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Speculate against speculative demand ☆

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ABSTRACT

Measuring individual investors' speculative demand for stocks using the Google search volume index (hereafter "SVI") on penny stocks, we examine how it relates to the return dynamics of U.S. stock indices. Speculative demand leads to a short-term return reversal. A simple trading strategy that sells a stock index when SVI is high and buys it otherwise generates annual excess returns of up to 20% over the buy-and-hold strategy. Applying the trading strategy to the corresponding ETFs and index futures yields similar results. Transaction costs, liquidity risk and strong time variation of the excess returns can potentially limit the exploitation of arbitrage opportunities.

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1. Introduction

Individual investors are often perceived to have behavioral biases and to trade on noise. If their aggregate demand is random, it should have no predictable and persistent influence on stock prices (Kyle, 1985). However, when their erroneous demand is unpredictable and systematic, noise trader risk limits the arbitrage process and enables individual investors to earn higher expected returns than sophisticated investors by bearing more risk (De Long, Shleifer, Summers, & Waldman, 1990).

Adding to a growing body of literature on the usage of social media and the internet in finance we investigate whether devising a trading strategy against the general investing public's time-varying speculative demand can generate profitable opportunities. Recent studies show that individual investors tend to speculate in the stock market and hold stocks with lottery characteristics (Kumar, 2009; Dorn & Huberman, 2010; Han & Kumar, 2013). To a certain extent individual investors can perform a liquidity provision role (Kaniel, Saar, & Titman, 2008), while retail trades are shown to be correlated and move the market (Barber, Odean, & Zhu, 2009). Kumar (2007) shows that the diversification choices of individual investors influence stock returns.

We propose a novel measure of individual investors' speculative demand using their online queries on "penny stocks" in Google search volume index (hereafter "SVI"). We argue that the SVI on penny stocks provides a measure of the general public's willingness to speculate in the stock market based on the following reasons. First, penny stocks are speculative. The U.S. Securities and Exchange Commission (SEC) classifies all stocks with prices lower than $5 as penny stocks. As a typical example of speculative stocks,[1] penny stocks have highly volatile prices, which creates space for differences of opinion and speculative trading. Existing literature establishes that penny stocks tend to be overpriced. For example, Beatty and Kadiyala (2003) and Bradley, Cooney, Dolvin, and Jordan (2006) show that penny stock IPOs have higher initial returns but significantly worse long-run underperformance than ordinary IPOs.

Second, we propose that individual investors are more likely to use Google to search for information for trading, which is consistent with the findings of Da, Engelberg, and Gao (2012). Third, the search intensity on "penny stocks" reflects individual investors' net demand for

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[1] Penny stocks are widely perceived as speculative securities among economic and legal researchers (e.g., Aggarwal & Rivoli, 1990; Beatty & Kadiyala, 2003; Bouraoui, 2011), financial regulators (http://www.sec.gov/answers/penny.htm), financial media McLean (2000) and financial professionals (see, for example, http://www.investopedia.com/terms/s/speculativestock.asp).

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speculative stocks. An individual investor often faces a formidable search problem: among thousands of stocks, upon which one(s) should he speculate? This problem is more severe when buying than selling stocks (Barber & Odean, 2008), implying that search activities are more likely to be related to buying interest. In contrast, institutional investors hold much larger stock portfolios and hence face a search problem when selling stocks too. This is the case especially when they want to short sell, since they need to search for which stocks to short sell. Barber and Odean (2008) test and confirm the hypothesis that individual investors are net buyers of attention grabbing stocks. Therefore the SVI index of "penny stocks"[2] should reflect retail investors' speculative demand.[3]

Measuring the speculative demand by SVI adds our paper to a growing body of literature on the role of investor attention/information demand on asset markets. In an information abundant environment such as financial markets, attention constrained investors have to allocate attention across different assets before portfolio selection. Recent theoretical studies show that limited attention affects asset price dynamics such as stock market volatility (Andrei & Hasler, 2011), return comovement, and return predictability (Peng & Xiong, 2006). Empirically testing the theory of attention calls for a proxy of investor attention. Traditional measures include media coverage, extreme price movement, or advertising expense. Unlike these indirect proxies of investors' passive attention, Da et al. (2012) propose a direct measure of investors' active attention: the search intensity on certain assets through Google. Since their seminal paper, a growing literature revisits the relationship between investors' attention and asset prices. This strand of literature examines the usefulness of SVI in explaining asset market phenomena such as stock prices around earnings announcements (Drake, Roulstone, & Thornock, 2011), liquidity and returns (Bank, Larch, & Peter, 2011), predicting a firm's future cash flow (Da, Engelberg, & Gao, 2010), biased attention towards local stocks (Mondria & Wu, 2012), stock market volatilities (Vlastakis & Markellos, 2012), and in foreign exchange markets (Smith, 2012). Google has been used also in predicting potential merger activity and to measure economic uncertainty. Siganos (2013) tests the market expectation hypothesis according to which firms with abnormal upward change in Google searches are identified as firms with potential merger activity while Dzelinski (2012) relies on SVI to measure the economic uncertainty. This literature examines the effect of search on either individual stocks or stock indices. Unlike them, we restrict our attention to penny stocks only as a proxy of general investing public's willingness to speculate in the stock market.

Using our novel proxy of investors' speculative demand, we firstly test whether the relationship between speculative demand and the U.S. stock indices is consistent with the "theory of attention" in Barber and Odean (2008). Specifically, we test whether high speculative demand, is associated with (i) high contemporaneous returns due to buying pressure, driving up current prices; (ii) lower future returns. We find that price increases are short lived. When the mispricing is corrected, future returns decline as the price falls. From in-sample regressions, we find that contemporaneous returns increase with the SVI of penny stocks. In addition, higher SVI causes lower near future returns, while recent high past returns cause lower SVI. These empirical results support the theory of Barber and Odean (2008). We also find that the relation of speculative demand with returns is more pronounced for Nasdaq than DJIA and S&P 500. This might be explained by the fact that securities listed on Nasdaq are smaller and less liquid, which makes it more difficult for sophisticated investors to correct the mispricing.

Based on the in-sample short term return reversal, we build a simple trading strategy that sells a stock index when SVI is high and buys the stock index otherwise. It generates an annual excess return of up to 20% over the buy-and-hold strategy. Accounting for transaction costs lowers the excess returns. Liquidity risk can also partially explain the excess returns since the strategy performs well mainly during periods of high liquidity risk. In addition, strong time variation of the excess returns imposes additional limits to arbitrage.[4] Therefore we conclude that the substantial excess returns to the trading strategy do not necessarily imply profitable opportunities.

Several prior studies have assumed the possibility of buying and selling of an index (e.g. Sullivan, Timmermann, & White, 1999). However, an investor cannot directly buy or sell an equity index in a straightforward manner. Therefore, we also examine the corresponding Exchange Traded Funds (ETFs) and index futures. ETFs are traded assets specialized in tracking the equity indices under examination. Chaua, Deesomsak, and Lau (2011) find positive evidence on the relation of investors sentiment measured by SVI and the feedback trading of the three largest U.S. ETF contracts. In a similar fashion we investigate how the general investing public's willingness to speculate in stock markets can be used to create profitable short-term reversal strategies. An ETF that tracks an index delivers diversification benefits as well as the ability to sell short. ETF can be traded like stocks, and the transaction cost is usually low. We adjust our simple trading strategy to sell an ETF when SVI is high and to buy and hold it otherwise. We find similar results as for "trading" the index itself. We also examine the performance of our trading strategy using price data on the relevant index futures. Trading futures contracts incurs quite modest transaction costs. In addition, taking short positions using the futures is more realistic than using the index itself. We find similar results based on trading index futures.

Our trading strategy relies on the short term reversal of market returns conditional on individual investors' speculative demand. It relates our paper to a large literature on short term momentum and long term reversal.[5] The approach in such literature tends to involve portfolios of winners and losers conditional on the individual asset's past performance. In a recent theoretical paper, Nagel (2012) shows how returns of short-term reversal strategies in equity markets can be interpreted as a proxy for the returns from liquidity provision. In this model, the public trades for informational and liquidity reasons, while the market makers have limited risk bearing capacity, and the author shows that reversal strategies closely track the returns earned by liquidity providers. The buying and selling in reversal strategies mimics the trading of a market maker who sells when the public buys and buys when the public sells, which coincides with rising and falling prices respectively.

The buying/selling decisions of our unique short-term reversal strategy are based on whether the increase in the informational speculative demand level of individual investors is substantially higher than its historical level. In the spirit of Nagel (2012) it follows that our trading strategy effectively resembles the trading of a market maker (liquidity provider) that sells when the public buys and buys otherwise. The informational source for our trading strategy is however based on a unique feature, which is the level of the public's informational demand for speculation, as opposed to the assets' historical performance. Our trading strategy sells when the speculative demand is high and buys when the speculative demand is low. In addition, we examine its impact on market returns, not the returns of a managed portfolio. Moreover, our strategy exploits the conditional short-term return reversal, instead of short term momentum or long term reversal.

[2] Note that we do not study penny stocks per se. Instead, we use the interest in penny stocks search in Google as a measure of the general public's willingness to speculate in the stock market.

[3] Although not reported in the paper, we consider alternative measures of speculative demand by using more general search keywords such as "best stocks", "buy stocks", "hot stocks", "stock picks", "stocks to buy" and "top stocks". We find similar empirical evidence.

[4] We do not imply a truly riskless arbitrage in a textbook sense. In fact, our trading strategy is a risky strategy that can incur losses in some periods.

[5] See for example, Cutler, Poterba, and Summers (1991), Jegadeesh and Titman (1993), Rouwenhorst (1998), Rouwenhorst (1999) and Levis and Liodakis (2001) among others.

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