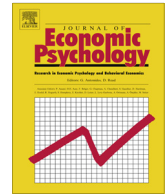




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Volatility expectations and the reaction to analyst recommendations



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ABSTRACT

Our study explores the effect of market volatility expectations, captured by the implied volatility index (VIX), aka "investors' fear gauge," on investors' reactions to analyst recommendation revisions. We find that positive (negative) excess returns following recommendation upgrades (downgrades) are stronger when accompanied by daily VIX decreases (increases). A rational explanation for the effect may be due to VIX serving as an indicator of future economic conditions. Noting, however, that the VIX effect is detected on excess daily stock returns is suggestive that the results are driven by more than mere changes in investors' expectations of economic fundamentals. We suggest, therefore, that investors' mood, as reflected by VIX changes, mediates their reactions to analyst recommendation revisions, to wit, investors in good (bad) mood perceive positive (negative) future financial outcomes as more probable (whether indicative of future occurrences or not) and react more strongly to analyst recommendation upgrades (downgrades).

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1. Introduction

We analyze a well-known category of events whose influence on stock returns is widely documented, namely, analyst recommendation revisions. The overall picture emerging from the literature is that analyst recommendation revisions contain useful investment information. To mention a few, [Stickel \(1995\)](#) documents the effect of brokerage house recommendation changes on short term stock prices; [Womack \(1996\)](#) documents significant systematic discrepancies between pre-recommendation prices and eventual values; [Jegadeesh and Kim \(2006\)](#) evaluate analyst recommendations in G7 countries and find that stock prices react significantly to recommendation revisions; [Green \(2006\)](#) finds evidence that early access to stock recommendations provides brokerage firms' clients with incremental investment value; and [Mikhail, Walther, and Willis \(2007\)](#), focusing on investor-specific responses to recommendation revisions, find that both large and small traders react to recommendations, while large investors appear to trade more in response to the amount of information contained in analyst recommendations.

Overall, it has been widely documented that analyst recommendation upgrades are surrounded by abnormally high stock returns, while downgrades are accompanied by abnormally low stock returns. Therefore, the recommendation revisions may

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be regarded as a source of information on company-specific events affecting the prices of the companies' stocks. These abnormal returns are of interest to our research, and we shed light on their interaction with investors' market volatility expectations.

To capture investors' market volatility expectations, we employ the implied volatility index (VIX), introduced by Whaley (1993) and launched by the Chicago Board Options Exchange (CBOE) in 1993. VIX is based on the prices of S&P 500 index options, providing thereby a benchmark for the expected future market volatility over the next month. The index is calculated in real-time and is continuously disseminated throughout each trading day. VIX is widely followed and has been cited in hundreds of news articles in leading financial publications.

VIX represents an implied measure of expected future volatility. Along with the view of VIX as an indicator of future economic conditions, it is also known as the investors' 'fear gauge' (see Whaley, 2000, 2008). According to this interpretation, though there are other factors affecting this index, in most cases, high VIX reflects increased investors' fear and low VIX suggests complacency. Whaley (2008) documents negative correlation between daily S&P 500 index returns and VIX changes, and interprets it as indicating that changes in the VIX are partially driven by investors demanding portfolio insurance in times of high current market volatility.

The goal of our study is to investigate the relation between investors' market volatility expectations and their reaction to analyst recommendation revisions, as expressed in the recommended firms' stock returns. We find that positive (negative) excess returns to recommendation upgrades (downgrades) are stronger when accompanied by decreases (increases) in the daily value of VIX.

One possible explanation for the detected VIX effect goes along rational argumentation, according to which VIX may be seen as an indicator of future economic conditions. To wit, the investors react more positively (negatively) to recommendation upgrades (downgrades) when they are accompanied by daily VIX decreases (increases) because, under these circumstances, they possess a more (less) favorable view of the future economic conditions.

Noting, however, that we detect the VIX effect while employing excess daily stock returns (i.e., returns net of contemporaneous market index movements) as a measure of the stock price reactions is suggestive that the results may be driven by more than mere changes in investors' expectations with respect to economic fundamentals. We call in mind, therefore, yet another possible explanation, commensurate with the growing literature connecting VIX and mood and indicating that mood is negatively correlated with subjective risk evaluations, namely, that investors' mood mediates their reactions to analyst recommendation revisions. To wit, investors in good (bad) mood perceive positive (negative) future financial outcomes as more probable (whether indicative of future occurrences or not) and react more strongly to analyst recommendation upgrades (downgrades). Henceforth, we portray a sketch of the literature on mood and subjective risk evaluations in the context of the potential effects of VIX.

Hilgard's Introduction to Psychology (Hilgard's Introduction to Psychology, 2000, p. 404) defines mood as an enduring emotional state that affects people's evaluation of other people and inanimate objects. Mood also affects judgments about the frequency of various risks. Good (bad) mood leads people to see risks as less (more) likely. Being in a bad mood makes the world seem more dangerous. The influence of mood on people's perceptions and decisions is the focus of a large body of psychological research. One of the central conclusions in this respect is that people in positive mood tend to make optimistic judgments, while people in negative mood tend to make pessimistic judgments (e.g., Forgas, 1992; Isen, Shalke, Clark, & Karp, 1978; Johnson & Tversky, 1983; Kahneman & Riis, 2006; Schwarz & Clore, 1983). Furthermore, Schwarz (1990) finds that individuals in good mood engage in more simplifying heuristics to aid decisions, and Isen (2000) argues that positive mood increases cognitive flexibility. Schwarz (1990), however, suggests that bad mood tends to stimulate people to engage in detailed analytical activity, and subsequently, Schwarz (2002) concludes that negative mood is related to increased attention, more search of new alternatives, and a more thorough processing of available information.

The effects of mood on financial markets are widely-documented in recent literature. Bad mood, being expressed by a number of psychologically motivated proxies, like high levels of cloudiness (e.g., Saunders, 1993; Hirshleifer & Shumway, 2003; Kliger & Levy, 2003a, 2003b), high temperatures (Cao & Wei, 2005), heightened geomagnetic storms (Krivelyova & Robotti, 2003), cycles of full moon (Dichev & Janes, 2003; Yuan, Zheng, & Zhu, 2006), Daylight Savings Time Changes (Kamstra, Kramer, & Levi, 2000) and small number of daylight hours (Kamstra, Kramer, & Levi, 2003) result in significantly lower stock returns. In addition, Mehra and Sah (2002) suggest that investors' mood has an effect on equity prices if it affects investors' 'subjective parameters' (such as level of risk aversion and judgment of the appropriate discount factor). Baker and Wurgler (2006) find that stocks that are attractive to optimists and speculators and at the same time unattractive to arbitrageurs – younger stocks, small stocks, unprofitable stocks, non-dividend paying stocks, high volatility stocks, extreme growth stocks, and distressed stocks – are especially likely to be disproportionately sensitive to broad waves of investor sentiment. Kliger and Levy (2003a) employ option price data to recover risk preferences, finding that good (bad) mood is associated with investors being less (more) willing to tolerate risk, and Kliger and Levy (2003b) find that bad mood, proxied by high cloud cover and precipitation volume, is characterized by investors placing higher-than-usual probabilities on adverse events, Kliger and Levy (2008) employing option prices, show that seasonal mood effects distort investors' probability perceptions, and Kliger, Gurevich, and Haim (2012) document seasonal impact on investors' demand for initial public offerings.

A number of psychological studies analyze the relationship between people's subjective evaluations of future risk and their contemporaneous feelings and emotions. Constans and Mathews (1993) indicate that contemporaneous people's mood is negatively correlated with their subjective evaluations of future risk. Wright and Bower (1992) argue that people's mood affects their judgments with respect to uncertain future events, by documenting that people in good (bad) mood report

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