Who Falls Prey to the Wolf of Wall Street? Investor Participation in Market Manipulation*

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PRELIMINARY DRAFT: DO NOT CIRCULATE

August 2017

Abstract

Manipulative communications touting stocks are common in capital markets around the world. Although the price distortions created by so-called "pump-and-dump" schemes are well known, little is known about the investors in these frauds. By examining 421 "pump-and-dump" schemes between 2002 and 2015 and a proprietary set of trading records for over 110,000 individual investors from a major German bank, we provide evidence on the participation rate, magnitude of losses, and the characteristics of the individuals who invest in such schemes. Our evidence suggests that participation is quite common and involves sizable losses, with more than 5% of active investors participating in at least one "pump-and-dump" and an average loss of nearly 30%. Moreover, we find that there are several distinct types of investors, some of which should not be viewed as simply falling prey to these frauds. We also find that portfolio composition and past trading behavior are better able to explain participation in manipulated stocks than demographics. Our analysis offers insights into the challenges associated with designing effective investor protection against market manipulation.

JEL classification: *D14, G11, G18, K42, M48*

Key Words: *market manipulation, financial regulation, fraud, investor protection*

* We would like to thank Joshua White and workshop participants at the University of Chicago Booth School of Business, University of Muenster, the Securities and Exchange Commission, Stockholm University, and Vienna Graduate School of Finance for their helpful comments. This research would not have been possible without the collaboration of a German bank and we gratefully acknowledge the help provided by the bank and its employees. We thank Sebastian de Schmidt and BaFin for kindly providing data on German tout cases.

1. Introduction

Well-functioning equity markets are predicated on investors' access to reliable and accurate information. There are many information sources that investors can utilize in their decisions including disclosures issued by firms, news conveyed by third-parties (e.g. analysts, brokers, promoters), and information contained in prices themselves. Manipulation of any of these sources of information can create distortions that undermine market functioning, the efficient allocation of capital, and individuals' willingness to invest in the stock market in the future (e.g., Aggarwal and Wu 2006; Kyle and Viswanathan 2008; Giannetti and Wang 2016).

Given these distortions and potential externalities, securities regulators and supervisors generally mandate truthfulness in disclosures and take action against those who seek to deceive. Regulators also prohibit deceptive trading practices and market manipulation, largely with the intention to protect investors. For example, the U.S Securities and Exchange Commission (SEC) describes its mission as one "to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation" (SEC 2016). These different objectives can compete with each other. For instance, lowering the regulatory burden for firms can foster access to and use of public capital markets, but doing so can also expose investors more frequently to duplicity in market transactions and lower market quality (e.g., Brüggemann et al. 2016). Deciding how to make appropriate tradeoffs between capital formation and investor protection requires, among other things, understanding the trading behavior of individual investors.

While there is a significant body of work examining the role of disclosure and securities regulation and enforcement in fostering capital formation and market quality (e.g., Leuz and Wysocki 2016 for a survey), there is much less research on even the most basic questions related to market manipulation and investor protection. What is the participation rate in market

manipulation? How damaging are these schemes to investors' portfolios? And to what extent do vulnerable investors "fall prey" to these schemes and need protection?

In this paper, we seek to make progress towards answering these questions by analyzing investor participation in "pump-and-dump" schemes. In such schemes, a promoter acquires a position in a stock and then artificially raises the price by disseminating false or misleading information about the firm (Kyle and Viswanathan 2008; Putnins 2012). To facilitate a rapid run up in stock price during the pump phase, promoters often target thinly traded "penny" stocks for which limited liquidity leads to rapid price increases when demand rises. Once the stock reaches a certain price level, promoters sell their shares causing a rapid decline in the share price and significant losses for other investors.

Pump-and-dump schemes directly harm investors who purchase shares on the false premise that some innovation or impending development justifies a rising valuation. Harm can further spread as those investors come to distrust information about other potential investments (Antweiler and Frank 2004; Guiso et al. 2008; Giannetti and Wang 2016; Soltes 2016). To mitigate these adverse effects, regulators expend considerable resources seeking to curtail fraudulent activity. Yet, an effective regulatory response requires understanding who invests in such schemes and why, as well as a sense for how investors fare in them.

To shed light on these questions, we examine a large set of pump-and-dump schemes from 2002-2015 and trading records for over 110,000 individual investors from a major German bank. By examining these confidential trading records, we can not only assess the returns or losses associated with participating in pump-and-dump schemes, but we can also learn about the characteristics of these investors, their trading behavior and their portfolios.

Our evidence shows that investing in pump-and-dump schemes is fairly common. We find that 6,569 individuals make over 20,000 purchases during the first 60 days of the 421 pump and dump schemes in our sample. Thus, nearly 6% of the investors in our sample invest in at least one pump-and-dump scheme. Moreover, in any given year, there is a 2% chance that an investor in our sample would take a position in at least one pump-and-dump stock. As would be expected, losses from investing are considerable with the average investment in a pump-and-dump scheme returning -28% to sample investors.

Although these losses are significant, they are substantially lower than what the price path of many schemes would suggest. For comparison, the average (median) 120-day holding period return for a pump-and-dump beginning on the date a stock is first touted is -50% (-71%). Thus, many investors curb their losses by selling their tout investments more quickly. We find that the pump-and-dump schemes for stocks that have their headquarters in Germany have the most investors), likely reflecting a broader tendency of individuals to invest in firms closer to home (French and Poterba 1991). We also find that pump-and-dumps employing e-mail tend to be the more effective than those employing telephone or fax, which likely reflects the wide reach and low cost of e-mail distribution.

We show that the average tout investment is €6,972 per investor, which is substantial relative to the average portfolio size. By comparison, the average investment outside pump and dump schemes for these investors is €6,142. Compared to a random sample of investors who never invested in touts, tout investors hold a greater number of stocks, have a higher share of penny stocks in their portfolio, a lower share of blue chip stocks, and smaller investments in each stock they purchase (i.e. the average investment for non-tout investors is €9,756 per firm).

Strikingly, we find a considerable number of individuals investing in more than one tout. In fact, roughly 11% of tout investors place money in four or more touts during the sample period. These multi-tout investors perform less poorly in their initial tout investments, but they still lose 22% on average across all their touts.

The frequency with which some investors invest in touts as well as the composition of their portfolios suggests that not all tout investors are gullible or fall prey to pump-and-dump schemes. Instead, some investors appear to seek out stocks with lottery-like payoffs and potentially even pump-and-dump schemes. To assess the characteristics of tout traders and better understand the vulnerability of different investors to tout schemes, we group investors based on their past trading behavior in non-tout stocks. In particular, by relying on their prior *non-tout* trading, we can assess whether the tout investment was consistent with their prior investment approach. We find that more than 30% of the tout investors have been day-trading in penny stocks or are frequent traders with short investment horizons, suggesting that they are willing to take substantial risks and trade aggressively also in other stocks.

We also investigate the broader ramifications of pump-and-dump schemes on investor behavior by studying how pump-and-dump investments are related to subsequent portfolio choices. We find that investors' subsequent investment behavior is associated with their prior tout performance. Specifically, investors who perform negatively (positively) in a tout are less (more) inclined to invest in another tout. Moreover, investors with more negative returns on average tend to significantly reduce trading and have a higher likelihood of stop trading all together in the subsequent 120 days. We also find that this effect is more pronounced for infrequent traders who are likely the more vulnerable investors. Finally, we have some evidence that, at least for some investors, there are potentially lasting ramifications for future investment

behavior from pump-and-dump campaigns. Specifically, we find that, even three years after the tout, investors who lost money in a pump-and-dump campaign still make fewer trades and hold less equity than before.

Overall, our analysis contributes to a more nuanced understanding of market manipulation and investor protection. First and foremost, our findings highlight the heterogeneity among investors participating in pump-and-dump schemes. There appear to be several types of individuals, including investors who trade infrequently and appear to be more vulnerable. But there is also a substantial fraction of investors (about 30%) who otherwise day-trade in penny stocks and appear to gamble with these stocks or even schemes. Importantly, we find that demographics provide only limited insights into who participates in such schemes, which also makes the protection of investors more difficult. Instead, portfolio characteristics and past trading behavior play a much larger role. We also show that there is substantial heterogeneity in outcomes, which in turn is connected to trading motives and investor types. Last but not least, we find that the level of participation and the magnitude of the aggregate losses are considerably larger than previously suggested in the literature.

Observing individual investor behavior is challenging and most prior research with access to such data has focused on characterizing potential investment biases (e.g. Odean 1999; Barber and Odean 2000, 2013; Schmittmann et al. 2014; Fecht et al. 2017). We build on this work by exploring individual investor participation in specific investments, i.e., pump-and-dump schemes, which are particularly relevant from an investor protection perspective. A unique aspect of our analysis is that we examine how investors respond to a variety of different distribution channels for promotional communications, including e-mail, newsletter and phone. The latter has not been analyzed in prior studies.

We also contribute to the academic literature on fraud and investor protection. A considerable body of work has examined the impact of financial fraud on firms (Karpoff and Lott 1993; Karpoff et al. 2008a), managers (Karpoff et al. 2008b), and investors (Guiso et al. 2008; Giannetti and Wang 2016; Miles and Pyne 2017). However, there is much less work on the impact of market manipulation. We find that participating in pump-and-dumps is fairly common. At the same time, our findings highlight that the notion that investors simply fall prey to deceptive schemes is not appropriate in all cases. Some tout investors appear to gamble in penny stocks and pump-and-dump schemes. This evidence contrasts with the popular image of vulnerable investors being successfully duped by aggressive promoters. As such our analysis suggests a nuanced approach to investor protection, one that recognizes the documented heterogeneity. To the extent that some individuals knowingly invest in pump-and-dump schemes, regulators could question the need of protecting these investors.[1] Our analysis also suggests that educational and protection efforts that target investors based on personal characteristics alone are unlikely to be particularly effective in reaching the relevant audience.

2. Stock Touts and Investor Behavior

2.1. Market for Stock Touting and Pump-and-Dump Schemes

Since the creation of the earliest joint-stock companies, individuals have been deceptively promoting specific stocks. In the early 1700's, the South Sea Company devised a scheme to exploit investors as the British government sought to restructure its debt by proposing to convert its obligations into South Sea Stock (Sperling 1962). The South Sea Company created the appearance of a highly desirable stock by publicly distributing it to influential people who spread rumors of overnight fortunes (Voth 2016). Investors rushed to purchase stock and within three

[1] Regulators may still desire to mitigate investment in pump-and-dump schemes (even by those who understand and are willing to bear the risks of such schemes) to curtail the incentives for promoters to manipulate stocks.

months it soared from 330 to 1,050 pounds. The bubble burst three months later as the price fell by more than 80% leaving investors with worthless stock and creating a national economic crisis.

Despite the growth in regulation over time to combat deceptive enterprises and fraud, securities manipulation continues (Allen and Gale 1992; Jiang et al. 2005; Khwaja and Mian 2005). Putnins (2012) characterizes schemes to manipulate markets into three classes: market-power based (e.g., "corner", "squeeze"), contract-based (e.g., "marking the close", "capping"), and information-based (e.g., "pump-and-dump"). We focus on pump-and-dump schemes in which investors distort the trading and price by responding to false information disseminated by the promoter. Given these distortions, pump-and-dump schemes are a form of illicit market manipulation according to the definition of Kyle and Viswanathan (2008).

In the typical pump-and-dump scheme, a promoter begins by purchasing stock in a thinly traded firm. Promoters tend to focus on stocks that trade at low share prices, commonly referred to as "penny" stocks. Most of these securities trade on over-the-counter or alternative markets (such as the German Open Market or the U.S. OTC Markets, formerly known as the "Pink Sheets"), which are less rigidly regulated than stock trading on major exchanges (Aggarwal and Wu 2006; Brüggemann et al. 2016). The relatively light regulation and low liquidity of these markets facilitate more effective "pumping." Moreover, even when severe mispricing is identified, low liquidity makes arbitrage difficult. Together, these factors make the market well-suited for promoters to engineer deceptive schemes (Griffin and Block 2001; White 2016).

To increase interest in the stock, the promoters concoct a story about some impending news or innovation that would lead to a dramatic increase in the firm's value. The promoters then circulate this information through e-mail, newsletters, or other promotional communications to potential investors. As an example, in one tout from September 2007, the promoter e-mailed:

We are glad to inform you of a CANCER CURE invented by ANDOVER MEDICAL INC (ADOV) that will take the world by storm. This new medicine, is above all other and boosts a 80% success rate during clinical trials

Over the next few days you will hear about this in the PAPERS and on TV.
So buy shares now, while price is low, before the news hits.

ANDOVER MEDICAL INC (ADOV) $.45

During the period of promotion and touting, the price of the stock typically rises as investors increasingly purchase shares in anticipation of the good news being realized. Once the campaign ends (or perhaps even during the campaign), the promoters sell their holdings leading to a precipitous decline in the stock. This pattern of promotion and rapid price increase followed by a steep decline in price fits the name to describe such schemes.

As with other attention grabbing news about firms (Lee 1992; Barber and Odean 2008), investors have been shown to react to information touted by promoters. Several prior papers examine promotional communications and find that stock touts generate significant trading volume and distortions in market pricing. Frieder and Zittrain (2008), for example, show that trading volume rises dramatically during periods of heavy touting. They find that stocks with a 4% likelihood of being the most actively traded during non-touted days have a 70% likelihood of being the most actively traded during touting periods. Relatedly, Böhme and Holz (2006) find significantly positive abnormal returns on the day of the tout for over 100 stock spams and Nelson et al. (2013) find that stock spams that are bundled with ostensibly more credible information also tend to have greater market impact.

Although the deceptive practices utilized by promoters to create pump-and-dump schemes are not themselves new or innovative, the cost of engineering such schemes has declined dramatically by recent technological advances. Promotional campaigns once required

telemarketers or physical mailings to reach potential investors, but now promoters can rely on inexpensive e-mail lists. To put these costs in comparison, Böhme and Holz (2006) estimate the cost per recipient for direct mailing and telemarketing (i.e., via phone) at $1.39 and $0.66 per recipient respectively. By comparison, sending e-mails to potential investors with addresses harvested from bulk e-mail lists costs only $0.0005 per recipient.

With these reduced costs, the amount of stock related e-mail spam has risen dramatically in the 2000s (Böhme and Holz 2006; Frieder and Zittrain 2008). One estimate from the security firm Sophos suggests that the amount of stock spam as a percentage of all unsolicited e-mail even rose as high as 25% when estimated in 2007 (Sophos 2007). Even if the efficacy of e-mail is significantly lower than of telemarketing, the vastly larger distribution makes email campaigns a popular way of promoting stocks.

As an example of a pump-and-dump campaign, Figure 1 displays the price path for BAR.bra Mining Group AG from December 5, 2007 to December 31, 2008. BAR.bra Mining Group was authorized for trading on the unregulated market of the Frankfurt stock exchange (*Open Market*) in Germany on December 5, 2007 with an initial price of € 0.46. Officially, the company was a mining company that had operations in Mongolia and Ghana with the goal of extracting precious metals and rare earths. The company claimed to have licenses for several territories in both countries and had been doing explorations for several years already. Starting from January 10, 2008, promoters advertised the company in several newsletters, mentioning the surge of the stock price since its launch in Frankfurt's Open Market as well as highlighting the firm's tremendous growth potential. Specifically, the promoters claimed that BAR.bra Mining Group was heavily undervalued since the company's mining territories were very promising and the company was expected to generate enormous profits once these resources were extracted.

Indeed, the stock continued to rise by 26% over the next five days until the price reached it its climax (€ 0.87) on January 15, 2008. As the dump began, the stock lost 67 percent of its value (€ 0.29) in less than a week. Roughly three months later, the stock was essentially worthless (€ 0.04). According to German newspaper reports, several premises of stock promoters were searched by police in 2012 in connection with the tout of BAR.bra Mining Group as well as eight other promotional campaigns (Reimann and Reimer 2012).

2.2. Investors and their Investments in Touted Stocks

Although the price path of touted stocks alone suggests that pump-and-dump campaigns can be effective, little is known about the investors who trade upon receiving a promotional communication. From a regulatory perspective, understanding who responds, why they respond and whether there are different motivations or investor types is central to efforts to protect investors and reduce the impact of manipulative pump-and-dump schemes. Media articles discussing the risks of pump-and-dump schemes offer anecdotal evidence that those who fall prey to these schemes are vulnerable investors who believe the touted information is truthful and are taken aback when it is revealed to be otherwise. Such investors are likely deceived by the promotional communication and not aware of the risks associated with the investment.

Why such investors succumb to such overt schemes has gained considerable attention in the behavioral ethics literature. Chugh and Bazerman (2007) argue that people have ‘bounded awareness’ which limits individuals’ ability to appropriately incorporate accessible and relevant information into their decision-making processes. In one experiment exploring this limitation, Zhang et al. (2015) showed a graph to participants that depicted the multi-year returns for five hypothetical funds, including the S&P 500, a tobacco fund, and a technology fund. They also included an additional fund named the “Fortitude Fund” that exhibited a significantly better risk-

return profile than other funds with historically stable year-over-year growth at a moderately high rate (i.e. several folds better than other low risk assets like treasuries). The researchers asked participants to place themselves in the position of an investment advisor and choose the fund for a client that had a long-term perspective and a moderate tolerance for risk. Nearly 70% of participants chose the Fortitude Fund. Yet, unbeknownst to the participants, Fortitude was actually a Madoff feeder fund (and the returns of the fund plummeted immediately after the graph ended when Madoff's fraud was disclosed). The returns for Fortitude were "too good to be true," but the majority of participants were not able to identify this suspicion without being prompted. Thus, bounded awareness provides one explanation why investors do not identify deceptive schemes when making trading decisions.[2]

However, it is not clear that all investors fall prey to pump-and-dump schemes. Some investors may invest in high-risk or penny stocks because they view them as lotteries and a form of gambling (Kumar 2009). These investors are looking for legitimate stocks that potentially generate large returns, albeit with high risks. Such investors may accidentally invest in a pump-and-dump in their desire to seek out high risk, high return payoffs. It is also conceivable that some investors participate in pump-and-dump schemes in order to profit from the schemes. These individuals are not duped by the promotional communication, but rather consciously decide to invest despite knowing the nature and risk of the investment. For example, a 2014 *Bloomberg* article described a 27-year-old telecom broker named Matthew Fromm who often traded stocks in his spare time in the evening (Faux and Lawrence 2014). He often invested in touted penny stocks noting that "the trick with trading penny stocks is being ahead of the curve." Fromm labeled these "Lotto Picks," indicating that he hoped to reap a potentially large gain, but

[2] For a broader overview of the behavioral ethics research regarding why individuals overlook deceptive conduct, see Bazerman and Tenbrunsel (2011) and Gino (2013). Frankel (2012) describes the victims of financial fraud by examining those that fall prey to Ponzi like investment.

also understood that his initial investment might prove to be worthless in the end. Thus, some investors are attracted to touted penny stocks, which may or may not be legitimate enterprises, because of the skewed payoffs and/or utility gain from investing in risky equities (Eraker and Ready 2015). Moreover, given these investors more deliberate involvement, it is also much less clear that these investors can or should be protected by securities regulators.

Prior research on market manipulation schemes only provides a limited understanding on the size of tout investments and the losses incurred by investors. Frieder and Zittrain (2008) assume investors purchase stocks when they are most heavily touted and hold them for two days. Based on these assumptions, they estimate a 5.5% loss on average per tout investor. However, if investors entered earlier or held longer, their profits could be substantially different. Without data on the actual tout investments made by individuals, it is difficult to assess investors' actual returns in such schemes.

As manipulation is a global phenomenon, investors in securities markets around the world encounter touts and pump-and-dump schemes.[3] To assess the returns of investing in such schemes, we examine the investments and returns for a large set of investors in Germany. In particular, we combine detailed knowledge of the portfolio and investment decisions for a sample of German investors with a set of pump-and-dump schemes that have arisen within Germany.

[3] Market manipulation is a phenomenon in both developed securities markets (e.g. U.S, UK, etc.) and emerging markets (e.g., .Khwaja and Mian 2005).

3. Data and Research Design

3.1. Pump-and-Dump Sample

Our investigation of pump-and-dump schemes extends from 2002-2015. We collect data on stocks which were subject to stock touts from two sources. The first is a proprietary sample provided to us by the German Financial Supervisory Authority (BaFin). The agency is charged with the supervision and enforcement of German market manipulation laws.[4] In this capacity, BaFin actively monitors German securities markets and also receives tips and complaints about manipulative schemes from investors and banks. It investigates these claims and determines whether the schemes constitute illegal market manipulation.[5] Such cases are then handed over to the prosecution. As noted by the regulator, "it is one of BaFin's main functions to detect market manipulation and to take action against it."[6]

From January 2002 to January 2015, BaFin identified 259 allegedly illegal tout campaigns which it handed over to law enforcement.[7] This sample comprehensively includes all pump-and-dump schemes provided to German prosecutors during this time period. BaFin generally does not consider the likelihood of apprehending the promoters and the likelihood of obtaining a conviction in determining whether or not to refer these cases to the prosecution. Thus, almost all cases that BaFin investigates and it views as illegal are handed over to the prosecution and hence form part of our sample. For touted companies in this sample, we also have confidence that the

[4] BaFin's jurisdiction encompasses the German financial system. While focusing on domestic firms and investors, BaFin has extraterritorial reach to the extent that operations or events outside of Germany impact the German financial system and/or German investors.

[5] Illicit market manipulation is defined by Article 12(1)(c) of the Market Abuse Regulation (Marktmanipulations-Konkretisierungsverordnung, No 596/2014).

[6] Market Manipulation, BaFin, May 8, 2017 (available at: https://www.bafin.de/EN/Aufsicht/BoersenMaerkte/Marktmanipulation/marktmanipulation_node_en.html)

[7] BaFin viewed the schemes as illicit market manipulation, but the touts would be accurately described as 'alleged market manipulation' since depending on the nature and result of the prosecution there may not have been civil or criminal sanctions for the perpetrators of the schemes.

promotions were targeting German investors and taking place in German markets given the objectives of investigators at BaFin, which is relevant given that we have a sample of retail investors with accounts in Germany.

To mitigate potential sample selection concerns, we create a second dataset of touts through hand-collecting cases from German websites and internet forums. To find these additional cases, we conducted several different searches. First, we examined stock trading websites that feature promotional communications and that allow users to post touts and spams. Second, we examined those trading websites for complaints by individuals about receiving unsolicited e-mail, fax, or telephone calls touting a stock (see Internet Appendix for details on the search process). To ascertain that the incident described was a stock tout, we required that the individual provided either a copy or detailed description of the promoted tout text. Based on this strategy, we identify 280 distinct campaigns that occurred between January 2002 and January 2015. If the same stock is touted multiple times, we treat the subsequent tout as a new campaign if there are more than six months between promotional communications.

When we combine the two sources, we obtain 421 distinct pump-and-dump campaigns. There are 118 cases that appear in both samples. While the overlap in the cases from the two sources may appear low, the BaFin sample is focused on the manipulation of German markets. For the hand-collected cases, it is harder to ascertain that they were tout campaigns specifically targeting German investors or that they took place on German trading venues. Moreover, all the BaFin cases were viewed as illegal market manipulation after an investigation. Our hand collection does not apply this same narrow criterion. As such, the hand-collected sample is less

restrictive. In the end, both data sources have their advantages and, for this reason, we combine the two subsamples for our analyses.[8]

A key data item for our analysis is the beginning of the tout campaign (i.e. pump phase). For the BaFin cases, we rely on the date that the allegedly illegal activity began as provided by BaFin based on their investigation. For the hand-collected cases, we define the beginning of the tout campaign as the date of the promotional e-mail, fax, or telephone communication, unless this date is not available in the actual message. In this case, we record the date of the complaint as the start of the tout campaign. When we find multiple messages for the same tout campaign, we record the tout campaign as beginning on the date of the first promotional communication. For each pump-and-dump campaign, we collect additional descriptive information about the touted firm, the type and country of its trading venue, the location of its headquarters, and industry via historical snapshots of Datastream.

Figure 2 describes our tout sample with 421 distinct pump and dump campaigns. In Panel A, we show the number of touts per year in our BaFin sample, hand-collected sample, and those contained in both samples. From 2006-2014, there are 46 touts on average per year. In the earlier period, 2002-2005, we have fewer touts in our sample. Aside from macro cycles in pump-and-dump schemes, BaFin was charged with supervision of market manipulation only in 2002 and began ramping up its surveillance a year later. Its authority over market manipulation cases was further expanded in 2004 and 2005 by the transposition of an EU directive and a related administrative order. Within the hand-collected sample, the lower incidence rate likely reflects that it is harder for us to find stock touts on websites when they are more distant in time.

[8] We analyze systematic differences between the two subsamples (Table 1). The primary difference is the "uptake" by our sample investors consistent with the above discussion on the sample construction.

Promoters of touts disseminate campaigns via a variety of different communications. E-mail and phone are the two most common means of distribution and are used by 30% and 29% of all campaigns, respectively. The relatively high percentage of phone campaigns is notable given the higher costs and lower reach of such campaigns. About 25% of campaigns employ newsletters, which provide stock recommendations to subscribers.

Over a fifth of all campaigns, or 21%, use multiple distribution forms with two channels being common. The two most common combinations are e-mail & phone and e-mail & newsletter. Only a very small number of campaigns (<2%) employ more than two channels.

We are able to find data on the industry, location of the tout venue, and the company's official headquarters for 416 out of 421 touts. Our touted stocks are traded on venues from 9 different countries, with Germany and the United States dominating the sample with 73% and 19%, respectively. The location of tout firms' headquarters is more diverse, comprising 12 countries. Although Germany and the United States are again the most frequent locations, there is considerably more heterogeneity in the official headquarter location, with Germany, the United States, and the UK representing 31%, 22%, and 13%, respectively (Figure 2, Panel D).

We also find that the touted firms are purported to be operating in a diverse set of industries (Panel E). Tout stocks are most commonly in Financial services (27%). Companies in mining, software, and oil & gas are also common. These designated industries of the firms being touted may be deceptive in that some touted firms are shell companies and/or lack substantive operations.

3.2. Investor Sample

Data on the trading behavior of investors was provided by a large German bank that operates in all 16 states of the country. Out of the bank's more than half-million clients, we received a random sample of 113,000 investors who held an account with the bank at some point between 1999 and 2016. For each investor, we were provided with the details of their complete trading activities. This included information on the transaction volumes, prices, and dates, as well as information on order types (i.e. orders with and without limits). We also received information on their age, gender, residence (i.e. zip-code), marital status, level of education, employment type, and duration of their account with the bank. We also received self-reported categorical information on their income levels, total wealth, and risk-class.[9]

During our sample period, the investors in our sample made 23 million trades with an aggregate transaction value of €123 billion. 54% of all trades are purchases and the average portfolio value is €55,854. Slightly more than half (55%) of the average investor's portfolio is invested in equities. The mean and median number of transactions (equity and non-equity trades) per year is 36 and 16, respectively, indicating that most investors manage their portfolios quite actively. These descriptive statistics are comparable to those reported by household finance studies using U.S brokerage data (e.g. Odean 1998; Barber and Odean 2001).

The majority of our sample is male (83%) with an average age of 52. Prior research suggests that investment clients are generally more educated and financially savvy than the overall population (Van Rooij et al. 2011; Cole et al. 2014). Following this expectation, we find that 7%

[9] Some investors do not provide personal characteristics (e.g. employment type) to the bank. Thus, we do not have these characteristics for all investors in our sample.

of the investors in our sample hold doctoral degree as compared with 1.5% of the German population at large (German Federal Bureau of Statistics 2015).

We conduct several tests to understand the comparability of our sample of investors to that of the population of German investors more broadly. One potential concern, specifically since we are focused on tout investments, is that the investment portfolios in our sample are somehow different (e.g., online "play money" accounts) than investment portfolios more broadly. To address this concern, we first compare the average portfolio values of the investors in our sample to the values reported in national statistics. The Deutsche Bundesbank reported the average portfolio value for German equity investors in 2013 is €48,000, which is only slightly lower than our sample average of €55,854. We also compare the portfolio holdings to annual household income. As the income values in our data set are provided in ranges (e.g., €100,000 - €150,000), we use the midpoint of each range as the measure for the investor's income. We find that the ratio of the average portfolio value to annual income is 1.3 in our sample which is comparable to the ratio of 1.1 computed for German investors more broadly (German Federal Bureau of Statistics 2008a, 2008b; Deutsche Bundesbank 2013). Together, this evidence suggests that our bank sample is comparable to the population of German investors holding accounts at other financial institutions.

3.3. Investor Participation in Pump and Dump Schemes

In Table 1, we describe the characteristics of touts that are traded. Out of the 421 distinct touts in our sample, 79% (334 touts) are traded by at least one investor in our bank sample during the assumed 60-day period from the start of the tout.[10] Of the touts that are traded by at

[10] As expected based on earlier discussion, the participation in the BaFin sample is higher with 84% of these touts having at least one sample investor participating (as opposed to 72% for touts in the hand-collected sample).

least one investor, the average tout has approximately 60 purchase trades. However, we find that the distribution is positively skewed since the median tout has 13 purchases. Investors in our sample made a total of 20,066 purchases in touted stocks during the pump period. As some investors would make multiple trades in the same touted stock during the pump campaign, we find there is a total of 12,296 tout-investor observations. Thus, the average tout investor makes approximately 1.6 purchases if they place an investment.

Panel B of Table 1 indicates that the average tout attracts 37 investors from our sample bank. However, there is considerable variation and skew with the median tout having 9 investors and the standard deviation being 90 investors. In total, we have 6,569 unique investors who participated in at least one tout in our sample. Thus, 5.8% of all sample investors trade in at least one tout during our sample period. We find that the average tout investor purchases nearly 1.9 distinct tout stocks, but with more than 50% of all tout investors only investing into just one tout stock. The higher average number of distinct touts purchased is skewed by the upper quartile of investors who purchase multiple touts.

In Panel C of Table 1, we explore characteristics of different tout campaigns. We find that tout firms that are headquartered in Germany are 13% more likely to be traded (marginal effect at the means). We also find that e-mail touts are more likely to garner responses by sample investors than telephone-based campaigns, likely reflecting the greater reach by low cost e-mail campaigns. Based on marginal effects, touts that utilize e-mail (telephone) are 14.4% more likely (17.4% less likely) to be traded by an investor from our sample bank. We do not find any differences in trading propensity between trading venue locations, potentially reflecting the ease for investors to readily trade on different exchanges globally.

We also seek to understand the attributes associated with more "effective" and thus more harmful campaigns. As described in Model 2 (in Table 1, Panel C), firms headquartered in Germany attract more investors, likely reflecting investor's propensity of home-bias (French and Poterba 1991). Specifically, touts headquartered in Germany have 61% more investors on average. E-mail and newsletter campaigns reach greater number of investors and we find that more investors join the campaign when such media are utilized. Phone campaigns are costlier and likely reach fewer potential investors, resulting in fewer individuals who actually invest in the tout. Specifically, telephone campaigns are associated with a 65% decrease in the number of investors. Finally, we find that touts investigated by BaFin are 30% more likely to be traded within our sample and such touts also have more investors. This finding reflects our sample construction, i.e., the fact that for the BaFin sample we know that the scheme targeted German investors or stocks traded on German venues. In Model (3), we find that schemes involving larger firms (as measured by their pre-pump market capitalization) attract more investors.

Overall, the participation rate in touts (nearly 6% of all investors in our brokerage sample) shows that pump and dump campaigns are fairly pervasive forms of market deception that engage a considerable number of investors. This participation rate is remarkable considering that certainly not all our sample investors were exposed to or aware of the promoter's campaign.

3.4. Performance in Pump and Dump Schemes

In this section, we examine the portfolio and wealth consequences of investors' decisions to participate in pump and dump schemes. In Table 2, we provide descriptive statistics on the returns of investing in pump and dump campaigns. In Panel A, we describe the performance of individual tout trades. Within our sample, 84.5% of the tout trades are closed out by investors during our sample period, i.e., we have roundtrip investments. For those trades that are not

closed by the investor, we close the trade 120 days after the purchase for the purpose of computing roundtrip returns.[11]

For the 20,066 tout purchases that occurred during the 60-day pump period, we find a mean raw return of -24%. We compute the average market return over the period during which investors hold the touted stocks. Using the CDAX index, the average market return is 2% during the tout trade window, thereby leading to a market-adjusted tout return of -26%. On average, each tout trade reduces investor wealth by €800.[12]

Despite the significantly negative return for the average tout trade, we find that for a considerable fraction of the tout trades (30%) the return is actually positive (untabulated). The average and median return for these trades are 29.82% and 12.98%, respectively. The trade size for tout investments that have positive returns is €4,796 on average, which is 18.5% larger than for trades with negative returns. Thus, it is conceivable that some investors are attracted to touts because of "lottery-like" payoffs.

In Panel B of Table 2, we show the performance of tout investments by aggregating all trades by the same investor within a tout. We find the market-adjusted, value-weighted performance is -31%, indicating that relatively larger tout trades are being made by investors that tend to perform worse. The average loss per tout investment is €1,305.

[11] Trades that are not closed out over our sample period ('inventory investment') tend to have larger negative returns than roundtrip investments. Based on our 120-days assumption, we calculate an average -53% return for inventory investments, whereas the average roundtrip investment has a -18% return. However, this large difference between both type of investments is not unexpected since retail investors tend to hold losing investments for a longer period (Odean 1998). Additionally, selling crashed stocks is often not feasible (liquidity) or profitable (net of fees). In fact, using an artificial 120-day cut-off is likely to understate the magnitude of the losses associated with these inventory investments. For example, roundtrip investments that are sold after this cut-off date have a negative -63% return with only a quarter of those investments achieving better returns than -53% (the average inventory investment return based on our assumptions).

[12] White (2016) examine returns for trading in all OTC stocks and finds a considerably smaller magnitude of loss per trade of $96 (median loss). For promoted stocks, he reports a mean holding return of -13%, which is slightly better than the average return for our roundtrip investments (-18%).

In Panels C and D of Table 2, we examine the returns for the tout and non-tout part of portfolios for investors who invest in at least one tout campaign. The performance of the tout part of investor's portfolios is aggregated and described in Panel C of Table 2. The average investment in touts is €13,051, but the standard deviation is €56,567 reflecting considerable variation in the invested amount across investors. The average value-weighted return for the tout portion of an investor's portfolio is -31% with the median value being similar in magnitude.

As for comparison, the hypothetical 120-day buy-and-hold return for the median tout is -70.5%. Thus, tout investors are doing considerably "better" than holding returns based on the price path following the pump phase would suggest. Essentially, many investors limit losses by selling earlier. In particular, the average holding period is only 52 days, with 78% of the trades being closed out within 120 days from the start of the tout. To the extent that investors hold onto tout investments longer, their losses tend to grow substantially.

Panel D of Table 2 shows the attributes of the non-tout part of the tout investors' portfolios as a basis to understand their broader investment decisions in stocks. 5,140 of our 6,569 unique tout investors purchase non-tout stocks during the 60-day pump period in which they purchase a touted stock. For these stock investments, the median and average value weighted return is -4% and -5% respectively. This return is below the market return but considerably greater than the return in tout investments. This evidence is consistent with prior research showing the tendency for individual investors to underperform the market indices (Barber and Odean 2000).

Overall, Table 2 indicates that tout investments are considerably worse than other investments made by tout investors. In fact, the average return for the tout portion of the bottom quartile of tout investors is -64%.

4. Analysis of Touts Campaigns

In this section, we investigate which individuals invest into touts and their investment behavior subsequent to these investments. We begin in Section 4.1 by providing support that investors are indeed responding to the tout campaign itself when making investments during the 60-day period after the start of the pump-and-dump campaign. In Sections 4.2 and 4.3, we explore the characteristics of tout investors and how tout investors' behavior changes subsequent to their tout investments, respectively.

4.1. Exposure to Touts

In treating investor purchases during the 60 days after the start of the tout campaign as "participation" in the tout, we assume that investors are aware and respond to promotional communication. However, we do not know whether investors actually received this communication. We essentially infer tout participation from their investment behavior. We provide two pieces of evidence that this assumption is valid. First, we find that only 11% (732) investors, who invest during the 60 days pump period, purchased the same tout stock in the 180 days preceding the beginning of the tout campaign (untabulated). This relatively small number of prior investments in touted stocks suggests that investors are responding to the tout campaign.

Second, we examine whether we would see a similar trading response by our sample investors for other stocks that were not touted, yet exhibited a similar price path. This test addresses the concern that investors respond to momentum, rather than touts. Towards this end, we match the prices of touted stocks at two dates before the pump-and-dump campaign (100 days and 50 days before) to the prices of non-touted stocks from the same country using coarsened-exact matching techniques. In essence, this technique matches stocks based on the

price path until the beginning of the tout. Panel A of Figure 3 shows the price path of the touted and the matched non-touted stocks. Visually, the run-up in prices is relatively similar across both types of stocks until the beginning of the pump-and-dump campaign and also t-tests confirm that returns are not significantly different before the tout date. In Panel B (average number of purchase-trades per stock) and Panel C (mean value of purchases), we plot the purchases of tout and matched non-tout stocks by our sample investors to compare the response in event time. The figures illustrate that investors react right around the time of the tout campaign and that the response is much stronger for touted stocks than for matched stocks. This result suggests that investors indeed respond to the tout itself and do not purchase these stocks for some other reasons (e.g., momentum trading).

4.2. Characteristics of Tout Investors

Given the significantly negative returns to the average tout investment as shown in Section 3, we seek to better understand who and why investors participate in tout campaigns. To this end, we effectively try to characterize investors that invest in touts. Panel A of Table 3 indicates that the median tout investor is a 47-year-old male living in the suburbs who is married and has a high self-assessed risk tolerance. The average tout investor has approximately €60,000 invested in securities and most of it is invested into equities. In fact, a large fraction of his (or her) entire portfolio (31%) is comprised of penny shares (defined as having a price below €5), which often have lottery-like return characteristics (see Kumar 2009 for definition of lottery stocks).

To provide a basis of comparison, we create a matched control sample of investors. For each tout month, we draw a random sample of 2,000 investors that did not invest in any tout before this date. We then retain only those investors who purchase at least one non-tout stock in the 60-day pump period. This restriction ensures that our control investors are not inactive and also

invest into equity during the same time period. Interestingly, control investors are relatively similar on personal characteristics and demographics (age, gender, married). However, we find striking differences in their portfolio characteristics. Specifically, non-tout investors trade less frequently than tout investors and hold a smaller fraction of their portfolio in penny stocks. Instead, they tend to invest more money into less risky blue-chip shares.

In Panel B of Table 3, we investigate more closely the characteristics associated with being a tout investor. In line with the univariate evidence, we find that investors who are male, older, have higher assessments of their own risk tolerance, and live outside cities are more likely to be tout investors (column 1).[13] Additionally, investors with a greater wealth (based on the value of their entire portfolio) are less likely to invest into touts. However, taken together, these personal characteristics explain the propensity to become a tout investor to a limited extent only (R^2 of 2.2%). In column (2) we add portfolio-level characteristics. Investors who hold riskier portfolios are more inclined to invest into touts. Specifically, those with a higher share of penny stocks, a lower proportion of blue chip shares and a greater number of individual stocks are more likely to become tout investors. Adding these portfolio-level characteristics greatly enhances the explanatory power of the model (R^2 of 17.0%). This finding suggests that tout investors can be better identified based on their portfolio composition and investment behavior than based on their personal characteristics. In column (3), we analyze the role of an investor's profession. Profession is self-reported by the investors when they open their brokerage account with the bank and captures only broad categories (the omitted category is "dependents and others," which includes students, apprentices and unemployed people). Relative to the omitted category (3% of

[13] An investor's risk tolerance is an investor's self-reported assessment of their desire for risk and range from 1 to 5. Clients of our sample German bank are only allowed to purchase securities equal or below their self-reported risk class. For example, to be able to trade in blue chips stocks, clients need to select at least risk-class 3 and to trade in penny stocks a risk-class of 5 is required.

all tout investors and 4% of all control investors), we find that blue-collar workers, retirees, and self-employed are more likely to be tout investors, suggesting that education could play a role in tout participation. However, the explanatory power of the model increases only modestly after the professional indicators are added to the model (R^2 of 18.0%).

Over one-third of the tout investors included in the analyses of Table 3 have more than one tout investment over the sample period. This large fraction of "repeat investors" is somewhat surprising given the large negative return for the average tout investment. One possible explanation could be that multi-tout and single investors are in fact very different investor types. For example, multi-tout investors could possess superior trading skill or participate in touts for different reasons. We explore this possibility in Table 4.

Table 4 shows descriptive statistics on tout investors conditional on the number of tout investments over our sample period. Overall, multi-tout investors seem to be a more 'extreme' version of single-tout investors. For example, penny share (blue chip) increases (decreases) in the number of tout investments. Investors with only one tout investment have a 27% penny share, whereas the percentage of penny stocks in an investor's portfolio reaches almost 50% for investors with seven or more touts. Interestingly, however, we find little support for the notion that multi-tout investors are superior traders or more successful in their tout investments. Although the mean return is higher than the mean return of single-tout investors, it is still quite negative (i.e., -20% for investors with seven or more touts). More importantly, the cumulative losses are larger for multi-tout investors. While a single-tout investor loses about $1,350 of his investment, an investor with five tout investments loses more than $7,000 across all touts.

In Table 5, we specifically analyze characteristics that are associated with the "success" or higher performance of tout investments. In column (1), we regress the average tout return on

personal and portfolio-level characteristics. Although most characteristics do not significantly explain returns, tout investors with a larger fraction of penny stocks in their portfolio as well as fewer stocks overall tend to have more positive tout returns. In column (2), we add tout-investment specific variables. As expected, the duration of the tout investment has a strong negative correlation with the average return. Selling a touted stock early tends to lead to significantly better (or at least less negative) returns.[14] Interestingly, investors that invested in the touted stock before the pump period (i.e., made at least one purchase in the same stock up to 180 days before the tout date) have a more positive return in the current tout.

In column (3) of Table 5, we directly compare multi-tout investors with other tout investors. On average, multi-tout investors have a 10 percentage points higher return in their first tout. However, for each subsequent tout investment, the mean return decreases by 1.5 percentage points. In column (4), we add investor- and tout-fixed effects and focus on two variables. First, we find that investors who invest relatively early into the tout (compared to other investors that invest into the same tout) have more positive returns. This result highlights a 'Ponzi Scheme' character of pump-and-dumps. It also suggests that investors (who are not necessarily affiliated with the promoters) can profit from a pump-and-dump scheme by investing early into the touted stock and quickly flipping it to other potential victims. Second, we find a negative coefficient for the number of touts that an investor has participated in up to the point of the most recent tout. This result again highlights that repeated participation does not increase performance and hence we do not see much evidence of investor learning.

[14] An alternative explanation for this negative relationship between duration and return could be that a more negative return causes the longer duration of the tout investment (reversed causality). For example, the disposition effect suggests that private investors tend to hold their losing stocks longer than their winning stocks. Furthermore, if the tout stock crashes, there might be not enough liquidity in the market to sell the tout investment immediately. Both effects would lead to an increase in the holding period for tout investments that do very poorly.

4.3. Subsequent Behavior after Investing in Touts

In this section, we seek to provide evidence on how a tout investment influences subsequent investment behavior. In Table 6, we investigate investors' willingness to invest in a subsequent campaign conditional on prior tout performance, controlling for various portfolio characteristics. In column (1) of Table 6, we examine whether investors that have a more positive return in their first tout, are more likely to invest into a second tout. We find this to be the case. A one decile increase in the return of the first tout makes it 2.6% more likely that the investor will participate in a second pump-and-dump campaign. In column (2), we focus on the first four touts of all investors and include the return decile of the investor's most recent as well as the return decile of the investor's previous tout (thereby, dropping the first tout observation of each investor). While both variables have a positive association with the likelihood of another tout investment, the return of the most recent tout is significantly more important (economically and statistically). Thus, the predilection to further invest in touts based on prior tout performance is not very long lived. We also find that the remaining right-hand side variables have the expected associations. For example, irrespective of returns, investors with a riskier portfolio (higher penny share, lower blue-chip share, more individual stocks) are more likely to invest in a subsequent tout.

For those investors who do invest in another campaign, we see some subsequent adjustments. In column (3), we show that a better return in the most recent tout leads to a shorter waiting period between two touts. A one decile increase in the most recent tout return reduces the waiting time between two touts by approximately 11%. Successful investors appear to be more eager to quickly invest into another tout, while less successful ones seem to hesitate even if they eventually decide to invest into another tout. Additionally, investors that had poorer returns in their prior tout, adjust by shortening the duration of their investment (column 4). As described

in Section 3.4, staying in tout campaigns for shorter periods leads on average to better performance.[15]

In sum, investors' behavior appears to be significantly influenced by recent experiences with pump-and-dump campaigns. Investors who have negative experiences and poor returns tend to reduce subsequent participation, increase wait times and shorten holding periods if they invest again. In contrast, investors who are initially successful continue to participate in touts and tend to accumulate larger losses than initially unsuccessful investors.

4.4. Types of Tout Investors

As described in Section 2.2, there may be different reasons why investors participate in pump-and-dump campaigns or different types of investors. While some investors may be duped by the promoter's campaigns, other investors may be aware of the fraudulent nature of scheme and decide to participate with the goal of quickly flipping the stock for a profit. However, it is challenging to infer the *ex-ante* motive of tout investors based on their investment behavior in touted stocks. To address this challenge, we classify individuals based on their past trading behavior in *non-touted* stocks.

In Table 7, Panel A, we create and describe four investor categories: new trader, infrequent trader, penny-stock day trader, and short-term trader (and a fifth category capturing residual traders who do not fall into any of four categories) The first investor type, new traders, makes her first equity-market trade only shortly prior to trading in a tout (e.g., because only recently opened an account at our sample bank). As a result, we cannot characterize this investor's prior trading behavior. The second investor group, infrequent traders, comprises people who do not

[15] Changes in the position size in the subsequent tout are not significantly correlated with higher or lower returns in the most recent tout.

trade in more than three stocks within the six months before the tout date or who do not purchase a penny stock. This investor category contains the least active equity investors who also have no experience in the penny stock market. Given their limited trading experience, investors in this group are arguably more vulnerable. The third and fourth investor group contain frequent traders that regularly trade in penny stocks and typically have short holding periods. In particular, the third investor group, penny day traders, day-trades in risky, low-priced stocks.

Panel A of Table 7 provides descriptive statistics for the investor type composition among tout investors and compares it to the composition among active control investors. While only 2.1% of control investors are penny day traders, more than 10% of all tout investors are of this type. Infrequent traders, on the other hand, are underrepresented in the tout investor sample (37.7% versus 66.9% in the control sample). Penny day traders and short-term traders are more likely to understand the risks of investing in penny stocks so their participation is less likely to be due to deception. These investors comprise 34% of the tout sample suggesting that a substantial portion of tout investors would not be aptly described as fooled when making tout investments.

The described classification of investor types can lead to overlap of the categories. However, the overlap between the groups is relatively modest; on average, each investor would be only assigned to 1.1 investor types. In Panel B of Table 7, we examine the investor types if we do not exclusively assign investors to one investor type (via iterative assignment). The “new trader” investor type has the largest overlap with other investor groups. In contrast, “infrequent investors” and “short-term traders” are relatively distinct groups (e.g., only six of all 750 penny day-traders would be simultaneously classified as “infrequent traders”). Due to the limited overlap and for ease of interpretation, we use mutually exclusive investor type definitions via an

iterative assignment of investors in Panel A and Panel C (e.g., if an investor is assigned to investor group I, we will not assign him or her to any other group).

Next, we re-estimate our models in Tables 3, 5 and 6 adding indicators for the different investor types.[16] In Panel C of Table 7, Model 1, we investigate the association between investor types and tout participation. In line with the descriptive evidence in Panel A, we find that infrequent traders (frequent traders) have a significantly lower (higher) likelihood of participating in pump-and-dump campaigns. Furthermore, the adjusted R^2 increases considerably (from about 17% to 21.5%) once investor type dummies are added to the regression. This increase in explanatory power suggests that our investor type classification captures meaningful differences in the propensity of tout participation, even though it is based on past investment behavior in *non-touted* stocks.

Column (2) shows the results for the return regression. Frequent traders have significantly larger returns as compared with the residual category. The average difference is 18.6% for penny day traders and 8.4% for short-term traders. This finding is in line with the notion that penny day and short-term traders are not entirely deceived by the pump-and-dump campaign, but are aware of the speculative and short-term nature of their tout investment. In Column (3), we assess whether certain investor types are more or less likely to invest into another tout. Even after controlling for performance in the most recent tout, frequent traders (and particularly penny day-trader) have significant higher likelihood of investing into another tout. This finding is consistent with the notion that this group of investors could even be actively seeking out touts. In contrast, infrequent traders seem to shy away from another tout investment after facing an adverse outcome in a prior tout.

[16] The omitted category in the analysis is "residual traders."

Finally, in Column (4), we run a probit model to test whether certain investor types differ in how much they invest in a tout ('tout stake'). Inexperienced investors may invest only small amounts to 'dip their toe into the water.' In contrast, more seasoned traders may make more substantive investments once they decide to invest. To shed light on differences in investment size, we code the dependent variable as '1' if an investor invests less than 2% of her portfolio value into the tout. The finding is in line with our expectation. Relative to the residual category, infrequent traders (short-term traders) are more (less) likely to invest small amounts in the stock.

Overall, the analysis in Table 7 suggests that there are different investor types. Specifically, we find a substantial number of investors who appear to gamble in penny stocks and trade non-tout stocks with high frequency. Tout participation by these investors seems less likely reflects the promotion per se, but instead is more likely a reflection of gambling or speculation. This interpretation is also supported by the differential performance of the investor types in the touts.

4.5. Market Participation after Investing in Pump and Dump Campaigns

In this section, we explore whether tout participation has an influence on the investors' portfolio beyond tout investments itself. It is possible that investors who feel that they were deceived and faced adverse financial consequences reduce their equity market participation more generally. Conversely, investors with a positive experience could trade more aggressively in penny stocks going forward.

In Panel A of Table 8, we explore how past experiences with touts influences investors' broader market participation. In model (1) of Table 8, we find that investors who experience more negative returns are more likely to stop trading in stocks in the subsequent 120 days after the pump-period. A one decile decrease in tout returns is associated with a 1.8% increase in the probability that the investor stops trading stocks entirely. In column (2), we replace the binary

left-hand side variable with a continuous variable, capturing trading frequency (i.e., the difference between the number of trades in the 120 days after the pump period and the number of trades in the 120 days before the pump period scaled by the total number of trades). Again, investors with worse returns reduce overall trading more strongly. In untabulated tests, we also analyze how these results vary by different investor types. Specifically, we expect that the effects should be more pronounced for vulnerable investors (and hence the category of infrequent traders). It is conceivable that these investor shy away from the stock market entirely after a bad experience. In line with this conjecture, we find that infrequent traders are significantly more sensitive to the return of their tout investment. Column (3) and column (4) focus on changes in penny stock trades and changes in blue chip share trades, respectively. A comparison of the two columns reveals that penny stock trades are more sensitive to the investor's return of the tout.

Panel B of Table 8 provides descriptive evidence on investors' portfolio responses. We partition each tout investor observation into quintiles based on the return of the tout. Observations in the lowest (highest) quintile have a mean return of -88% (37%). Changes in total number of trades (*Diff # TotalTrades*) as well as changes in number of penny trades (*Diff # PennyTrades*) display a monotonic pattern across quintiles. Investors who invest in a tout and are successful continue to make risky investments. For example, investors in the lowest quintile reduce the number of penny stock trades by 33%, whereas investor in the highest quintile reduce the number of penny stock trades by 6% only. Changes in blue chip trades (*Diff # BlueChipTrades*) exhibit a reversed U-shaped pattern. Investors in the lowest quintile seem to reduce the number of blue-chip investments since they decide to leave the equity market entirely, whereas investors in the highest quintile substitute blue chip trades with riskier stocks.

In Panel C of Table 8, we explore the long-term consequences for investors that experienced a negative tout return. Specifically, we analyze how these investors changed their long-term portfolio composition and investment behavior conditional on their short-term response to tout investments. In column (1), we regress the number of trades in the second and third year after the tout (minus the number of trades in year three and year two before the tout) on investors' immediate responses after the tout. *Diff # TotalTrades* has a positive association with the long-run variable, indicating that investors who trade less frequently immediately after the tout, still do so two to three years later. In column (2), we find that these investors also hold fewer single stocks three years after the tout date (minus the number of stocks six months before the tout). In the next two columns, we analyze the association of the initial response with the long-run portfolio composition. Consistent with the initial response, investors that increase the number of penny trades still hold more penny stocks three years after the tout relative to the respective share six months before the tout (column 3). Finally, investors that purchase fewer blue chip stocks immediately after the tout, have a smaller fraction of blue chips three years after the tout date (column 4). All these associations are consistent with the notion that tout investments not only influence the investment behavior shortly after the tout, but also investors' long-term investment behavior.

Overall, the evidence suggests that pump-and-dump campaigns can have lasting effects on investor behavior. Harmed investors appear to reduce their equity market participation. In contrast, investors who fared better in such schemes continue to seek risky and lottery-like investments. As such, our evidence raises the possibility that pump and dump schemes have broader distortionary effects in markets beyond the immediate economic impact of the touts.

5. Conclusion

Although pump-and-dump schemes have long been the subject of significant regulatory attention, we have relatively little evidence on investor participation in such schemes. Using a unique proprietary set of trading records along with a database of German pump-and-dump schemes, our paper sheds light on individual investor participation and outcomes. Our evidence suggests that participation is quite common and involves sizable losses, with more than 5% of active investors participating in at least one "pump-and-dump" and an average loss of nearly 30%. We also find that portfolio composition and past trading behavior are better able to explain participation in manipulated stocks than demographics.

Our analysis offers several insights that could help with designing effective investor protection against pump-and-dump schemes. Importantly, our evidence is consistent with several distinct investor types, some of which should not be viewed as simply falling prey to these frauds. It seems that effective investor protection should take this heterogeneity into account. For those investors who appear to be duped into these schemes, recent work in behavior ethics offers ideas on how to potentially dissuade individuals from investing in pump-and-dumps. For instance, Zhang et al. (2015) show that by simply prompting individuals to think about which fund looked more suspicious, individuals were significantly dissuaded from investing in an attractive, but fraudulent Ponzi scheme. Brokerages could similarly offer prompts to investors to reconsider investing in pump-and-dump like stocks. Other techniques known to help investors from becoming victims include asking investors to assess the reasonableness of the claims and the evidence prompting them to invest (i.e., the tout communication) or nudging individuals to take more time when making a decision.

Such techniques, however, are less likely to be effective for those investors who deliberately seek these schemes. They are much less likely to be fooled by the pump campaign per se and instead might see the pump phase as an opportunity to make a gain. Such investors are unlikely to be dissuaded from investing with additional educational efforts. Thus, curtailing their desire to invest in pump-and-dump schemes is likely more challenging, but could still be worthwhile to the extent that their investments create externalities by providing greater benefits for promoters. We leave this issue for future research.

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Table 1: Participation in Pump and Dump Schemes

This table investigates the participation of investors in pump and dump schemes. Panel A shows that 334 touts out of 421 touts from the BAFIN and public sample were traded. It also provides statistics on the number of purchases made by all sample investors during the 60-day pump window for both roundtrip and holding period tout trades. Panel B provides summary statistics at the tout-level (number of investors per tout) and the investor-level (number of touts per investor). Panel C reports correlations between tout characteristics and investor participation in the tout. The dependent variable in column (1) is coded as '1' if at least one investor in our sample participates in a certain tout and '0' otherwise. The independent variables are firm characteristics of the touted stock, the medium used for the tout and whether the tout is in the BAFIN sample and hence identified as fraudulent market manipulation. Market variables (returns and market value) are calculated over a 60-day period before the tout. In column (2) and (3), we use the logarithm of the number of investors (plus 1) as the dependent variable. All t-statistics are based on robust standard errors. *, **, and *** indicate significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Panel A: Trades in Pump and Dump Schemes

	N	Mean	SD	Q1	Median	Q3	Total Trades
# purchases per tout during pump phase	334	60	179	4	13	46	20,066

Panel B: Number of Investors in Pump and Dump Schemes

	N	Mean	SD	Q1	Median	Q3	Total Tout-Trades
# investors per tout during pump phase	334	36.81	90.09	3.00	9.00	33.00	12,296
# touts per investor during pump phase	6,569	1.87	1.82	1.00	1.00	2.00	12,296

Panel C: Investor Response to Pump and Dump Schemes

	(1)	(2)	(3)
	Probit	OLS	OLS
	Tout Response	Log(Number Investors)	Log(Number Investors)
Tout HQ in Germany	0.515**	0.476***	0.480**
	(2.46)	(2.94)	(2.57)
Tout on German Exchange	-0.343	-0.311	-0.208
	(-1.19)	(-1.32)	(-0.75)
Tout on US Exchange	-0.371	-0.072	-0.090
	(-1.16)	(-0.23)	(-0.27)
Utilized E-Mail	0.571**	0.749***	0.514**
	(2.17)	(3.08)	(2.15)
Utilized Telephone	-0.689***	-1.051***	-1.211***
	(-2.92)	(-5.27)	(-5.58)
Utilized Newsletter	0.293	0.916***	0.700***
	(1.37)	(4.88)	(3.44)
Utilized Fax	0.074	0.258	0.015
	(0.30)	(1.36)	(0.07)
Log(Market value)			0.115**
			(2.37)
Returns			0.036
			(0.36)
BAFIN sample	1.176***	1.040***	0.940***
	(4.75)	(5.40)	(4.67)
Constant	0.324	1.246***	1.191***
	(1.01)	(4.63)	(3.80)
Adj/Pseudo R2	0.137	0.288	0.265
No. Obs	421	421	354

Table 2: Investor Performance in Pump and Dump Schemes

This table examines the performance of tout (Panel A to C) and non-tout investments (Panel D). Panel A shows descriptive statistics on all tout trades during the 60-day pump period. Volume of investment refers to number of shares. Size of investment (measured in euro) is the number of shares multiplied by the market price at the time of purchase. Tout trades which are not closed out during our sample period are imputed to be closed out 120 days after the purchase date (these returns are calculated based on Datastream data). Gross gain/loss is the investor's loss before fees. Market-adjusted returns are raw returns adjusted by the German CDAX index. Panel B describes the returns for investors aggregating across all their trades in a particular tout. If indicated, variables are value-weighted by the size of the investment of each trade within a tout. Panel C depicts the statistics of the performance of investor's tout trades aggregated by all tout investments made by the investor. Returns are value-weighted across touts. Panel D provides statistics on investments in non-touted stocks that were made during the same 60-day pump period. These statistics only refer to the 5,140 (out of 6,569) investors that made at least one investments in non-touted stocks during the 60-day pump period. Number different stocks purchased refers to the number of distinct firms (ISINs) purchased during the 60-day pump period. Average investment size refers to the total investment amount divided by the distinct number of firms purchased. All remaining rows are defined as in Panel C.

Panel A: Investor Performance at Trade Level

All Trades	N	Mean (per trade)	SD	Q1	Median	Q3
Volume of investment (# shares)	20,066	6,519	42,964	500	1,250	4,000
Size of Investment (Euros)	20,066	4,272	19,248	916	1,910	4,050
Percent Return (raw)	20,066	-0.24	0.54	-0.63	-0.21	0.03
Percent Return (mkt adjusted)	20,066	-0.26	0.56	-0.65	-0.23	0.03
Gross gain/loss (Euros)	20,066	-800	6,640	-993	-245	60

Panel B: Investor Performance at Tout Level

All Touts	N	Mean (per tout)	SD	Q1	Median	Q3
Volume of investment (# shares)	12,296	10,638	110,635	600	1,900	5,000
Size of Investment in Tout (Euros)	12,296	6,972	30,595	995	2,189	5,298
Average Percent Return (raw value weight)	12,296	-0.28	0.53	-0.66	-0.27	0.00
Average Percent Return (mkt adjust, value weight)	12,296	-0.31	0.54	-0.68	-0.29	-0.01
Gross gain/loss (Euros)	12,296	-1,305	8,895	-1,419	-377	0

Panel C: Performance of Tout Portion of Investor Portfolio

All Investors	N	Mean (per investor)	SD	Q1	Median	Q3
Number Different Touts Purchases	6,569	1.87	1.82	1.00	1.00	2.00
Number Tout Trades	6,569	4.18	11.63	1.00	2.00	4.00
Total Investment (euro)	6,569	13,051	56,567	1,160	3,114	8,935
Average Return (raw value weight)	6,569	-0.31	0.50	-0.64	-0.31	-0.04
Average Return (mkt adjust, value weight)	6,569	-0.33	0.51	-0.67	-0.33	-0.05

Panel D: Performance of Non-Tout Portion of Investor Portfolio

All Investors	N	Mean	SD	Q1	Median	Q3
Number different stocks purchased	5,140	11.74	36.76	2.00	5.00	11.00
Number Non-Tout Trades	5,140	30.09	258.28	3.00	7.00	19.00
Total Investment (euro)	5,140	117,606	1,538,663	4,336	14,444	45,535
Average Investment (euro/different stocks)	5,140	6,142	19,189	1,360	2,742	5,453
Average Percent Return (raw value weight)	5,140	-0.05	0.34	-0.17	-0.04	0.04
Average Percent Return (mkt adjust, value weight)	5,140	-0.09	0.33	-0.19	-0.06	0.01

Table 3: Analysis of Tout Investors

This table investigates the characteristics of investors who participate in pump and dump schemes. Panel A depicts the average characteristics of a tout investor at the point of investing in his or her first tout (n= 6,569). Non-tout investors are randomly drawn from the sample of all investors that did not invest into a tout before. Non-tout investors are then matched in the same month as the tout investor and are required to have purchased a non-touted stock during the pump period (n = 21,384). For categorical variables, p-values are based on chi-squared tests (t-tests otherwise). Panel B is a probit model using tout investor-level observations. The dependent variable is equal to '1' if the investor is a tout investor and '0' otherwise. The explanatory variables refer to investor and portfolio characteristics (measured one month before the tout investment) and the investor's profession. Male is an indicator equal to '1' if the investor's gender is male. Married is an indicator equal to '1' if the investor is married. Age is the investor's age at the tout date. City is an indicator equal to '1' if the investor's 4-level zip code contains more than 40,000 citizens. The self-assigned risk classification is a score between 1-5 assigned by the investor; 5 indicates the highest inclination toward taking financial risk. Portfolio wealth is the euro value of the investor's portfolio and we use the logarithm of the variable (plus 1). Penny share is defined as the percentage of the portfolio which is invested in penny stocks (share price < 5 EUR). Blue chip share is the percentage of the portfolio that is invested into stocks from the S&P500 and the Euro STOXX 600 indices. All professions are self-reported by investors. The omitted professional category is "dependents and others". All t-statistics, included in parentheses, are based on standard errors clustered at the investor level. *, **, and *** indicate significance (two-sided) at the 10%, 5%, and 1% levels, respectively

Panel A: Descriptive Statistics for Tout and Non-Tout Investors

	Tout Investor	Non-Tout Investor	p-value
Portfolio wealth (Euro)	60,988	77,922	0.00
Total stock value (Euro)	41,605	51,096	0.00
Penny Stock Share	30.9%	13.2%	0.00
Blue Chip Share	14.4%	31.9%	0.00
Size of trade (Euros)	3,837	6,634	0.00
Number of purchases (over prior year)	62	29	0.00
Age	47	46	0.01
Male?	89%	87%	0.00
Married?	61%	60%	0.46
Retired	18%	16%	0.00
Self-assigned risk factor (out of 5)	4.0	3.7	0.00
City Resident?	36%	41%	0.00
Maximum N	6,569	21,384	

Panel B: Personal and Portfolio Characteristics of Tout Investors

	(1)	(2)	(3)
	Probit	Probit	Probit
	Tout Investor	Tout Investor	Tout Investor
Male	0.096***	0.077**	0.068**
	(2.75)	(2.33)	(2.03)
Married	-0.017	0.001	0.021
	(-0.68)	(0.04)	(0.92)
Age (at tout date)	0.008***	0.010***	0.004***
	(7.61)	(9.89)	(3.20)
City	-0.128***	-0.106***	-0.101***
	(-5.37)	(-4.50)	(-4.33)
Self-assigned risk	0.092***	0.044***	0.089***
	(10.11)	(5.15)	(10.48)
Log(Portfolio Wealth(t-1))	-0.072***	-0.066***	-0.066***
	(-15.10)	(-9.34)	(-9.97)
Penny Share (t-1)		1.041***	1.013***
		(31.63)	(30.95)
Blue Chip Share (t-1)		-1.431***	-1.396***
		(-23.93)	(-24.42)
Log(# Stocks (t-1))		0.214***	0.213***
		(15.59)	(15.67)
White-collar Job			0.007
			(0.10)
Blue-collar Job			0.237***
			(2.83)
Retiree			0.352***
			(4.43)
Civil Servant			-0.025
			(-0.30)
Managerial Position			-0.002
			(-0.02)
Self-employed			0.209***
			(2.94)
Not disclosed (NA)			0.582***
			(7.18)
Constant	-0.563***	-0.897***	-0.981***
	(-7.16)	(-9.33)	(-9.47)
Pseudo R2	0.0224	0.170	0.180
No. Investors	24742	24742	24742
No. Obs	38313	38313	38313

Table 4: Multi-Tout Investors and their Performance

This table provides descriptive statistics on unique tout investors sorted by the number of their tout investments over the sample period. Returns are value-weighted across touts (i.e., within investor) and equally-weighted across investors. Euro Return are the cumulative gains/losses over all tout investments. Investment is calculated as the number of shares multiplied by the market price at the time of purchase. See notes of Table 3 for the other variable definitions.

		% Returns		Euro Return (EUR)		Investment (EUR)		Penny Share		Blue Chip Share	
# Touts invested	N	mean	p50	mean	p50	mean	p50	mean	p50	mean	p50
1	4,162	-0.33	-0.36	-1,355	-427	5,248	1,837	0.27	0.12	0.16	0.02
2	1,156	-0.27	-0.29	-2,343	-942	5,859	2,565	0.37	0.28	0.12	0.02
3	517	-0.22	-0.20	-5,164	-1,474	7,685	2,639	0.43	0.38	0.11	0.01
4	285	-0.22	-0.21	-4,813	-2,079	8,512	3,433	0.40	0.32	0.10	0.03
5	174	-0.23	-0.22	-7,559	-3,949	7,133	4,158	0.47	0.43	0.07	0.02
6	103	-0.23	-0.20	-7,446	-4,172	8,499	4,326	0.48	0.45	0.10	0.05
7 or more touts	172	-0.20	-0.17	-9,140	-4,717	10,148	4,119	0.49	0.48	0.09	0.03
Total	6,569	-0.30	-0.30	-2,442	-640	5,918	2,142	0.32	0.20	0.14	0.02

Table 5: Regression Analysis of Tout Investor Returns

This table reports results from a regression analysis of tout investor returns. In column 1, we use investor and portfolio level variables as defined in Table 3. The dependent variable is the average percentage return of an investor in a specific tout. In column (2), we add four tout-specific variables. Duration is the number of days that an investor holds a specific tout investment. Investment is the euro value of the tout investment. Days after tout is defined as the number of days between the beginning of the pump period and the investor's first trading date. When indicated, we use the logarithm of the variables (plus 1). Earlier tout-stock investment is an indicator variable coded as '1' if the tout investor invested into the same stock within the 180 days *before* the pump period. In column (3), we add MultiToutInvestor, which is an investor-level indicator variable coded as '1' if an investor participates in at least four different touts during our sample period. Number of Tout is a discrete variable that captures how many touts an investor has invested in until (and including) the focal tout. To determine this variable, touts are sorted within each investor based on the final closing date of each tout (we assume a maximum closing date of 120 days for 'inventory investments' or long 'round-trip investments'). In line with Table 4, the maximum value of this variable is set to 7. Investor- and tout-fixed effects are included in column 4. All t-statistics, included in parentheses, are based on standard errors clustered at the investor and month-level. *, **, and *** indicate significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
	Mean Return (%)	Mean Return (%)	Mean Return (%)	Mean Return (%)
Log(Duration)		-0.130***		
		(-10.57)		
Log(Investment)		0.005		
		(0.40)		
Log(# Days After Tout)		-0.000		-0.056***
		(-0.01)		(-4.36)
Earlier Tout-Stock-Investment		0.096*		
		(1.82)		
MultiToutInvestor			0.098***	
			(3.99)	
Number of Tout			-0.015**	-0.031***
			(-2.03)	(-4.40)
Male	-0.022	-0.029*	-0.024	
	(-1.10)	(-1.65)	(-1.18)	
Married	-0.011	0.008	-0.013	
	(-0.97)	(1.11)	(-1.17)	
Age (at tout date)	-0.001	-0.000	-0.001*	
	(-1.57)	(-0.06)	(-1.92)	
City	0.011	0.009	0.013	
	(0.81)	(0.82)	(1.01)	
Self-assigned risk	-0.001	-0.002	-0.002	
	(-0.11)	(-0.34)	(-0.40)	
Log(Portfolio Wealth(t-1))	0.001	0.001	0.001	0.000
	(0.17)	(0.43)	(0.26)	(0.11)
Penny Share (t-1)	0.117***	0.025	0.109***	0.006
	(4.17)	(1.09)	(4.16)	(0.23)
Blue Chip Share (t-1)	0.016	0.014	0.029	-0.014
	(0.31)	(0.29)	(0.59)	(-0.27)
Log(# Stocks (t-1))	-0.038***	0.008	-0.042***	0.003
	(-4.00)	(1.05)	(-4.28)	(0.18)
Constant	-0.179***	0.104	-0.158***	
	(-4.21)	(1.08)	(-3.67)	
Fixed Effects	No	No	No	Investor & Tout
Adjusted R2	0.0117	0.144	0.0158	0.394
No. Investors	6094	6094	6094	2354
No. Obs	11466	11466	11466	7942

Table 6: Subsequent Pump and Dump Investments

This table shows the investment behavior of tout investors in subsequent pump and dump schemes conditional on the success of the most recent tout as well as conditional on portfolio and tout characteristics. To alleviate right censoring, we restrict the analysis to touts before 2013. The dependent variable in column (1) and (2) is an indicator variable that takes the value of '1' if an investor invests into at least one subsequent tout later during our sample period (for the sorting procedure of the touts see notes of Table 5). In column (1), we restrict the sample to the first tout of each investor. Decile Return (most recent tout) is a decile-ranked return of the tout with a higher rank indicating higher returns. All remaining variables are defined as in Table 3. In column (2), we add a lagged decile-ranked return variable (i.e., decile-ranked return of the previous tout) and restrict the sample to the first four tout observations of each investor. In column (3) to (4), we additionally restrict the sample to tout-investor observations that resulted into at least one subsequent tout investment of the investor during the sample period. In column (3), the dependent variable is the natural logarithm of the number of days between the closing of the most recent tout and the investment into the subsequent tout (plus 1). The dependent variable in column (4) is an indicator variable that is coded as '1' if the next tout investment has a longer duration than the most recent tout investment. All t-statistics, included in parentheses, are based on standard errors clustered at the investor-level. *, **, and *** indicate significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	Probit	Probit	Probit	Probit
	Another Tout Investment	Another Tout Investment	Log(# Days Next Tout)	Increase Duration
Decile Return (Recent Tout)	0.075***	0.089***	-0.116***	0.098***
	(12.59)	(10.87)	(-10.93)	(8.23)
Decile Return (Previous Tout)		0.014*	-0.026**	0.016
		(1.65)	(-2.10)	(1.20)
Log(Portfolio Wealth(t-1))	-0.002	-0.026**	0.025	0.020
	(-0.17)	(-1.98)	(1.09)	(1.18)
Penny Share (t-1)	0.403***	0.140**	-0.144	-0.175*
	(7.51)	(2.05)	(-1.26)	(-1.85)
Blue Chip Share (t-1)	-0.564***	-0.375***	-0.546**	-0.183
	(-6.18)	(-2.75)	(-2.14)	(-0.94)
Log(# Stocks (t-1))	0.150***	0.173***	0.119***	-0.053
	(6.87)	(5.86)	(2.76)	(-1.42)
Utilized Newsletter	0.201***	0.027	0.521***	-0.113
	(5.72)	(0.54)	(5.34)	(-1.48)
Constant	-1.370***	-0.845***	5.412***	-0.745***
	(-13.47)	(-5.97)	(24.89)	(-3.82)
Observations	6,303	3,250	1,498	1,498
Sample	1st Tout	<= 4 Touts	<= 4 Touts	<= 4 Touts
Pseudo/Adj. R2	0.0545	0.0411	0.117	0.0387

Table 7: Investor Types Trading in Touted Stocks

This table classifies investors into five different investor types based on their trading behavior in *non-touted stocks* during the 180 days before each tout. Panel A provides the definitions and descriptions of these five different investor types. Panel A also shows the percentage of tout investors that fall into each investor type category at the point of investing in his or her first tout relative to the corresponding percentage for active control investors (see Table 3 for details on control investors). We iteratively assign investors into each investor type category in Panel A, resulting in mutually exclusive investor types. Panel B provide details on the overlap between all investor types if we would not assign tout investors iteratively to each category. Without iterative assignment, investor type III is a perfect subgroup of investor type IV and, hence, we group investor types III and IV into one category ("Frequent Trader") to provide meaningful comparisons. In column (1), (2) and (3) of Panel C, we supplement prior analyses of Table 3, Table 5 and Table 6, respectively, by adding dummies for each investor type to the regressions. The dependent variable in column (4) is an indicator variable that is coded as '1' if the tout investment is less than 2% of the investor's overall portfolio value. In all columns, the omitted investor type category is "residual trader". In line with Panel A, we use mutually exclusive investor type definitions. All t-statistics, included in parentheses, are based on standard errors clustered at the same level as in the underlying analyses (and by investor in column 4). *, **, and *** indicate significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Panel A: Different Investor Types

			Tout-Investors (N = 6,569)	Control-Investors (N = 21,384)	p-value
I.	**New Trader**	First-time use of brokerage account in the 180 days before the tout	6.5%	6.3%	0.47
II.	**Infrequent Trader**	No penny trade or no more than three trades overall in the 180 days before the tout	37.7%	66.9%	0.00
III.	**Penny Day Trader**	At least one day-trade in a penny stock in the 180 days before the tout	10.8%	2.1%	0.00
IV.	**Short-term Trader**	Flipped at least one stock within a week in the 180 days before the tout	23.3%	9.9%	0.00
V.	**Residual Trader**	Not a member of the other four investor-type groups	21.6%	14.8%	0.00
			100.0%	100.0%	

Panel B: Overlap between Investor Types for Tout Investors

		N	Exclusively belonging to the respective investor type		Number of investors within each category who (also) belong to the following investor type:			
			N	%	I. New Trader	II. Inexperienced Trader	III. + IV. Short Term Trader	V. Residual Trader
I.	**New Trader**	430	80	19%	430			
II.	**Infrequent Trader**	2,718	2,274	84%	243	2,718		
III. + IV.	**Frequent Trader**	2,572	2,244	87%	127	221	2,572	
III.	***Penny Day Trader***	[750]	[712]	[95%]	[34]	[6]	[750]	0
IV.	***Short-term Trader***	[2,572]	[2,244]	[87%]	[127]	[221]	[2,572]	0
V.	**Residual Trader**	1,420	1,420	100%	0	0	0	1,420
Number of types per investor		1.09						

Panel C: Explanatory Power of Investor Types

	(1)	(2)	(3)	(4)
	Probit	OLS	Probit	Probit
	Tout Investor	Mean Return (%)	Another Tout Investment	Small Investment
New Trader	0.066	0.015	0.129	-0.192
	(1.32)	(0.45)	(1.48)	(-1.45)
Infrequent Trader	-0.389***	-0.028	-0.326***	0.139***
	(-16.33)	(-1.04)	(-6.49)	(2.77)
Penny Day-Trader	0.805***	0.186***	0.291***	-0.344***
	(16.23)	(5.64)	(4.69)	(-4.86)
Other Short-term Trader	0.288***	0.084***	0.096**	-0.259***
	(10.42)	(3.59)	(1.97)	(-5.33)
Decile Return (Recent Tout)			0.066***	
			(10.80)	
Constant	-0.678***	-0.228***	-1.116***	-6.141***
	(-7.90)	(-4.53)	(-10.12)	(-23.11)
Controls				
Personal characteristics	Yes	Yes	No	Yes
Portfolio characteristics	Yes	Yes	Yes	Yes
Adj./Pseudo R2	0.215	0.0294	0.0721	0.290
No. Investors	24742	6094	6303	6094
No. Obs	38313	11466	6,303	11466

Table 8: Subsequent Portfolio Investments after Tout Participation

This table analyzes subsequent portfolio investments after tout participation. We restrict our sample to investors that purchased at least one stock during the 120 days before the pump period (as in Table 6, we focus on the first four touts of each investor). Panel A shows the trading behavior of tout investors in the immediate aftermath of a tout investment conditional on the success of the most recent tout (decile-ranked returns). All independent variables are defined as in Table 5, except that the portfolio composition is measured six months before the tout for some variables (due to the definitions of the dependent variables in column 2 to 4). The dependent variable in column (1) is an indicator variable coded as '1' if an investor does not purchase any stock in the 120 days after the pump period of a tout. In column (2), the dependent variable is the number of purchases in the 120 days after the pump period minus the number of stock purchases in the 120 days before the pump period (scaled by the total number of purchases). The dependent variable in column (3) [4] is the number of penny stock [blue chip] purchases in the 120 days after the pump period minus the number of penny stock [blue chip] purchases in the 120 days before the pump period (scaled by the total number of penny stock [blue chip] purchases). In Panel B, we partition the sample based on return quintiles. Panel C focuses on the long-term portfolio consequences if investors had a negative tout return. The dependent variable in column (1) is defined as the number of stock purchases in year 2 and year 3 after the tout (minus the number of purchases in year 2 and 3 before the tout). *DiffNumberStock* in column (2) is the number of single stocks in the portfolio three years after the tout (minus the respective number six months before the tout). *DiffPennyShare* [*DiffBlueChipShare*] is the difference between the penny share [blue chip share] three years after the tout and the penny share [blue chip share] six months before the tout. The remaining variables are defined as in Panel A. All t-statistics, included in parentheses, are based on standard errors clustered at the investor and tout-level. *, **, and *** indicate significance (two-sided) at the 10%, 5%, and 1% levels, respectively.

Panel A: Stock trading 180 Days after Tout

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
	No Trades	Diff # TotalTrades	Diff # PennyTrades	Diff # BlueChipTrades
Return Deciles	-0.018***	0.032***	0.032***	0.003
	(-10.94)	(9.58)	(6.24)	(0.71)
Log(Portfolio Wealth(t-6))	0.006**	-0.002	0.000	0.003
	(2.51)	(-0.79)	(0.03)	(0.71)
Penny Share (t-6)	-0.016	-0.019	-0.051**	0.044**
	(-1.20)	(-0.80)	(-1.97)	(2.25)
Blue Chip Share (t-6)	0.069***	0.001	0.077*	-0.122***
	(3.20)	(0.02)	(1.95)	(-3.58)
Log(# Stocks)(t-6)	-0.064***	0.047***	0.023**	0.016
	(-11.78)	(6.35)	(2.14)	(1.61)
Utilized Newsletter	-0.025	0.025	0.027	-0.003
	(-1.53)	(0.60)	(0.48)	(-0.12)
Constant	0.331***	-0.477***	-0.428***	-0.122***
	(13.66)	(-14.09)	(-9.59)	(-3.71)
Adj. R2	0.0474	0.0395	0.0269	0.00414
No. Investors	5460	5460	5460	5460
No. Obs	8324	8324	8324	8324

Panel B: Investor Response by Return Quintile

			Diff # TotalTrades		Diff # PennyTrades		Diff # BlueChipTrades	
Return Quintile	count	(Mean Return)	mean	p50	mean	p50	mean	p50
1	1,559	-88%	-0.37	-0.33	-0.33	-0.33	-0.10	0.00
2	1,638	-59%	-0.26	-0.25	-0.25	-0.20	-0.05	0.00
3	1,694	-28%	-0.19	-0.16	-0.17	-0.14	-0.02	0.00
4	1,734	-5%	-0.16	-0.12	-0.17	-0.11	-0.04	0.00
5	1,709	37%	-0.11	-0.05	-0.06	0.00	-0.07	0.00
Average	8,334	-27%	-0.22	-0.19	-0.19	-0.14	-0.06	0.00

Panel C: Long-Term Portfolio Changes for Investors with Negative Returns

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
	DiffNumberPurchases	DiffNumberStock	DiffPennyShare	DiffBlueChipShare
Diff # TotalTrades	46.186***	1.508**	0.000	0.010
	(3.54)	(2.12)	(0.01)	(1.17)
Diff # PennyTrades	-15.415	0.162	0.019*	0.002
	(-1.24)	(0.31)	(1.69)	(0.25)
Diff # BlueChipTrades	21.071	0.098	-0.025**	0.010*
	(1.42)	(0.22)	(-2.02)	(1.90)
Log(Portfolio Wealth(t-6))	-0.350	-0.162	-0.012***	-0.005***
	(-0.10)	(-0.92)	(-6.98)	(-4.28)
Penny Share (t-6)	-58.291***	-1.538	-0.667***	-0.066***
	(-3.36)	(-1.54)	(-30.31)	(-7.33)
Blue Chip Share (t-6)	-58.370**	0.679	-0.170***	-0.636***
	(-2.51)	(0.56)	(-8.67)	(-22.48)
Log(# Stocks)(t-6)	-2.867	-3.350***	0.031***	0.023***
	(-0.47)	(-7.07)	(5.15)	(6.90)
Utilized Newsletter	-11.658	-0.598	-0.025	-0.002
	(-0.62)	(-0.78)	(-1.47)	(-0.17)
Constant	79.553**	8.815***	0.289***	0.136***
	(2.55)	(6.25)	(14.80)	(12.93)
Adj. R2	0.00354	0.0509	0.299	0.237
No. Investors	4581	4574	4574	4574
No. Obs	6154	6143	6143	6143

Figure 1: Example for a Pump-and-Dump Campaign – BAR.bra Mining Group AG

This figure shows the price path of "BAR.bra Mining Group AG" (ISIN: CH0032823640). The red line corresponds to January 10, 2008 which is the first date for which we find a newsletter. At December 5, 2007, the stock was authorized for trading on the *Open Market* of the Frankfurt stock exchange, an unregulated market segment. The price increased from € 0.46 at its inception to € 0.69 (January 10, 2008) and reached its maximum at January 15, 2008 (€ 0.87). Within less than three months, the stock lost most of its value (€ 0.04 at April 15, 2008) and is basically worthless ever since.

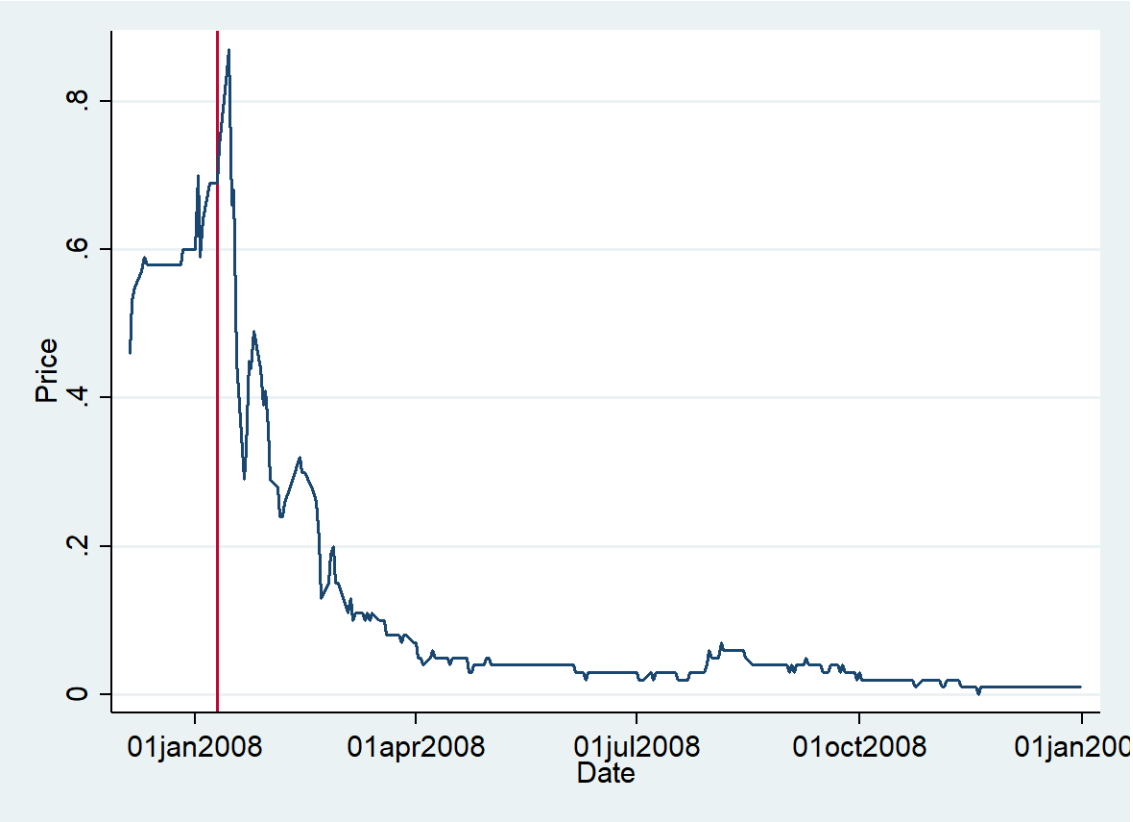
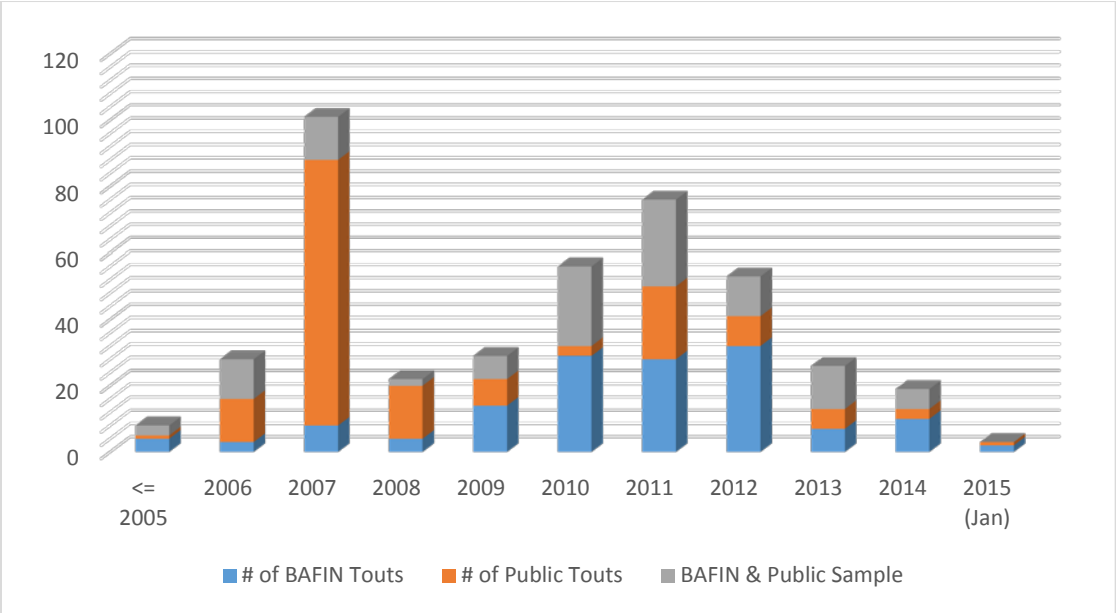


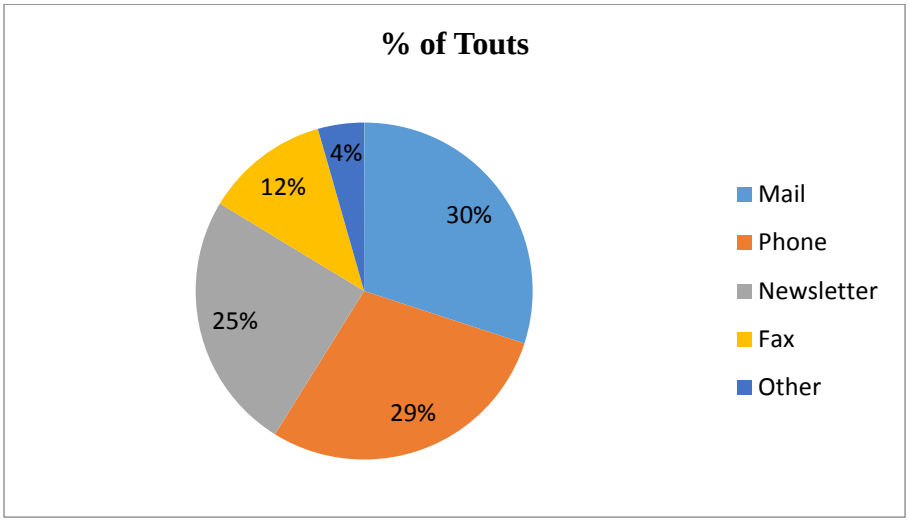
Figure 2: Descriptive Statistics on the Pump and Dump Schemes

This figure provides descriptive statistics on the 421 touts in our sample. Panel A shows the frequency of touts as well as the source of the data by year. The sample period begins in 2003 and ends in January 2015. Panel B describes the distribution channel. Mail includes either electronic mail or physical mail. Panel C and Panel D show the country of the touted firm by its primary trading venue and the location of its headquarters, respectively, as described by Datastream. Panel E shows the industry of each tout at the time of the pump and dump as collected from Datastream.

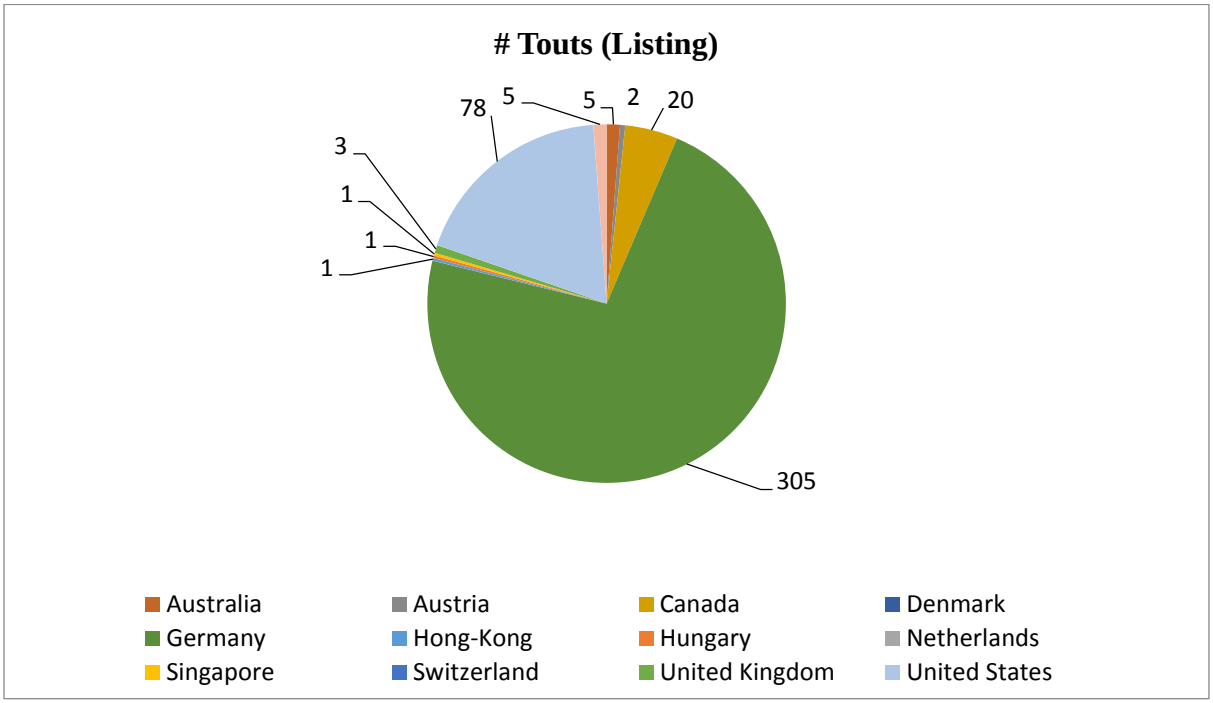
Panel A: Frequency of Touts



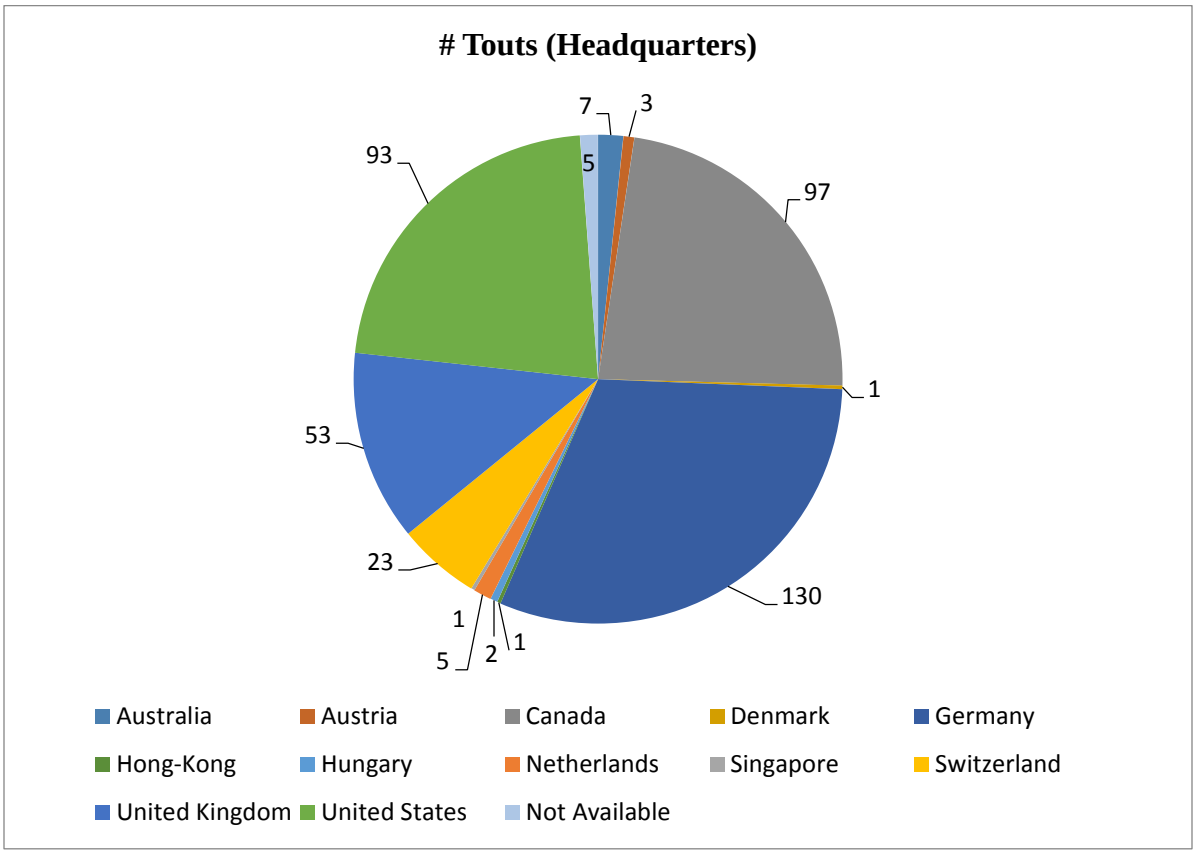
Panel B: Distribution Channel of Touts



Panel C: Country of Tout Trading Venue



Panel D: Tout Headquarter Locations



Panel E: Tout Industries

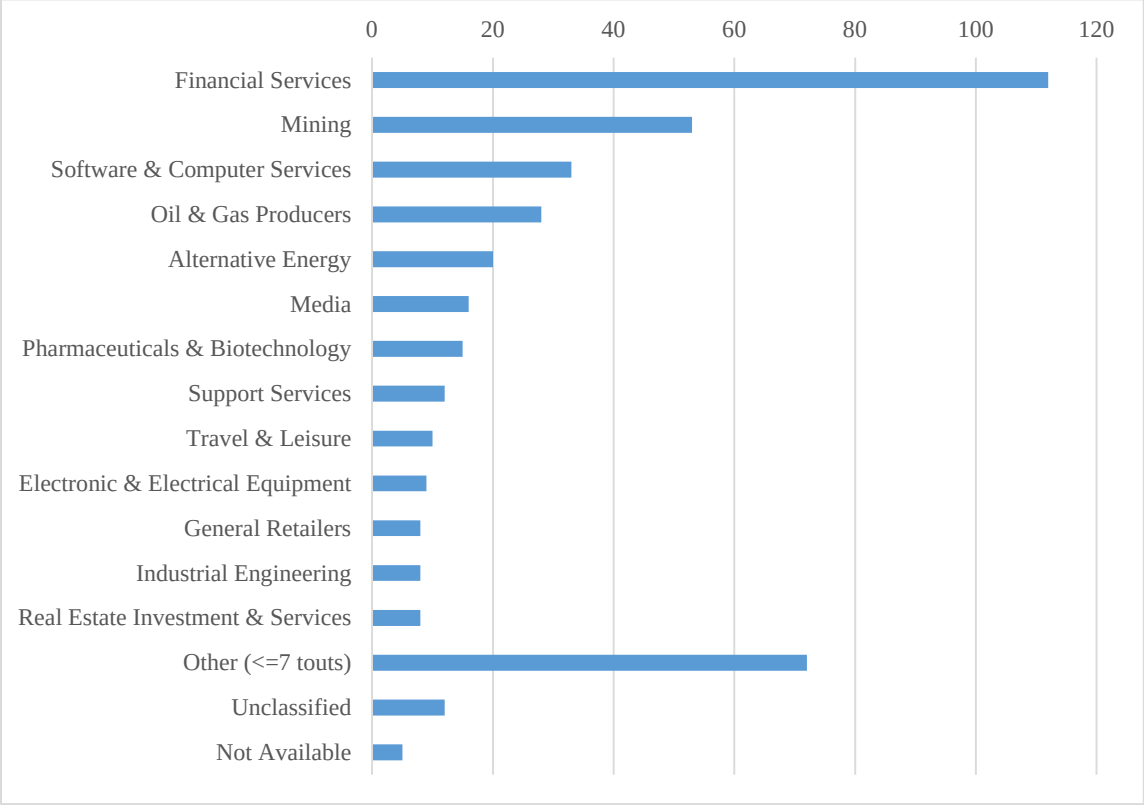
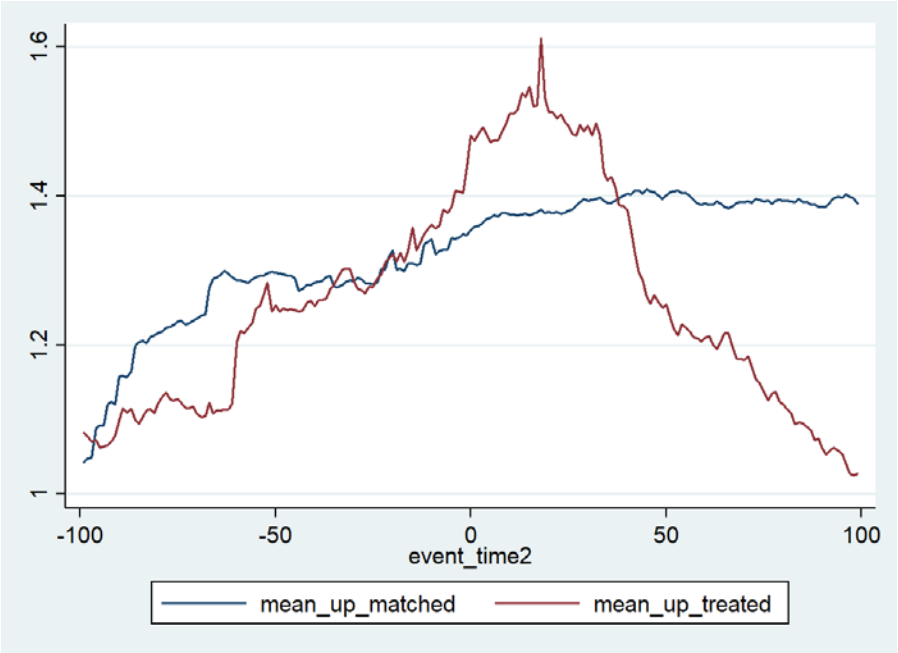


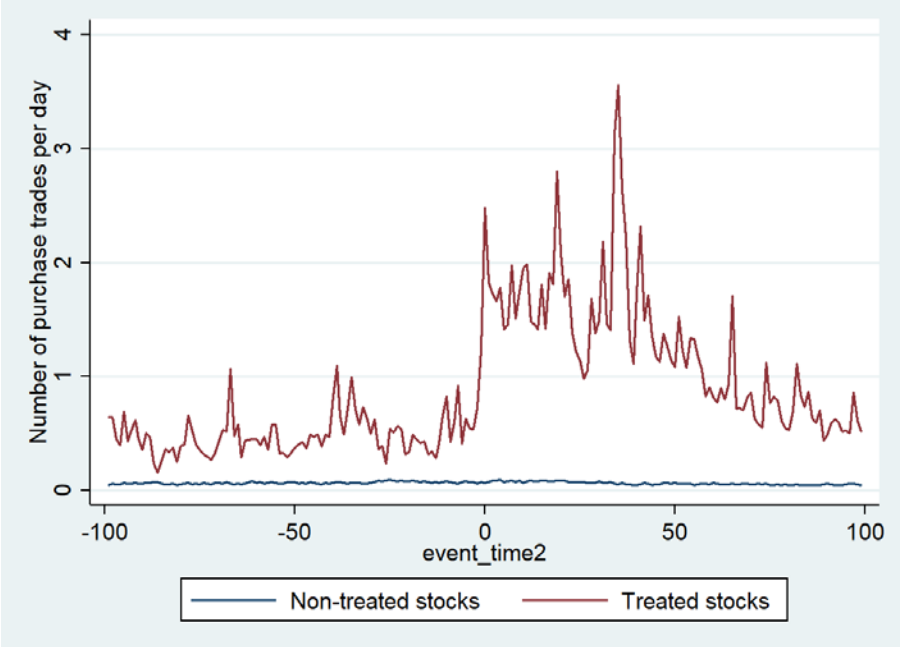
Figure 3: Coarsened-Exact Matching of Touted Stocks with Non-Touted Stocks

This figure shows the price path and investor response for coarsened-exact matched touted stocks and non-touted stocks. Stocks are matched based on (unadjusted) prices 100 and 50 days before the beginning of the tout using four different price strata. Panel A shows the price path of touted and non-touted stocks. Returns for both types of stocks are not significantly different before the tout date. Panel B shows the within-sample average of the number of purchases per stock and per day. Panel C provides the within-sample average of the average value of the purchases per stock and per day.

Panel A: Price Path of Touted and Matched Stocks



Panel B: Average Number of Purchases for Touted and Matched Stocks



Panel C: Average Value of Purchases for Touted and Matched Stocks

