Melancholia and Japanese stock returns – 2003 to 2012

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ABSTRACT

Japan's "lost decades" challenge a central tenet of finance, namely a positive relationship between risk and expected return. We present evidence that Japan's dismal returns are a function of sentiment both at the aggregate market and individual firm level. Utilizing a text-based measure of news sentiment (Thomson Reuters News Analytics) to proxy for investor sentiment, we find that sentiment is predominantly negative during our sample period (2003 to 2012) and is associated with negative returns. We also find that the effect of news sentiment is greatest for smaller firms.

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1. Introduction

A positive relationship between risk and expected return is a central tenet of finance theory (Merton, 1973, 1980).[1] However, Japan's "lost decades" challenge this idea. In the 25 years and counting since the Japanese crash, the Nikkei stock index, which peaked at 38,916 in December 1989,[2] has not "recovered". In the period we consider, average returns have been primarily negative.[3]

Merton's proposition of the positive relationship between returns and risk is based on rational expectations. Given its relatively flat historical returns, it appears that Japan does not seem to follow this relationship. Japan's *prima facie* violation of Merton's proposition suggests that a quasi-rational, or behavioral, model might help us understand Japanese returns. This paper examines the relationship between the returns on the Tokyo Stock Exchange (TOPIX)[4] and investor sentiment from January 2003 to October 2012. This time period encompasses part of the "second lost decade of Japan".

Our analysis uses a text-based measure of news sentiment (Thomson Reuters News Analytics) to proxy for investor sentiment over our sample period. We find that sentiment has a significant positive relationship with stock returns. During our sample period, the average return on the TOPIX is zero and we present evidence that this may be attributable to the prevailing negative

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[1] See Müller et al. (2011) for a review of literature discussing the relationship of risk and expected return.

[2] Shiratsuka (2005) described the pre-crash period as one dominated by "euphoria" or "optimism", consistent with Shiller's (2000) "irrational exuberance".

[3] We discuss this result in detail below when presenting summary statistics in Table 3.

[4] The TOPIX is a free-float adjusted market capitalization-weighted index that is calculated using all the domestic common stocks listed on the TSE First Section. TOPIX shows the measure of current market capitalization assuming that market capitalization as of the base date (January 4, 1968) is 100 points. This is a measure of the overall trend in the stock market, and is used as a benchmark for investment in Japanese stocks.

mood throughout this period.[5] We also analyze the role of sentiment at the firm level and find evidence to suggest that the effect of news sentiment is greatest on the stocks of smaller firms, although smaller firms generally have fewer news items.

Our study fills a gap in the literature on the cross-sectional effect of sentiment; this body of work has largely ignored text-based measures such as that employed here. In addition, the link between mood and sentiment has, to our knowledge, not been examined in Japan. Our findings are consistent with US evidence suggesting that sentiment has a greater effect on small firms. Baker and Wurgler (2006, 2007) established a size effect, where smaller stocks are more susceptible to "sentiment" and related this to the notion of limits-to-arbitrage. Berger and Turtle (2012) found a similar result, where "sentiment prone" stocks tend to be young, volatile and small firms with "opaque" characteristics. Brown and Cliff (2005), Lemmon and Portniaguina (2006), and Schmeling (2009) also noted that sentiment had a greater influence on small firms, although there is conflicting evidence as to whether the effect is greatest for stocks categorized as value or growth.

Our analysis of the association between investor sentiment and Japanese returns contributes to a growing literature (outlined above and, in more detail, in Section 2) linking returns to sentiment. Section 3 discusses our methodology; in particular, we detail how we construct text based sentiment measures for the Japanese markets using data from Thomson Reuters News Analytics (TRNA).[6] Further, our findings, presented in Section 4, demonstrate that the consideration of sentiment can help us understand the prolonged Japanese bear market. Given that findings related to text-based measures of sentiment are predominately obtained using US data, our analysis provides evidence that sentiment can play an important role in understanding markets outside of the US.

2. Background

Mood has been found to have influencing or conditioning effects on human decision making, perception and behavior (Schwarz and Clore, 1983). Johnson and Tversky (1983) report that bad moods could be induced in readers by brief news stories, even if minimal information is disclosed. They theorized that an individual's judgement is influenced by their current mood state, even if the subject matter they are analyzing is unrelated to the cause of their mood. Readers reacted not to the information contained in the article, but to the mood which it introduced. This is known as mood misattribution. Loewenstein (2000) found that visceral factors[7] influence an individual's mood or emotion, which in turn act as a channel influencing preferences. As a result, an individual investor's behavior may not always be rational depending on their conditioning mood. Lucey and Dowling (2005) examined this in detail and developed a theoretical framework for "investor feelings" and the effect that this can have on equity pricing. More broadly, as Kaplanski et al. (2014) describe, this psychological framework examines the effects of non-economic variables on stock markets, neither of which are consistent with efficient and rational markets.

A growing body of literature suggests that mood, a term that is often used interchangeably with sentiment (as we will do in this paper), influences share market behavior (Baker and Wurgler, 2006; Brown and Cliff, 2005; Tetlock, 2007; Tetlock et al., 2008; Stambaugh et al., 2012). However, *sentiment* is not directly observable: only its effects are visible. Therefore, when analyzing its influence on market behavior we must introduce a proxy.

The earliest work sought to proxy investor sentiment through weather conditions. Saunders (1993) presented an early and influential study that suggested the weather in New York City had a significant effect on stock market performance. Demonstrating a positive correlation between days with more sunshine and stock market returns, Saunders argued for the presence of a weather effect on investor psychology, which in turn influenced the behavior of investors and subsequently the stock market. Hirshleifer and Shumway (2003) extended this research for a sample of twenty six countries and also found a significant positive relationship between sunny days and stock returns. Trading on this "sunshine" effect can improve the Sharpe ratio of a trader's investment portfolio, but only if the trader has low transaction costs. Kamstra et al. (2003) and Goetzmann et al. (2015) examined mood fluctuations due to Seasonal Affective Disorder (SAD) and the effects on stock markets. Kamstra et al. (2003) found a relationship between SAD and investor risk aversion. They examined nine stock indices around the world and found seasonality in stock returns. Investors suffering from SAD due to changing seasons, became more (less) risk averse and sold (bought) stocks, therefore depressing (raising) prices. Goetzmann et al. (2015) also examined the impact of weather induced mood on investor belief and also found sunnier (cloudier) days are related to investor optimism (pessimism). They found that institutional investors have an increased propensity to buy on sunnier days, but also an increased propensity to sell due to perceived mispricing on cloudier days. Perceived mispricing in this study was captured through a survey, where investors are asked their opinions about the level of the Dow Jones Industrial Average based on their beliefs about US corporate strength and fundamentals. Goetzmann et al. (2015) also constructed a firm level proxy for investor optimism based on weather. They found a positive correlation between their optimism measure and firm stock returns, with the effect concentrated in stocks which are subject to higher arbitrage costs.

Weather is not the only psychological link between aggregate investor sentiment and stock market returns. The effect of team sports results on market returns has also been discussed in the literature, where a win is generally seen as having a positive effect

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[5] García (2013) used a similar psychological framework and stated "human behavior is significantly different in times of anxiety and fear versus periods of prosperity and tranquility". Our measure of market sentiment is negative for most years in our sample, which is perhaps one reason why, contrary to the literature, the effects of sentiment identified in Japan are not any stronger at times such as the Global Financial Crisis of 2008–09.

[6] Formerly the Reuters NewsScope Sentiment Engine.

[7] Visceral factors are a series of negative emotions, drive states and feeling states which can alter desires rapidly as they are affected by external and internal stimuli (Loewenstein, 2000).