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Analyst Recommendations and Nasdaq Market Making Activity

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Abstract:

I investigate the linkage between liquidity provision by Nasdaq market makers and analysts in the same firm. Using three measures of market activity, I find that Nasdaq firms are more likely to provide buy side liquidity in anticipation of upgrades in the period 1999-2000. ECN activity supports this pattern. Firm level evidence shows that 15 of 42 market makers studied engage in significant pre-recommendation activity. I estimate cumulative abnormal returns of more than 75% and profits of almost $600 million in a sample of 47 large capitalization stocks.

JEL: G14; G24.

Keywords: analyst; Nasdaq; market maker.

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Stock analysts became celebrities in the bull market of the 1990s. In the bear market that followed, they became the focus of retail investor outrage, especially after regulatory investigations revealed widespread conflicts of interest. In December 2002, ten of the leading investment banks paid fines totalling $1.4 billion dollars to settle civil claims brought by Eliot Spitzer, the New York Attorney General.

This paper looks at another potential conflict of interest in the stock market, the one between market making activity and analyst recommendations. I find compelling evidence that at many security firms, market making activity is influenced by analyst recommendations. For both 1999 and 2000, I find that market makers tended to accentuate their bid activity in anticipation of analyst upgrades. I estimate the potential profits from this activity to be substantial, approaching $600 million in a group of 47 large capitalization Nasdaq stocks.

The academic literature has focused on both the market power and bias of analysts. It has been well known since Womack's (1996) pioneering work that individual analysts do impact stock returns. Analyst recommendation changes not only produce large daily changes in security prices, but these effects also persist, for as long as six months in the case of downgrades. Barber, Lehavy, McNichols and Trueman (2001) also show that there is investment value in the consensus recommendations.

Well before the Spitzer investigation, research had documented serious bias in analyst recommendations. Analysts have been too bullish overall. In June 2001, 15 months into the bear market, First Call reported that only 2% of all security analyst recommendations were sells. Part of this bias reflects potential revenues from investment banking activities. According to Michaely and Womack (1999), lead underwriter analysts issued 50% more buy recommendations. Their recommendations under performed picks by unconflicted analysts by more than 25% per year for two years.

Spitzer's investigation brought into plain view what the statistical evidence could only hint at. There was direct pressure within firms for analysts to slant coverage in cases where other profitable (generally investment banking) relationships existed. These links are illustrated by an e-mail from Kirsten Campbell to Henry Blodget, both Internet analysts at Merrill Lynch: "... we are putting half of merrill retail into this stock... i don't think that's the right thing to do. We are losing people money and i don't like it. john and mary smith are losing their retirement because we don't want todd [Tappin, GoTo CFO] to be mad at us."[1] GoTo.com (now known as Overture and

recently acquired by Yahoo) was an Internet company that Merrill hoped to win investment banking business from. Large sums of money helped to blur the ethical lines: between December 1999 and November 2000, the Internet group at Merrill produced $115 million in investment banking fees for the firm.

Additional conflicts of interest may arise in firms that sponsor sell-side research and make markets in securities. Analyst recommendations create profit opportunities on an agency basis through brokerage commissions and on a principal basis through proprietary trading. Weiss (2003) notes that for the 10 firms cited by Spitzer, their aggregate share of revenues from commissions (9%) and trading (10.8%) exceeded those from investment banking (8.4%).

The academic literature has found indirect evidence of these conflicts. Ellis, Michaely and O'Hara (2000) find that the lead underwriter typically becomes the most active market maker in the stock and that 23% of profits come from inventory gains and trading. Aggarwal and Conroy (2000) highlight the important role underwriters play in price discovery in the aftermarket for IPOs. Irvine (2003) finds that trading activity in Toronto Stock Exchange issues increases at the analysts' firm in the two weeks following earnings and recommendation changes. Chung, McInish, Wood, and Wyhowski (1995) demonstrate that analysts are more likely to cover stocks on the NYSE and Nasdaq with wide bid-ask spreads. Schultz (2003) also notes that a Nasdaq firm is more likely to make markets in stocks in which they have analyst coverage.

This paper finds empirical evidence of market maker-analyst conflicts in the period leading up to a recommendation change. Section I begins by describing principal and agent relationships that influence liquidity. There is also a discussion of rules and ethical standards regulating these associations.

The Nasdaq[2] limit order book, described in Section II, allows me to observe liquidity from all market makers. Historical data from the order book is collected in Nasdaq's Nastraq database.

Section II also develops a variety of measures of bid or ask pressure. The first relies on the frequency with which a market maker provides the best available price in the marketplace. A second measure takes into account depth on these occasions. A final measure looks at trading activity.

I cross reference, in Section III, the Thomson First Call database of analyst recommendations with data from the order book. I have three complete years of overlap in both data sets, 1999 to 2001. In total, I examine nearly $1,600$ recommendations and the corresponding market making

activity.

For all three liquidity measures, I find evidence of increased bid activity prior to upgrades in the years 1999 and 2000 in Section IV. For downgrades in all years, and for upgrades in 2001, this pattern is not in evidence. In Section V, I find that 7 of the 10 firms fined by Spitzer and 15 of 42 overall show statistically significant links between their analysts and market makers.

An analysis of the ex-post returns in Section VI suggests that the potential profits from this activity are large. I compute a very conservative measure that suggests abnormal profits of $1.8 million per recommendation in just a single week. The aggregate abnormal returns for the 42 firms are 75%.

I conclude with some general comments in Section VII on the Nasdaq and the functioning of a marketplace in which market makers act as both principal and agent.

I. Principal and Agent Conflicts

When a Nasdaq market maker displays a quote to the market, there are two possible sources for the liquidity. The market maker may be acting on an agency basis, representing a customer order or trading as a principal from the firm's inventory. Conflicts[3] can arise in either case, but their empirical implications are similar.

Sell-side research is provided to clients in return for commission business[4]. These arrangements are legal under the SEC Exchange Act of 1934 Section 28(e). A conflict of interest could arise, however, if the information concerned the timing of an analyst's recommendation change. This would violate the Association for Investment Management and Research's Standards of Professional Conduct. Section B.3 requires that "..members shall deal fairly and objectively with all clients and prospects when disseminating investment recommendations..." Section B.8 would also require disclosure of any fees the firm earns for providing such information. NASD's Rule 2711, which took effect in July 2002, now clearly prohibits pre-release access of the content of the firm's research report.

A Nasdaq firm accumulating (selling) shares prior to the public release of the analyst upgrade (downgrade) presents an obvious conflict of interest. This kind of trading would be a violation of NASD Rule 2110.4 which prohibits "...purposefully establishing, creating or changing the firm's inventory position...in anticipation of the issuance of a research report..."

Both principal and agent conflicts should result in changes in the bid or ask behavior of market

makers *prior* to their recommendation changes. The next section develops several quantitative measures of market maker activity.

II. Buying and Selling Interest

The National Association of Security Dealers Automated Quote System (Nasdaq) has a unique microstructure conducive to our analysis. Nasdaq has no trading floor and provides a decentralized network of broker dealers and automated quote and execution systems. In the absence of a centralized auction as in the New York Stock Exchange, traders on the Nasdaq receive a comprehensive display of limit order prices and depth[5] known as the Level II. This enables the public to view the behavior of distinct market makers and their electronic competitors[6] known as ECNs (Electronic Communication Networks). Because of the ability to identify liquidity provision from specific market participants in the order book, my study is limited to Nasdaq stocks. Historical data from the Level II is obtained from the Nastraq database.

While all quotes on the Nasdaq are firm, one way to express buying (selling) interest is to provide the best bid (offer). I can illustrate this idea by discussing Figure 1.

[INSERT Figure 1 HERE]

In the figure[7], there are five tiers of liquidity for the Nasdaq National Market (NNM) stock Cisco Systems (CSCO). On the left side of the color coded display, one can see five liquidity providers at the best bid of 19.98. These include four market makers, GVR Company (GVRC), Morgan Stanley (MSCO), Spear Leeds and Kellog (SLKC), and Soundview Technology (SNDV), and one ECN, the Nasdaq-owned ECN (SIZE). ECNs are distinguished by a # in the display. The best offer is just a penny away at 19.99 with liquidity from a market maker, U.S. Bancorp Piper Jaffray (PIPR), and the ECN Size.

These quotes make up what is called the *inside market* in the stock. In the aggregate, Cisco's national best bid and offer (NBBO) is 19.98×19.99 with a depth of $6,100 \times 1,500$. These depths should be construed as minimums. In many cases, market makers will refresh their quotes automatically to provide greater depth at that price.

Under the Nasdaq's new SuperMontage system, which was fully implemented in December 2002, market makers may offer depth at more than one price level. For example, Morgan Stanley (MSCO) is bidding for 2,100 shares at 19.98 and for another 500 shares at 19.97. The multiple quotes are not relevant for our study which only spans 1999-2001.

A key decision for a market maker is how to represent his own buying and selling interest and those of his clients. I turn to this decision in the next section.

II.A Inside market appearances

The first measure of buying and selling interest I will tabulate is the willingness of a market maker to provide a quote to the inside market. Simaan, Weaver and Whitcomb (2003) note that Nasdaq market makers are less likely to enter the inside market than ECNs. ECN quotes of all kinds are nearly three times as likely to improve the inside market than market maker quotes. They conclude that market makers place a value on anonymity. A decision to take the inside bid (ask) may be informative and consistent with a desire to accumulate (decumulate) shares or raise (lower) the share price.

I count the number of times[8] a market participant provides a price quote in the inside market. I compute average counts for the bid and the ask for the market maker in a period from 4 weeks (-16 to -20 days) before the recommendation change to 4 weeks after (+16 to +20). For clarity, I will discuss the results for one upgrade by Goldman Sachs of Qualcomm, Inc. (QCOM) on April 21, 1999.

Qualcomm Upgrade on April 21, 1999
Inside Market Appearances by Goldman Sachs

Days	Date	Bid Count	Ask Count
-10	7-Apr-1999	82	172
-9	8-Apr-1999	85	345
-8	9-Apr-1999	192	3
-7	12-Apr-1999	97	283
-6	13-Apr-1999	420	337
-5	14-Apr-1999	40	79
-4	15-Apr-1999	295	172
-3	16-Apr-1999	228	174
-2	19-Apr-1999	910	229
-1	20-Apr-1999	179	243

Two weeks prior to the analyst's upgrade (days -6 to -10), the Goldman Sachs market maker was more often on the inside offer than on the inside bid. The average inside ask count for the week was 228.00 versus a 175.20 average for the inside bid count. In the week prior to the upgrade this pattern reverses, with an average inside bid count of 330.40 versus 179.40 average inside ask appearances.

If the average bid (ask) side count rises in a week prior to an upgrade (downgrade) from the

average 2, 3 or 4 weeks prior, this will be evidence of market maker analyst conflicts.

II.B Inside depth

A market maker could also accumulate (decumulate) shares without altering their inside frequency counts. They could simply increase the number of shares bid (offered) whenever they take the inside. To capture this possibility, I aggregate the depth of a market maker every time they take the inside bid or ask. For upgrades, I compute a ratio of the number of times average aggregate inside bid depth exceeds aggregate inside ask depth. I compute the converse ratio for downgrades. As before, I use rolling 5 day periods before and after the downgrade.

In practice, this measure is highly correlated with our prior measure because many market makers offer a constant bid or ask size. Goldman Sachs, for example, shows a constant bid size of $1,000$ shares more than 99% of the time. It is worth recalling that quoted depth and true depth are not the same on the Nasdaq because market makers can set a reserve depth not visible[9] in the Level II display.

II.C Matched trades

Quotation activity represents only an intention to buy or sell a security. My third measure looks at trading activity to see if it is consistent with the quotes.

I assign trades to the bid or ask based on the standard assignment mechanism, distance from the quote midpoint. A trade that goes off above (below) the midpoint is considered to be a buyer (seller) initiated trade. I then assign the buyer (seller) initiated trades equally to all the market participants on the inside bid (ask). I aggregate these throughout the trading day and compare weekly averages. A pattern of increased buyer (seller) initiated trades in the week prior to an upgrade (downgrade) will provide evidence of possible conflicts.

III. Data

III.A Liquidity in the Nasdaq marketplace

The large capitalization stocks in the Nasdaq are aggregated into the Nasdaq 100 index. The individual stocks are extremely liquid; futures, options, and exchange traded funds based on the index contribute to trading volume. To maintain a consistent sample, I chose to analyze the 47

listings that remained[10] in the Nasdaq 100 during the four years of 1999-2002[11]. This group and some of their characteristics are listed in Data Appendix A.1.

The 47 stocks had capitalizations ranging from $268.7 billion at the end of 2000 (CSCO: Cisco Systems) to $2.3 billion (CPWR: Compuware). The sample average is $34.18 billion. The stocks traded an average of 13.79 million shares per day in December 2000.

On average, 68 market makers and ECNs provide liquidity in the 47 issues. All ten of the investment banks that settled with New York Attorney General Spitzer also make markets in Nasdaq securities. I list each of the ten, their Nasdaq market participant identity symbols, and their Nasdaq national market share of volume from December 2000. (1) Bear Stearns and Co. (BEST: 1.80%); (2) Credit Suisse First Boston LLC (CSFB: 3.38%); (3) Deutsche Bank Securities Inc. (DBKS, DBAB: 1.83%); (4) Goldman, Sachs & Co. (GSCO: 3.50%); (5) J. P. Morgan and Chase Co. (JPMS, JPHQ: 0.68%); (6) Lehman Brothers, Inc. (LEHM: 2.32%); (7) Merrill Lynch and Co. (MLCO: 4.63%); (8) Morgan Stanley & Co. (MSCO: 4.48%); (9) Salomon Smith Barney (SBSH: 5.42%); (10) UBS Warburg (WARR, UBSW: 1.54%);

ECNs had approximately 17% of the market[12] in December 2000, so the ten banks cited by Spitzer had 30% of the overall national market volume and 36% of the non-ECN share[13]. The 42 market maker-investment bank pairs I study had 41% of the total market and 49% of the non-ECN share.

III.B Details on the First Call database

Thomson Financial is now the publisher of the industry standard database of earnings estimates and analyst recommendations that were originally offered by First Call and I/B/E/S. The data set covers over $9,700$ securities with information from 1990. I will be using only a small portion of the data set that intersects with my data on Nasdaq liquidity.

There are 808 entities providing security recommendations. Thomson translates the qualitative recommendations of brokerage firms into a five point scale, with one the strongest buy recommendation. I exclude recommendations that are not issued in real time, reiterations of previous recommendations, and initial ratings.

For the 47 stocks, there are 747 upgrades by 82 entities in the three years from 1999 to 2001. There are 852 downgrades by 90 entities between 1999 and 2001 in the Nasdaq 100 sample.

In 1999, during the tech stock boom, upgrades outnumber downgrades, 297 versus 198. In 2000, as tech stocks began to decline, downgrades became the majority. The ratio of upgrades to

downgrades was 203 to 276. In 2001, in the second year of a tech stock bear market, the downgrades dominate the upgrades, 377 to only 245.

In the upgrade group, I can match a subset of these 82 entities to 42 market making firms in the Nasdaq. For a listing of these pairs, see Data Appendix A.2. Within my 42 pairs are all of the top ten underwriting firms of tech IPOs for 1999, and 21 of the top 25.

Limiting myself to these market making-analyst matched pairs, my sample retains 636 upgrades. In about 80% of these cases, the analyst firms also make markets in the stock that they upgrade. After excluding unmatched combinations, I am left with 536 events in the three year period. For each Nasdaq stock, there is a median of 10 upgrades, with a range from 28 (Applied Materials: AMAT) to 0 for Compuware (CPWR). Only Compuware (CPWR) has no upgrades from 1999-2001 in the matched set.

For the downgrades, I search for matches among the same 42 market maker analyst pairs in a sample of 720 recommendations. Again, in about 80% of the cases, the market maker does provide liquidity in the stock. There are then 586 events in the three year downgrade sample from 1999 to 2001. Each Nasdaq stock has a median of 12 downgrades, ranging from 30 for Oracle (ORCL) to 0 for Compuware, which is again the only stock with no downgrades.

In all, I have a large sample of analyst ratings changes and a set of affiliated market makers representing nearly half of the market maker share on the Nasdaq.

IV. Aggregate Results

This section aggregates the recommendation changes across analysts and stocks in two sub-periods, 1999-2000 and 2001. Tables I to VI show the results for upgrades and downgrades for the three liquidity measures before and after the recommendation change.

The inside counts, such as those in the Goldman Sachs example in Section II, are summed over five days and treated as a single binomial event. Begin and end indicate the range of days relative to the public release by the analyst. For an upgrade (downgrade), if the average bid (ask) activity for the week exceeds ask (bid) activity, I assign a value of 1. The column labeled frequency is the fraction of times that the recommending market maker provided more liquidity in the direction of the recommendation change.

I have chosen a binomial test of count frequency for two reasons apart from its simplicity: (1) the data come from a variety of market makers, large and small; (2) the stocks are also heterogenous

in terms of market capitalization, quote, and trade activity. I will examine later in this section whether this heterogeneity matters for the results.

In Tables I to VI, I report a p-value of the probability that the observed count frequency in the week prior to the recommendation change is consistent with the count frequency in some other week. A small p-value indicates that bid (ask) pressure increases significantly for that upgrade (downgrade) with respect to the reference week.

IV.A Upgrades - inside bid activity

In the first two lines of Table I, for example, I observe that inside bid counts exceed inside ask counts 181 out of 327 times -6 to -10 days prior to upgrades in 1999 and 2000. That is a relative frequency of 55.4%. In the week prior to the upgrade, the firm's market maker is more often on the inside bid 63.6% of the time, or 208 out of 327 cases. This increase in inside bid activity is significant at the 99.9% confidence level. I note that this increase in inside bid presence is significant with respect to 3 and 4 weeks prior[14] (-11 to –15 and -16 to -20 days) as well.

[INSERT Table I HERE]

Looking at 1999 and 2000 separately reveals this pattern to be stable. In 1999, there are 189 upgrades. 54.0% of the time from day -10 to -6 prior to the upgrade, market makers are more frequently on the inside bid than ask. This rises to 61.4% the week prior. Bid count prevalence rises from 57.3% to 65.9% from two weeks to one week prior to upgrades in 2000.

The upgrades in 2001 do not show the pattern of increased bid side activity. Bid count appearances are steady in the two weeks prior to the upgrade at 56.4%.

In all three years, it appears that bid side activity persists after the upgrades. In 1999-2000, inside bid frequency is still above 60% four weeks after the upgrade. In 2001, bid side activity returns to normal after three weeks.

IV.B Downgrades - inside ask activity

The downgrades in Table II show no distinct pattern of prior week selling pressure. Market makers are on the inside ask more frequently two weeks prior than one week, 40.0% versus 39.1%. The symmetric pattern to the upgrades is just not present in the downgrades.

[INSERT Table II HERE]

In 2001, inside ask counts for the downgrades are similar to 2000 at a 39% average. There is

again no evidence of pre-recommendation ask side pressure.

After the downgrades are released, the inside ask side pressure in 1999-2000 is not very protracted, returning to normal after a week. In 2001, after a downgrade, the inside ask pressure stays high for three weeks.

IV.C Other liquidity measures

Inside depth

This pattern of pre-upgrade bid activity is also supported by the inside depth measure. In Table III, market makers have a larger aggregate inside bid depth 52.9% of the time two weeks prior to upgrades. This jumps to 61.2% in the week prior. The proportional increase in bid pressure is almost identical to the inside bid counts, and the resulting binomial test rejects at the same significance level, 99.9%. The upgrades in 2001 show a rise when I compare the week prior to two weeks prior, but not when I compare it to the aggregate liquidity earlier in the month.

[INSERT Table III HERE]

Inside bid depth remains very strong in the week following the upgrade, and stays above pre-upgrade levels for the rest of the month in 1999-2000. Aggregate bid liquidity stays elevated for only a week after the upgrade in 2001.

[INSERT Table IV HERE]

The same two sample periods for downgrades are in Table IV. Downgrade ask depth exceeds bid depth between 41 and 44% of the time in the month prior to the recommendation change during 1999 and 2000. It is stable throughout the month, and betrays no overt signs of a market maker decumulating (or shorting) shares. There is a one week surge in ask pressure after the downgrade. The pattern in 2001 is similar, although average sell side liquidity appears a bit lower. There is a strong surge in ask pressure after the downgrade, exceeding 50% for the only time in the sample, but it falls back to pre-downgrade levels after three weeks.

Matched trades

The trade data is also supportive of the pattern of pre-upgrade accumulation in the period 1999 to 2000. Buyer initiated trades, as reported in Table V, exceed seller initiated trades 53.8% of the time from -6 to -10 days prior to the upgrade in 1999-2000. This jumps to 61.8% in the week prior to the upgrade. I can then reject this increase as random at the 99.5% level or better with respect

to any of the three preceding weeks. Again, in 2001, there is no statistically significant pattern.

[INSERT Table V HERE]

Strong buyer initiated trading continues for (at least) a full month after upgrades in 1999-2000. In 2001, there is only a one-week surge in buyer initiated trading.

[INSERT Table VI HERE]

The downgrades show no pre-recommendation pattern in either 1999-2000 or 2001 in Table VI. There is a sustained increase in seller initiated trades after the downgrades in both samples, but the relative increase is larger in the 1999-2000 period.

IV.D Do analyst firm market makers differ?

One possible explanation for my pre-upgrade results is that buyers enter the market because of good news. Analysts then react to bullish news with upgrades. If the signal or information were public though, a randomly selected market maker would on average also be more eager to buy the stock. In this section, I examine and reject this explanation for my results.

For every security that undergoes a recommendation change, I construct a list of market makers who are present every day in a one month window before and after the announcement. I then select a market maker randomly from this list and compute the inside bid and ask counts. Results for this randomly selected group are in the first panel of Table VII.

[INSERT Table VII HERE]

I do not find any statistically significant pattern of inside bid counts prior to upgrades in either sample period. In reporting the results in Table VII, I show the p-value for a test that the 63.6% bid frequency from Table I is random based on the count for the corresponding time period. In all cases, I reject at the 99.9% level or more. Interestingly, the random market makers also do not provide post recommendation change bid pressure either. They reduce their bid side presence to under 50% for three of the next four weeks. I will examine post-upgrade performance in greater detail in Section VII.

It might be the case that analyst firms may have an informational advantage[15], and they receive some news not available to other market makers. I take a second random selection among all the firms that have a rating on the stock and also make markets in it. This group, in the second panel, shows a slightly higher average bid side frequency of 56.9% versus 53.0% for a purely random market

maker. In the week prior to the recommendation change though, the analyst market making firms decrease their inside bid presence, unlike the firms about to upgrade. This differs from the pattern in Table I at the 99.8% level.

I also reject that our pattern from Table I is random at the 99% level in 8 of the 10 weeks, and at the 90% level for all 10 weeks, including those after the upgrade. Based on the average frequency for the four weeks prior to the upgrade, I can reject a market wide analyst informational advantage at the 99% level.

IV.E Initial summary of evidence

Measured by inside market presence, inside depth or trade initiation, there is a strong pattern of pre-upgrade market maker buying activity in the first two years of our sample. The pattern is almost certainly not random or common across all analysts.

The downgrades for all three years from 1999-2001 show no significant patterns. By disaggregating the results, I hope to better understand where this pre-upgrade pattern is coming from.

V. Disaggregate Findings

I now examine several cross sectional breakdowns of the results. I provide results for individual market makers, ECNs and market making subsidiaries, and provide frequency counts by stock.

V.A By market maker

I examine one dimension of the heterogeneity in the data set by breaking down the results for individual market makers. My tests here are limited by sample size. For only four market makers, Merrill Lynch (MLCO), Prudential (PRUS), Morgan Stanley (MSCO) and ABN Amro (ABNA), do I have more than 20 upgrades in the sub-sample 1999-2000. For 16 market makers, though, I do have 10 or more. Table VIII shows the sample sizes for upgrades, and tests of the their inside bid count activity.

[INSERT Table VIII HERE]

Merrill Lynch, our most active market maker analyst pairing, also provides the strongest evidence in support of our hypothesis. In only 12 of 29 upgrades does their inside bid count exceed the ask count two weeks prior to an upgrade. In the week prior though, their inside bid counts surge and exceed the ask counts 62.1% of the time, or 18 of 29 times. Despite a relatively small

sample, I can reject that Merrill's behavior is random at the 98.8% level.

There is one other market maker I can reject at the 98% level, Credit Suisse First Boston (FBCO) which raises its inside bid prevalence from 46.2% to 76.9%. I can reject two other market makers at the 95% level, William Blair (WBLR) and J.P. Morgan (JPMS), and three others at the 90% level, U.S. Bancorp Piper Jaffray (PIPR), A.G. Edwards (AGED), and Donaldson, Lufkin and Jenrette (DLJP).

This group is certainly heterogenous with three industry titans, Merrill, J.P. Morgan, and First Boston, all of whom were cited by Spitzer and were among the top ten tech underwriters during the Internet boom. There are also three mid-tier players, Piper Jaffray, A.G. Edwards and Donaldson, Lufkin. Finally, a very small firm also makes it into the group, William Blair.

It should be noted that the other three of our most active pairings do not display any pattern of buying pressure (p-values are in parentheses): Morgan Stanley (0.34), Prudential (0.50), ABN Amro (0.50). The largest Nasdaq market maker by share in our group, Salomon Smith Barney (0.32), also does not demonstrate pre-upgrade accumulation.

[INSERT Table IX HERE]

In 2001, while there appears to be no market wide pattern of pre-upgrade activity, individual market makers in Table IX show significant increases in their bid presence. First Boston (0.00), A.G. Edwards (0.01), and J.P. Morgan show continuations of their prior market making activity. Morgan Stanley is significant at the 95% level, and Dain Rauscher (DAIN) at the 92% level.

[INSERT Table X HERE]

For the downgrades, my tests were unable to detect any market wide selling interest. Individual market makers, however, do demonstrate a pattern of increased inside ask activity. For 1999-2000, as shown in Table X, A.G. Edwards and Hambrecht and Quest (HAMR) are significant at the 98% level, and Lehman Brothers (LEHM) and Piper Jaffray are at the 95 and 90% levels, respectively. Merrill Lynch at the 99% level, Legg Mason (LEGG) at the 98% level, and Robertson Stephens (RSSF) at the 95% level are the only statistically significant rejections in 2001 in Table XI. As with the upgrades, this is a diverse group, ranging from boutique size, Hambrecht and Quest, to financial supermarket, Merrill Lynch.

[INSERT Table XI HERE]

Merrill Lynch is noteworthy for appearing in three of our four samples (all but the downgrades

in 1999-2000). Their size alone is clearly not the determining factor. Salomon Smith Barney has about 80% of the events of Merrill Lynch (35 versus 46 downgrades, and 30 versus 41 upgrades), but it never shows a statistically significant market making pattern. A.G. Edwards, a much smaller firm, also appears in three of four samples at the 10% level or better (all but the downgrades in 2001). J. P. Morgan and First Boston appear in both upgrade samples.

V.B Market making subsidiaries

There are many investment firms which do market making through subsidiaries as well. Because of the indirect linkage, it may be possible that some firms use their subsidiary market making relationships to avoid the appearance of a conflict. There are six linked firms in my sample: (1) Goldman Sachs and Spear Leeds and Kellog (SLKC) which merged on September 11, 2000; (2) Morgan Stanley which acquired Dean Witter (DEAN) back in 1997; (3) Deutsche Bank which acquired National Discount Brokers (SHWD, NDBC) in June of 2000; (4) Merrill Lynch acquired Herzog, Heine Geduld, LLC (HRZG) on June 6, 2000; (5) First Boston has an IPO sharing relationship with Charles Schwab (MASH, SCHB) that started in 1997. (6) J.P. Morgan has the same IPO sharing relationship and is a minority shareholder in Schwab Capital Markets (MASH, SCHB).

[INSERT Table XII HERE]

I look at upgrade and downgrades during the entire period of the company's linkage and find strong evidence for our upgrade pattern in Table XII across these subsidiaries. The Morgan Stanley-Dean Witter pairing is a strong one, and can be rejected as random at the 99.8% level. The Goldman Sachs-Spear Leeds relationship is also strong and can be rejected at the 95% level. At the 89% level or better, I can also identify a pattern in both Deutsche Bank and National Discount Brokers and Credit Suisse First Boston and Charles Schwab's Mayer Schweitzer. What is especially interesting about these results is that they include upgrades into 2001 as well. I found no significant links in the downgrade group, so these are not reported.

Including the subsidiary relationships, 15 of 42 market makers and 7 of the Spitzer 10 show significant market making analyst linkages: A. G. Edwards (AGED); Dain Rauscher (DAIN); Deutsche Bank (DBAB); Donaldson, Lufkin, Jenrette (DLJP); First Boston (FBCO); Goldman Sachs (GSCO); Hambrecht and Quest (HAMR); J.P. Morgan (JPMS); Legg Mason (LEGG); Lehman (LEHM); Merrill Lynch (MLCO); Morgan Stanley (MSCO); Piper Jaffray (PIPR); Robert-

son Stephens (RSSF); and William Blair (WBLR).

V.C By stock

I find the market making pattern prior to upgrades is present across a wide variety of stocks. Even though the analysis is restricted to large cap stocks in the Nasdaq 100, they are still a diverse group, with market capitalization from $2 to $200 billion. Trading activity also displays a wide range from an average of a half million shares a day in Panamsat Corp. (SPOT) to 107 million for Microsoft, (MSFT). Market maker competition is also diverse, from 32 for Paccar Inc. (PCAR) to 111 for Oracle (ORCL) and Cisco (CSCO).

[INSERT Table XIII HERE]

In 1999-2000, our significant bid pressure group from Table XIII includes Microsoft, Applied Materials (AMAT) and Yahoo (YHOO) among the larger caps, and Staples (SPLS), Biogen (BGEN), and Linear Technology (LLTC) among the smaller caps. Across the entire sample, I find bid pressure unrelated to market capitalization, number of market makers, or trading volume. The total number of recommendations does matter, so a more frequently covered stock is more likely to enter the group.

[INSERT Table XIV HERE]

In 2001, the significant upgrade group in Table XIV is entirely new with the exception of Applied Materials, our most frequently upgraded stock. Oracle is also highly significant. The only other stock at the 95% level is Chiron (CHIR). There is no significant relationship with any stock characteristics.

There are five stocks in Table XV which display significant ask pressure in 1999 and 2000 at the 95% level: Yahoo, Fiserv (FISV), Xilinx (XLNX), Apple (AAPL) and Linear Technology. Yahoo, Linear Technology and Applied Materials (which is significant at the 93% level) are notable, because they also appear on the upgrade bid pressure list for the same time period.

[INSERT Table XV and XVI HERE]

Linear Technology appears yet again in the downgrade list in Table XVI for 2001 at the 99.9% level. The other repeat stock is Microsoft at the 95% level. Microchip Technology (MCHP), Biogen (BGEN), Dell (DELL) and ADC Telecommunications (ADCT) appear for the first time and are significant at the 95% level or higher. None of the stock characteristics matter for the ask pressure

frequency in either time period.

I next turn to an analysis of the anonymous trading outlets available to Nasdaq market makers.

V.D ECN activity

One surprising aspect of these results is that Nasdaq market makers have the ability to quote anonymously through ECNs. The majority of institutional ECN trading takes place on the Instinet (INCA) network, even though Island[16] had more liquidity during our sample period. This is partly due to Instinet's long term presence in the market, and because their order book is only visible in its entirety to subscribers. Archipelago (ARCA) which is owned partly by Goldman Sachs, J.P. Morgan and Merrill Lynch, among others, is the other ECN with substantial institutional liquidity.

Selling interest is more likely to be expressed through an ECN than through a market maker. INCA is unconditionally more likely to be an inside ask participant 55.14% of the time in 1999-2000. Conversely, our 42 market makers are more likely to be on the inside ask 50.1% of the time in 1999-2000.

[INSERT Table XVII HERE]

Despite having an ask side bias, Instinet appears to respond to upgrades in 1999 and 2000, although not as strongly as the market makers. Three and four weeks prior to an upgrade in Table XVII, INCA is more often on the inside bid than ask only 41.3% of the time. This increases to 46.5% two and one week prior to the upgrade. Comparing the later two weeks (-1 to -10) to the prior two weeks (-11 to -20), I detect the presence of inside bid pressure at the 99.8% level. Bid pressure remains strong for a month after the upgrade. The pre-upgrade pattern is not repeated in 2001.

[INSERT Table XVIII HERE]

There is some evidence for an increase in ask pressure in 1999 and 2000 for downgrades in Table XVIII. The inside ask presence increases from 52.9% to 56.9% from two weeks to one week prior, which is significant at the 92.5% level. This surge, however, is not statistically significant compared to the 58.5% inside ask presence four weeks prior. After a downgrade, there is some persistent inside ask activity. For two weeks, sell side pressure is over 61%. The pattern both before and after is not repeated in 2001.

A similar analysis for both Island and Archipelago revealed no significant patterns for either upgrades or downgrades.

I will devote the rest of my discussion now to what happens to the stock price and market making activity *after* the recommendation change has been made public.

VI. Returns

Given all of the recent publicity about analyst's conflict of interest, it may be surprising that Womack (1996) finds substantial investment value to brokerage industry recommendations in his 1989-1991 sample. Abnormal returns from the day before the event to one month after are 5.93% for upgrades and −5.38% for downgrades. Perhaps more surprising is that, especially for the downgrades, the returns are persistent. In the six months following the recommendation change, abnormal returns are 2.42% for upgrades and −6.42% for downgrades.

[INSERT Table XIX HERE]

Abnormal returns in my sample are summarized in Table XIX. My ex-post returns are similar to Womack's but less persistent for the downgrades. From one day before to four days after (−1 to 4) the recommendation change, upgrades have an abnormal return of 5.73% in 1999 and 2000. Even in the bear market year of 2001, these returns are positive, 5.00%. Downgrades also have a strong impact in the bull market years of 1999 and 2000, −7.24%. The downgrade returns in 2001 are nearly symmetric to the upgrades, −5.01%.

For the downgrades, I find that the entire return is in the first week. During the next three weeks, there is an abnormal *positive* return of 1.69% in 1999-2000. Even in the bear market of 2001, the three week abnormal return after one week is 0.86%. There are positive abnormal returns from 1 to 3 weeks after the upgrades, 0.32% in 1999-2000 and 1.70% in 2001.

VI.A Profitability analysis

There is little evidence that *ex-ante* market maker activity impacts *ex-ante* returns. In three of four cases though (with the exception of the upgrades in 1999 to 2000), stock prices do move in the direction of the recommendation change in the week prior.

I do find substantial evidence though that ex-ante market making activity does effect *ex-post* returns. In three cases (the exception are the downgrades in 1999-2000), pre- and post-change returns have the opposite sign. I also find that market maker bid activity raises ex-post returns for the upgrades. Finally, a sub-group of market makers that display significant pre-upgrade increases in inside bid frequency produce large abnormal returns.

I regress the abnormal return from one day before to four days after on the recommendation change on three explanatory variables and a constant. The results for the two upgrade and downgrade samples are in Table XX.

[INSERT Table XX HERE]

The first explanatory variable is the prior return from -5 to -1 days before. The two upgrade samples show mean reverting returns. A 1% increase in the week prior is associated with a -0.10% reduction in the ex-post return in 1999-2000, and -0.26% in 2001. Only the latter estimate is statistically significant though. Both downgrade prior return coefficients are insignificant as well.

To test the impact of market maker activity, I sum the difference between inside bid and ask counts in the five days prior to the recommendation change and use this as an excess demand regressor. The estimates for upgrades and downgrades in 1999 and 2000 are statistically significant. The upgrade regression suggests that if a market maker is on the inside bid 234 times more often than on the ask, there is a 1% higher ex-post return. The downgrade regression has the wrong sign: 148 net inside ask appearances *raise* the stock price ex-post by 1%. The sample estimates for upgrades and downgrades in 2001 for this variable are insignificantly different from zero.

Finally, I include a dummy variable for whether the market maker was significant at the 95% level in Tables VIII to XI. In the first case, I assign a dummy if the upgrading market maker is Merrill Lynch, First Boston, J.P. Morgan or William Blair. Their presence in 1999-2000 is associated with a 3.29% higher ex-post return. In 2001, the upgrade group is First Boston, A. G. Edwards Morgan Stanley and J.P. Morgan. They raise ex-post returns by 3.26%. The downgrade group, A.G. Edwards, Hambrecht Quest and Lehman Brothers in 1999-2000, and Merrill Lynch, Legg Mason, and Robertson Stephens in 2001, have a very small (under 0.5%) positive and insignificant impact on abnormal returns.

The last estimate I compute from this regression are the abnormal profits from market maker accumulation in the 1999-2000 time period. First, I compute the marginal abnormal return due to market maker activity by multiplying inside frequency counts times the elasticity in Table XX. I report aggregate results by market maker in Table XXI. The average marginal abnormal return for all market makers is 0.23%. The range is from 20.47% at the high for Robertson Stephens (RSSF) and to -5.86% at the low for Salomon Smith Barney (SBSH).

[INSERT Table XXI HERE]

I construct the dollar profitability estimates by first calculating bid or ask share[17] in the security

from relative inside frequency counts. I then multiply that by the trading volume over the five days. Finally, I multiply by the five day return in the security times the dollar price on the close the day before the announcement. In total, I show profitability estimates of $592 million for the 327 upgrades, or an average of $1.81 million per upgrade.

The profits for individual firms in Table XXI present a slightly different picture than our statistical results in Tables VIII to XI. Most of our statistically important market makers also show large profits: First Boston with $192 million and CIBC with $65.5 million are among them. Our most active analyst-market making pair, Merrill Lynch, is actually estimated with a loss of −$47.17 million[18]. Robertson Stephens, which is on the bid and offer in equal frequencies overall, instead shows a profit estimate of $292 million.

VII. Conclusion

This paper looks at Nasdaq market making activity in the most liquid stocks in the month before and after analyst recommendation changes. I reject the null hypothesis that analysts and market makers act independently. On a given week before an upgrade in 1999-2000, I find that buying interest by market makers accelerates. This is true whether I measure how often a market maker enters the inside market, from the aggregate depth they provide on the inside, or whether trades tend to go off on the ask when they bid for shares. This is not a market wide phenomenon. A randomly selected market maker or analyst tends not to display a similar uptick in buying interest. Evidence from ECNs and market making subsidiaries reinforces these results. 15 of the 42 market makers studied show significant changes in their pre-recommendation liquidity provision.

The pre-upgrade activity influences ex-post returns. Aggregate stock returns are cumulatively more than 75% higher due to market maker activity in the upgrade events, an average of 0.23% per upgrade. I estimate aggregate market maker profits of almost $600 million.

I can only speculate why the results appear to weaken in 2001. There are at least three possible explanations: (1) The bear market. Barber, Lehavy McNichols and Trueman (2003) note that returns to analysts picks deteriorated drastically in 2000-2001; (2) Regulation Fair Disclosure[19] (Reg FD), which appears to increase the quantity of public information; (3) The Spitzer investigation. All three explanations are intermingled, but each would reduce the benefits of pre-upgrade accumulation.

The fact that conflicts appear to be present primarily on upgrades is consistent with the buy-

side bias on Wall Street. It seems reasonable to conclude, as do Michaely and Womack (1999, p.654) that "implicit pressure on analysts to ... maintain positive recommendations" may extend to market makers as well.

Overall this statistical evidence, while certainly not a smoking gun, questions the impartiality of both analysts and market makers. It merits further investigation by the appropriate regulatory agencies.

Paul Schultz (2003, p.72) questions in his analysis of the Nasdaq "why market making is typically bundled with brokerage, analyst coverage and underwriting in the same firm. Why are not these businesses separable?" He suggests that "one possibility is that the information generated in one of these activities is valuable in the others..." Our analysis supports this explanation and points to inherent problems in the Nasdaq microstructure that regulation alone may not be able to eliminate.

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Notes

[1]The e-mail exchange is dated November 16, 2000, and was made public by the initial Spitzer investigation into conflicts just at Merrill Lynch. See http://www.oag.state.ny.us/press/2002/apr/MerrillL.pdf, exhibit (ML 09045). Blodget gained notoriety for his bullish recommendations of Amazon.com. He left Merrill in December 2001, and was barred from the securities industry for life by the SEC.

[2]The reason for looking at Nasdaq stocks has nothing to do with a possible ethical gap between New York Stock Exchange specialists and Nasdaq market makers but rather the transparency of the Nasdaq microstructure.

[3]Michaely and Womack (1999) also note that proprietary trading can come into conflict with a market maker's best execution responsibility. This seems to be an inherent problem of the Nasdaq microstructure.

[4]It is also common practice for some of the commission revenue to be returned to the institutional client in the form of "soft dollars." This conflict between the mutual fund shareholders and management has recently come under scrutiny as well.

[5]For a discussion of the mechanics of the Level II display and short-run price discovery on the Nasdaq, see Mizrach (2002).

[6]Additional information on ECNs may be found in Hasbrouck and Saars (2002), Weston (2002), and Barclay, Hendershott, and McCormick (2001).

[7]This graphic is from the Nasdaq's TotalView display which provides the full order book of liquidity. It can be found at http://viewsuite.nasdaqtrader.com/total.asp. The Nastraq database provides only the top market maker quote.

[8]A market maker who appears most frequently on the bid or ask is known among daytraders as "the ax."

[9]Mizrach (2002) shows that the number of market makers on the inside bid or offer matters more than the quoted depth for short term price discovery.

[10]There was substantial turnover during this time period though because of the dramatic rise and collapse of the technology stock market.

[11]ATML and VTSS were dropped on December 23, 2002, but were included in the sample. USAI become IACI on June 23, 2003.

[12]ECNs have a much higher share of trades, around 35%, than of volume, because the ECNs, especially Island (ISLD), the largest ECN in our sample period and a favorite of daytraders, handle many small trades.

[13]The remaining market share is highly concentrated in retail oriented market makers like Knight-Trimark (NITE) which had market share of 7.188% in December 2000.

[14]The number of cases sometimes drops off with longer lags because the dealer may not have made markets in the security in the prior weeks. Some of the recommendations from January 1999 may also extend outside my sample of dealer quotes.

[15]I thank Roberto Rigobon for this suggestion.

[16]In May of 2001, Reuters took Instinet public and in September 2002, they acquired Island. The two ECNs continued to operate independently with different clienteles during the rest of my sample. In 2002, Archipelago (ARCA) became the second most liquid ECN.

[17]This is measured as percentage of the time on inside bid less the percentage on the inside ask, relative to all other market participants, summed over the 5 days prior to the recommendation change.

[18]The loss is due to two upgrades of Amazon.com on August 18, 1999 and February 3, 2000 which are estimated to have cost the firm -$24.48 and -$35.94 million, respectively.

[19]You can read more of the details on Reg FD at the SEC web site: http://www.sec.gov/rules /final/33-7881.htm. It was implemented on October 23, 2000. Heflin, Subramanyam and. Zhang (2003) find that post-earnings announcement price changes are smaller. Bailey, Li, Mao, and Zhong (2003) find that the quantity of public information increases.

Data Appendix A.1
Market Characteristics for Nasdaq 100 Stocks[20]

Company Name	Ticker	Market Cap	Daily Close	MMs	Volume
APPLE COMPUTER INC	AAPL	4.9962	14.875	86	7.528
ADOBE SYSTEMS INC	ADBE	13.9850	58.188	59	4.371
ADC TELECOMMUNICATIONS INC	ADCT	13.9916	18.125	79	11.756
ALTERA CORP	ALTR	10.4310	26.313	73	7.121
APPLIED MATERIALS INC	AMAT	30.9752	38.188	88	34.581
AMGEN INC	AMGN	65.7216	63.938	77	6.687
AMAZON.COM INC	AMZN	5.5430	15.563	87	9.622
ATMEL CORP	ATML	5.4194	11.625	82	9.679
BED BATH BEYOND INC	BBBY	6.3232	22.375	57	4.108
BIOGEN INC	BGEN	9.0518	60.063	65	2.440
BIOMET INC	BMET	7.0599	26.458	70	2.272
CHIRON CORP	CHIR	7.9955	44.5	58	1.629
COSTCO WHOLESALE CORP	COST	17.8959	39.938	69	6.785
COMPUWARE CORP	CPWR	2.2823	6.25	57	3.496
CISCO SYSTEMS INC	CSCO	268.6623	38.25	111	75.053
CINTAS CORP	CTAS	8.9505	53.188	37	1.571
CITRIX SYSTEMS INC	CTXS	4.1787	22.5	73	4.236
DELL COMPUTER CORP	DELL	45.6299	17.438	100	41.356
ERICSSON (L M) TEL -ADR	ERICY	80.1665	11.188	84	1.346
ELECTRONIC ARTS INC	ERTS	5.5373	42.625	45	2.031
FISERV INC	FISV	5.8464	47.438	45	1.884
GENZYME GENERAL	GENZ	7.8442	44.969	49	3.937
INTEL CORP	INTC	202.3206	30.063	97	58.297
INTUIT INC	INTU	8.1601	39.438	59	5.744
KLA-TENCOR CORP	KLAC	6.2660	33.688	68	5.156
LINEAR TECHNOLOGY CORP	LLTC	14.6483	46.25	57	4.038
MICROCHIP TECHNOLOGY INC	MCHP	2.6048	21.938	47	3.187
MOLEX INC	MOLX	5.9723	35.5	38	0.823
MICROSOFT CORP	MSFT	231.2902	43.375	99	107.893
MAXIM INTEGRATED PRODUCTS	MXIM	13.6383	47.813	54	3.672
NEXTEL COMMUNICATIONS	NXTL	17.9611	24.75	70	9.991
ORACLE CORP	ORCL	162.6758	29.063	111	43.358
PAYCHEX INC	PAYX	18.0544	48.625	55	3.914
PACCAR INC	PCAR	3.7684	49.25	32	1.209
PEOPLESOFT INC	PSFT	10.6151	37.188	63	4.707
QUALCOMM INC	QCOM	61.5120	82.188	82	17.809
STARBUCKS CORP	SBUX	8.2097	22.125	65	4.117
STAPLES INC	SPLS	5.3508	11.813	65	6.613
PANAMSAT CORP	SPOT	5.1907	34.688	40	0.505
SMURFIT-STONE CONTAINER CORP	SSCC	3.6379	14.938	37	1.953
SUN MICROSYSTEMS INC	SUNW	89.7116	27.875	96	67.308
TELLABS INC	TLAB	23.1714	56.5	75	5.488
USA NETWORKS INC	USAI	5.8017	19.438	50	2.654
VERITAS SOFTWARE CO	VRTS	35.7567	87.5	67	11.584
VITESSE SEMICONDUCTOR CORP	VTSS	9.9353	55.313	72	6.758
XILINX INC	XLNX	15.2074	46.125	77	9.747
YAHOO INC	YHOO	16.5144	30.063	86	18.016

[20] Market capitalization is in billions of dollars. The average price is the monthly average of the daily closes. The number of market makers is the total for the entire month. Volume is in millions of shares. All data are for December 2000.

Data Appendix A.2
Nasdaq Market Makers[21]

Company	MMID	Merger date	Share	Up	Down
ABN Amro Securities LLC	AANA		0.274	37	42
Adams, Harkness Hill, Inc.	ADAM		0.242	6	7
Advest, Inc.	ADVS		0.059	3	1
A. G. Edwards Sons, Inc.	AGED		0.264	31	36
Brown Brothers Harriman Co.	BBHC		0.000	3	4
Sanford C. Bernstein Co., Inc.	BERN		0.000	6	6
Bear, Stearns Co. Inc.	BEST		1.799	18	15
C.E. Unterberg, Towbin	CEUT		0.131	3	6
CIBC World Markets Corp.	OPCO, CIBC	3-May-1999	0.910	23	17
SG Cowen Securities Corporation	COWN		0.501	19	30
RBC Dain Rauscher Inc.	DAIN		0.560	4	3
Deutsche Bank Securities Inc.	DBKS, DBAB	16-Jan-2001	1.832	19	23
Donaldson, Lufkin, Jenrette	DLJP		0.072	11	7
Dresdner Kleinwort Wasserstein Securities	DKNA, DRKW	29-Jan-2001	0.003	2	11
First Albany Corporation	FACT		0.059	9	4
Credit Suisse First Boston LLC	FBCO		3.379	26	39
Goldman, Sachs Co.	GSCO		3.502	20	13
W.R. Hambrecht + Co., LLC	HAMR		0.063	22	24
Investec Inc.	ITEC		0.000	2	3
J. P. Morgan Securities	JPMS, JPHQ	5-Jan-2001	0.680	20	27
Kaufman Bros., L.P.	KBRO		0.019	2	2
Legg Mason Wood Walker, Incorporated	LEGG		0.202	3	5
Lehman Brothers Inc.	LEHM		2.319	14	21
Merrill Lynch and Co.	MLCO		4.626	43	46
Banc of America Securities LLC	MONT		1.958	23	32
Morgan Stanley Co., Incorporated	MSCO		4.481	36	45
Needham Company, Inc.	NEED		0.135	24	19
U.S. Bancorp Piper Jaffray Inc.	PIPR		0.707	13	16
Prudential Securities Incorporated	PRUS		1.034	36	26
UBS PaineWebber Inc.	PWJC		0.861	12	10
RBC Dominion Securities Corporation	RBCD		0.031	13	17
Robertson Stephens, Inc.	RSSF		1.912	24	20
The Seidler Companies Incorporated	SASI		0.009	1	1
Citigroup Global Markets Inc.	SBSH		5.419	30	36
Sands Brothers Co., Ltd.	SNDS		0.027	1	2
Soundview Technology Corporation	SNDV		0.435	16	19
Tucker Anthony Cleary Gull	TGUL		0.000	6	9
Thomas Weisel Partners LLC	TWPT		0.737	7	15
UBS Warburg	WARR, UBSW	7-May-2001	1.540	24	26
William Blair Company L.L.C.	WBLR		0.197	8	9
Wachovia Securities, Inc.	WCHV		0.000	5	12
Wells Fargo Securities, LLC	WELS		0.000	11	14

[21] These are the 42 firms for whom I have analyst recommendations and market making combinations. MMID is the market maker identity observed in the Nastraq database. Merger dates are the days in which the MMID changes in the Nastraq database. Share is the market share of volume for that market maker in all Nasdaq national market securities for the month of December 2000. Up (Down) is the number of upgrades (downgrades) in the sample from the analyst firm.

Table I
Inside Market Maker Counts - Upgrades[22]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	-1	208	327	0.6361	
-10	-6	181	327	0.5535	0.0013
-15	-11	180	317	0.5678	0.0023
-20	-16	179	312	0.5737	0.0030
0	5	210	336	0.6250	0.5449
6	10	208	336	0.6190	0.4553
11	15	216	336	0.6429	0.7873
16	20	203	336	0.6042	0.2516

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	101	179	0.5642	
-10	-6	101	179	0.5642	0.5000
-15	-11	108	177	0.6102	0.9173
-20	-16	109	177	0.6158	0.9389
0	5	121	179	0.6760	0.9993
6	10	109	178	0.6124	0.9169
11	15	113	178	0.6348	0.9785
16	20	96	178	0.5393	0.2738

[22] The frequency is the ratio of market makers whose inside bid counts trades exceed inside ask counts. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table II
Inside Market Maker Counts - Downgrades[23]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	-1	128	327	0.3914	
-10	-6	131	327	0.4006	0.6325
-15	-11	133	321	0.4143	0.8461
-20	-16	118	318	0.3711	0.2808
0	5	153	334	0.4581	0.9860
6	10	126	334	0.3772	0.2147
11	15	134	333	0.4024	0.5445
16	20	137	333	0.4114	0.6720

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	93	259	0.3591	
-10	-6	100	259	0.3861	0.8142
-15	-11	107	259	0.4131	0.9614
-20	-16	104	259	0.4015	0.9184
0	5	128	259	0.4942	1.0000
6	10	105	257	0.4086	0.9505
11	15	116	257	0.4514	0.9987
16	20	93	255	0.3647	0.5518

[23] The frequency is the ratio of market makers whose inside ask counts exceed inside bid counts. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table III
Inside Market Maker Liquidity - Upgrades[24]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	-1	201	327	0.6147	
-10	-6	173	327	0.5291	0.0010
-15	-11	171	317	0.5394	0.0012
-20	-16	162	312	0.5192	0.0001
0	5	206	336	0.6131	0.6729
6	10	190	336	0.5655	0.0933
11	15	197	336	0.5863	0.2898
16	20	196	336	0.5833	0.2534

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	105	179	0.5866	
-10	-6	92	179	0.5140	0.0259
-15	-11	108	177	0.6102	0.7795
-20	-16	105	177	0.5932	0.6202
0	5	117	179	0.6536	0.9703
6	10	100	178	0.5618	0.2728
11	15	106	178	0.5955	0.6200
16	20	91	178	0.5112	0.0256

[24] The frequency is the ratio of market makers whose aggregate inside bid depth exceeds their inside ask depth. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table IV
Inside Market Maker Liquidity - Downgrades[25]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	-1	134	327	0.4098	
-10	-6	139	327	0.4251	0.7120
-15	-11	140	321	0.4361	0.8698
-20	-16	138	318	0.4340	0.8457
0	5	159	334	0.4760	0.9858
6	10	133	334	0.3982	0.2512
11	15	148	333	0.4444	0.8395
16	20	141	333	0.4234	0.5878

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	99	259	0.3822	
-10	-6	99	259	0.3822	0.5000
-15	-11	112	259	0.4324	0.9485
-20	-16	104	259	0.4015	0.7369
0	5	136	259	0.5251	1.0000
6	10	125	257	0.4864	0.9996
11	15	124	257	0.4825	0.9994
16	20	108	255	0.4235	0.8975

[25] The frequency is the ratio of market makers whose aggregate inside ask depth exceeds their inside bid depth. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the freqeuency for the reference week.

Table V
Trading Activity - Upgrades[26]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	-1	202	327	0.6177	
-10	-6	176	327	0.5382	0.0020
-15	-11	176	317	0.5552	0.0047
-20	-16	164	312	0.5256	0.0001
0	5	210	336	0.6250	0.7134
6	10	199	336	0.5863	0.2527
11	15	202	336	0.6012	0.3691
16	20	216	336	0.6429	0.8948

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	102	179	0.5698	
-10	-6	92	179	0.5140	0.0674
-15	-11	107	177	0.6045	0.8218
-20	-16	98	177	0.5537	0.3251
0	5	113	179	0.6313	0.9558
6	10	91	178	0.5112	0.0669
11	15	95	178	0.5337	0.1837
16	20	98	178	0.5506	0.3256

[26] The frequency is the ratio of market makers whose buyer initiated trades exceed seller trades. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table VI
Trading Activity - Downgrades[27]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	-1	116	327	0.3547	
-10	-6	120	327	0.3670	0.6769
-15	-11	119	321	0.3707	0.7560
-20	-16	113	318	0.3553	0.5926
0	5	146	334	0.4371	0.9986
6	10	129	334	0.3862	0.8695
11	15	139	333	0.4174	0.9869
16	20	126	333	0.3784	0.7855

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	94	259	0.3629	
-10	-6	92	259	0.3552	0.3976
-15	-11	103	259	0.3977	0.8734
-20	-16	96	259	0.3707	0.6015
0	5	109	259	0.4208	0.9705
6	10	102	257	0.3969	0.8744
11	15	108	257	0.4202	0.9710
16	20	109	255	0.4275	0.9786

[27] The frequency is the ratio of market makers whose seller initiated trades exceed buyer trades. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table VII
Random Market Maker Inside Bid Counts - Upgrades 1999-2000[28]

All Market Makers

Begin	End	Press	Total	Frequency	p-value
-5	-1	179	327	0.5474	0.0006
-10	-6	176	327	0.5382	0.0002
-15	-11	161	316	0.5095	0.0000
-20	-16	163	311	0.5241	0.0000
0	5	167	336	0.4970	0.0000
6	10	158	336	0.4702	0.0000
11	15	181	336	0.5387	0.0002
16	20	165	336	0.4911	0.0000

Market Maker Analyst Pairs

Begin	End	Press	Total	Frequency	p-value
-5	-1	177	317	0.5584	0.0023
-10	-6	179	317	0.5647	0.0046
-15	-11	168	305	0.5508	0.0010
-20	-16	182	303	0.6007	0.0957
0	5	187	327	0.5719	0.0095
6	10	175	327	0.5352	0.0001
11	15	180	327	0.5505	0.0009
16	20	196	327	0.5994	0.0878

[28] The frequency is the ratio of market makers whose inside bid counts exceed inside ask counts. The p-value is the probability of observing the inside frequency counts from Table I in the week prior to the recommendation change using the randomly selected market maker bid frequencies.

Table VIII
Inside Quote Activity by Market Maker Upgrades 1999-2000[29]

MM	Total	Bid Press	Control	p-value
MLCO	29	18	12	0.0118
FBCO	13	10	6	0.0130
JPMS	6	4	2	0.0416
WBLR	6	4	2	0.0416
PIPR	6	5	3	0.0512
AGED	7	6	4	0.0633
DLJP	10	8	6	0.0984
GSCO	10	7	5	0.1030
FACT	3	3	2	0.1103
CIBC	12	8	6	0.1241
SBSH	19	10	8	0.1764
NEED	11	8	7	0.2654
BEST	12	7	6	0.2819
MSCO	24	15	14	0.3394
ABNA	24	17	17	0.5000
ADAM	3	2	2	0.5000
COWN	13	8	8	0.5000
HAMR	5	3	3	0.5000
LEHM	10	6	6	0.5000
MONT	16	10	10	0.5000
PRUS	26	17	17	0.5000
PWJC	10	6	6	0.5000
TWPT	2	1	1	0.5000
RSSF	17	11	12	0.7027
SNDV	12	4	5	0.7209
UBSW	9	5	6	0.7602
DBAB	5	2	3	0.8193
ADVS	1	1	1	1.0000
BBHC	0	0	0	1.0000
BERN	0	0	0	1.0000
CEUT	2	1	0	1.0000
DAIN	2	1	0	1.0000
DRKW	0	0	0	1.0000
ITEC	0	0	0	1.0000
KBRO	0	0	0	1.0000
LEGG	1	0	1	1.0000
RBCD	0	0	0	1.0000
SASI	1	0	0	1.0000
SNDS	0	0	0	1.0000
TGUL	0	0	0	1.0000
WCHV	0	0	0	1.0000
WELS	0	0	0	1.0000

[29] Total is the total number of upgrades. Bid Press is the number of times the inside bid count exceeds the inside ask count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table IX
Inside Quote Activity by Market Maker Upgrades 2001[30]

MM	Total	Bid Press	Control	p-value
FBCO	11	10	4	0.0001
AGED	7	7	4	0.0110
MSCO	11	7	4	0.0300
JPMS	13	8	5	0.0436
DAIN	2	2	1	0.0786
ABNA	3	2	1	0.1103
CIBC	9	6	6	0.5000
FACT	5	3	3	0.5000
MLCO	12	5	5	0.5000
MONT	5	3	3	0.5000
PRUS	10	5	5	0.5000
RSSF	7	4	4	0.5000
SBSH	11	5	6	0.7276
GSCO	10	7	8	0.7854
UBSW	11	3	5	0.8871
NEED	13	8	10	0.9060
COWN	5	0	3	0.9969
ADAM	1	0	1	1.0000
ADVS	0	0	0	1.0000
BBHC	0	0	0	1.0000
BERN	0	0	0	1.0000
BEST	6	1	5	1.0000
CEUT	1	0	1	1.0000
DBAB	2	1	2	1.0000
DLJP	0	0	0	1.0000
DRKW	1	0	1	1.0000
HAMR	2	1	2	1.0000
ITEC	0	0	0	1.0000
KBRO	1	0	0	1.0000
LEGG	2	1	2	1.0000
LEHM	4	1	4	1.0000
PIPR	5	4	3	1.0000
PWJC	0	0	0	1.0000
RBCD	0	0	0	1.0000
SASI	0	0	0	1.0000
SNDS	0	0	0	1.0000
SNDV	3	2	3	1.0000
TGUL	0	0	0	1.0000
TWPT	5	5	0	1.0000
WBLR	1	0	0	1.0000
WCHV	0	0	0	1.0000
WELS	0	0	0	1.0000

[30] Total is the total number of upgrades. Bid Press is the number of times the inside bid count exceeds the inside ask count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table X

Inside Quote Activity by Market Maker Downgrades 1999-2000[31]

MM	Total	Ask Press	Control	p-value
AGED	11	8	4	0.0061
HAMR	8	3	1	0.0163
LEHM	12	6	3	0.0228
PIPR	7	5	3	0.0633
MSCO	25	13	10	0.1103
ABNA	18	6	4	0.1284
TWPT	6	2	1	0.1367
DBAB	7	2	1	0.1400
CIBC	5	3	2	0.1807
SBSH	21	10	9	0.3296
MLCO	26	15	14	0.3470
CEUT	4	2	2	0.5000
COWN	17	8	8	0.5000
DLJP	7	2	2	0.5000
JPMS	10	4	4	0.5000
NEED	9	2	2	0.5000
SNDV	12	7	7	0.5000
BEST	11	4	5	0.7276
PWJC	10	2	3	0.7549
GSCO	7	2	3	0.7775
FBCO	18	6	8	0.8286
PRUS	14	3	5	0.8677
UBSW	9	1	3	0.9214
RSSF	8	1	3	0.9279
WBLR	7	2	4	0.9367
MONT	26	5	14	0.9998
ADAM	2	1	2	1.0000
ADVS	0	0	0	1.0000
BBHC	0	0	0	1.0000
BERN	0	0	0	1.0000
DAIN	3	0	3	1.0000
DRKW	0	0	0	1.0000
FACT	0	0	0	1.0000
ITEC	0	0	0	1.0000
KBRO	1	0	0	1.0000
LEGG	1	0	0	1.0000
RAJA	2	2	0	1.0000
SASI	1	0	0	1.0000
SNDS	1	1	0	1.0000
TGUL	1	0	1	1.0000
WCHV	0	0	0	1.0000
WELS	0	0	0	1.0000

[31] Total is the total number of upgrades. Ask Press is the number of times the inside ask count exceeds the inside bid count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table XI
Inside Quote Activity by Market Maker Downgrades 2001[32]

MM	Total	Ask Press	Control	p-value
MLCO	20	11	5	0.0010
LEGG	4	3	1	0.0105
RSSF	12	7	4	0.0331
BEST	3	2	1	0.1103
NEED	9	2	1	0.1444
MSCO	20	9	7	0.1742
LEHM	8	4	3	0.2326
JPMS	17	6	6	0.5000
SNDV	6	2	2	0.5000
UBSW	16	8	8	0.5000
ABNA	12	4	5	0.7209
CIBC	9	3	4	0.7488
TWPT	9	3	4	0.7488
MONT	5	1	2	0.8193
SBSH	14	3	5	0.8677
DRKW	4	0	1	0.8759
FACT	4	0	1	0.8759
PRUS	12	2	4	0.8897
FBCO	21	8	11	0.9050
PIPR	9	2	4	0.9101
GSCO	6	1	3	0.9488
COWN	12	5	8	0.9669
HAMR	4	0	2	0.9772
DBAB	9	1	4	0.9779
ADAM	4	1	3	0.9895
ADVS	0	0	0	1.0000
AGED	7	4	0	1.0000
BBHC	0	0	0	1.0000
BERN	0	0	0	1.0000
CEUT	1	0	0	1.0000
DAIN	0	0	0	1.0000
DLJP	0	0	0	1.0000
ITEC	0	0	0	1.0000
KBRO	0	0	0	1.0000
PWJC	0	0	0	1.0000
RBCD	0	0	0	1.0000
SASI	0	0	0	1.0000
SNDS	0	0	0	1.0000
TGUL	0	0	0	1.0000
WBLR	1	0	1	1.0000
WCHV	1	1	0	1.0000
WELS	0	0	0	1.0000

[32] Total is the total number of upgrades. Ask Press is the number of times the inside ask count exceeds the inside bid count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table XII
Bid Pressure by Market Making Subsidiaries: Upgrades[33]

Analyst	Subsidiary	Date Eff.	Pairs	Pressure	p-value
MSCO	DEAN	01-01-1999	14	9	0.0015
DBAB	NDBC	01-07-2000	2	2	0.0787
JPMS	MASH	01-01-1999	19	13	0.3172
FBCO	MASH	01-01-1999	24	17	0.1071
MLCO	HRZG	06-06-2000	16	11	0.0668
GSCO	SLKC	11-09-2000	11	10	0.0300

[33] Date effective is January 1, 1999 if the merger took place before our sample started. Pairs is the number of upgrades in which the subsidiary made markets. Pressure is the number of times the inside bid count exceeded the inside ask count for the subsidiary market maker. The p-value is based on the two weeks prior frequency of the market maker being on the inside.

Table XIII
Inside Quote Activity by Stock: Upgrades 1999-2000[34]

Stock	Total	Bid Press	Control	p-value
SPLS	7	5	1	0.0000
QCOM	7	6	2	0.0004
BGEN	5	3	1	0.0127
LLTC	8	6	3	0.0142
AMAT	15	13	9	0.0175
MSFT	5	4	2	0.0339
YHOO	7	4	2	0.0471
TLAB	6	5	3	0.0512
ORCL	16	10	7	0.0653
CTAS	2	2	1	0.0786
PSFT	9	5	3	0.0786
PAYX	3	2	1	0.1103
SBUX	12	8	6	0.1241
VTSS	4	4	3	0.1241
SSCC	5	5	4	0.1318
SPOT	6	6	5	0.1367
ERICY	16	8	6	0.1508
DELL	16	11	9	0.1568
INTC	18	13	11	0.1668
ADBE	5	3	2	0.1807
PCAR	6	3	2	0.1932
KLAC	8	5	4	0.2398
ATML	5	3	3	0.5000
BMET	4	3	3	0.5000
CHIR	4	3	3	0.5000
COST	5	3	3	0.5000
FISV	4	3	3	0.5000
INTU	4	3	3	0.5000
MCHP	7	4	4	0.5000
MOLX	3	2	2	0.5000
MXIM	4	3	3	0.5000
NXTL	6	4	4	0.5000
VRTS	6	3	3	0.5000
SUNW	10	5	6	0.7407
GENZ	8	4	5	0.7674
AAPL	13	10	11	0.7790
BBBY	5	3	4	0.8682
XLNX	11	2	4	0.8950
ADCT	8	4	6	0.9488
AMGN	6	1	3	0.9488
AMZN	9	3	6	0.9831
ALTR	13	6	10	0.9958
CPWR	0	0	0	1.0000
CSCO	1	0	0	1.0000
CTXS	4	4	4	1.0000
ERTS	0	0	0	1.0000
USAI	1	1	1	1.0000

[34] Total is the total number of upgrades. Bid press is the number of times the inside bid count exceeds the inside ask count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table XIV
Inside Quote Activity by Stock: Upgrades 2001[35]

Stock	Total	Bid Press	Control	p-value
ORCL	8	8	3	0.0001
AMAT	13	12	7	0.0027
CHIR	4	4	2	0.0228
CTAS	2	2	1	0.0786
PAYX	2	2	1	0.0786
INTC	10	6	4	0.0984
AMGN	3	2	1	0.1103
GENZ	3	2	1	0.1103
CTXS	4	3	2	0.1587
NXTL	5	4	3	0.1807
DELL	10	4	3	0.2451
AAPL	2	1	1	0.5000
COST	3	1	1	0.5000
LLTC	2	1	1	0.5000
MCHP	2	1	1	0.5000
MXIM	2	1	1	0.5000
PCAR	2	1	1	0.5000
USAI	4	1	1	0.5000
VRTS	6	3	3	0.5000
VTSS	10	6	6	0.5000
PSFT	7	3	4	0.7775
QCOM	7	2	3	0.7775
MSFT	6	2	3	0.7929
BBBY	5	3	4	0.8682
BMET	5	3	4	0.8682
INTU	3	1	2	0.8897
KLAC	9	4	6	0.9214
ALTR	5	1	3	0.9661
ERTS	4	0	2	0.9772
CSCO	9	4	7	0.9919
YHOO	6	2	5	0.9995
ADBE	2	1	2	1.0000
ADCT	0	0	0	1.0000
AMZN	2	1	2	1.0000
ATML	1	1	0	1.0000
BGEN	1	1	1	1.0000
CPWR	0	0	0	1.0000
ERICY	1	1	1	1.0000
FISV	1	1	1	1.0000
MOLX	0	0	0	1.0000
SBUX	0	0	0	1.0000
SPLS	1	0	0	1.0000
SPOT	0	0	0	1.0000
SSCC	0	0	0	1.0000
SUNW	4	3	4	1.0000
TLAB	0	0	0	1.0000
XLNX	3	2	3	1.0000

[35] Total is the total number of upgrades. Bid press is the number of times the inside bid count exceeds the inside ask count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table XV
Inside Quote Activity by Stock: Downgrades 1999-2000[36]

Stock	Total	Ask Press	Control	p-value
YHOO	11	5	2	0.0095
FISV	5	3	1	0.0127
XLNX	12	6	3	0.0228
AAPL	14	7	4	0.0380
LLTC	6	4	2	0.0416
ERICY	9	4	2	0.0544
AMAT	15	4	2	0.0644
SSCC	3	2	1	0.1103
BBBY	4	4	3	0.1241
CTAS	4	4	3	0.1241
SUNW	9	2	1	0.1444
INTC	18	7	5	0.1463
DELL	21	9	7	0.1773
AMGN	6	4	3	0.2071
VTSS	7	4	3	0.2225
ADCT	5	1	1	0.5000
AMZN	12	3	3	0.5000
BGEN	10	6	6	0.5000
NXTL	4	2	2	0.5000
ORCL	12	6	6	0.5000
SBUX	14	7	7	0.5000
VRTS	3	1	1	0.5000
ALTR	12	4	5	0.7209
MSFT	9	2	3	0.7602
SPLS	9	2	3	0.7602
MCHP	6	2	3	0.7929
ERTS	5	2	3	0.8193
COST	3	0	1	0.8897
PAYX	3	1	2	0.8897
SPOT	10	3	5	0.8970
QCOM	7	2	4	0.9367
PCAR	6	2	4	0.9584
KLAC	11	3	6	0.9654
CHIR	5	0	2	0.9661
GENZ	6	2	5	0.9995
CTXS	4	0	3	0.9997
MXIM	4	0	3	0.9997
ADBE	3	2	3	1.0000
ATML	3	1	0	1.0000
BMET	2	1	0	1.0000
CPWR	0	0	0	1.0000
CSCO	1	1	1	1.0000
INTU	3	0	3	1.0000
MOLX	2	0	2	1.0000
PSFT	1	0	0	1.0000
TLAB	6	3	0	1.0000
USAI	2	0	2	1.0000

[36] Total is the total number of downgrades. Ask press is the number of times the inside ask count exceeds the inside bid count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table XVI
Inside Quote Activity by Stock: Downgrades 2001[37]

Stock	Total	Ask Press	Control	p-value
LLTC	4	4	1	0.0003
MCHP	3	3	1	0.0072
BGEN	6	3	1	0.0142
DELL	6	3	1	0.0142
ADCT	12	8	5	0.0395
MSFT	7	4	2	0.0471
CSCO	20	10	7	0.0798
AMAT	5	2	1	0.1318
ALTR	8	2	1	0.1425
ADBE	2	1	1	0.5000
AMGN	5	3	3	0.5000
ATML	6	2	2	0.5000
CTAS	3	1	1	0.5000
INTC	5	1	1	0.5000
INTU	3	1	1	0.5000
KLAC	5	2	2	0.5000
PAYX	2	1	1	0.5000
VTSS	15	6	6	0.5000
TLAB	14	4	5	0.7115
NXTL	11	4	5	0.7276
XLNX	6	2	3	0.7929
PSFT	6	1	2	0.8068
USAI	6	1	2	0.8068
SPOT	4	1	2	0.8413
SBUX	4	0	1	0.8759
SUNW	4	0	1	0.8759
ERICY	11	4	6	0.8871
AMZN	12	2	4	0.8897
MXIM	3	0	1	0.8897
ORCL	18	5	8	0.9226
YHOO	13	4	8	0.9887
VRTS	7	1	4	0.9890
AAPL	1	0	1	1.0000
BBBY	3	1	0	1.0000
BMET	3	0	3	1.0000
CHIR	3	1	0	1.0000
COST	1	0	0	1.0000
CPWR	0	0	0	1.0000
CTXS	2	1	2	1.0000
ERTS	1	1	1	1.0000
FISV	1	0	0	1.0000
GENZ	1	0	1	1.0000
MOLX	4	2	0	1.0000
PCAR	0	0	0	1.0000
QCOM	2	1	2	1.0000
SPLS	1	0	0	1.0000
SSCC	0	0	0	1.0000

[37] Total is the total number of downgrades. Ask press is the number of times the inside ask count exceeds the inside bid count in the week prior to the upgrade. Control is the same count in the period two weeks prior. The p-value is the probability of observing the first count given the frequency in the control group week.

Table XVII
Inside Instinet ECN Counts - Upgrades[38]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	1	152	327	0.4648	
-10	-6	152	327	0.4648	0.5000
-15	-11	131	317	0.4132	0.0435
-20	-16	126	312	0.4071	0.0324
0	5	172	336	0.5119	0.9682
6	10	167	336	0.4970	0.9048
11	15	172	336	0.5119	0.9682
16	20	166	336	0.4940	0.8850

2001

Begin	End	Press	Total	Frequency	p-value
-5	1	74	179	0.4693	
-10	-6	88	179	0.4916	0.9818
-15	-11	71	177	0.4011	0.3795
-20	-16	78	177	0.4407	0.7755
0	5	87	179	0.4860	0.9741
6	10	74	178	0.4157	0.5000
11	15	88	178	0.4944	0.9821
16	20	92	178	0.5169	0.9965

[38] The frequency is the ratio of Instinet ECN inside bid counts exceeding inside ask counts. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table XVIII
Inside Instinet ECN Counts - Downgrades[39]

1999-2000

Begin	End	Press	Total	Frequency	p-value
-5	1	186	327	0.5688	
-10	-6	173	327	0.5291	0.0749
-15	-11	181	321	0.5639	0.4110
-20	-16	186	318	0.5849	0.6755
0	5	208	334	0.6228	0.9789
6	10	205	334	0.6168	0.9641
11	15	181	333	0.5435	0.1610
16	20	178	333	0.5345	0.0937

2001

Begin	End	Press	Total	Frequency	p-value
-5	-1	154	259	0.5946	
-10	-6	150	259	0.5792	0.3073
-15	-11	146	259	0.5637	0.1581
-20	-16	168	259	0.6486	0.9658
0	5	159	259	0.6139	0.7383
6	10	170	257	0.6615	0.9875
11	15	155	257	0.6031	0.6006
16	20	146	255	0.5725	0.1878

[39] The frequency is the ratio of Instinet ECN inside ask counts exceeding inside bid counts. The p-value is the probability of observing the inside frequency counts in the week prior to the recommendation change given the frequency for the reference week.

Table XIX
Abnormal Returns Pre- and Post-Recommendation Change[40]

Sample	**5 to 20**	**-1 to 4**	**-1 to 20**	**-1 to -5**	**-6 to -10**	**N**
Upgrades 1999-2000	0.32	5.73	6.11	-0.17	-0.06	327
Upgrades 2001	1.70	5.00	6.99	0.94	-0.16	179
Downgrades 1999-2000	1.69	-7.24	-5.23	-1.14	-0.02	327
Downgrades 2001	0.86	-5.01	-4.14	-1.16	0.60	259

[40] The abnormal return is the stock return over the time period listed less the return on the Nasdaq 100 index.

Table XX
Regression Results Ex-Post Returns[41]

Dep. Var.	**Constant**	**R(-1,-5)**	**ED**	**PushDum**	**N**	**R^2**
Up 1999-2000	4.939	-0.096	0.004	3.290	327	0.041
	(8.47)	(-1.66)	(2.37)	(2.32)		
Up 2001	4.738	-0.256	-0.001	3.256	179	0.066
	(6.89)	(-2.77)	(-0.44)	(1.91)		
Down 1999-2000	-7.163	-0.150	-0.007	0.035	327	0.021
	(-7.17)	(-1.43)	(-2.18)	(0.01)		
Down 2001	-5.012	0.044	0.000	0.434	259	0.001
	(-6.41)	(0.52)	(0.18)	(0.21)		

[41] The dependent variable is the 5 day abnormal return, relative to the Nasdaq 100 index, from 1 day prior to the upgrade to 4 days after. $R(-1,-5)$ is the abnormal return from -5 to -1 days before the recommendation change. Excess demand is the net difference between inside bid and ask appearances in the week prior. PushDum is a dummy for market makers with significant patterns of pre-recommendation activity.

Table XXI
Profitability Estimates for 1999-2000[42]

Market Maker	Marginal Abnormal Return %	Excess Profits ($mn)
RSSF	20.5238	292.4179
FBCO	13.0812	192.1587
MSCO	-0.4189	79.9783
CIBC	6.1482	65.5510
LEHM	6.0789	64.1398
MONT	-2.0767	44.1134
PWJC	1.2739	32.5183
DBKS	2.0400	27.9919
AGED	2.4726	23.2679
AANA	5.8994	20.7097
NEED	1.3740	9.5520
WBLR	1.0208	5.8297
SNDV	2.0126	2.8218
TWPT	0.5002	2.0518
ADAM	0.1522	1.2954
FACT	0.3240	1.1239
PIPR	4.8802	1.0372
ADVS	0.0453	0.5702
CEUT	0.0068	0.0531
DAIN	-0.0103	-0.0421
JPMS	2.5307	-0.3619
HAMR	0.6028	-0.3849
SASI	-0.1103	-1.7760
LEGG	-0.3300	-3.0309
COWN	2.0562	-3.4683
DLJP	5.9276	-4.2401
BEST	-1.4885	-6.0906
WARR	-0.4318	-27.0480
GSCO	-0.8550	-31.6505
MLCO	-2.9027	-47.1708
PRUS	10.5838	-62.1068
SBSH	-5.8617	-87.7342
Total	75.0492	592.0770

[42] Marginal abnormal returns are based on the estimates from Table XX for market making excess demand. Profitability estimates are computed from market maker inside bid and ask frequencies, daily volumes, and 5-day ex-post abnormal returns.

Figure 1: **Nasdaq SuperMontage Level II Display**

Symbol: CSCO Cisco Systems, Inc.
NBBO: 19.98 Q 19.99 Q 61 - 15
NNM Last Sale: 19.99 Q UPC 11830: No

Level	Bid Price	Total Depth	Ask Price	Total Depth
1st	19.98	61	19.99	15
2nd	19.97	58	20.00	83
3rd	19.96	82	20.01	108
4th	19.95	51	20.02	38
5th	19.94	81	20.03	59

MPID	Bid Price	Bid Size
GVRC	19.98	10
MSCO	19.98	21
SIZE#	19.98	10
SLKC	19.98	10
SNDV	19.98	10
MKXT#	19.97	5
PRUS	19.97	10
MSCO	19.97	5
SBSH	19.97	1
SIZE#	19.97	25
SLKC	19.97	10
WCHV	19.97	1
MLCO	19.97	1
BRUT#	19.96	11
NITE	19.96	1
SLKC	19.96	5
PRUS	19.96	10
SIZE#	19.96	55
BARD	19.95	10
GSCO	19.95	10
NDBC	19.95	10
PRUS	19.95	5
SIZE#	19.95	10
SLKC	19.95	6
BARD	19.94	10
BRUT#	19.94	5
GSCO	19.94	5
JPHQ	19.94	10
PRUS	19.94	10
MSCO	19.94	10
SIZE#	19.94	26
SLKC	19.94	5
...		
DAIN	19.50	10

MPID	Ask Price	Ask Size
PIPR	19.99	10
SIZE#	19.99	5
CHIP	20.00	1
DAIN	20.00	10
FBCO	20.00	10
MWSE	20.00	7
PIPR	20.00	15
MSCO	20.00	10
SCHB	20.00	5
SIZE#	20.00	20
UBSW	20.00	4
WCHV	20.00	1
ABNA	20.01	50
FBCO	20.01	15
MSCO	20.01	9
SCHB	20.01	10
SIZE#	20.01	24
BRUT#	20.02	7
FBCO	20.02	10
SCHB	20.02	5
SIZE#	20.02	16
BRUT#	20.03	10
FBCO	20.03	5
GSCO	20.03	10
NITE	20.03	1
PIPR	20.03	7
SBSH	20.03	1
SIZE#	20.03	15
WCAI	20.03	10
...		
SNDV	20.13	1
BARD	20.15	1
PRUS	20.17	10
SLKC	20.25	8