Finance Research Letters 9 (2012) 36–47

Contents lists available at ScienceDirect

Finance Research Letters

journal homepage: www.elsevier.com/locate/frl

# Investor sentiment and stock returns: Wenchuan Earthquake

Liwei Shan [a], Stephen X. Gong [b,*]

[a] Research Institute of Economics and Management, Southwestern University of Finance and Economics, Chengdu, Sichuan, China
[b] School of Accounting and Finance, Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

ARTICLE INFO

*Article history:*
Received 14 January 2011
Accepted 16 July 2011
Available online 23 July 2011

*JEL Classification:*
G10
G11
G12
G14

*Keywords:*
Stock Returns
Earthquake
Behavioral finance
Sentiment
Local bias
Disasters

ABSTRACT

This paper exploits a natural experiment (the Wenchuan Earthquake in China) to study the effects of investor sentiment on stock returns. We find that during the 12 months following the earthquake, stock returns are significantly lower for firms headquartered nearer the epicenter than for firms further away. Further analyses indicate that this pattern of stock returns does not exist before or long after the earthquake, and cannot be explained by actual economic losses or a change in systematic risk. Overall, our evidence is consistent with the interaction of local bias and investor sentiment affecting stock returns.



## 1. Introduction

On May 12, 2008, a major earthquake that registered 8.0 on the Richter magnitude scale struck Wenchuan, in Sichuan province of Mainland China. According to the US Geological Survey, it is the 11th deadliest earthquake ever recorded.[1] Numerous properties were destroyed, more than 370,000 people were injured, and over 87,000 people died or are unaccounted for. The earthquake left about 4.8 million people homeless, though the number could be as high as 11 million.[2] In the months following the earthquake, people in many places far away from the epicenter camped on streets because of rumors of possibly more earthquakes. The earthquake was widely covered in the Chinese media, and newspaper coverage of the disaster remained relatively high up to 12 months after the earthquake. It is fair to say

* Corresponding author. Fax: +852 23569550.
*E-mail addresses:* lshan@swufe.edu.cn (L. Shan), afxhg@inet.polyu.edu.hk (S.X. Gong).

[1] http://www.sciencedaily.com/releases/2009/03/090302183250.htm.
[2] http://en.wikipedia.org/wiki/2008_Sichuan_earthquake.

1544-6123/$ - see front matter 
doi:10.1016/j.frl.2011.07.002

that the Wenchuan Earthquake created a level of anxiety and fear in Mainland China so strong and so widespread that is incomparable to any natural disasters the country experienced in the past 30 years.

This paper exploits the natural experiment provided by the Wenchuan Earthquake and examines whether negative emotions such as anxieties and fear affect stock returns. One of the differentiating points of this paper is that we exploit the possible interaction of sentiment and local bias in a natural experiment. Specifically, we measure investor sentiment using distance to the epicenter. Such an empirical proxy is based on the literature that investors prefer to invest in firms located closer to them (Coval and Moskowitz, 2001; Grinblatt and Keloharju, 2001; Ivkovic and Weisbenner, 2004), and on the literature that people are more strongly affected emotionally by disasters occurring nearer to where they live (Schlenger et al., 2002; Silver et al., 2002; Kaplanski and Levy, 2010). We find that firms headquartered nearer the epicenter had lower returns in the 12 months following the earthquake (2008.6–2009.5). After controlling for known risk factors, firms headquartered within a 500-km radius of the epicenter had significantly negative stock returns averaging over −3% per month. As the distance from the epicenter increases, negative stock returns gradually disappear. If China allowed short-selling, a trading strategy of shorting stocks headquartered within 250 km of the epicenter and buying stocks headquartered more than 1500 km from the epicenter would generate an average monthly return of 3% net of fees and taxes. In robustness checks, we find that firms headquartered nearer the epicenter do not have lower profitability or lower cash flows in the year of the earthquake. Further, we find no evidence of a return-distance relationship up to 36 months before the earthquake. Finally, we find no evidence that the positive relationship between stock returns and distance to the epicenter can be explained by systematic risk changes.

We contribute to the literature in two major ways. First, we provide evidence through a natural experiment that a large-scale natural disaster can affect investor sentiment and hence stock returns. Second, we provide evidence that the magnitude of negative stock returns is greater for firms located nearer the place of the disaster. Overall our evidence is consistent with the notion that investors located nearer the disaster experience more negative shocks to sentiment, and that investors exhibit local bias in their investment decisions.

## 2. Literature review and hypothesis development

A rapidly growing literature indicates that investor sentiment can affect investment decisions and is associated with future stock returns. For example, Saunders (1993) finds that sunshine, which is associated with upbeat mood, is positively correlated with stock returns. Kamstra et al. (2000) find that daylight saving time changes, which cause sleep desynchronosis and hence anxiety, negatively impact stock markets. Kamstra et al. (2003) further provide evidence of a link between seasonal variation of daylight (which influences human sentiment and risk tolerance) and seasonal variation in stock returns. Kaplanski and Levy (2010) find that US investors react more negatively to aviation disasters involving US airlines than those involving foreign airlines. They attribute the differential reaction to widespread local media coverage of the disasters, which increases fear and anxiety among US investors and causes them to be more pessimistic about stock prices. Hirshleifer (2001), Baker and Wurgler (2006) and Symeonidis et al. (2010) provide a review of the relevant literature.

This paper explores the impacts of the Wenchuan Earthquake on investor sentiment and stock returns in Mainland China. Baker and Wurgler (2006) define investor sentiment as a belief about future cash flows and investment risks that is not justified by the facts at hand. By virtue of its unexpectedness, extent of damages to human lives, and far-reaching effects on mass psychology, especially for people living near the affected area, we expect the Wenchuan Earthquake to generate strong negative emotions (i.e. anxieties and fear) among Chinese investors at large and cause them to be (perhaps excessively) pessimistic about the future cash flows and investment risks of firms located nearer the epicenter.[3]

[3] In a study of psychological reactions to the September 11 Terrorist Attacks, Schlenger et al. (2002) find that the prevalence of probable post-traumatic stress disorder (PTSD) was significantly higher in the New York City metropolitan area (where the attacks took place) than elsewhere in the US. They also find that direct exposure to the attacks and the amount of time spent viewing TV coverage of the attacks on September 11 are associated with PTSD symptom levels. Silver et al. (2002) find that the level of post-traumatic stress symptoms remained relatively high up to 6 months after the September 11 Terrorist Attacks, and that the psychological effects of disaster are not limited to those who experience it directly.