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Determinants of stock returns: Factors or systematic co-moments? Crisis versus non-crisis periods

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ABSTRACT

In this paper we evaluate the intertemporal pricing performance of stock return determinants over the periods surrounding, and outside of, financial crises. The analysis focuses on the variables of size, book-to-market ratio, momentum, liquidity, and higher-order systematic co-moments. The evidence reveals that over non-crisis periods the market beta plays an important role in determining the cross-section of stock returns. Size, value, momentum, and liquidity also exhibit associations with the cross-section of stock returns. However, over crisis periods most of the variables we examined lose their explanatory power, suggesting that their usefulness is limited for investment purposes when financial markets experience crises. There is some evidence of coskewness pricing surrounding market crashes. Practitioners may consider coskewness over crisis periods.

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1. Introduction

Many empirical studies document strong evidence that the cross-section of expected stock returns is associated with firm-specific characteristics such as market equity capitalization ("size") (Banz, 1981), book-to-market ratio ("value") (Fama and French, 1993), return momentum (Jegadeesh and Titman, 1993), and liquidity (Pastor and Stambaugh, 2003). In addition to the market beta of the capital asset pricing model (CAPM), the *SMB* and *HML* portfolios that mimic the risk dimensions of size and value become pricing factors in Fama and French's (FF) (1993) three-factor model. In the setting of multifactor models, recent research further evaluates the momentum factor *WML*, the "winner minus loser" hedge portfolio, and liquidity (see, e.g., Avramov and Chordia, 2006).

As opposed to the approach of incorporating the empirically documented pricing factors, Harvey and Siddique (2000) and Dittmar (2002) examine the role of coskewness and cokurtosis, respectively, in the U.S. stock markets.[2] Furthermore, Chung, Johnson and Schill (2006) provide empirical evidence to suggest that both the *SMB* and *HML* factors proxy for higher-order systematic co-moments. Harvey and Siddique (2000) compare portfolio characteristics and suggest an association between skewness and momentum returns.

There has been extensive theoretical and empirical research on the higher-order co-moment models (Kraus and Litzenberger, 1976; Friend and Westerfield, 1980; Lim, 1989; Hung et al., 2004; Smith, 2007; Hung, 2008; Doan et al., 2010; among others). However, the literature has not examined the pricing roles of coskewness and cokurtosis as well as the empirically documented pricing factors in different phases of the financial market as dictated by the prominent phenomena of stock market crashes, bubbles, and the recent credit crunch.[3] This study aims to fill this gap and performs litmus tests to assess the performance of coskewness, cokurtosis, and the *SMB*, *HML*, *WML*, and liquidity (*LIQ*) factors in explaining the cross-section of stock returns.

The paper contributes to the literature by revealing important insights into the asset pricing roles of systematic co-moments and each of the empirical factors over different phases of the financial market. We explicitly analyze the *WML*- and *LIQ*-augmented FF models, and the four-moment CAPM that restricts investors' preferences to depend on the first four moments of returns. In addition, we estimate a model that includes the systematic co-moments together with the size, book-to-market ratio, momentum, and liquidity factors.

The analyses involve generalized least squares (GLS) estimation, which is crucial for asset pricing tests (see, Lewellen, Nagel, & Shanken, 2010). We apply the method of Shanken (1992) to correct for the errors-in-variables bias in the standard errors of coefficient estimates. Furthermore, in order to avoid the survivorship bias, the sample includes all stocks listed on the NYSE, AMEX, and NASDAQ for the period from 1926 to 2012.[4]

We examine two prominent crisis periods: (i) the stock market crash in October 1929 and the crash in October 1987; and (ii) the "dot-com bubble" and the "credit crunch". These crises have had significant impacts on the stock market and the economy. The 1929 crash was followed by the Great Recession. The 1987 crash set the largest one-day percentage loss of 22.61% ever recorded for the Dow Jones Industrial Average. The dot-com bubble was built up in the late 1990s and then was followed by the burst in the early 2000s. The credit crunch evolved from 2006 to 2008 and led to the recent global financial crisis.

The paper presents evidence that the return distributions of stock portfolios are significantly different from normal and exhibits significant market coskewness and cokurtosis (the third and fourth systematic co-moments, respectively). Over non-crisis periods the market beta plays an important role in determining the cross-section of stock returns, while in crisis periods the significance of coskewness emerges.

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[2] Other approaches in identifying systematic risk without the normality restriction include Ross's arbitrage pricing theory (1976) and the co-lower partial moments of Bawa and Lindenberg (1977).

[3] We are grateful for the referee's valuable suggestions.

[4] Some prior articles only use stocks that were continuously listed on the NYSE. For example, Kraus and Litzenberger (1976) use stocks that survived through 1926–1935. Fang and Lai (1997) use stocks that survived through 1969–1988.

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