	0.39*	0.45*	0.34*	0.39*	0.40*	0.37*
	ALL	0.30	0.16*	0.15*	0.18*	0.14*	0.13*	0.14*	0.13*
10,001 20,000	Downtick	−0.54	−0.47*	−0.46*	−0.50*	−0.37*	−0.42*	−0.42*	−0.38*
	Uptick	0.52	0.45*	0.42*	0.47*	0.37*	0.39*	0.41*	0.39*
	ALL	0.31	0.17*	0.17*	0.19*	0.15*	0.14*	0.16*	0.15*
20,001 30,000	Downtick	−0.55	−0.46*	−0.49*	−0.49*	−0.40*	−0.44*	0.49*	−0.38*
	Uptick	0.53	0.51	0.47*	0.52	0.40*	0.40*	0.46*	0.42*
	ALL	0.33	0.20*	0.20*	0.21*	0.18*	0.16*	0.19*	0.18*
30,001 50,000	Downtick	−0.58	−0.51*	−0.55	−0.53**	−0.41*	−0.47*	−0.49*	−0.41*
	Uptick	0.54	0.47*	0.50***	0.52	0.39*	0.42*	0.49**	0.41*
	ALL	0.36	0.22*	0.25*	0.24*	0.20*	0.19*	0.22*	0.20*
> 50,000	Downtick	−0.60	−0.62	−0.70*	−1.01*	−0.55	−0.81*	−0.96*	−0.67
	Uptick	0.53	0.55	0.55	0.56	0.46**	0.48**	0.62**	0.44*
	ALL	0.39	0.28	0.33*	0.45*	0.29*	0.35**	0.46***	0.31**

*(*)Significantly smaller (larger) than the Nasdaq sample at 1% (two-tailed test).
**(**)Significantly smaller (larger) than the Nasdaq sample at 5% (two-tailed test).
***(***)Significantly smaller (larger) than the Nasdaq sample at 10% (two-tailed test).

Table 7
Frequency of block type and block trade volume

Panel A compares the frequency of block type (downtick, zerotick, and uptick) based on the number of block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988-1990 and seven samples of matched NYSE firms. (See Table 2 for a description of the matching methods.) Block type is determined by the price prevailing 30 minutes prior to the block trade. Panel B compares the mean (median) block trade volume for the firms. Volume is reported in 100's.

Block type		Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value Book value	Number of block trades	½ Number of block trades	½ Block volume
Panel A									
Number of blocks		46,756	13,772	19,282	14,894	16,768	39,102	2,637	20,920
Frequency (%)	Downtick	36.86	31.89	35.82	34.44	37.01	34.78	36.00	36.76
	Zerotick	25.71	29.59	26.62	28.67	25.45	26.89	26.42	24.75
	Uptick	37.43	38.52	37.56	36.89	37.54	38.33	37.58	38.48
χ^2 =			137.24	8.55	56.65	0.41	41.61	6.21	9.46
Panel B									
Volume	Downtick	196 (146)	253* (150)*	219* (150)*	332* (150)*	215* (140)*	281* (150)*	239* (150)*	207* (136)
	Zerotick	189 (145)	212* (150)*	208* (145)*	297* (150)*	199** (140)*	255* (150)*	236* (150)*	199* (140)*
	Uptick	184 (133)	231* (150)*	201* (136)*	286* (150)*	195* (138)*	236* (148)*	228* (140)*	193* (132)*
	All Blocks	190 (140)	232* (150)*	209* (143)*	305* (150)*	204* (140)*	257* (150)*	234* (149)*	200* (135)*

Six of seven chi-square test statistics reject the hypothesis that the frequency of block type in the two markets is the same at the 5% significance level.

*(*) Significantly larger (smaller) than the Nasdaq sample at 1% (two-tailed test).

** Significantly larger than the Nasdaq sample at 5% (two-tailed test).

Table 8
Volume frequency distributions in percent for block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms (see Table 2 for a description of the matching methods); block type is determined by the price prevailing 30 minutes prior to the block trade

		Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value /Book value	Number of block trades	½ Number of block trades	½ Block volume
Volume	Block type	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume	Frequency within volume
10,000	Downtick	36.25	30.97	33.33	35.07	35.99	33.52	34.34	35.95
	Zerotick	25.27	28.23	26.33	25.25	25.05	26.59	25.48	23.76
	Uptick	38.48	40.80	40.34	39.68	38.96	39.90	40.17	40.29
	ALL	41.83	31.18	32.95	29.88	33.49	33.22	31.43	36.17
10,001–20,000	Downtick	36.20	31.91	36.86	33.91	37.32	35.17	36.32	37.36
	Zerotick	26.05	31.26	26.46	30.62	25.81	27.24	27.01	25.25
	Uptick	37.75	36.83	36.38	35.47	36.87	37.60	36.67	37.39
	ALL	31.01	40.44	40.45	38.59	41.04	39.32	40.92	39.55
20,001–30,000	Downtick	37.05	30.22	35.26	32.25	34.91	33.94	35.73	35.11
	Zerotick	26.37	30.12	27.92	31.00	26.31	26.18	26.07	25.26
	Uptick	36.58	39.66	36.82	36.75	38.78	39.88	38.20	39.64
	ALL	17.58	14.78	14.27	16.64	13.87	14.21	14.49	13.10
30,001–50,000	Downtick	41.03	34.61	40.13	33.48	39.79	35.60	37.84	38.23
	Zerotick	25.53	26.36	25.62	28.92	25.17	28.24	27.81	25.53
	Uptick	33.44	39.03	34.25	37.59	35.04	36.16	34.34	36.23
	ALL	6.95	8.71	8.12	8.98	7.91	8.13	8.59	7.41
> 50,000	Downtick	42.37	37.78	38.79	40.95	44.66	41.07	41.93	41.24
	Zerotick	24.49	28.59	27.96	26.95	22.49	26.10	26.09	25.76
	Uptick	33.14	33.63	33.25	32.10	32.85	32.83	31.98	32.99
	ALL	2.52	4.90	4.21	6.90	3.69	5.13	4.57	3.77

increases slightly in the NYSE samples compared to Table 5, suggesting that very large blocks on the NYSE occur less frequently in the first half-hour of trading. Again, the frequency of zeroticks in the largest size category is higher for the NYSE samples than for the Nasdaq firms.

Table 9 presents returns based on the percentage change in stock price from the price prevailing 30 minutes prior to the block trade for the different block types and volume categories. While returns are always larger than the corresponding returns in Table 6, the results are consistent with Table 6. Panel A shows that all seven NYSE samples have significantly smaller block trade price impacts compared to Nasdaq (roughly 0.54% versus 0.66%, respectively). Panel B shows return patterns across block types by volume categories that are similar to panel B of Table 6. While there is evidence in both markets of price movements occurring many minutes before a block trade, the NYSE still absorbs block trades with less price movement than Nasdaq.

3.1.3. Expanded sample

This study compares levels of liquidity offered to large firms in the Nasdaq market and the NYSE by focusing on block trade execution for the ten largest and most actively traded firms on Nasdaq. We do not attempt to draw conclusions regarding the general liquidity in the Nasdaq market versus the NYSE. However, as a check on our restricted sample size, we now expand the sample to include all Nasdaq firms that qualified to list during 1988–1990 and use a sample of NYSE firms matched on market value as a comparison. The original sample contained 167 firms. We drop 18 with prices less than $10 and six more because of data discrepancies. The final sample contains 143 firms which are matched to NYSE firms by closest 1990 year-end market values. Table 10 contains the results of the comparisons. Panel A shows that the average number of block trades is similar (658 for the Nasdaq sample and 748 for NYSE), but again the mean number of shares traded in a block is smaller for the Nasdaq firms (18,700 shares versus 22,800 shares). It is interesting to note that the pattern of block type frequency is very similar to those found in the smaller sample. For example, the incidence of zeroticks is still higher on the NYSE, 58.52% versus 37.52%. Panel B shows the mean absolute price impacts based on the previous trade and the prices prevailing 15, 30, and 60 minutes earlier. Again, the results with the expanded sample are consistent with the smaller sample in that the price impacts of NYSE blocks are significantly smaller across all size categories for all benchmarks. We conclude that Nasdaq firms eligible to list on the NYSE could have smaller block price impacts if their shares were traded on the NYSE.

3.1.4. Regression analysis

To further check our findings we use an alternative methodology and conduct a pooled regression analysis for the ten Nasdaq firms and seven matched

samples. We repeat the regression analysis for the expanded sample of 143 firms. Since the unit of observation is the price impact of each block trade, a fixed effects model is employed and we run the following regression:

$$|Ret_{ij}| = a_0 + a_1 \ln VOL_j + a_2 \ln MV_j + a_3 \ln INST_j + a_4 \ln INSD_j \quad (+) \quad (-) \quad (-) \quad (+)$$

$$+ a_5 STDV_i + a_6 BV/TV_j + a_7 MRKT_j. \quad (+) \quad (-)$$

where

$|Ret_{ij}|$ = absolute return of block i for firm j,
$\ln VOL_{ij}$ = log of volume for block trade i for firm j,
$\ln MV_j$ = log of market value as of year-end 1990 for firm j
$\ln INST_j$ = log of percent institutional ownership as of year-end 1990 for firm j,
$\ln INSD_j$ = log of percent inside ownership as of year-end 1990 for firm j,
$STDV_j$ = average standard deviation of daily stock returns for 1990 for firm j,
BV/TV_j = ratio of annual block volume to total volume for 1990 for firm j,[7] and
$MRKT_j$ = dummy variable equaling one for Nasdaq firms and zero for NYSE firms.

The predicted sign for each variable is shown above the regression equation. We assume that price reactions are due to the expected degree of information asymmetry and market depth for that security. We predict that, ceteris paribus, price reaction to a block trade will be larger the more shares traded in a given transaction ($\ln VOL$), the smaller the firm ($\ln MV$), the smaller the potential depth for block trades as measured by institutional ownership ($\ln INST$), the larger the potential for information asymmetry as measured by insider ownership ($\ln INSD$), the larger the volatility of returns ($STDV$), and the less frequently traders and market makers transact a block in that firm's shares (BV/TV). A check indicates that there are no collinearity problems in the regression analysis. The highest absolute value in the correlation matrix is 0.56 and all condition indices are less than 3.00.

Panel A of Table 11 presents the results for the analysis of the ten Nasdaq firms pooled with the 70 NYSE firms (ten firms from each of the seven matched samples). The coefficient for the market variable is positive and statistically significant, indicating that block trades incur significantly larger price reactions on the Nasdaq. Because the coefficients for $STDV$ and BV/TV are opposite in sign to that expected, a less restrictive regression is conducted that allows each market to determine the slope for these variables. Regression 2 includes the interactive variables $MRKT*STDV$ and $MRKT*BV/TV$. In this regression, the coefficient for the dummy variable $MRKT$ continues to be positive and significant.

[7] Using a ratio accommodates the problem of comparing Nasdaq volume to NYSE volume.

Table 9
Returns across block type and volume categories

Panel A shows mean (median) returns across block type for block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms. (See Table 2 for a description of the matching methods.) Panel B shows mean returns for block type across volume categories. Returns are measured as the percentage change in stock price from the price prevailing 30 minutes prior to the block trade. The ALL returns are calculated as the average of the unsigned returns for all trades and thus reflects the frequency of zerotick blocks. Block type is detemined by the price prevailing thirty minutes prior to the block trade.

Volume	Block type	Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value Book value	Number of block trades	½ Number of block trades	½ Block volume
Panel A									
All volumes	Downtick	−0.94	−0.97	−0.79*	−0.99**	−0.66*	−0.73*	−0.75*	−0.75*
		(−0.67)	(−0.56)*	(−0.53)*	(−0.63)*	(−0.46)*	(−0.54)*	(−0.53)*	(−0.50)*
	Uptick	0.82	0.71*	0.70*	0.76*	0.61*	0.68*	0.69*	0.69*
		(0.65)	(0.52)*	(0.51)*	(0.57)*	(0.44)*	(0.52)*	(0.50)*	(0.48)*
	ALL	0.66	0.58*	0.55*	0.62*	0.47*	0.51*	0.53*	0.54*
		(0.53)	(0.42)*	(0.40)*	(0.48)*	(0.37)*	(0.35)*	(0.42)*	(0.39)*

Panel B									
10,000	Downtick	−0.94	−1.10	−0.76*	−1.07*	−0.65*	−0.72*	−0.73*	−0.78*
	Uptick	0.84	0.73*	0.68*	0.79*	0.62*	0.70*	0.68*	0.73*
	ALL	0.66	0.64	0.53*	0.69*	0.47*	0.52*	0.52*	0.57*
10,001 20,000	Downtick	−0.92	−0.89	−0.78*	−0.92	−0.64*	−0.70*	−0.69*	−0.71*
	Uptick	0.81	0.70*	0.69*	0.74*	0.59*	0.66*	0.67*	0.66*
	ALL	0.64	0.54*	0.54*	0.57*	0.46*	0.50*	0.50*	0.51*
20,001 30,000	Downtick	−0.99	−0.87*	−0.82*	−0.85*	−0.66*	−0.71*	−0.77*	−0.75*
	Uptick	0.83	0.75*	0.73*	0.77**	0.61*	0.64*	0.70*	0.67*
	ALL	0.67	0.56*	0.56*	0.56*	0.47*	0.50*	0.54*	0.53*
30,001 50,000	Downtick	−0.97	−0.86**	−0.83*	−0.90	−0.67*	−0.75*	−0.81*	−0.73*
	Uptick	0.80	0.66*	0.76	0.72*	0.60*	0.67*	0.72*	0.69*
	ALL	0.66	0.56*	0.59*	0.57*	0.48*	0.51*	0.55*	0.53*
> 50,000	Downtick	−1.07	−1.18	−1.00	−1.32*	−0.83*	−1.07	−1.07	−0.83*
	Uptick	0.79	0.70***	0.77	0.73	0.61*	0.71**	0.87	0.66*
	ALL	0.72	0.68	0.64***	0.77	0.57*	0.67	0.73	0.56*

*(*) Significantly smaller (larger) than the Nasdaq sample at 1% (two-tailed test).
**(**) Significantly smaller (larger) than the Nasdaq sample at 5% (two-tailed test).
***(***) Significantly smaller (larger) than the Nasdaq sample at 10% (two-tailed test).

Table 10
Expanded sample of all block trades during 1990 for 143 Nasdaq firms eligible to list on the NYSE during 1988-1990 and 143 NYSE firms matched to 1990 year-end market value of equity

Panel A compares mean number of block trades, block volume, and share price per firm for the two samples and the frequency of block type in the two markets. Panel B compares mean absolute returns calculated as the percentage change in stock price from the trade price to the price prevailing 15 minutes prior, 30 minutes prior, and 60 minutes prior to the block trade.

Panel A

	Mean number of blocks	Mean volume	Mean share price	Frequency (%)		
				Downtick	Zerotick	Uptick
Nasdaq	658	18,700	28	30.34	37.52	32.14
NYSE	748	22,800	27	20.66	58.52	20.81

Panel B

	1 trade earlier		15 minutes earlier		30 minutes earlier		60 minutes earlier	
Volume	Nasdaq	NYSE	Nasdaq	NYSE	Nasdaq	NYSE	Nasdaq	NYSE
All	0.45	0.27*	0.61	0.53*	0.73	0.67*	0.91	0.86*
10,000	0.43	0.23*	0.62	0.52*	0.74	0.69*	0.93	0.90*
10,001–20,000	0.45	0.25*	0.60	0.52*	0.72	0.64*	0.88	0.83*
20,001–30,000	0.45	0.29*	0.58	0.54*	0.71	0.66*	0.91	0.83*
30,001–50,000	0.49	0.33*	0.61	0.55*	0.74	0.69*	0.91	0.85*
> 50,000	0.58	0.46*	0.72	0.68**	0.85	0.80***	1.01	0.98

* Significantly smaller than the Nasdaq sample at 1% (two-tailed test).
** Significantly smaller than the Nasdaq sample at 5% (two-tailed test).
*** Significantly smaller than the Nasdaq sample at 10% (two-tailed test).

Table 11
Regression results

Panel A presents regressions results for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms. (See Table 2 for a description of the matching methods.) Panel B presents regression results for a sample of 143 Nasdaq firms eligible to list on the NYSE during 1988–1990 and 143 NYSE firms matched to 1990 year-end market value of equity. The dependent variable is the absolute returns for all block trades during 1990. The independent variables for Regression 1 are log volume of each block trade (ln *VOL*), log market value as of year-end 1990 (ln *MV*), log percent of institutional shareholders as of year-end 1990 (ln *INST*), log percent of inside ownership as of year-end 1990 (ln *INSD*), average standard deviation of daily stock returns (*STDV*), ratio of annual block volume to annual trading volume (*BV/TV*), and a dummy variable with a value of one for Nasdaq firms and zero for NYSE firms (*MRKT*). The same independent variables are used for Regression 2 with the addition of two interactive variables, (*MRKT***STDV*) and (*MRKT***BV/TV*). All coefficients are multiplied by 100.

Regression	Intercept	ln *VOL*	ln *MV*	ln *INST*	ln *INSD*	*STDV*	*BV/TV*	*MRKT** *STDV*	*MRKT** *BV/TV*	*MRKT*	Adjusted R^2
Panel A											
1	0.527*	0.696*	−0.047*	−0.040*	0.000	−0.609*	0.047*			0.123*	7.87*
2	0.402*	0.070*	−0.042*	−0.030*	0.0000	0.321***	0.126*	−2.092*	−0.398*	0.373*	8.12*
Panel B											
1	1.595*	0.074*	−0.115*	−0.022*	0.002*	−0.269***	0.030*			0.219*	11.05*
2	1.440*	0.075*	−0.112*	−0.020*	0.003*	1.376*	0.158*	−2.570*	−0.294*	0.421*	11.18*

* Significantly different from zero at 1% (two-tailed test).
*** Significantly different from zero at 10% (two-tailed test).

Table 12
Mean temporary, permanent, and total absolute returns for all block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms (See Table 2 for a description of the matching method)

Temporary price effects are calculated as $\ln(Price_t/Price_{t+i})$, permanent effects are calculated as $\ln(Price_{t+i}/Price_{t-1})$, and total effects are $\ln(Price_t/Price_{t-1})$, where t indicates the block trade price and i indicates the number of trades before or after the block.

Relative trade	Price impact	Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value/ Book value	Number of block trades	½ Number of block trades	½ Block volume
+/− 1 Trade	Temporary	0.32	0.13*	0.13*	0.15*	0.11*	0.11*	0.13*	0.11*
	Permanent	0.26	0.21*	0.20*	0.23*	0.18*	0.17*	0.20*	0.17*
	Total	0.32	0.18*	0.18*	0.21*	0.16*	0.16*	0.18*	0.16*
+/− 2 Trade	Temporary	0.32	0.16*	0.16*	0.19*	0.14*	0.13*	0.16*	0.13*
	Permanent	0.27	0.25*	0.24*	0.26*	0.21*	0.19*	0.23*	0.20*
	Total	0.32	0.21*	0.22*	0.24*	0.19*	0.18*	0.21*	0.18*
+/− 3 trade	Temporary	0.33	0.19*	0.18*	0.20*	0.15*	0.15*	0.18*	0.15*
	Permanent	0.28	0.28	0.27*	0.28	0.22*	0.21*	0.25*	0.23*
	Total	0.31	0.24*	0.23*	0.26*	0.20*	0.19*	0.23*	0.20*
+/− 4 trade	Temporary	0.33	0.21*	0.19*	0.22*	0.17*	0.16*	0.19*	0.17*
	Permanent	0.29	0.31*	0.29	0.31*	0.24*	0.23*	0.28*	0.25*
	Total	0.31	0.25*	0.24*	0.28*	0.21*	0.20*	0.24*	0.21*

+ / − 5 trade	Temporary	0.33	0.22*	0.21*	0.23*	0.18*	0.17*	0.21*	0.18*
	Permanent	0.30	0.33′	0.32′	0.33′	0.26*	0.24*	0.30**	0.27*
	Total	0.31	0.27*	0.26*	0.29*	0.22*	0.21*	0.25*	0.22*
+ / − 6 trade	Temporary	0.34	0.24*	0.22*	0.25*	0.19*	0.18*	0.22*	0.19*
	Permanent	0.32	0.35′	0.33′	0.36′	0.28*	0.26*	0.31	0.29*
	Total	0.31	0.28*	0.27*	0.30*	0.23*	0.22*	0.26*	0.23*
+ / − 7 trade	Temporary	0.34	0.25*	0.23*	0.26*	0.20*	0.18*	0.23*	0.20*
	Permanent	0.33	0.37′	0.35′	0.38′	0.29*	0.27*	0.33	0.31*
	Total	0.32	0.29*	0.28*	0.31	0.24*	0.22*	0.27*	0.24*
+ / − 8 trade	Temporary	0.35	0.26*	0.24*	0.27*	0.21*	0.19*	0.24*	0.21*
	Permanent	0.34	0.39′	0.37′	0.39′	0.31*	0.29*	0.35′	0.33*
	Total	0.32	0.31*	0.29*	0.32′′	0.25*	0.23*	0.28*	0.25*
+ / − 9 trade	Temporary	0.35	0.28*	0.26*	0.29*	0.21*	0.20*	0.25*	0.22*
	Permanent	0.35	0.42′	0.39′	0.42′	0.32*	0.30*	0.36′	0.34*
	Total	0.32	0.32	0.30*	0.34′	0.26*	0.24*	0.29*	0.26*
+ / − 10 trade	Temporary	0.36	0.29*	0.26*	0.30*	0.22*	0.21*	0.26*	0.23*
	Permanent	0.36	0.44′	0.40′	0.43′	0.34*	0.31*	0.38′	0.35
	Total	0.32	0.33′′	0.31*	0.35′	0.26*	0.25*	0.30*	0.27*

*(′) Significantly smaller (larger) than the Nasdaq sample at 1% (two-tailed test).
**(′′) Significantly smaller (larger) than the Nasdaq sample at 5% (two-tailed test).

Panel B of Table 11 presents the results for the same regression analysis performed on the expanded sample of 143 Nasdaq firms matched by market value of equity to NYSE firms. The regression results are quite similar to those found in the pooled sample, with the coefficient on the market variable being positive and significant. Overall, the regression results are consistent with the previous findings that block transactions cause larger price movements on Nasdaq than on the NYSE.

3.2. Temporary and permanent price effects

It is possible that institutional traders are not concerned about evidence that blocks trade with larger price impacts on Nasdaq. Large reactions to large trade volumes may be appropriate if the market is incorporating new information. Kraus and Stoll (1972) and Holthausen et al. (1987, 1990) develop methodologies that partition the impact of a block into the portion due to information being impounded in the price (the permanent effect) and the portion due to illiquidity in the market (the temporary effect). To determine whether institutional traders are making appropriate price concessions relative to other traders or are simply having to pay more because the market has lower liquidity and cannot absorb the large trades, we calculate temporary and permanent price effects for the blocks in the two markets. The larger the temporary effect, the higher the premium the trader paid to trade in that market. While the temporary effect is our main concern for this study, for completeness we also present the permanent effect, which indicates whether information was incorporated into the price, as well as the total effect.

Temporary price effects are calculated as $\ln(Price_t/Price_{t+i})$, permanent effects are calculated as $\ln(Price_{t+i}/Price_{t-i})$, and total effects are $\ln(Price_t/Price_{t-i})$, where t indicates the block trade price and i indicates the number of trades before or after the block. Table 12 presents the mean absolute return for each of the price effects calculated out to ten trades on either side of the blocks. Temporary price effects for up to ten trades after a block across all seven matched samples are statistically smaller on the NYSE at a 1% level of significance. Specifically, for up to ten trades and across 70 different matched firms, institutional traders experience smaller price reactions to their trades on the NYSE than on Nasdaq. These findings support those of Keim and Madhavan (1996), who study block trades for much smaller firms. Total price impacts are significantly smaller for all trades and samples except trades $+/-$ 10 for the market value sample and trades $+/-$ 8,9,10 for the sample based on the ratio of market value to book value.

Temporary, permanent, and total price effects are also calculated according to the various size categories used earlier. Results for trades $+/-$ 1,2,3,4 are presented in Table 13. Results for the remaining six trades are qualitatively similar. Temporary effects out to trade $+/-$ 4 across all seven matched

Table 13

Mean temporary, permanent, and total absolute returns for various sizes of block trades during 1990 for the ten largest Nasdaq firms eligible to list on the NYSE during 1988–1990 and seven samples of matched NYSE firms (see Table 2 for a description of the matching methods)

Temporary price effects are calculated as $\ln(Price_t/Price_{t+i})$, permanent effects are calculated as $\ln(Price_{t+i}/Price_{t-i})$, and total effects are $\ln(Price_t/Price_{t-i})$, where t indicates the block trade price and i indicates the number of trades before or after the block.

Volume	Relative trade	Price impact	Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value/ Book value	Number of block trades	½ Number of block trades	½ Block volume
10,000	+ / − 1 trade	Temporary	0.31	0.12*	0.12*	0.13*	0.11*	0.10*	0.12*	0.10*
		Permanent	0.27	0.19*	0.17*	0.21*	0.16*	0.16*	0.17*	0.16*
		Total	0.30	0.16*	0.15*	0.18*	0.14*	0.14*	0.13*	0.13*
	+ / − 2 trade	Temporary	0.31	0.16*	0.15*	0.17*	0.13*	0.12*	0.15*	0.12*
		Permanent	0.28	0.24*	0.22*	0.24*	0.18*	0.18*	0.21*	0.18*
		Total	0.30	0.19*	0.19*	0.21*	0.16*	0.15*	0.18*	0.16*
	+ / − 3 trade	Temporary	0.31	0.18*	0.17*	0.18*	0.15*	0.14*	0.16*	0.14*
		Permanent	0.29	0.27*	0.24*	0.27*	0.20*	0.20*	0.23*	0.21*
		Total	0.30	0.21*	0.20*	0.23*	0.18*	0.17*	0.20*	0.17*
	+ / − 4 trade	Temporary	0.32	0.21*	0.18*	0.20*	0.16*	0.14*	0.18*	0.16*
		Permanent	0.30	0.32*	0.27*	0.30	0.22*	0.22*	0.26*	0.24*
		Total	0.30	0.24*	0.21*	0.24*	0.18*	0.17*	0.21*	0.19*
10,001–20,000	+ / − 1 trade	Temporary	0.31	0.12*	0.12*	0.14*	0.11*	0.11*	0.12*	0.11*
		Permanent	0.26	0.20*	0.20*	0.22*	0.17*	0.16*	0.19*	0.17*
		Total	0.31	0.17*	0.17*	0.19*	0.15*	0.14*	0.16*	0.15*
	+ / − 2 trade	Temporary	0.32	0.16*	0.16*	0.17*	0.14*	0.13*	0.16*	0.14*
		Permanent	0.28	0.24*	0.23*	0.25*	0.21*	0.19*	0.22*	0.20*
		Total	0.31	0.20*	0.20*	0.22*	0.18*	0.17*	0.19*	0.18*
	+ / − 3 trade	Temporary	0.32	0.18*	0.18*	0.19*	0.15*	0.14*	0.17*	0.15*
		Permanent	0.28	0.27	0.27**	0.28	0.22*	0.21*	0.24*	0.23*
		Total	0.30	0.23*	0.23*	0.23*	0.20*	0.18*	0.21*	0.20*

Table 13 (continued)

Volume	Relative trade	Price impact	Nasdaq	Market value	½ Trading volume	Market value & ½ Trading volume	Market value Book value	Number of block trades	½ Number of block trades	½ Block volume
	+ / − 4 trade	Temporary	0.33	0.20*	0.19*	0.21*	0.17*	0.15*	0.19*	0.17*
		Permanent	0.29	0.30	0.29	0.31*	0.24*	0.23*	0.27*	0.25*
		Total	0.31	0.24*	0.24*	0.26*	0.21*	0.19*	0.22*	0.21*
20,001-30,000	+ / − 1 trade	Temporary	0.34	0.14*	0.13*	0.14*	0.11*	0.11*	0.12*	0.10*
		Permanent	0.26	0.21*	0.22*	0.23*	0.19*	0.17*	0.21*	0.19*
		Total	0.33	0.20*	0.20*	0.21*	0.18*	0.16*	0.19*	0.18*
	+ / − 2 trade	Temporary	0.34	0.16*	0.16*	0.16*	0.14*	0.12*	0.16*	0.13*
		Permanent	0.27	0.25*	0.26***	0.26	0.22*	0.19*	0.23*	0.22*
		Total	0.33	0.22*	0.23*	0.24*	0.20*	0.18*	0.21*	0.21*
	+ / − 3 trade	Temporary	0.35	0.19*	0.18*	0.18*	0.16*	0.15*	0.18*	0.15*
		Permanent	0.28	0.28	0.27	0.29	0.24*	0.23*	0.27	0.24*
		Total	0.33	0.24*	0.24*	0.26*	0.21*	0.19*	0.24*	0.21*
	+ − 4 trade	Temporary	0.34	0.20*	0.20*	0.21*	0.17*	0.15*	0.20*	0.17*
		Permanent	0.29	0.30	0.29	0.31*	0.26*	0.23*	0.28	0.26*
		Total	0.33	0.26*	0.25*	0.27*	0.22*	0.20*	0.24*	0.22*
30,001-50,000	+ − 1 trade	Temporary	0.37	0.13*	0.15*	0.14*	0.12*	0.11*	0.13*	0.11*
		Permanent	0.27	0.23*	0.25*	0.27	0.20*	0.21*	0.24*	0.20*
		Total	0.36	0.22*	0.25*	0.24*	0.20*	0.19*	0.22*	0.20*
	+ − 2 trade	Temporary	0.37	0.17*	0.17*	0.17*	0.14*	0.13*	0.16*	0.14*
		Permanent	0.28	0.26***	0.30**	0.28	0.24*	0.22*	0.27	0.23*
		Total	0.37	0.25*	0.28*	0.27*	0.24*	0.21*	0.25*	0.23*
	+ − 3 trade	Temporary	0.36	0.20*	0.19*	0.19*	0.16*	0.15*	0.17*	0.15*
		Permanent	0.28	0.31**	0.32*	0.31*	0.24*	0.23*	0.29	0.25*
		Total	0.36	0.28*	0.30*	0.29*	0.24*	0.22*	0.27*	0.23*

	+ / − 4 trade	Temporary	0.38	0.21*	0.22*	0.21*	0.17*	0.16*	0.19*	0.17*
		Permanent	0.28	0.34*	0.35*	0.32*	0.27***	0.25*	0.31*	0.27
		Total	0.36	0.29*	0.31*	0.29*	0.24*	0.23*	0.27*	0.24*
> 50,000	+ − 1 trade	Temporary	0.39	0.18*	0.18*	0.37	0.21*	0.27*	0.31**	0.17*
		Permanent	0.28	0.29	0.31***	0.38***	0.28	0.31**	0.36*	0.26
		Total	0.39	0.28	0.33*	0.45*	0.35*	0.35**	0.46***	0.31**
	+ − 2 trade	Temporary	0.40	0.21*	0.20*	0.43	0.22*	0.31*	0.31	0.22*
		Permanent	0.26	0.32*	0.34*	0.35*	0.32*	0.29*	0.38*	0.27
		Total	0.38	0.34*	0.37	0.50*	0.38	0.38	0.49*	0.34
	+ − 3 trade	Temporary	0.39	0.22*	0.23*	0.41	0.26**	0.30*	0.35	0.22*
		Permanent	0.29	0.34*	0.37*	0.33*	0.33**	0.29	0.37*	0.29
		Total	0.38	0.34**	0.41	0.51*	0.39	0.40	0.48**	0.35
	+ − 4 trade	Temporary	0.38	0.23*	0.24*	0.42	0.26**	0.31*	0.35	0.22*
		Permanent	0.28	0.38*	0.38*	0.35*	0.34*	0.31**	0.38*	0.33*
		Total	0.38	0.35*	0.39	0.51*	0.41	0.41**	0.51*	0.36

*(*)Significantly smaller (larger) than the Nasdaq sample at 1% (two-tailed test).
**(**)Significantly smaller (larger) than the Nasdaq sample at 5% (two-tailed test).
***(***)Significantly smaller (larger) than the Nasdaq sample at 10% (two-tailed test).

samples for blocks ranging in size from 10,000–50,000 shares are significantly smaller on the NYSE. Nearly all temporary effects for trades over 50,000 shares continue to be significantly smaller on the NYSE. Only two samples have temporary price impacts for these block sizes that are not significantly smaller than similar Nasdaq-traded blocks. Repeating the tests in Tables 12 and 13 for the expanded market value sample of 143 firms shows that for all trades and all sizes, the NYSE sample has significantly smaller temporary and total effects. For practically all sizes of blocks then, the NYSE has smaller temporary price impacts and thus greater liquidity for large trades.

4. Summary and conclusions

We compare the price impact of block trades on the NYSE and the Nasdaq market to contrast the liquidity of the two trading structures. We study a sample of Nasdaq-traded issues that meet NYSE listing criteria during 1988–1990. Firms with a relatively high percentage of their shares traded in blocks and eligible to change trading mechanisms may be concerned about the effects of different trading structures on block trades, given that the number and volume of block trades and the percentage and type of institutional ownership are similar in the two markets.

Our paper extends prior research on block trades that focuses on large trades in the organized exchanges. Only very recently have studies begun to include blocks transacted in the Nasdaq market, and those papers investigate issues other than the relative impact of block trades for firms of equivalent size and risk trading in the different markets. We focus on the ten largest Nasdaq firms eligible for exchange listing and compare the nature of their block trades with NYSE firms matched to various size and trading volume criteria. This approach allows us to focus on the relative abilities of the different trading systems to handle large transactions.

Nasdaq argues that the multidealer system provides more depth and hence more liquidity, while the NYSE stresses the importance of potential price improvement because of exposure to other floor traders and limit orders. Based on the change in price from the previous trade, we find that blocks on Nasdaq result in uptick and downtick trades in the same proportion (29%) and that zerotick trades occur about 41% of the time. In contrast, nearly 61% of the blocks on the NYSE trade with a zerotick, which is significantly more frequent than zerotick block trades on Nasdaq. The average volume for NYSE block trades is significantly larger than for Nasdaq block trades: Nasdaq blocks transact frequently at the minimum block size of 10,000 shares while NYSE blocks are more likely to be in the range of 10,001 to 20,000 shares. NYSE blocks are also twice as likely as Nasdaq blocks to trade in volumes above 50,000 shares.

We first measure the impact of block trades as the relative change in stock price from the previous trade to the block trade. The mean and median returns for uptick and downtick block trades are smaller on the NYSE than on Nasdaq. These findings are robust for all seven matched samples. The absolute return of all block trades in the Nasdaq sample (including the zerotick blocks) is statistically larger than the absolute returns for all seven matched samples of NYSE firms. There is a significant difference in the average price change due to block trading in the two markets of 0.14% (0.32% versus 0.18%). This difference results in a potential present value of extra costs to block traders of approximately $157 million per Nasdaq firm.

We also measure the returns of block trades based upon the prices of trades occurring 15, 30, and 60 minutes prior to the block trade. The returns are consistently greater than returns based upon the earlier trade and could indicate that information regarding the block trade leaks to the market prior to the block trade execution. In all seven matched samples, the NYSE continues to show significantly lower block price impacts than Nasdaq.

An expanded sample of 143 firms matched on market value provides similar results based on trades immediately prior to the block trade as well as on trades occurring 15, 30, and 60 minutes prior to the block trade. A regression analysis also reveals the same pattern of higher price impacts for blocks traded on Nasdaq.

To determine whether the price reactions are experienced solely by block traders and whether they are due to the market's lack of liquidity or to information being incorporated by other traders, we calculate temporary price effects for up to ten trades after the blocks. Across all seven samples and for nearly all sizes of blocks, traders on the NYSE pay smaller premiums to trade blocks.

Despite the consistent results, there are limitations to the empirical methodology used throughout the paper. Ideally, we would like to have information on total execution costs. Unfortunately, without proprietary data, we cannot directly measure the costs faced by institutions in different markets. For example, we are unable to measure commission costs. Some institutions pay commissions on NYSE trades but not on Nasdaq trades. In addition, soft-dollar payments and preferencing arrangements may also affect institutions' costs as discussed in Madhavan (1996). Another limitation to our methodology is our inability to identify interdealer trades on Nasdaq. Our analysis would be more precise if we could eliminate these transactions. However, this limitation may strengthen the results since interdealer trades are likely to be at a zerotick.

Subject to the above limitations, our conclusion is that the NYSE system with its centralized public limit order book and procedures to handle large trades offers block traders superior execution due to the significantly larger average block size, the significantly larger proportion of zerotick block trades, and the significantly smaller temporary price effects. The NYSE system also exhibits

smaller price impacts for uptick and downtick trades of comparable size. Very large block trades (greater than 200,000 shares) rarely occur on Nasdaq. This is unlikely to be the result of differences in the demand for large block transactions, since institutional investors are about equally active in our sample of large Nasdaq firms and matched NYSE firms. We conclude that the Nasdaq multi-dealer system does not execute large institutional transactions as effectively as the NYSE system.

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