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Are Shares More Volatile during the Global Financial Crisis?

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Abstract

This research empirically identifies price jump phenomenon of heavily traded New Zealand shares focusing on the period of GFC2008. Specifically, this paper confirms the hypothesis that the price jump behaviour does not change during the recent financial turbulence. To achieve this goal, the study uses realized trades for 10 shares and one ETF (Exchange Trade Fund) from the Yahoo Finance & NZX50 database. Data selected were from January 2008 to the end of July 2009, as the GFC2008 is generally accepted to begin with the plunge of Lehman Brothers shares on September 9, 2008. The study adopts three models to examine the price jump phenomenon. The results reveal an increasing overall volatility during the crisis; however, the null hypothesis made cannot be rejected, which means there was no change for the behaviour of price jump in the data during the financial crisis. Overall, it implies that the uncertainty among NZ stock market has increased during the crisis but the structure of the uncertainty remains the same.

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1. Introduction

The behaviour of stock prices in the financial markets is usually unpredictable even during the non-crisis period. This uncertainty means that the unpredictability of financial instruments follows a random walk in the price process. Noise movement does tamper with the price process and this is known as market volatility (Novotny, 2010).

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Nevertheless, this unpredictability can be significantly informative for investors in the financial market when the markets are working well. Hence, in this instance, it is very meaningful to capture the noise movements in the form of stock price changes (Gatheral, 2006; Abidin, Banchit, Lou & Niu, 2013). The motivation of this paper are, firstly the outcome of this research could benefit both the financial industry in New Zealand (NZ) as well as enhance the research area pertaining to the behaviour of extreme noise movements of heavily trading stock returns. Secondly, this paper aims to provide a deeper understanding of the market volatility in New Zealand during the recent financial crisis as this could help to minimize risks associated with future financial crises.

Previous studies have shown that financial markets reveal a striking feature of noise price movement which comprises two distinct components (Giot, Laurent & Petitjean, 2010). Regular noise, the first component represents noise that is frequent but does not bring any abrupt changes. The second component known as price jumps seldom occurs but signifies price movements. Price jumps do not fit into the description of the first noise component and thus have to be treated on their own (Merton, 1976) and sometimes can be difficult to interpret (Pan, 2002; Broadie & Jain, 2008).

The goal of this research paper is essentially to address two questions. First, it seeks to determine whether the overall market volatility in New Zealand increases when the GFC2008 occurs. Second, it aims to determine whether the behaviour of price jumps changes significantly during the recent crisis. The methods employed by Novotny (2010) and Hanousek, Kočenda and Novotny (2014) are adapted in the NZ setting by selecting 10 highly traded shares and one Exchange Traded Fund (ETF) from the NZ exchanges found in the Yahoo Finance and NZX50 database. All these shares represent important portion of the traded financial assets. The time period of data spanned from January 2008 to July 2009. It is found that the overall volatility dramatically scaled up in September 2008 when the Lehman Brothers in the United States (US) filed for Chapter 11 bankruptcy protection. In addition, the period immediately after this announcement reveals significantly higher levels of price volatility. However, the results do not show any significant changes on the ratio between the regular noise and price jump components of volatility during the crisis to draw any industry-dependent conclusions. This result is consistent with Novotny (2010) and Hanousek et al., (2014) suggesting that the individual firm's behaviour increases as well as decreases soon after an event.

2. Literature review

Previous research provides a wide range of explanations on classifying volatility. Harris (2003) discusses the volatility from the financial practitioners' viewpoint where the most important perspective is to separate the Gaussian-like component from price jumps. This separation can be seen in the first pioneering papers dealing with price jumps (Merton, 1976; Gatheral, 2006). Recently, the same point was also argued by Giot, Laurent and Petitjean (2010) on the division in the Gaussian-like component and price jumps. The motivation for this separation is purely mathematical; however, it is also meaningful as it can be exploited within the realms of financial market behaviour.

Price jumps is a phenomena of abrupt price changes over a very short time. It is related to a broad range of market occurrence that cannot be connected to the noisy Gaussian distribution. Price jumps also have the ability to signal changes in the market or a part of the market. Hence, the price jumps phenomenon may react as a proxy for these moments to study market efficiency (Fama, 1970) or information-driven trading (Cornell & Sirri, 1992; Kennedy, Sivakamur & Vetzal, 2006). Financial regulators may use this knowledge to implement the most optimal policies (Beckett & Roberts, 1990; Tinic, 1995) or estimate the performance of various financial vehicles (Heston, 1993; Bates, 1996; Scott, 1997; Gatheral, 2006). Most recently, by robustly testing the U.S. and the European markets, Novotny (2010) and Hanousek et al., (2014) found the overall volatility scaled up especially for the recent financial crisis but the structure of the volatility seems not to change much.

Two main conclusions are found on the causes of price jumps. The first argument by Bouchaud and Potters (2004) and Joulin et al. (2008) states that lack of liquidity available in the market though high volume of trading occurs or what they call relative liquidity is the main source of price jumps. In fact, they claim that the effect of news announcements will not affect the jumpiness of price jumps. While the second opinion by Lahaye, Laurent and Neely (2009) conjure that the news announcements are a significant source of price jumps. They also show a connection between macroeconomic announcements and price jumps on developed markets.

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