

Spam Works: Evidence from Stock Touts and Corresponding Market Activity

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Abstract

We assess the impact of stock touting via unsolicited email upon the stocks' trading activity, and sketch how profitable spamming might be for those who manipulate stocks via spam as well as how harmful it is to those who might heed advice in stock-touting e-mails. We suggest that the profitability of spammed stock touting calls for adjustments to securities regulation models that rely principally on the proper labeling of information and disclosure of conflicts of interest in order to protect consumers.

Based on a large sample of touted stocks listed on the Pink Sheets quotation system, we find that stocks experience a significantly positive return on days when they are heavily touted via spam, and on the day preceding such touting. Volume of trading also responds positively and significantly to heavy touting. Indeed, on a day when no tout has been detected in our database, the likelihood of a touted stock being the most actively traded stock that day is only 6%. On the other hand, on days when there is touting activity, the probability of a touted stock being the single most actively traded stock is 81%. Returns in the days following touting are significantly negative. The evidence accords with a hypothesis that spammers "buy low and spam high," purchasing penny stocks with comparatively low liquidity, then touting them – perhaps immediately after an independently occurring upward tick in price, or after having caused the uptick themselves by engaging in preparatory purchasing – in order to increase or maintain trading activity and price enough to unload their positions at a profit. Selling by the spammer then results in negative returns following touting. Investors who respond to touting are losing, on average, 5.25% in the two day period following touting. For the quintile of stocks in our sample that are touted most heavily, this 2-day loss approaches 8%. These estimates are conservative, as they do not account for transaction costs.

For access to our raw data and interactive charts showing price and volume changes for individual touted and control stocks, see <<http://cyber.law.harvard.edu/stockspam>>.

I. Introduction

Unsolicited e-mail is said to account for over 65% of all Internet e-mail traffic, with estimates approximating 730 million messages per week, 15% of which are stock touts.¹ Stock-touting spam asks a user to invest in a specific stock, and often such e-mail itself concedes in fine print that the spammer has an interest in touting those stocks, either for hire or as a current investor. When they invest, spam recipients indirectly send money to the spammer by investing in a stock that the spammer (or spammer's client) has already purchased, driving up the price and/or increasing trading activity so that the stock can then be liquidated at a profit. In a well-known case brought by the U.S. Securities and Exchange Commission, stock touter Jonathan Lebed routinely purchased stock accounting for anywhere from 17% to 46% of the stock's market volume for a day, and sent spammed e-mail touts on the same day. He then lodged limit orders to sell for the next day's trading session, anticipating a rise in the stock price after the general public received his touts and some acted on them. (Lebed's case and subsequent settlement with the S.E.C. focused on his failure to disclose his own financial interest in the securities he touted; as discussed below, stock touts today often include such disclosures (In Re Lebed (2000)).

We match price and volume data from Pink Sheets, LLC to ticker symbols that appear in email touts received by one of the authors and by the Internet Usenet newsgroup net.admin.network.abuse.sightings ("NANAS") between January 2004 and July 2005, and compare the presence and volume of spam that touts particular stocks with the price and volume behavior of those stocks before, during, and after the touts.

¹ See <<http://www.postini.com/stats>>. See also Sophos Security Threat Management Report (2006), available at <<http://www.sophos.com/sophos/docs/eng/papers/sophos-security-report-jun06-srus.pdf>>, and <<http://www.junk-o-meter.com/stats/index.php>>.

We find a significantly positive return on a day of heavy spam touting of a stock, along with the day preceding our detection of such touting. Volume also responds positively and significantly to heavy touting. Returns in the days following touting are significantly negative. Though we have no way of directly knowing if the spammer actually has holdings in the spammed stock apart from the spammer's own admission, when it appears, and the surmise that some pecuniary motive inspires sending the spam, the evidence accords with a hypothesis that spammers tout stocks in order to increase trading activity and price enough to unload their positions at a profit. Selling pressure on the part of the spammer then results in negative returns following heavy touting. Our results are consistent with the model of Hong and Huang (2005) that suggests that, in highly illiquid markets (like Pink Sheets), traders with significant liquidity needs have an incentive to make costly investments that would increase liquidity and decrease the impact of their trades.

A connection between touting and short-term price movements or volume suggests anomalous non-efficiency in some parts of the securities market, with trading taking place not on the basis of underlying fundamentals, but rather thanks to misconceptions by some of those spammed with touts – people who not only read their spam and believe its contents, but who then undertake the effort to issue instructions to a broker to purchase the touted stock. The touted stocks in our sample are nearly always found listed on the Pink Sheets, i.e. not listed on any major exchange nor traded in significant total dollar amounts, making them amenable to manipulation. Moreover, the fact that Pink Sheets stocks are so inexpensive per share may attract amateur investors to this market. Any mispricing that is created by trading in response to touting may persist in price quotations since liquidity risk in these stocks is high, which in the absence of a tout-created market may partially preclude arbitrage. Our results are also consistent with Merton (1987) who, based on the observation that individual and institutional investors each hold just a small proportion of the universe of traded

equities, assumes that investors only invest in those securities with which they are familiar. Indeed, touting a stock via spam email is a mechanism by which a spammer can make a potential investor aware of a previously unheard-of company. Given that most firms listed on Pink Sheets are unknown to most investors, Merton's recognition hypothesis lends itself well to the notion behind touting in order to draw attention to an obscure stock.

Spam is comparatively cheap to send. Since 2002, relationships between spammers and virus authors have caused millions of virus-infected personal computers to be harnessed as "zombies" to send spam,² further lowering its cost. In addition, unlike most other commercial spam, stock touts do not call for any direct (and therefore traceable) Internet-mediated reply from the person spammed, such as the sending of money to purchase a "spamvertised" product. Stock-touting spammers are therefore particularly difficult to identify and punish by private anti-spam consortia or public authorities – further lowering the cost of sending such spam. However, stock touts do call for action by their recipients, in the form of purchases placed on financial markets. If the volume of such purchases is high enough, it ought to be reflected in the price and/or volume information recorded for that market. Stock touting spam thus provides a uniquely measurable proxy for how effective spam can be.

If junk e-mail can find its way through ISPs and client-side filters to the eyes of Internet users, what kind of response rate might be expected? For spammers wanting recipients to read and then take some action on the basis of an e-mail, even a very small response rate might be enough justify the modest effort and expense required to send it.

² See <<http://news.bbc.co.uk/2/hi/technology/3107613.stm>> and <<http://news.bbc.co.uk/2/hi/technology/2987558.stm>>.

The successes of spam touting that we document also raise questions about the right scope and depth of government-sponsored consumer protection in an era in which the Internet has enabled both the ready reception of stock touts and corresponding one-click investing by amateurs who previously would have had brokers or other intermediaries to temper actions arising from their susceptibility to scams. Many of the stock-touting e-mails that we examine contain disclosures that the spammer would sell his or her own shares contemporaneously with the spam campaign, perhaps as a result of a campaign by the U.S. Securities and Exchange Commission in 2000 to crack down on stock touting by those who failed to disclose their own holdings in the touted stocks.³ Regulatory regimes that rely only on disclosure of information to investors who will then rationally weigh it may prove ineffective when the investors in question are so clearly disregarding what disclosures might be present.

Indeed, these findings add to the evidence of investor irrationality and market inefficiency. For example, Cooper, Dimitrov, and Rau (2001) show that, by reacting to “information” that is not relevant to a firm’s risk or fundamental value (in particular, purchasing shares of a stock that added “.com” to its name during the Internet boom), investors cause predictable patterns in volume and returns.

Successful spam touting also calls into question the very notion that spam is in fact unwanted by the recipient. Recipients may wish to avoid spam generally, but at least some part of the Internet public appears to be hungry for investing advice and information, enough so to absorb and follow advice that is flatly against interest and delivered in one of the most reviled formats of the information age. Evidence that touting stocks by spam “works” under the right circumstances helps to address the puzzle of why spam is so voluminous.

³ The SEC campaign is described in Walker and Levine (2001), of which the Lebed case described in the Introduction is a part.

The paper proceeds as follows. The data and method are reviewed in Section II. Results are presented in Section III. In Section IV, we provide a discussion, and Section V concludes.

II.A. Literature Review

Previous literature has covered investor response to new information. For example, studying earnings surprises, Lee (1992) finds that individual investors have a habit of buying after news is released, whether the news is positive or negative. This suggests that small investors do not place weight on the information content of the news, but rather its mere presence. Barber and Odean (2004) find that individual investors are inclined to buy after “attention-drawing” events. For example, after a news release or a day with an extremely abnormal return, individual investors trading through a large discount brokerage house tend to buy significantly more. The stocks that they buy subsequently underperform those that they sell. Antweiler and Frank (2004) study market response to messages posted on Yahoo! Finance and Raging Bull message boards about Dow Jones Industrial Average companies. In particular they find that, besides predicting increased trading, significant postings about a stock are followed by statistically significant negative returns. This result suggests that many individuals who act on news (at least that posted on message boards) are trading irrationally.

While the aforementioned literature examines response of investors to legitimate news and information that they seek to obtain, in this paper we examine their response to news that broader audiences passively receive, news of apparently no substantive validity. A concurrent working paper by Bohme & Holz (2006)

examines the relationship between spammed stock touts and market movements. We compare our results and methods to theirs below.

Some internet users have tracked the performance of the stocks for which they received spam e-mail touts to see what happened to the value of the stock.⁴

Aggarwal and Wu (2003) create a model of market manipulation and find that manipulated stocks are less liquid and smaller than non-manipulated stocks, and are often listed in inefficient markets like OTCBB and Pink Sheets.

II.B. Spam Data

Our archive of junk e-mails was seeded by all 26,273 pieces of spam accumulated in Zittrain's e-mail box between January, 2004 and July, 2005. After generating preliminary results from this set, we augmented it to make it more comprehensive with 1,775,743 reports of junk e-mails received by the Internet Usenet newsgroup net.admin.network.abuse.sightings ("NANAS") over the same period in order to make it more comprehensive. NANAS is used for the purpose of alerting network administrators to spam in progress so that they might take action against it, and its archives contain time-stamped reports of spam from Internet users around the world.⁵ There is no way to assure that NANAS's archive is a representative cross-section of spam from around the world, but its contributors are found worldwide, and judgments can be made within the NANAS group between stocks touted very little, garnering few spam reports, or

⁴ See Joshua Cyr's <<http://www.spamstocktracker.com/>> and Leonard Richardson's <<http://www.crummy.com/features/StockSpam>>.

⁵ Reports to NANAS may result in actions taken against spam in progress. If such actions reduce the amount of identical spam in a batch reaching other recipients, it could reduce the effectiveness of stock-touting spam, making our results understated in comparison to spam that eludes NANAS reporting. While other stock spam may therefore have a larger market impact, NANAS may have a limited effect, since spammed stock touts appear to be intended for immediate consumption against which subsequent filtering is ineffective.

stocks touted heavily enough that multiple reports of the spam are found from different reporters.⁶

We scanned the junk e-mail archive for emails touting stocks by looking for the presence of capitalized ticker symbols.⁷ We then noted the date and time each piece of such spam was processed, along with the name of the stock touted. We identified 631 likely touts from Zittrain’s mailbox, and 74,784 likely touts from NANAS, concerning 307 Pink Sheets stock tickers. Duplicate reports of touts lodged at the same time from different reporters – from similarities in text and timing, presumably from the same spamming source – could be identified from the NANAS data, providing a rough proxy for how broadly spammed a particular tout was. An example of a typical stock tout spam is shown in Figure 1.

II.C. Stock data

We gathered trading data about the spammed stocks in our sample. All but a handful of the touted stocks are traded on Pink Sheets, LLC; the others are listed on the U.S. NASDAQ electronic quotation service. Pink Sheets is a principal provider of trading information for over-the-counter stocks and bonds not listed with major exchanges or NASDAQ. Unlike markets for other over-the-counter

⁶ Bohme & Holz (2006) perform a similar study. Their study also faces the task of developing an archive of stock touting spam. They settled upon an archive of 21,935 spam e-mails compiled by Leonard Richardson, who runs a web site that automates the process of comparing a given stock spam to that stock’s performance on the day of receipt. Richardson’s stock spam appears to be a concatenation of his own personally-received spam and that received by other email addresses he has created specifically for the purpose of drawing spam.

⁷ Specifically, we applied a number of filters to the e-mail text to account for some of the obfuscating techniques used by spammers to foil spam filters; some of these obfuscations included inserting meaningless HTML tags and encoding the text of messages as if they were attachments. Once the messages were cleaned, we discarded messages that did not contain the word “stock.” For the remaining messages, we searched for sequences of three or four uppercase letters in the message, which formed a list of potential stock ticker symbols. The majority of these uppercase words were common abbreviations such as URL or USA rather than unique ticker symbols. We filtered many of them out by discarding both dictionary words and common acronyms.

stocks (e.g., OTCBB, which is operated and regulated by NASD), Pink Sheets neither imposes substantive standards for the listing of its securities, nor does Pink Sheets regulate the market. To be quoted on Pink Sheets, a company simply finds an SEC-registered market maker who is a member of the National Association of Securities Dealers (NASD) and who is willing to quote the stock. This fosters a comparatively opaque trading venue, and as a lister of stocks that include firms with low capitalization and day-to-day market volume, it may make Pink Sheets an attractive venue for manipulative activity.

Perhaps due to the lack of publicly available bulk historical trading data, there has been relatively little research on Pink Sheets stocks (Macey, O'Hara, and Pompilio (2004)). Upon our request, Pink Sheets, LLC provided us with archival data on the price, volume, and bid-ask spreads for all the stocks we found touted in our sample.⁸ We did not have ready access to standardized accounting data on the touted firms. It is therefore nearly impossible to match firms based on specific characteristics such as book-to-market value.⁹ Thus, we asked Pink Sheets to provide us with data on 500 randomly selected Pink Sheets securities. We use this sample as a set of control firms in our analysis. Because one of the randomly selected control stocks had a price of \$130, we impose the restriction that the price of our control stocks is less than \$14 so that the control sample is reasonably aligned with the touted stocks (the maximum price in the sample of touted stocks is \$8.80). After we eliminated those stocks from the control sample that had been found to be touted, and those for which no price or volume data

⁸ We first sought to obtain pricing and market data freely accessible online, but found such sources as Yahoo! Finance market data to be incomplete. Bohme & Holz (2006) found the same problem, and were compelled to reduce their sample size of touted stocks from 391 to 111 tickers (and from 21,935 to 7,606 spam e-mails) because of unavailable data.

⁹ Bohme & Holz (2006) faced the same problem in finding a suitable market baseline to which to compare touted stock activity. They chose daily market indices: Standard & Poor's 500, NASDAQ Composite, and Russell's daily microcap, which includes stocks with comparatively low liquidity. We choose the approach described within this paper to avoid the mismatch between these indices and the lightly-traded and thus volatile individual stocks that are the target of touters, but also compare with the Russell microcap for robustness.

existed at the time of a comparison with a touted stock (see Table 3), 277 control stocks remained.

In reviewing the data, we find that spam touts typically occur in temporal groups – the NANAS reports indicate that touting is often made over a course of a few days. This might not represent intentional continuing touts by the spammer, but rather the fact that much spamming takes place by “zombie” PCs that are infected with viruses and then instructed to send the spam. Once the spam is sent, the spammer may have little incentive to retract the original instructions sent to the zombie, since the zombie’s future actions are no longer relevant to a completed market manipulation scheme.

In our analysis we cluster tout spam that continued for a few days; we label each period of continual touting as a “group.” For example, suppose a given stock is touted for 5 consecutive days. The 5 days of touting would be denoted as 1 group. Similarly, if a stock is only touted on 1 day, that 1 day forms its own group. We identify any instances of more than 5 consecutive trading days without any further touting as the end of a group. Within each group, we also identify the peak day of touting, represented by the day with the largest number of recorded touts in that group. For the purposes of testing whether spamming can be profitable to the touter, we took the peak day of spamming as the one directly intended by the spammer in which to initiate selling the stock.

II.D. Method

Because we have the time stamps of the e-mail touts, we are able to match the Pink Sheets price and volume data with the tout data in the following way. We classify the date of the tout as day 0. For both individual touts and groups of touts (discussed above), we use OLS regression with clustered standard errors to

examine returns and abnormal volume (measured as the difference between volume on a given day and mean volume over the days preceding the event date, standardized by mean volume). Further details are presented in the next section. In Table 1, we present summary statistics for the entire sample, the control stocks, and the touted stocks. We see that, on average, both prices and volume for the touted stocks are much lower than for control stocks. Specifically, the mean price for touted stocks is \$0.44, while that for the control stocks is \$0.96. Share volume for touted stocks is roughly half of what it is for control stocks (1.1 v. 2.3 million, respectively). Surprisingly, the average bid-ask spread (the amount by which the ask price exceeds the bid) is slightly lower for touted stocks (\$0.03 v. \$0.05 for control stocks). Additionally, we not only notice that standard deviations are enormous, but also that means and medians are significantly different which suggests a significant presence of outliers (and a skewed distribution). Examining the statistical as well as the economic significance mitigates some concern that might accompany such data volatility, and statistical significance persists despite the presence of such large deviations. Table 1 provides us with data on the entire sample in the analysis. Additionally, for each touted stock on the day of the tout, we randomly select 1 stock from the already randomly selected set of Pink Sheets non-touted stocks to serve as a benchmark. The data on this sample is presented in Section III.

III.A. Results

We begin our analysis by examining the extent to which a tout is capable of swamping the overall Pink Sheets market. We find that it does. Panel A shows that on days when the sample stocks are touted, they are much more likely to be the top stock in our sample in dollar value of trading activity, compared to their control stocks: 81% vs 19%. Dollar value of trading activity is defined as price multiplied by volume. On days when the sample stocks are not touted, their

control stocks are instead much more likely to be the top stock: 94% vs 6%. Panel B shows that on days when the sample stocks are touted, they are much more likely to be the top stock in terms of dollar value of abnormal trading activity, compared to their control stocks (83% vs 17%). Dollar value of abnormal trading activity is defined as price multiplied by abnormal volume (where abnormal volume is volume on day t less mean volume over all days in our sample before day t standardized by mean volume). On days when the sample stocks are not touted, their control stocks are actually more likely to be the “top stock” (75% vs 25%). Our results build upon the evidence found in Busse and Green (2002), who report a significant increase in trading activity in a stock after it is mentioned on the Morning or Midday Call segments on CNBC TV.

We present summary statistics for our touted stocks and the set of control stocks at both the individual and group levels in Table 3. The number of observations for our control firms is slightly smaller since such small stocks are thinly traded, and sometimes not even traded at all. If no data are available, we drop the stock from the sample. Several features of the data shown in Panel A are noteworthy. First, on the peak touting day for a given stock, the average return is 136 basis points larger than that for a non-touted stock. Abnormal volume is also much larger. Moreover, leading to the peak day, even though returns for touted stocks are 67 basis points greater than they are for the benchmark sample, the risk associated with them (measured by standard deviation of returns) is much lower, suggesting that in the days leading to peak day, touted stocks offer a much higher return for risk tradeoff. This evidence is consistent with the notion that spammers tout stocks when their prices are already beginning to trend well, with the aim of sustaining the liquidation of an existing stake at a profit. It might also indicate that, for clusters of touts, the initial wave of touts a day before peak day 0 (recorded within a group as the day with the most spam reports) has already induced buying activity. Or it could represent the effects of anticipatory buying

by the spammer within a small market just prior to unleashing the touts. After the peak day (looking at the rows labeled Peak to End + 2), abnormal volume remains significantly higher relative to the period before the peak day of touting, but returns are significantly more negative (the difference in returns before and after peak day is just under 3%). Even though volume is much higher following the peak day of touting, returns for touted stocks are approximately 1% lower than they are for a non-touted stock over the same days. We interpret the result to suggest that spammers tout the stock in order to encourage buying pressure and trading activity, making the stock liquid enough to sell. Selling pressure is reflected in the negative returns after the touting. This might also reflect opportunistic selling by more informed investors who encounter an unexplained up-tick in price and volume and choose to lock in what appear to be (and in fact are) windfall gains.

Because we anticipate that investors who receive spam may buy the touted stock on the day they received the email or may purchase the following day, in the preceding analysis, we examined return behavior up to two days following the peak day of touting. We also examine returns on the following day (as opposed to the following two days) and find that returns are still significantly lower than they are for the control group. To verify that our results are not driven by thinly-traded stocks and bid-ask bounce, we also evaluate midpoint returns (shown in column 5 of the panel). Leading up to the peak day of touting, midpoint returns are 123 basis points higher for touted stocks, and are 117 basis points smaller following the peak day of touting. Thus, at the daily level, bid-ask bounce does not account for our findings.

Results using group level data potentially offer us a cleaner explanation, since some of the noise from examining daily-level data is eliminated. Results are similar using these data and can be found in Table 3, Panel B. We have fewer observations because now several days as opposed to a single day form a “group.”

Relative to non-touted stocks, returns for touted stocks are 7.86% larger leading up to the peak day. However, following the peak day, returns are, on average, 7.08% lower for touted stocks. Using midpoint returns, we see a similar pattern; bid-ask bounce does not significantly alter our results. Specifically, leading up to peak day, midpoint returns are 4.64% higher, and following peak day, they are 5.92% lower (see column 5).

We also consider adjusting our returns according to some benchmark rather than simply comparing them to a set of control stocks. Pink Sheets stocks are dissimilar from those within the stock indices traded on a major exchange, so finding an appropriate benchmark with which to adjust returns is difficult. Nonetheless, we compare returns with the return on Russell Micro-cap Index. Results are qualitatively unchanged, and are available upon request.¹⁰ Volume is also much higher on the peak day for touted stocks than it is prior to the peak day, suggesting that touting induces trading activity.

Overall, our results accord with the notion that after a modest but positive price increase – possibly one caused by their own anticipatory buying of the sort in which Lebed engaged (In Re Lebed (2000)) – spammers tout stocks. Spam recipients provide a set of buyers for the stock on the touted day, enabling spammers to liquidate at a profit. Reflecting sell activity that may outstrip spam-induced temporary demand, returns for touted stocks subsequently fall. These results are depicted in Figure 2, which shows that the cumulative return for holding a touted stock decreases after the peak day of touting (labeled day 0 in the graph). Because the negative returns following touting activity may have nothing to do with the touting per se, but may just be a simple reversion or price correction after an increase independent of touting activity, we match each touted stock with other non-touted stocks that have a similar increase in price on

¹⁰ The average beta resulting from a regression of each touted stock's return on the Russell Micro-cap Index return is indistinguishable from zero.

the relevant day. Matching our stocks to other Pink Sheets stocks proved difficult because they are so thinly traded. As an alternative, we match each touted stock with one stock from NASDAQ such that the matched stock is the smallest stock with the most similar price increase on the same day. The average price increase for the NASDAQ stocks on the day before the peak day of touting is statistically indistinguishable from that for the touted stocks (t-statistic = 0.88). We then compare the returns for the two groups of stocks over the next two days. We find that the return for the NASDAQ stocks is on average 1.16%, while that for the touted Pink Sheets stocks is -5.32%, and the difference between them is accompanied by a statistically significant t-statistic of -3.14. This evidence is consistent with the idea that the manipulation of trading activity via spam generates a systematic negative return of touting.¹¹

Since creating liquidity alone does not allow for profit opportunity, it is not immediately obvious that market makers would allow such an impact on prices. In other words, if market makers are rational, and know that volume is uninformed, then the price of the stock should not move at all. However, given the anecdotal evidence of Lebed (In Re Lebed, 2000), perhaps the volume that market makers observe is not completely uninformed. Lebed purchased shares on the days that he was touting, and placed orders to liquidate his position immediately after.

The standard deviation of our price data is high, reflecting the volatile nature of the Pink Sheets listings (see Table 1), so any estimates from regression analysis are likely to be noisy (see also Macey, O'Hara, and Pompilio (2004)). We therefore run a pooled cross-sectional generalized least squares regression using all observations in our sample period. We first examine daily midpoint returns as the dependent variable. The left hand side of Table 4 refers to the full sample (2004-

¹¹ The table for this result is available online at <<http://cyber.law.harvard.edu/stockspam>>.

2005). From Panel A, we see that the coefficient on “#touts,” which represents the number of touts on the day the return is measured, is significantly positive. Specifically, it is 0.07%, which suggests that each additional tout is associated with an increase in daily return of 7 basis points. Additionally, looking at what happens in the combined 5 days after the tout (“cum5”), we see that returns are significantly negative (p-value = 0.0040). Not only are the results from the regression using daily returns consistent with our hypothesis of why people spam, but the volume regressions (shown in Panel B) also appear to provide supporting evidence. On average, touted stocks have a much higher abnormal volume (reflected in the significantly positive coefficient on the variable “tstk”). The significantly positive coefficient on “#touts” indicates that touting does have a significantly positive effect on volume. Specifically, abnormal volume increases with each additional tout on the order of 7% in the full sample. This abnormal volume associated with touting remains high in the 5 days following the touting activity, reflecting several days’ time in which a spammer could liquidate his or her position. We also examine our results in the 2004 and 2005 subperiods (shown in the respective middle and right hand columns). An interesting pattern emerges: in 2005 volume reacts much more strongly to touting activity. Abnormal volume increases by 9.17% with each additional tout in 2005, though only by 5.5% in 2004. This result is somewhat surprising since we would think that the general public would learn over time, so its reaction to touting would be smaller. Rather, it appears that touters are the ones who learn over time. In fact, the results are consistent with the idea that touters are able to reach a broader set of potential investors with their touting, to hone their messages, and to better select the stocks that are amenable to volume movements. In January 2005, 0.8% of spam e-mails were stock touts, and from January 2005 through June 2005, the proportion of spam that touted stock is said to have increased by 10% per month, representing an average of 8.5% of all spam during that period.¹² Later in

¹² See “Sophos identifies the most prevalent spam categories of 2005,” August 3, 2005, available at <http://www.sophos.com/pressoffice/news/articles/2005/08/pr_us_20050803topfive-cats.html>

this section we discuss how returns and trading activity respond to stocks that are most actively touted in our sample.

Table 5 allows us to analyze our result further by examining results for touted stocks only. (Since all stocks in this analysis are touted stocks, we omit the variable “tstk” from our regressions.) Panels A and B, for returns and volume, respectively, show two interesting patterns. As before, the left hand side of the table refers to all data (2004-2005), the middle column provides results for 2004, and the right hand side of the table gives results for 2005. The results are similar to those presented in Table 4: returns increase by a statistically significant 7 basis points with each additional tout, but they are significantly lower in the following days. Volume increases by 6.6% with each tout on touted days and remains high following the tout. Subperiod results for returns and volume follow the same pattern as they did in Table 4. Specifically, the effect of each additional tout on volume is approximately 3% greater in 2005.

It appears that, despite the volatile and unpredictable behavior of Pink Sheet stocks, touting activity does indeed have explanatory behavior for both returns and trading activity. It is an empirical regularity that news impacts liquidity (trading activity increases after earnings announcements, causing spreads to decrease; see also Barber and Odean (2005)). At the same time, Pink Sheets is “off the beaten path” in that many investors are unaware of the existence of most Pink Sheet stocks. Our results suggest that one way for an investor trading on Pink Sheets to change his or her position is to create liquidity, and this is fairly easily done by attracting attention to the stock via spam. These results buttress the assumption underlying the Merton (1987) model that investors can only invest in stocks in which they are familiar. Overall, our results are consistent with the concurrent working paper by Bohme and Holz (2006) who suggest that,

and “Sophos reveals ‘dirty dozen’ spam relaying countries,” July 24, 2006, available at <<http://www.sophos.com/pressoffice/news/articles/2006/07/dirtydozjul06.html>>.

in data from 2005, a significantly positive abnormal return accompanies spam messages but disappears within four days.

Within the group of touted stocks there is great variation on the amount of touting that takes place, both in sheer number of messages (as represented by multiple reports of the same spam to NANAS) and in messages over time. Table 6 explores how return, the abnormal volume and the overall economic effect (measured by abnormal dollar value of transactions in a given day) are affected by the specific amount of spam touting, testing the hypothesis that more reports of stock touting in NANAS for a given group represent a more successful touting effort by the spammer, which in turn results in a greater impact on the market for the touted stock. To evaluate this, we split stocks into quintiles based on quantity of touting. Table 6 shows that the average number of touts on a given day for a given stock is 1 for the first group of stocks. By construction, this number monotonically increases to 40.3 for the quintile including those stock-days with the highest amount of touting (labeled quintile 5). More important is that average return is over 3% higher for the group of most actively touted stocks than it is for the group of least actively touted stocks on the tout day. Additionally, the overall dollar value of transactions roughly increases with touting activity. These results suggest not only that returns are higher, but the economic effect of the touting is larger for those stock-days with more touting. This is a very important distinction because for Pink Sheets stocks, many of which are penny stocks, a price increase from \$0.01 to \$0.03 is 200%, whereas a price increase from \$1 to \$1.05 (which is a greater absolute increase) is only a 5% return. The price-multiplied-by-abnormal volume measure accounts for the fact that lower price stocks can end up with huge returns, since it expresses the total dollar size of the stock's market on a given day. Nonetheless, we see the same pattern in this variable. Specifically, on a given day, there is, on average, approximately \$38,000 more traded in strongly touted stocks than in weakly touted stocks (\$101,974 vs. \$63,730). Figure 3 depicts the magnitude of the effect.

Table 6, Panel B shows returns and volume for the most actively touted quintile of stocks. Note that the sample size is greater than one-fifth of the original sample because these are the most actively touted stocks and have more than one observation a piece. In particular, we see that leading up to the peak day, returns are almost 7.8% greater for heavily touted stocks, but their return in the days following is roughly 7.6% lower. Abnormal volume is also extremely high for these stocks relative to the control stocks.

III.B. Robustness Checks

We perform several robustness tests. We mentioned that we matched the touted stocks in our Pink Sheets sample with stocks in the smallest decile of NASDAQ firms. As a first robustness check, on each event day for each stock we match that stock with the most thinly traded NASDAQ stock. Unreported results suggest that for the “day -1 to peak” period, touted stocks perform 7% better than control stocks; they subsequently underperform the control stocks by 3.3% in the 2 days following the peak day of touting. Even though compared to this set of control stocks the reversal is not as strong, it is still economically and statistically significant. As another possibility we match stocks based on abnormal volume in the days preceding the peak day of touting. The notion is that stocks that have a lot of volume may experience abnormally high returns (see Baker and Stein (2004)). This being the case, a subsequent reversal may just be a result of the stock “cooling down.” Yet, when we perform the analysis matching on NASDAQ stocks that experienced a similar increase in volume, results remain qualitatively unchanged. In particular, leading up to the peak day, the controls stocks earn 1.1%, which is significantly lower than the touted stocks. Subsequently, the touted stocks underperform the control stocks by 4%.

As an additional check, we hand collect the industry data for each touted firm in our sample from Pink Sheets. We match each of these firms with one from the same industry (determined by 2-digit SIC code) and repeat the analysis. It is interesting to note the distribution of firms across industries. We see from Table 7 that over one-third of the sample (34%) is from the Business Services industry. 11% of the sample is from chemicals and gas extraction. The oil and gas and communication industries each compose approximately 9% of our sample. Table 8, Panel A provides information similar to Table 3, Panel A, but in Table 8, our control firms are matched by industry.

As can be seen, using this alternative control group leads to qualitatively unchanged results. In particular, we see that touted firms, on average, perform over 6% better leading up to the day of peak touting, while in the 2 days following touting, on average, they under-perform the control sample by over 5%. The t-statistics testing for a difference in mean return between these two groups are 2.98 and -2.59, respectively.

We also check if any of our touted stocks are touted by e-mail spam on days that they also appear on the RagingBull.com message board (as per Antweiler and Frank (2004)).¹³ In other words, we consider that touting may serve as a means to capture investor attention, incremental over the ability of message boards to do the same. Results for firms that are in both samples (our touted sample of Pink Sheets stocks and those that are present on RagingBull.com) are presented in Table 8, Panel B. We have 61 cases of a touted stock being displayed on Raging Bull on the same day. We see that these firms that are both touted and on the message board perform better leading up to the peak day of touting than

¹³ We also attempted to gather information from Yahoo! and Silicon Investor. Only 2 of our observations overlapped with messages in Yahoo! (by ticker – date), and only scarce news for a subset of the period studied in our paper was available on Silicon Investor. We also do a search on www.google.com for news articles about the tickers in our sample on days they are touted. We do not find evidence of news for these stocks, other than what appears on the message boards.

do the control firms in our sample. That said, while the overlapping sample still has inferior performance following touting relative to the control sample, the degree to which the overlapping sample underperforms is much less for the firms that appear both on message boards and in our touted sample than it is for firms that appear in only the touted sample. This lends credence to the idea that touting is a measure used to generate liquidity, therefore enabling touters to more easily dump their stocks.

To further understand the impact of touting, incremental to any effect on volume or returns of message boards, we run a regression that includes a dummy variable that indicates if the touted stock also had a message about it displayed on RagingBull.com. These results are presented in Table 9. As can be seen from Panel A, the effect of touting on returns when we consider the overlapping sample remains approximately the same as when no dummy variable is included. Though the small p-value indicates the message board dummy is significant, messages displayed on RagingBull.com have a significantly negative relationship with both returns and abnormal volume. Further, the impact that a touted stock has on abnormal volume remains significantly positive, as is the case when the overlapping sample is not considered. Overall, these results suggest that the overlap between the touted stock sample and the sample of stocks that are also mentioned on message boards does not significantly alter our primary findings.

IV. Discussion

The evidence presented in Section III suggests not only that some investors actually do respond to spam stock touts, but they respond in ways that affect the overall market for the comparatively illiquid stocks that are the favorites of spammers. The returns rise with the initial touts and then fall immediately after. In this section we seek to quantify the magnitude of the effect. First, let us

consider an example from the point of view of the spammer. To follow this example, refer to Table 3, Panel B (sub-panel labeled “-1 to peak”). Assume the spammer buys on the day before beginning heavy touting, and then liquidates on the eve of the day of heavy touting or the morning of the first day after touting. While buying stock earlier might provide more of an opportunity to buy low, keeping the buying and selling tightly anchored to the touting might prove an attractive strategy because the touter’s money would rarely be tied up in one stock for too long, and because observations are spread throughout the year. If the spammer (or the spammer’s client) were to invest \$10,000 using this basic practice for a given stock, midpoint returns suggest that his or her net worth would increase approximately 4.9% to \$10,490 in two days, on average. If this same person were to invest in all of the touted stocks in our sample, he or she could make approximately \$133,770 over several 2-day periods.¹⁴ This would be even more significant if he or she were to be a particularly effective spammer, responsible for the stocks that are in the highest quintile of touting activity. Returns to this strategy would be roughly 6% (see Table 6, Panel B). Assuming the spammer is spamming stocks he or she already owns, the average incremental transaction cost is only 2%, so the profit remains significant. Despite the large gains to investing in touted stocks (prior to the touting), the risk associated with this investment is only marginally higher than for non-touted stocks. Depending on the touter’s risk aversion level, the greater return may more than compensate for bearing this added risk.

Now let us consider the returns to an investor who follows the advice of a spammed tout. Again, refer to Table 3, Panel B (sub-panel labeled “peak to end + 2”). On average, if the victim were to invest \$1,000 in the touted stock on the day of the heavy touting, after two days, he or she would have approximately \$947.50 dollars. Looking only at the most actively touted stocks (Table 6, Panel

¹⁴ The spammer makes 4.9% on 273 investment opportunities. It follows that $(\$1000 * 273 * 1.049) - (273 * 1000)$ is the spammer’s net gain.

B), the loss would be even more significant (7%), indicating that the relationship between returns and touting depends on touting activity. Of course, we do not know that the spammer would sell the stock after 2 days, but casual observation suggests that the Pink Sheets stocks do not return to their price level on the day of touting for some time. This analysis actually understates losses, because it does not account for transaction costs. The midpoint return column from “peak to peak + 2” suggests that, if each time the victim saw a touted stock he or she invested in a randomly selected non-touted Pink Sheets stock, he or she would face lower idiosyncratic risk and, on average, increase his or her return by over 6%. The results further imply that, in theory, the investor could create a profitable strategy by forming a zero-cost portfolio that entails short selling, or buying non-tout stocks and selling tout stocks each time he or she receives a spam touting stock. While this strategy may have a high expected return, since Pink Sheets stocks are so thinly traded, the possibility of not being able to liquidate cannot be overlooked. In fact, investing in several non-touted Pink Sheets stocks has a higher expected return than, say, investing in the S & P 500 index. To be sure, such investors are being compensated for holding relatively illiquid and small stocks (see, for example, the discussion about an illiquidity premium in Brennan and Subrahmanyam (1996)).¹⁵

V. Implications and Conclusion

Based on an archived database of touts drawn from 75,415 likely e-mail tout messages, themselves drawn from over 1.7 million reports of spam, we document a significantly negative return following days of heavy spam touting of a stock. We also provide evidence of an average positive return on the day of heavy touting, along with the day preceding such touting. Volume responds positively and significantly to touting. The evidence is consistent with the notion that

¹⁵ In Section V, we discuss legality issues surrounding the touter’s possible strategy.

spammers tout stocks to increase demand and perhaps price enough to unload previously-secured positions at a profit. Selling pressure on the part of the spammer then results in negative returns following heavy touting. The implication of this is that the investors who respond to heavy touting are losing, on average, 5.25% in the two day period following touting. When aggregated across touts, the dollar value of this loss may be significant. The fact that losses from investing in the stocks touted most heavily approach 8% in the same two day period underscores the notion that heavy touting via spam can have an effect on trading activity and returns. We find that touting in clusters is related to an even more negative subsequent return, and show that prices have increased leading up to the peak day of touting. Our results also accord with a model put forward in Hong and Huang (2005) where insiders who participate in highly illiquid markets may engage in costly activities in order to liquidate their positions without significant price impact.

In the United States, the prevailing model of consumer protection is that of disclosure. Those who give advice to the public about stocks run the risk of sanction by the federal Securities and Exchange Commission or state counterparts if they fail to disclose such material facts as a material interest they have in the stocks themselves.¹⁶ Interestingly, much of the stock-touting spam we examine, such as the sample provided in Figure 1, contains boilerplate disclosures such as the statement that the spammer had been compensated a certain amount of money and shares of stock by a third party to send out an optimistic tout, and that the spammer (and the third party) were likely to be selling the very stock touted contemporaneously with the tout itself. The substantive touts themselves, suggesting great returns, do not appear to be put to a stringent test

¹⁶ Some stock tout spammers have been prosecuted under section 17(b) of the Securities Act of 1933, on the basis that the spammers did not sufficiently disclose their financial interests (see, e.g., *In Re James Sheret, Jr.*, Lit. Rel. No. 16451, 71 S.E.C. Docket 1787 (Feb. 24, 2000)). Walker and Levine (2001) write that after the SEC began to bring enforcement cases, disclosure “markedly improved.” Many of our recorded spams reflect that improvement – if improvement it is.

by U.S. legal authorities. In order for a touter's (or other entity recommending stocks) substantive claims to run afoul of the S.E.C., a reasonable person must be thought to believe that the claims are both true and significant (Langevoort 2002). This standard turns out to exculpate much of the touting that takes place in the spam we examine.¹⁷ Pinksheets C.E.O. R. Cromwell Coulson has called attention to this type of market manipulation, highlighting the inadequacy of such disclosure, and has called for the S.E.C. to consider rules that would make this type of stock touting much more difficult.¹⁸

Given the disclosure statements, the fact that so much spam is blocked by spam filters, and the additional effort it takes a recipient to place an order, it is striking that heavy stock touting can actually work.¹⁹

If such disclosures meet the requirements of law and yet consumers are still so readily taken in, regulators might consider more aggressive, and paternalistic, applications of law to prohibit such conflicts outright, rather than simply requiring disclosure. These could include requiring additional transactional steps before individuals are permitted to trade in penny stocks – similar to the assurances that brokers seek from their clients before permitting them to pursue risky and complex investment activities such as writing uncovered options. Such steps might suffice as a cooling off period between the receipt of a tout and

¹⁷ Langevoort (2002) writes that “[t]he fact that a pseudonymous person on a web site says, even repeatedly, that he thinks that a stock is poised to gain an immense amount does not by itself convey any seemingly reliable information. In other areas of antifraud litigation under the securities laws, the courts have dismissed claims involving far more substantive assertions of general optimism than this – even when made by corporate insiders – as immaterial as a matter of law.”

¹⁸ See R. Cromwell Coulson, Petition for Commission Action to Protect the Investing Public from Unlawful and Deceptive Securities Promotions, April 2006, <<http://sec.gov/rules/petitions/petn4-519.pdf>>.

¹⁹ Studies such as Karpatkin (1999) suggest that children and teenagers are “easily manipulated” so are vulnerable to marketing ploys like spam. Yet, given that Barber and Odean (2001) find that the average age of the principal account holder in their sample is approximately 50, it is unlikely that this group of individuals is responsible for the trading activity covered in this paper.

acting upon it. Spammers, to be sure, might then take up more sustained touting campaigns in order to maintain interest across such cooling off periods.

The mere disclosure of odds (and fidelity to them) is typically not legally sufficient for casinos to offer standardized games of chance to the public; instead, regulators impose minimum payouts by such games to the public, presuming that many members of the public would not shop among casinos for the best odds if the casinos had a free hand to set them. Just as casinos must go beyond disclosure and provide minimum government-mandated “fair” returns to those who gamble, stock touters might be prohibited from trying to move markets to their advantage using the wealth of unsophisticated investors, even if they fully disclose their bias – in essence, conceding the swindle they seek to accomplish in text alongside the touts that are central to the enterprise.

Finally, those who tout stocks using spam might be singled out for enforcement under the CAN-SPAM Act, since our review of the spam emails indicate failure to abide by CAN-SPAM’s labeling and opt-out requirements.

Our analysis shows that spam works. Among its millions of recipients are not only those who read it, but who also act upon it, suggesting a value to spamming that will create a powerful counterbalance to regulatory and technical efforts to contain it.

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Table 1: Summary Statistics

Table 1 presents summary statistics on price and volume data for the stocks in our sample. Under the column Touted, All refers to all of the stocks in our sample, 0 represents the control sample, and 1 represents the touted sample. Volume is share volume, and bid-ask spread is simply Ask less Bid on the closing trade. All data are from January, 2004-July, 2005.

Variable	Touted	N	Mean	Median	St Dev	Min	Max
Price	All	154977	0.85	0.10	1.92	0.00	14.00
	0	122142	0.96	0.10	2.11	0.00	14.00
	1	32835	0.44	0.11	0.86	0.00	8.80
Volume	All	154977	2041454	32200	32040143	100	2147483600
	0	122142	2284760	24700	35823459	100	2147483600
	1	32835	1136386	83000	8394412	100	559904984
Bid Ask Spread	All	154977	0.05	0.01	0.15	0.00	13.00
	0	122142	0.05	0.01	0.16	0.00	13.00
	1	32835	0.03	0.01	0.09	0.00	2.30

Table 2: Relevant Percentages

Table 2 presents summary statistics on the touted and control stocks in our sample on all days in the sample: days that experience a tout and days that do not. Panel A gives results for the single most actively traded stock in our sample in terms of dollar value of trading activity (determined by price multiplied by share volume). Panel B gives data for the single most actively traded stock in our sample in terms of dollar value of abnormal trading activity (measured by price*abnvol) among touted sample stocks and their matched, control stocks. AbnVol is obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. If a sample stock has not been touted on a certain day, Tout Day = 0 for it and for its control stock. If a sample stock has been touted on a certain day, Tout Day = 1 for it and for its control stock. Touted = 0 indicates a control stock and Touted = 1 represents a sample stock. N is the sample size, Pr*Vol (or Pr*AbnVol) is share price multiplied by volume (abnormal volume), and is an indication of total dollar value traded. StDev is the standard deviation of Pr*Vol (Panel A) and Pr*AbnVol (Panel B), and Percent indicates the percentage of control or touted stocks on non-tout and tout days. Data for the sample period is January, 2004 - July, 2005.

Panel A: Top Stock, Dollar Value of Trading Activity

Tout Day	Touted	N	Pr*Vol	StDev	Percent
0	0	439	13508396.82	14683549.72	0.94
0	1	27	7915145.17	5305522.82	0.06
1	0	67	1083095.89	3871076.79	0.19
1	1	287	311102.84	543879.23	0.81

Panel B: Top Stock, Price * Abnormal Volume

Tout Day	Touted	N	Pr*AbnVol	StDev	Percent
0	0	349	62.64	100.44	0.75
0	1	117	71.91	106.72	0.25
1	0	59	5.26	16.70	0.17
1	1	295	3.03	10.54	0.83

Table 3: Means

Table 3 presents summary statistics on the variables in our sample around days that experience a tout. Panel A gives “day-level” results. Group-level results are presented in Panel B. A group is defined as a period with fewer than 5 days without a tout. The peak day is defined as the day within a group with the heaviest touting. N is the number of observations, Ret represents average daily return for the day-level results, and Group Ret represents average return over the relevant period for the “group-level” results. In Panel A, MP RET is the average daily midpoint return, and in Panel B MP Ret is the average return calculated from spread midpoints for the specified period. AbnVol is abnormal volume, obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. Spread gives median bid-ask spread. Our sample period is January, 2004 - July, 2005. For the day-level results, “Beg - 1 to Peak” represents the period from the day before the tout through the day of the tout. Peak day is the day of the tout, and “Peak to End+2” represents day of the tout plus the 2-day period after. For the group-level results, “Beg - 1 to Peak” represents the period from the day before the beginning of the group of touts through the day of the tout. Peak day is the day of the heaviest touting, and “Peak to End+2” represents day of heaviest touting through the two days after the group of touts ends.

Panel A: Day Level Results

Touted	N	Ret	SD	MP Ret	SD	AbnVol	SD	Spread	SD
Peak day									
0	277	0.0001	0.1714	-0.0016	0.0899	-0.1982	1.3460	0.0150	0.6803
1	307	0.0137	0.1607	0.0046	0.1312	2.3308	6.2821	0.0200	0.0688
Beg-1 to Peak									
0	717	0.0137	0.2341	0.0014	0.1084	-0.0673	1.8086	0.0190	0.5414
1	975	0.0204	0.1596	0.0137	0.1342	1.5270	4.4801	0.0200	0.0585
Peak to End+2									
0	1,088	0.0021	0.2055	0.0016	0.0847	-0.0598	2.0792	0.0150	0.5625
1	1,483	-0.0072	0.1416	-0.0101	0.1217	2.0337	6.2643	0.0200	0.0588
Beg-1 to End+2									
0	1,584	0.0028	0.1838	0.0020	0.0956	-0.0438	2.0505	0.0185	0.5338
1	2,151	0.0023	0.1479	-0.0015	0.1268	1.7613	5.5265	0.0200	0.0571

Panel B: Group Level Results

Touted	N	Group Ret	SD	MP Ret	SD	AbnVol	SD	Spread	SD
Peak day									
0	271	0.0001	0.1741	-0.0017	0.0908	-0.1893	1.3630	0.0150	0.6869
1	268	0.0155	0.1712	0.0053	0.1407	2.2867	6.1470	0.0200	0.0729
Beg-1 to Peak									
0	277	-0.0164	0.2449	0.0015	0.1762	-0.0613	1.4025	0.0150	0.6795
1	273	0.0622	0.2740	0.0479	0.2611	1.4155	3.4372	0.0200	0.0512
Peak to End+2									
0	277	0.0239	0.2428	0.0067	0.1840	-0.1157	1.4060	0.0150	0.6854
1	273	-0.0469	0.2833	-0.0525	0.3029	1.6978	3.8545	0.0200	0.0632
Beg-1 to End+2									
0	277	0.0076	0.2943	0.0086	0.2232	-0.0696	1.3453	0.0150	0.6839
1	273	-0.0059	0.3357	-0.0129	0.3716	1.5199	3.3041	0.0200	0.0543

Table 4: Regressions I

Table 4 gives results for a pooled cross-sectional, time-series generalized least squares regression for the entire sample period, 2004 only, and 2005 only, on all stocks in our sample. The left hand side of the table refers to the entire sample period, the middle panel gives results for observations from 2004, and the right hand side panel gives results for observations in 2005 only. Panel A uses midpoint returns as the dependent variable and Panel B gives results using abnormal volume as the dependent variable. Abnormal volume is obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. Int denotes intercept and tstk is a dummy variable that takes on the value 1 if the stock is touted and zero otherwise. #touts is a variable that represents the number of touts on a given date, and cum5 is a variable that represents the cumulative effect of touting in the 5 days after touting occurs. Standard errors are adjusted for clustering in time. N is the number of observations.

Panel A: Dependent Variable = Daily Return

All	Est	Error	$Pr > Z $	2004	Est	Error	$Pr > Z $	2005	Est	Error	$Pr > Z $
int	0.0151	0.0002	<.0001	int	0.0095	0.0023	<.0001	int	0.0140	0.0001	<.0001
tstk	-0.0010	0.0011	0.3724	tstk	-0.0029	0.0011	0.0096	tstk	-0.0019	0.0008	0.0165
#touts	0.0007	0.0004	0.0945	#touts	0.0008	0.0005	0.1278	#touts	0.0007	0.0003	0.0293
cum5	-0.0003	0.0001	0.0040	cum5	-0.0002	0.0001	0.0181	cum5	-0.0003	0.0001	0.0003
		N =	128151			N =	69561			N =	58590

Panel B: Dependent Variable = Abnormal Volume

All	Est	Error	$Pr > Z $	2004	Est	Error	$Pr > Z $	2005	Est	Error	$Pr > Z $
int	-0.1086	0.0037	<.0001	int	0.6602	0.0066	<.0001	int	0.1209	0.0563	0.0317
tstk	0.1523	0.0250	<.0001	tstk	0.1318	0.0307	<.0001	tstk	0.1761	0.0405	<.0001
#touts	0.0677	0.0116	<.0001	#touts	0.0554	0.0104	<.0001	#touts	0.0917	0.0254	0.0003
cum5	0.0047	0.0019	0.0132	cum5	0.0028	0.0019	0.1463	cum5	0.0084	0.0036	0.0181
		N =	128151			N =	69561			N =	58590

Table 5: Regressions II

Table 5 gives results for a pooled cross-sectional, time-series generalized least squares regression for the entire sample period, 2004 only, and 2005 only, for touted stocks only. Results are presented in the left-hand-side, middle, and right-hand side of the table, respectively. Panel A gives results using midpoint return as the dependent variable and Panel B gives results using abnormal volume as the dependent variable. Abnormal volume is obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. *int* denotes intercept, *#touts* is a variable that represents the number of touts on a given date, and *cum5* is a variable that represents the cumulative effect of touting in the 5 days after touting occurs. Standard errors are adjusted for clustering in time. *N* gives the number of observations.

Panel A: Dependent Variable = Daily Return

All	Est	Error	<i>Pr</i> > <i>Z</i>	2004	Est	Error	<i>Pr</i> > <i>Z</i>	2005	Est	Error	<i>Pr</i> > <i>Z</i>
int	0.0438	0.0000	< .0001	int	0.0226	0.0000	< .0001	int	0.0099	0.0046	0.0326
#touts	0.0007	0.0003	0.0208	#touts	0.0007	0.0004	0.0682	#touts	0.0008	0.0005	0.1315
cum5	-0.0003	0.0001	0.0002	cum5	-0.0003	0.0001	0.0034	cum5	-0.0002	0.0001	0.0182
		N =	29996			N =	16066			N =	13930

Panel B: Dependent Variable = Abnormal Volume

All	Est	Error	<i>Pr</i> > <i>Z</i>	2004	Est	Error	<i>Pr</i> > <i>Z</i>	2005	Est	Error	<i>Pr</i> > <i>Z</i>
int	-0.1361	0.0000	< .0001	int	0.1153	0.0001	< .0001	int	0.3819	0.1687	0.0236
#touts	0.0657	0.0117	< .0001	#touts	0.0558	0.0104	< .0001	#touts	0.0849	0.0267	0.0015
cum5	0.0049	0.0019	0.0097	cum5	0.0028	0.0019	0.1447	cum5	0.0090	0.0036	0.0127
		N =	29996			N =	16066			N =	13930

Table 6: Quintiles

In Table 6, quintiles are formed based on touting activity on tout days only. Quintile 5 represents the stocks with the most frequent touting. Panel A gives the sample size for each quintile (stock-days), the average number of touts, average return, price, volume, price multiplied by volume, abnormal volume, and abnormal dollar volume data by quintiles based on the amount of touts for a given stock. Values are calculated on tout days only. Panel B presents “group-level” summary statistics on the variables in our sample for tickers in our sample that have the highest amount of touting activity around days that experience a tout. A group is defined as a period with fewer than 5 days without a tout. The peak day is defined as the day within a group with the heaviest touting. N is the number of observations, and MP is the average midpoint return calculated from spread midpoints for the specified period. AbnVol is abnormal volume, obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. Spread gives median bid-ask spread. “Beg - 1 to Peak” represents the period from the day before the beginning of the group of touts through the day of the tout. Peak day is the day of the heaviest touting, and “Peak to End+2” represents day of heaviest touting through the two days after the group of touts ends. The sample period is January 2004 - July 2005.

Panel A: Summary Statistics by Quintile

quintile	Stock-Days	Avg Touts	Ret	Pr	Vol	Pr*Vol	AbnVol	Pr*AbnVol
1	329	1.0	0.0018	0.3705	669,230	133,045	284,012	63,730
2	124	2.0	0.0016	0.3354	858,202	177,638	440,428	92,747
3	143	3.8	0.0002	0.3877	835,746	170,292	529,375	101,564
4	132	8.9	0.0034	0.4825	949,702	119,638	747,667	80,508
5	143	40.3	0.0324	0.4473	675,696	136,914	544,088	101,974

Panel B: Quintile Group Level Results

Touted	N	Group Ret	SD	MP Ret	SD	AbnVol	SD	Spread	SD
Peak day									
0	292	-0.0016	0.2067	-0.0016	0.2067	0.2864	4.1264	0.0746	0.1633
1	134	0.0096	0.1720	0.0018	0.1434	2.4424	5.6119	0.0425	0.0548
Beg-1 to Peak									
0	299	-0.0279	0.2399	-0.0279	0.2399	0.0450	1.7247	0.0741	0.1578
1	137	0.0510	0.2748	0.0327	0.2645	1.5676	3.4237	0.0426	0.0474
Peak to End+2									
0	299	-0.0029	0.3253	-0.0029	0.3253	0.1025	1.9682	0.0732	0.1534
1	137	-0.0789	0.3046	-0.0775	0.3456	1.6538	3.3496	0.0415	0.0460
Peak to End+2									
0	299	-0.0281	0.3453	-0.0281	0.3453	0.0476	1.5173	0.0733	0.1521
1	137	-0.0459	0.3312	-0.0527	0.3849	1.5690	3.0609	0.0418	0.0455

Table 7: Industry Definitions

Table 7 shows the distribution of the touted stocks in our sample across industries, as determined by 2-digit SIC code. The industry description is given in the left panel, 2-digit SIC code is provided in the middle column, and the column on the right hand side gives the percentage of stocks in our sample that falls in the relevant industry. The sample period is January 2004 - July 2005.

Industry Description	SIC code	%
Business Services	73	34.1
Chemicals & Allied Products	28	11.1
Oil & Gas Extraction	13	8.7
Communications	48	8.7
Industrial & Commercial Machinery & Computer Equipment	35	4.8
Electronic & Other Electrical Equipment & Components, Except Computer Equipment	36	4.8
Measuring, Analyzing, & Controlling Instruments; Photographic, Medical & Optical Goods; Watches & Clocks	38	4.8
Food & Kindred Products	20	4.0
Apparel & Other Finished Products Made From Fabrics & Similar Materials	23	3.2
Metal Mining	10	2.4
Engineering, Accounting, Research, Management, & Related Services	87	2.4
Petroleum Refining & Related Industries	29	1.6
Miscellaneous Manufacturing Industries	39	1.6
Amusement & Recreation Services	79	1.6
Health Services	80	1.6
Mining & Quarrying Of Nonmetallic Minerals, Except Fuels	14	0.8
Printing, Publishing, & Allied Industries	27	0.8
Fabricated Metal Products, Except Machinery & Transportation Equipment	34	0.8
Transportation Equipment	37	0.8
Home Furniture, Furnishings, & Equipment Stores	57	0.8
Motion Pictures	78	0.8

Table 8: Summary Statistics II

Table 8 presents summary statistics on the variables in our sample around days that experience a tout. Panel A refers to group-level results, with control firms matched by 2-digit SIC industry code, from the smallest decile of NASDAQ stocks. Panel B refers to group-level results with the touted sample of firms also being displayed on RagingBull message board on the same day they are touted. A group is defined as a period with fewer than 5 days without a tout. The peak day is defined as the day within a group with the heaviest touting. N is the number of observations, Ret represents the average return for the group-level results, and AbnVol is abnormal volume, obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. Bid-Ask Spread gives median bid-ask spread. Our sample period is January, 2004 - July, 2005. “Beg - 1 to Peak” represents the period from the day before the beginning of the group of touts through the day of the tout. Peak day is the day of the heaviest touting, and “Peak to End+2” represents day of heaviest touting through the two days after the group of touts ends.

Panel A: Nasdaq Control Stocks Matched by 2 - Digit SIC Code

Touted	N	Group Ret	StDev	Abn Vol	StDev	Bid-Ask Spread	StDev	Median
Peak day								
0	296	-0.0008	0.0362	0.0496	2.5876	0.0816	0.4682	0.0816
1	268	0.0158	0.1725	2.3166	6.3976	0.0407	0.0727	0.0407
Beg-1 to Peak								
0	303	-0.0020	0.0772	0.9940	5.2712	0.0855	0.4910	0.0843
1	273	0.0629	0.2755	3.2402	6.9017	0.0395	0.0522	0.0390
Peak to End+2								
0	302	0.0057	0.0729	0.8932	3.7649	0.0937	0.6214	0.0812
1	273	-0.0473	0.2844	4.5301	8.9128	0.0396	0.0631	0.0388
Beg-1 to End+2								
0	303	0.0037	0.0892	1.6406	5.8559	0.0931	0.5944	0.0833
1	273	-0.0059	0.3357	5.1281	9.2151	0.0391	0.0547	0.0387

Panel B: Touted Stocks that Appear on RagingBull

Touted	N	Group Ret	StDev	Abn Vol	StDev	Bid-Ask Spread	StDev	Median
Peak day								
0	299	-0.0037	0.0446	0.0579	1.7232	0.0538	0.1157	0.0538
1	61	0.0126	0.1511	2.4016	5.5195	0.0206	0.0299	0.0206
Beg-1 to Peak								
0	305	-0.0067	0.0745	-0.0201	1.2691	0.0541	0.1117	0.0531
1	65	0.0732	0.2825	1.5392	3.3329	0.0205	0.0257	0.0206
Peak to End+2								
0	306	0.0023	0.0875	0.1013	1.4580	0.0566	0.1062	0.0542
1	65	-0.0355	0.2848	1.5917	2.7558	0.0215	0.0279	0.0201
Beg-1 to End+2								
0	306	-0.0008	0.1051	0.0545	1.2817	0.0559	0.1071	0.0528
1	65	0.0162	0.3304	1.4487	2.3443	0.0206	0.0258	0.0193

Table 9: Regressions III

Table 9 gives results for a pooled cross-sectional, time-series generalized least squares regression for the entire sample period, 2004 only, and 2005 only, for all stocks in our sample. The left hand side of the table refers to 2004-2005, the middle panel gives results for only 2004, and the right hand side panel gives results for 2005 only. Panel A uses return as the dependent variable and Panel B gives results using abnormal volume as the dependent variable. Abnormal volume is obtained by subtracting the mean volume over the sample from daily dollar volume, standardized by mean volume. Int denotes intercept, Tstk is a dummy variable that takes on the value 1 if the stock is touted and zero otherwise. #touts is a variable that represents the number of touts on a given date. Cum5 is a variable that represents the 5 days after touting occurs. Mb is a dummy variable that takes on the value 1 if the stock is displayed on RagingBull on the same day it is touted. Standard errors are adjusted for clustering in time. N is the number of observations.

Panel A: Dependent Variable = Daily Return

	Est	Error	$Pr > Z $		Est	Error	$Pr > Z $		Est	Error	$Pr > Z $
int	0.1957	0.0004	<.0001	int	0.0546	0.0007	<.0001	int	0.0693	0.0288	0.0161
tstk	-0.0148	0.0027	<.0001	tstk	-0.0188	0.0036	<.0001	tstk	-0.0108	0.0040	0.0075
#touts	0.0009	0.0004	0.0321	#touts	0.0006	0.0005	0.1780	#touts	0.0014	0.0008	0.0898
cum5	-0.0003	0.0001	0.0003	cum5	-0.0003	0.0001	0.0164	cum5	-0.0004	0.0001	0.0017
mb	-0.0067	0.0024	0.0046	mb	-0.0060	0.0028	0.0343	mb	-0.0069	0.0040	0.0868
		N =	128151			N =	69650			N =	58591

Panel B: Dependent Variable = Abnormal Volume

	Est	Error	$Pr > Z $		Est	Error	$Pr > Z $		Est	Error	$Pr > Z $
int	-0.1167	0.0038	<.0001	int	0.6549	0.0067	<.0001	int	0.1227	0.0572	0.0320
tstk	0.2619	0.0287	<.0001	tstk	0.2724	0.0386	<.0001	tstk	0.2475	0.0429	<.0001
#touts	0.0675	0.0116	<.0001	#touts	0.0557	0.0105	<.0001	#touts	0.0911	0.0254	0.0003
cum5	0.0046	0.0019	0.0133	cum5	0.0029	0.0019	0.1258	cum5	0.0081	0.0036	0.0237
mb	-0.2718	0.0416	<.0001	mb	-0.3204	0.0483	<.0001	mb	-0.1973	0.0733	0.0071
		N =	128151			N =	69650			N =	58591

Figure 1 gives an example of Spam email touting a stock.

Received: from broadtech.co.nz (d233-64-140-225.dnv.wideopenwest.com [64.233.225.140]) by mail-cyber.law.harvard.edu with SMTP (Microsoft Exchange Internet Mail Service Version 5.5.2653.13) id 1Y7PFFVG; Thu, 18 Mar 2004 10:13:29 -0500
Message-ID: <KFEIKICHPPKOLOMBHEGPMPEOMPAB.johnathoni_hathawaypg@artspas.uwaterloo.ca>
From: "Johnathon I. Hathaway" <johnathoni_hathawaypg@artspas.uwaterloo.ca>
To: zittrain@cyber.law.harvard.edu
Subject: Strong Buy Alert: CWTD my8zupb
Date: Thu, 18 Mar 2004 13:09:47 +0000
MIME-Version: 1.0
Content-Type: text/html

Financial Insiders Report
Mid-Week Report

If you loved your 900 percent gains on our stock pick last week, we think our next pick, China World Trade Corp. "CWTD", will do even better !!

Strong-Buy Alert !
Breaking News in the Previous 2 weeks

CWTD Makes Application to list on Amex

China World Trade Corp Signs Letter of Intent to Acquire Controlling Stake of Guangdong Huahao Industries Holdings Limited

China World Trade Corp. ticker: "CWTD"

CHINA WORLD TRADE CORP.

Symbol: CWTD OTC.BB

Price \$4.80 <THIS WAS PROFILED AT 1.50 2 WEEKS AGO>

Shares out: 16Million

Market Capitalization: \$ 19Million

Significant Revenue Growth in 2004

Average PE Industry: 30x

Rating: Strong Buy

7 days trading target: \$6.50

30 day trading target: \$7.50

Investment Outlook

- CWTD HAS A STRONG MANAGEMENT TEAM THAT INCLUDES TOP LOCAL CORPORATE OFFICERS, HIGH RANKING SENIOR GOVERNMENT OFFICIALS AND SENIOR MANAGEMENT FROM THE HONG KONG WORLD TRADE CENTER

- IN THE LAST TWENTY YEARS, THE FOREIGN DIRECT INVESTMENT INTO CHINA HAS INCREASED FROM 0.92 BILLION USD IN 1983 TO 52.74 BILLION USD IN 2004

- CWTD IS FIRMLY POSITIONED TO VASTLY EXPAND ITS MARKETING AND ACQUISITION STRATEGIES AND CAPITALIZE ON ASIA'S MULTI-BILLION DOLLAR EMERGING MARKET.

- CWTD HAS JUST MADE THE APPLICATION TO LIST ON THE AMEX!!!

- CHINA WORLD TRADE CORP SIGNS LETTER OF INTENT TO ACQUIRE CONTROLLING STAKE OF GUANGDONG HUAHAO INDUSTRIES HOLDINGS LIMITED

CWTD is our **PLAY OF THE MONTH** stock pick.

Here are a few simple reasons why one would own China World Trade Corp:

[China World Trade Corporation](#) is an official operator of World Trade Centers in China, in association with The World Trade Centers Association (WTCA) and offers an enormous variety of services for businesses and industries seeking to do business in China.

The Company's business model consists of three major components -- The World Trade Center business, value-added services, and strategic investments.

[China World Trade Corporation](#) established the first World Trade Center in the province of Guangzhou (Canton) in the year 2002 and started the commercial operation at the beginning of 2003. This significant event was covered in detail on [CNN ASIA](#).

With the recent tragic events of 9-11, the name World Trade Center has instant global recognition, and stands for unity, strength and prosperity throughout the worlds top economy leaders.

[China World Trade Corp](#) Signs Letter of Intent to Acquire Controlling Stake of Guangdong Huahao Industries Holdings Limited

CWTD's business potential is built upon the opportunity created by the international trade of China.

Don't be sorry next week that you forgot to buy this one!

China World Trade Corp. is uniquely positioned and capitalizing on the rapidly expanding asian markets!

Investors take note, Get in early !

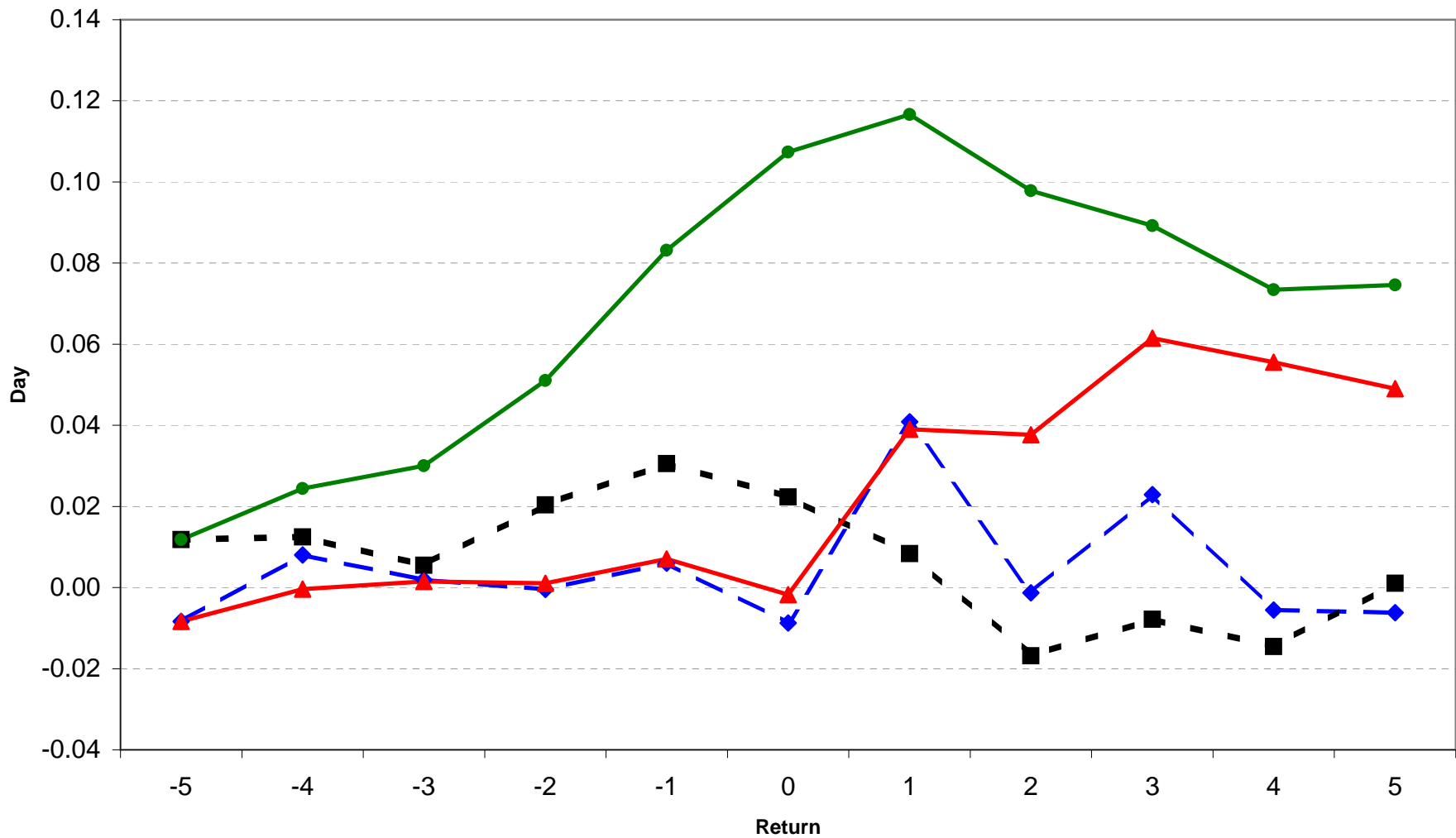
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Figure 1.

Event Returns



Control Ret Touted Ret Control CumRet Touted CumRet

Returns and Dollar Value by Quintile

