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Does mood affect trading behavior? ☆

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ABSTRACT

The assumption that mood affects investors' behavior in the field is gaining acceptance due to experimental studies and papers linking stock returns with environmental variables, such as weather and length of day. To identify mood effects this paper utilizes account level stock trading data from all investors in Finland, a country with significant variation in weather and length of day. While some weather-related mood variables and calendar effects are individually significant, little of the day-to-day variation in trading is collectively explained by all such factors. In contrast, we find strong seasonal lower frequency patterns that seem connected to vacations.

1. Introduction

Mood — a transient state of feeling at a particular time — can influence trading decisions if it affects expectations of future fundamentals, or interacts with risk preferences (Hirshleifer, 2001; Baker and

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Wurgler, 2007; DellaVigna, 2009).[3] In this paper we provide the first comprehensive evaluation of the hypothesis that mood impacts investor behavior in the field, using account level transaction data from all domestic investors in Finland. Our main instruments for measuring mood are hours of daylight and local weather, both medically validated mood proxies (e.g., Keller, Fredrickson, Ybarra, Côté, Johnson, Mikels, Conway, and Wager, 2005; Papadopoulos, Frangakis, Skalkidou, Petridou, Stevens, and Trichopoulos, 2005). To the extent that people are more optimistic about stocks or have higher risk tolerance when they are on a better mood, we would expect them to be more inclined to buy rather than sell stocks when the day is longer or when there is more sunshine. Hours of daylight and amount of sunshine have also been found to correlate with stock market returns at the country level.[4]

However, unlike the prior studies on stock returns, we examine the direct link between mood and investors' trading actions. This distinction is important as a statistical correlation between an environmental mood variable and stock returns can arise in multiple ways.[5]

Our main data come from the official registry of stock holdings in Finland. Our sample period is 1995–2002. In addition to providing account level transaction data, this setting is ideal for studying the impact of environmental mood variables on trading behavior for three reasons. First, Finland is located far up in the north and stretches 1,157 km (719 miles) in the north–south dimension. There is consequently a great deal of variation in the length of day in the time series as well as in the cross-section. At the winter solstice on December 21, the length of day in Finland varies between zero above the Arctic Circle in the north (66°33′N) and 5.6 hours in the southernmost tip. At the summer solstice on June 21, the length of day varies from 18.7 hours in the south to 24 hours in the north.

Second, Finland has an area of 338,424 km^2, roughly the size of Germany, and comprises multiple climate zones. This provides cross-sectional variation in local weather across the 455 municipalities in the country. For a visual representation of reasons one and two, we refer to Fig. 1 for a map of Finland, Europe, and the Eastern United States. Third, seasonal affective disorder (SAD) due to sunlight deprivation is somewhat more prevalent in Finland by international standards (Partonen and Magnusson, 2001; Kelly and Meschke, 2010). Of the total population, 85% report at least some seasonal changes in mood and behavior (Grimaldi, Partonen, Haukka, and Aromaa, 2009).

Due to the above reasons, we believe that, to the extent that mood changes caused by weather or length of day impact trading decisions, such effects should show up in Finland, if anywhere in the world. Additionally, we use *temperature* (Cao and Wei, 2005) and *precipitation* (Saunders, 1993), as these variables have also been linked to mood in psychology and medical literature, found to be correlated with stock returns, and have both cross-sectional and time-series variation, ideal for our panel data setup.

To measure the behavioral response of investors, we first classify investors into individuals, financial corporations (institutions), and other corporations. We exclude government bodies because of lack of variation in their location, and foreign investors because of missing data on their location and local weather. We then construct a behavioral outcome variable: daily *buy ratio* (of buys/(of buys+ of sells)) for each investor group in each municipality. We focus on the buy ratio as the mood hypothesis makes a clear prediction regarding the direction of trade: people on positive mood are more likely to buy than sell conditional on making a trade. Not all investor groups can simultaneously

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[3] People in a positive mood generally assess bad outcomes as being less likely compared to people in a negative mood (Johnson and Tversky, 1983; Wright and Bower, 1992). The affect infusion model (Forgas, 1995) predicts that a good mood should increase risk taking and a negative mood should depress risk taking if the current mood primes access to memories of mood congruent outcomes from risky choices. Forgas (1998) finds that people in good moods are more likely to resort to heuristic rather than analytical decision making.

[4] See Saunders (1993) and Hirshleifer and Shumway (2003) for sunshine, and Kamstra, Kramer, and Levi (2003) for hours of daylight.

[5] There is an active debate concerning the implications of the country level studies correlating environmental mood variables with stock returns. Several studies confirm the earlier evidence on stock returns and extend findings to other asset classes (Kliger and Levy, 2003; Garrett, Kamstra, and Kramer, 2005; Kamstra, Kramer, and Levi, 2007; Chang, Chen, Chou, and Lin, 2008; Dowling and Lucey, 2008; De Silva, Pownall, and Wolk, 2012). However, critical studies have also appeared. The counter arguments include data mining, same seasonal return pattern explainable by many different mood-related variables, and econometric as well as data-related problems (Goetzmann and Zhu, 2005; Jacobsen and Marquering, 2008, 2009; Kelly and Meschke, 2010; Novy-Marx, 2014). Bouman and Jacobsen (2002) and Loughran and Schultz (2004) note that a strong seasonal pattern in stock returns is not necessarily directly linked to any environmental mood factor despite correlation with a mood variable.