Journal of Banking & Finance 33 (2009) 1563–1574

Contents lists available at ScienceDirect

Journal of Banking & Finance

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

Stock market crashes, firm characteristics, and stock returns

Jia Wang [a], Gulser Meric [a,*], Zugang Liu [b], Ilhan Meric [c]

[a] Department of Accounting and Finance, Rowan University, Glassboro, NJ 08028, USA
[b] Department of Business and Economics, Penn State University, Hazleton, PA 18202, USA
[c] Department of Finance, Rider University, Lawrenceville, NJ 08648, USA

ARTICLE INFO

Article history:
Received 14 October 2008
Accepted 4 March 2009
Available online 12 March 2009

JEL classification:
G10
G12
G14

Keywords:
Stock market crash
Firm characteristics
Stock returns

ABSTRACT

A number of studies have investigated the causes and effects of stock market crashes. These studies mainly focus on the factors leading to a crash and on the volatility and co-movements of stock market indexes during and after the crash. However, how a stock market crash affects individual stocks and if stocks with different financial characteristics are affected differently in a stock market crash is an issue that has not received sufficient attention. In this paper, we study this issue by using data for eight major stock market crashes that have taken place during the December 31, 1962–December 31, 2007 period with a large sample of US firms. We use the event-study methodology and multivariate regression analysis to study the determinants of stock returns in stock market crashes.

1. Introduction

Studying stock market crashes has long been a popular research topic in finance. Arshanapalli and Doukas (1993) and others study the effects of the 1987 global stock market crash on the co-movements of national stock markets. Pan et al. (2001) and others examine the role of emerging markets on the 1997 global stock market crash. Hon et al. (2004) and others investigate the effect of the September 11, 2001 terrorist attacks on the world's stock markets. Previous studies mainly focus on the factors causing stock market crashes and on the volatility and co-movements of stock markets during and after the crashes. However, the impact of company financial characteristics on stock returns during stock market crashes has not received sufficient attention.

In the traditional capital asset pricing model (CAPM), a stock's returns are explained by its market risk (*beta*). There are many empirical tests of the CAPM conducted during normal periods. However, there are no studies that investigate if *beta* has a significant influence on stock returns in stock market crashes. Fama and French (1992, 1993) present a three-factor capital asset pricing model. They demonstrate that size and market-to-book ratio are two significant proxies for risk that can help explain asset returns better than using *beta* alone. There are many empirical studies that test the Fama–French model during normal periods. However, there are no studies that investigate if size and market-to-book ratio can affect stock returns significantly in stock market crashes.

The traditional CAPM relies on market risk and it assumes that company-specific idiosyncratic risk can be diversified away. However, Xu and Malkiel (2003) and others show that company-specific idiosyncratic risk and expected earnings growth are positively related. Amihud et al. (1990) observe that the decline in liquidity contributed significantly to the decline in stock prices in the 1987 stock market crash. Amihud (2002) finds a positive relationship between illiquidity and stock returns. The findings of these studies suggest that company-specific idiosyncratic risk factors and stock-specific illiquidity characteristics can be significant determinants of stock returns in stock market crashes.

In this paper, we study the effects of several company-specific, stock-specific, and industry-related characteristics on stock returns in eight major stock market crashes with data for a large sample of US firms using the event-study methodology and multivariate regression analysis. We find that stocks with higher betas, larger capitalization, lower levels of illiquidity, and more return volatility prior to the crash date have significantly lower returns in stock market crashes. We also find that the stocks of companies with higher debt ratios, higher levels of liquid assets, lower cash flow per share, and lower profitability tend to have lower returns in crashes. We observe a significant positive momentum effect for the cumulative stock returns earned one-week prior to the crash date in most crashes. Stocks with higher returns one-week prior

* Corresponding author. Tel.: +1 856 256 4038; fax: +1 856 256 4439.
E-mail addresses: wangji@rowan.edu (J. Wang), meric@rowan.edu (G. Meric), zxl23@psu.edu (Z. Liu), meric@rider.edu (I. Meric).

0378-4266/$ - see front matter © 2009 Elsevier B.V. All rights reserved.
doi:10.1016/j.jbankfin.2009.03.002

to the crash date tend to have higher returns on the crash day. We observe a significant negative reversal effect for the cumulative stock returns earned three months and three years prior to the crash date in most crashes. Stocks with higher returns for three months and three years prior to the crash date tend to have more losses on the crash day. We also find that high tech firms lose more value in most crashes compared with firms in other industries.

The paper is organized as follows: In Section 2, we describe our sample. In Section 3, we explain our methodology. We present our regression results in Section 4. We present some robustness tests in Section 5. In Section 6, we study the cumulative returns of high-cap firms during the three-day period after each crash. Section 7 summarizes the paper and presents our conclusions.

2. Sample characteristics

Our sample for each crash event consists of common stocks of US firms. We obtain the stock returns data from the Center for Research in Security Price (CRSP) database and the financial statements data from the Research Insight (COMPUSTAT) database. Wikipedia defines a stock market crash as a "...sudden dramatic decline of stock prices across a significant cross-section of a stock market." We study the eight most important stock market crashes that occurred during the December 31, 1962–December 31, 2007 period with a minimum one-day decrease of 5% in the daily value-weighted market index returns of stocks included in the CRSP database. The daily stock market index returns of the CRSP stocks for the December 31, 1962–December 31, 2007 period are presented in Fig. 1.

The eight stock market crashes studied in the paper and the percentage decrease in the market index in each crash are presented below:

Crash date	Decrease in the index (%)
October 19, 1987	−17.12
October 26, 1987	−8.27
January 8, 1988	−5.51
October 13, 1989	−5.31
October 27, 1997	−6.57
August 31, 1998	−6.56
April 14, 2000	−6.66
September 17, 2001	−5.01

It is interesting to note that four of the eight crashes occurred in October.

Following Fama and French (2001) and Gadarowski et al. (2007), we exclude utilities (SIC code 4900-4949) and financial firms (SIC code 6000-6999) from the sample. We exclude utilities because their financial decisions are affected by regulation and financial firms because their financial ratios are not comparable to those of industrial firms.

Firms with a share price less than $1 are not included in the sample. To reduce the chance that missing data might affect our analysis, we also require that a firm has valid CRSP stock returns data for the estimation period. Our financial statements data for each crash event are obtained from the firms' year-end financial statements for the previous year in the COMPUSTAT database. Firms with missing financial data are excluded from the sample. To reduce the effect of outliers on the regression results, all variables are winsorized at the 97.5% and 2.5% levels.

The final sample consists of 1330 firms for the October 19, 1987 event (hereafter referred to as the 1987/1 crash); 1322 firms for the October 26, 1987 event (referred to as the 1987/2 crash); 1313 firms for the January 8, 1988 event (referred to as the 1988 crash); 1369 firms for the October 13, 1989 event (referred to as the 1989 crash); 2092 firms for the October 27, 1997 event (referred to as the 1997 crash); 2167 firms for the August 31, 1998 event (referred to as the 1998 crash); 2319 firms for the April 14, 2000 event (referred to as the 2000 crash); and 2074 firms for the September 17, 2001 event (referred to as the 2001 crash).

The descriptive statistics of the variables used in the study are presented in Table 1. The mean return losses in the table are lower than the value-weighted-index losses of the crash events, implying that larger firms are generally affected more severely than smaller firms in crashes. The maximum, minimum, and standard deviation figures indicate that all variables have wide ranges of values, promising good results with regression analysis.

Empirical studies find that stock returns tend to be skewed to the right with a positive skewness coefficient during normal periods. However, our negative skewness coefficient statistics in Table 1, except the coefficient for the 2001 crash, indicate that crash stock returns are generally skewed to the left.

The descriptive statistics for all eight crashes appear to have common characteristics. The distributions of most explanatory variables, except the distributions for *BEP* and *LR*1, have positive

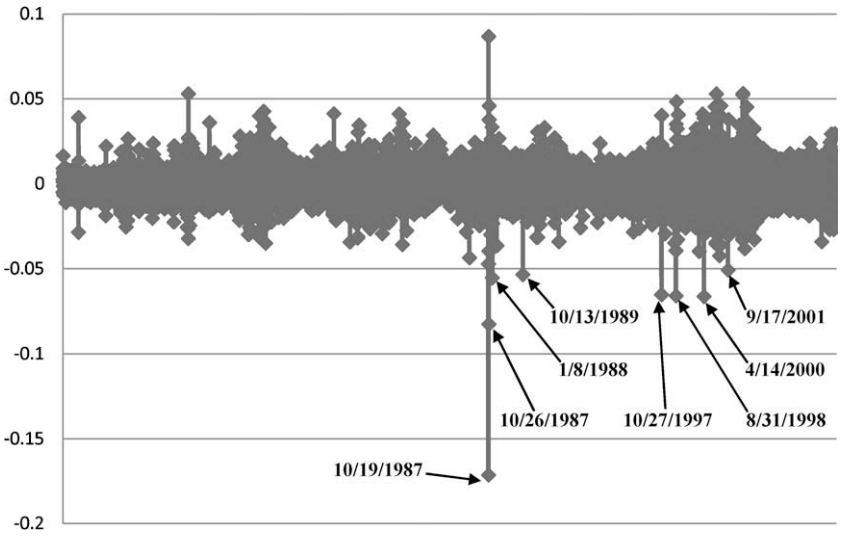

Fig. 1. Daily stock market index returns for the December 31, 1962–December 31, 2007 period.