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主 論 文 の 要 旨

論文題目 Three Essays on Market Efficiency
(株式市場の効率性に関する研究)

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論 文 内 容 の 要 旨

This dissertation includes three essays on the efficiency of stock market. Although the efficient market hypothesis (EMH) is one of the highly studied areas in the theoretical as well as empirical finance, it is still not concluded whether market can truly be efficient. The EMH assumes that rational investors can correct mispricing of securities when market provides an opportunity for unlimited arbitrage. The EMH also conjectures that anomalous pattern in stock returns cannot last long in an efficient market. Thus, it is important to examine whether stock market indeed offers opportunity for costless arbitrage and whether anomalous pattern in stock returns exists for long. This dissertation includes three essays to examine short-sales constraints and anomalous pattern in stock returns. The first essay discusses whether short-sales constraints are really binding in the presence of a centralized lendable stocks market in Japan. The second essay discusses market conditions and momentum in Japanese stock returns and the third essay discusses market states and momentum in stock returns in Bangladesh.

Are Short-Sales Constraints Binding when there is a Centralized Lendable Securities Market? Evidence from Japan.

Frictionless short-sale is a precondition for ensuring pricing efficiency in the stock market. According to the EMH, mispricing of stock cannot exist for long in an efficient market because rational investors correct the mispricing and restore equilibrium in the market by way of arbitrage. As a result, short-sales constraints could be one of the reasons why the efficient market does not exist in most of the countries. Thus, the test of market efficiency partly depends on whether the market provides opportunity for unconstrained short-sales. Previous studies on short-sales constraints do not provide credible evidence on the actual state of short-sales constraints. The limitations of previous studies emerge from institutional features of the market and limitations of data. Most of the previous studies measured short-sales constraint indirectly by using the short interest ratio and ownership structure, which do not provide evidence on the cost of short-sales. In the recent times, D'Avolio (2002), Geczy et al. (2002), and Beneish et al. (2015) provided evidence of short-sales constraints using the cost of short-sales. However, these studies used data from few custodian banks that do not represent the whole market. The institutional feature of the market impedes the possibility to get a complete scenario of the market as well. In most of the countries of the world, short-sales are conducted by individual custodian banks that cannot provide information on actual cost of borrowing for at least three reasons. First, a complete schedule of demand for borrowing stocks and supply of lendable stocks, required to

measure actual cost of borrowing, is not possible to get (Kolasisnski et al. 2013), second, an uniform pricing of borrowing fees is absent because borrowing fees are often linked to other brokerage services (Saffi and Sigurdsson, 2011), and third, search cost is usually higher in a non-centralized market making the cost of borrowing higher (Jones and Lamont, 2002). The lack of evidence on the actual state of short-sales constraints and the presence of a centralized lendable stock market in Japan make the study on short-sales constraints important. The primary objective of this study is to examine whether the presence of a centralized lending market reduces short-sales constraints or not. We also examine the nature of recall risk and future return behavior of short-sales constrained stocks in the presence of a centralized lending market.

The sample period of our study ranges from the 12th November, 2015 to the 11th May, 2016. We included all stocks listed on the Tokyo stock exchange and JASDAQ but excluded REITs and ETFs. We collected data required to conduct our study from the Japan Securities Finance Company (JSFC) and Nikkei NEEDS. We provide new empirical evidence on the market for borrowing stocks in Japan. First, the short-sale is not generally strictly binding in Japan; the cost of borrowing is low, the demand for short-sale of stocks is also low and the institutional ownership is high. Second, a direct comparison of the cost of borrowing of stocks listed both in the Tokyo Stock Exchange and New York Stock Exchange also show that cost of borrowing in Japan is lower than that in the U.S. Third, the cost of borrowing is found to be affected largely by the demand for borrowing stocks. Fourth, large capitalization and value stocks are often

found to have higher short positions compared to the supply of lendable stocks. Fifth, recall risk, a situation when lenders recall stocks, is not observed in the centralized lending market even when the aggregate short position exceeds supply of lendable stocks. Sixth, stocks facing short-sales constraints, as measured by the high cost of borrowing and the high short interest ratio (SIR), are not found to underperform subsequently. Moreover, the regression analysis shows that the relationship between short-sales constraints and the subsequent stock returns is not significantly negative.

Market Conditions and Momentum in Japanese Stock Returns

According to the EMH, anomaly in stock return cannot last long in an efficient stock market because rational investors correct the mispricing by way of arbitrage. However, the momentum effect, a past-performance-based investment strategy, is found to be consistently significant in most stock markets of the world. Japan has always been an exception because the momentum effect has never been found in Japanese stock returns. The long-standing evidence of momentum in the major stock markets of the world and the non-existence of momentum effect in Japanese stock returns make the study of the momentum effect in Japanese stock returns important.

Jegadeesh and Titman (1993) first identified the momentum effect in the U.S. stock market by providing evidence that an investment strategy based on buying the stocks that outperformed the peers in the past and selling short the past worst performing stocks produce significant positive returns in the short to intermediate term. Since then, a large number of studies have provided evidence for, and causes of,

momentum profits across the world (Daniel and Titman, 2000; Jegadeesh and Titman, 2001; Lewellen, 2002; Lee and Swaminathan, 2000; Rouwenhorst, 1998, 1999; Griffin et al. 2003; Gutierrez and Kelley, 2008). Although the evidence of momentum effect is unanimously supported across the world, what causes the momentum effect is still inconclusive. Rational explanations attribute momentum profits to common risks and firm-specific and industry-specific factors (Conrad and Kaul, 1998; Chordia and Shivakumar, 2002, 2006; Dittmar et al. 2007; Sagi and Seasholes, 2007). Behavioral explanations, on the other hand, attribute momentum profits to investors' behavioral biases such as underreaction and overreaction to information (Barberies et al. 1998; Daniel et al. 1998; Hong and Stein, 1999). Besides rational and behavioral explanations, culture (Chui et al. 2010), cognitive dissonance (Antoniou et al. 2013), market conditions (Cooper et al. 2004; Asem and Tian, 2010), and period of portfolio formation (Novy-Marx, 2012) are found to explain momentum profits. As previous studies did not find the momentum effect in Japan using conventional methodology (Liu and Lee, 2001; Iihara et a. 2004; Chou et al. 2007), recently, several studies provided evidence of momentum profits in Japanese stock returns in market conditions that triggers investors to overreact (Iihara et al. 2016; Hanauer, 2014). However, these studies assume that investors' overreaction to information as a cause of momentum in Japan is questionable because the cultural and psychological traits of Japanese people do not support the assumption that Japanese people overreact (Kitayama et al. 1997; Chui et al. 2010). The inconsistent evidence and assumptions

used to explain momentum profits necessitates further examination of momentum profits in Japanese stock returns.

In the second essay, I examine whether momentum in Japanese stock returns based on market conditions is evident. To examine whether momentum profits exist in any particular type(s) of market state(s), I divide market states into UP and DOWN states and then again divide the UP and DOWN states on the basis of subsequent market movements. This division produces four market states, such as UP-UP, UP-DOWN, DOWN-UP, and DOWN-DOWN, of which UP-UP and DOWN-DOWN represent continuations and UP-DOWN and DOWN-UP represent market reversions. I also examine the long-term performance of momentum portfolios to determine the causes of momentum profits. On the basis of cultural and psychological traits of Japanese people, I hypothesize that momentum profits are significant in market conditions where investors tend to underreact to information. The sample period of this study ranges from November 1984 to November 2014. I used monthly equity data on all Japanese listed stocks collected from the Nikkei NEEDS database.

This study provides evidence that momentum profits are not significant when conventional methodology is used. However, significant momentum profits are found in the reverting UP market (UP-DOWN) states but momentum profits are not followed by long-term reversions. Momentum profits found in the revering UP market states are consistent with investors' under-reaction. I argue that when market conditions suddenly change from UP to DOWN states, investors appear to become cautious and

respond conservatively to new information. Investors tend to underreact because they do not find conformity of information. The reverting UP states also trigger investors' conservatism due to cognitive dissonance, which is created when their self-perception about a rising market is challenged by a sudden reversion of the market.

Market States and Momentum: Evidence from the Dhaka Stock Exchange

Emerging stock markets have increasingly been attracting attention in the global marketplace. Besides major emerging nations such as those in the BRICS, several small emerging markets, often known as the 'next 11', are also experiencing tremendous growth in the economy and stock markets. Bangladesh, one of the countries in the next 11, has also been experiencing high economic growth (Goldman Sachs, 2007). Although several studies focused on the international evidence of momentum profits (Rouwenhorst, 1998; Griffin et al. 2003; Chui et al. 2010; Iihara et al. 2004; Liu and Lee, 2001), relatively fewer studies are made on the emerging markets (Rouwenhorst, 1999; Chui et al. 2010). Studies that focused on the emerging markets usually examine large emerging countries because of the large market size and the availability of data. As a result, empirical evidence on the momentum in stock returns in relatively smaller emerging countries are still scarce.

This study examines the momentum in Bangladeshi stock returns to provide an international evidence of the momentum effect. Besides examining momentum profits, this study also finds causes of high momentum profits in Bangladesh as previously found (Chui et al. 2010). This study hypothesizes that momentum profits are

conditioned on the market states and are significant in market conditions that trigger investors' overreaction to information. When market states are divided into UP and DOWN on the basis of the past market performance, significant momentum profits are hypothesized to be evident only in the UP states. The sample period of this study ranges from January, 1999, to December, 2014.

This study finds the evidence that momentum profits are significant in the DSE listed stock returns. High momentum profits in the DSE are also found to be explained by the market states hypothesis as momentum profits are found only in the UP states. This evidence remains the same even after adjusting risks. Regression coefficients are also found to be significantly positive in the UP states and insignificant in the DOWN states indicating that momentum profits are significant in the UP states. Long term performance of momentum portfolios in the UP states is also measured and found to be significantly negative indicating that short term momentum profits in the UP states revert in the long term. However, a non-linear relationship between momentum profits and market states is found indicating that the most significant momentum profits are not produced at the top of the market performance rather found to be produced at the median market performance. Results of this study support the market states hypothesis. The long term reversion of momentum profits found in the short- to intermediate term suggests that investors' overreaction to information could be the reason of high momentum profits in the DSE.