Syed Riaz Mahmood Ali

Gambling in Stock Markets: Empirical Evidence from a Few Important Markets

Åbo Akademi
University

Syed Riaz Mahmood Ali
Born 1982 in Rajshahi, Bangladesh

Previous studies and degrees
  MA in Economics, Central Michigan University, MI, USA
  MBA in Finance and Banking, University of Rajshahi, Rajshahi, Bangladesh

Gambling in Stock Markets: Empirical Evidence from a Few Important Markets

Syed Riaz Mahmood Ali

Supervisor   **Ralf Östermark**
Professor, accounting, especially financial accounting and optimization systems,
Department of Accounting,
Åbo Akademi University,
Åbo, Finland

Second Supervisor   **Jussi Nikkinen**
Professor, School of Accounting and Finance,
University of Vaasa,
Vaasa, Finland

Dedicated to my parents
Md. Mobasser Ali and Sultana Akhter

Acknowledgment

Starting the Ph.D. was not that easy for me, but in the course of time, it becomes achievable and pleasant. Carrying out this long and hectic task would not be possible without the support of a few excellent and supportive individuals, and in this section, I would like to acknowledge them for their contribution and effort. At first, I want to thank my Supervisor, Professor Ralf Östermark, for his generous and kind support from the very beginning of this program. He is the man who continuously provides motivation and encouraging comments throughout the whole program. He always stays in touch and guides me when I lost my path. For all this great and splendid contribution, I would always remain deeply indebted to Professor Ralf, and this acknowledgment would never be enough.

Additionally, I would like to address the support of my second supervisor Professor Jussi Nikkinen, head of our department Professor Matti Skoog and the Dean, Professor Marko Joas, in the whole process. Apart from that, the contribution of my two coauthors Shaker Ahmed and Mohammad Nurul Hasan deserves special recognition. Even before starting this program, Mr. Shaker and Mr. Hasan encourage me to enter this kind of program and help me in the application process. They always remain on my side when I need any assistance. My direct teacher and colleague, Dr. Arifur Rahman, also provides his generous support and advice during the topic selection and later in the Ph.D. thesis preparation. I also like to address the service of our Research Coordinator Johanna Hedenborg and Study Counselors Tuija-Liisa Pohja in my Ph.D. program.

Finally, most significantly, my parents were always on my side by giving their relentless love, affection, and inspiration. They are the individuals who implanted the value of education and ethics. They did everything within their capacity to offer a high quality of childhood and upbringings. Among other family and friends, I like to specially address the contribution and sacrifice of my wife Samima, my sister Mahjabeen as well as my father and mothers-in-law. They had to give many efforts and had to face suffering for my persistent work with this Ph.D. program. I also like to thanks all of the friends (I may not mention everyone's name here, but they are always in my mind), my uncles and aunts, my cousins, brothers, sisters, nephews, and nieces who were always keep me happy and fresh by their love and time during these painstaking periods.

Turku, March 2021
Syed Riaz Mahmood Ali

Abstract

This thesis is mostly related to the speculative investment nature of market participants of a few stock markets over the world. Evidence shows that investors are poorly diversified, and they have a preference for lottery-type stocks,i.e., stocks that have a relatively low probability of very high return. Both portfolio level and firm-level cross-sectional analysis have been used in all articles to find our different kinds of relations between variables. Hence this thesis is empirical research focusing on speculative investors who are not fully diversified and responsible for overpricing or underpricing of assets due to varieties of biases.

The risk aversion of investors is the most basic proposition in standard financial theory. However, an understanding of investment behavior remains incomplete when a risk-seeking attitude rooted in the minds of investors is completely ignored from the consideration. In recent years, researchers in finance have increasingly focused on the impacts of speculative stock market issues. While pre-emerging frontier stock markets denote an ideal setting for testing many of the hypothesized effects of speculative investment activities, given their data-constrained environment, little research has been undertaken in the context of these markets. This research aims to contribute to this void by investigating the propensity of some major stock market investors to invest in stocks with lottery-type payoffs – stocks with a very small probability of generating very high returns, and its asset pricing implications.

Some recent theoretical developments suggest that investors' errors in probability weighting of events might cause them to overvalue stocks that have a small chance of a large positive return. Since investors tend to pay more for stocks that show extreme positive returns, these stocks exhibit lesser returns in the future. With the recent evidence of investors' inclination towards the stocks with lottery-type payoffs documented on the U.S. and European stock markets, we will investigate the existence and preferences for stocks that appear to be like lotteries in few other major stock markets. Across major markets, lottery-type stocks, identified by highly skewed with huge idiosyncratic volatility and low price, underperform and exhibit a *"lottery premium."* Furthermore, lottery-type stocks can help to explore the puzzling relationship between past idiosyncratic volatility and returns.

Abstrakt

Denna avhandling är mest relaterad till den spekulativa investeringen hos marknadsaktörer på några få aktiemarknader över hela världen. Bevis visar att investerare är dåligt diversifierade och att de föredrar aktier av lotterityp, dvs. aktier som har en relativt låg sannolikhet för mycket hög avkastning. Både portföljnivå och tvärsnittsanalys på företagsnivå har använts i alla artiklar för att hitta våra olika typer av relationer mellan variabler. Därför är denna avhandling empirisk forskning med fokus på spekulativa investerare som inte är helt diversifierade och ansvariga för överprissättning eller underprissättning av tillgångar på grund av olika partiskhet.

Investerarnas riskaversion är det mest grundläggande förslaget i standard finansiell teori. En förståelse för investeringsbeteende förblir emellertid ofullständig när risksökande attityd rotad i investerarnas sinnen ignoreras helt från övervägandena. Under de senaste åren har finansforskare i allt högre grad fokuserat på effekterna av spekulativa aktiemarknadsfrågor. Medan de framväxande gränsmarknadsaktierna betecknar en idealisk inställning för att testa många av de hypoteser som effekterna av spekulativa investeringsaktiviteter medför, med tanke på deras data-begränsade miljö, har lite forskning gjorts i samband med dessa marknader. Denna forskning syftar till att bidra till detta tomrum genom att undersöka benägenheten hos vissa större aktiemarknadsinvesterare att investera i aktier med utdelningar av lotterityp - aktier med mycket liten sannolikhet att generera mycket hög avkastning och dess konsekvenser för tillgångsprissättning.

Några av de senaste teoretiska utvecklingen tyder på att investerarnas fel i sannolikhetsviktning av händelser kan få dem att övervärdera aktier som har en liten chans att få en stor positiv avkastning. Eftersom investerare tenderar att betala mer för aktier som visar extremt positiv avkastning uppvisar dessa aktier mindre avkastning i framtiden. De senaste bevisen för investerarnas benägenhet mot aktierna med lotterityper som dokumenterats på de amerikanska och europeiska aktiemarknaderna kommer vi att undersöka förekomsten och preferenser för aktier som verkar vara som lotterier på få andra stora aktiemarknader. Över större marknader är aktier av lotterityp, identifierade av mycket snedställda med enorm idiosynkratisk volatilitet och lågt pris, underpresterande och uppvisar en "lotteripremie". Dessutom kan lager av lotterityper hjälpa till att utforska det förbryllande förhållandet mellan tidigare idiosynkratisk volatilitet och avkastning.

List of abbreviations

IVOL= Idiosyncratic Volatiliy

MAX= Maximum daily return over a month

MIN= Minimum daily return over a month

MOM= Momentum

REV= Reversal

SKEW= Skewness

OLS= Ordinary least squares

GLS= Generalized least squares

CAPM= Capital Asset Pricing Model

Key Words: Extreme Return, Idiosyncratic Volatiliy, MAX effect, Stock Market, Asset Pricing

Contents

Appendix: Original publications

1. Introduction

Five essays of this thesis try to explore the speculative tendency of market participants, especially in a few emerging and small integrated developed markets. Bali, Cakici, and Whitelaw (2011) show that extreme positive returns can predict a future return in the U.S. stock market. They establish a solid negative MAX (maximum daily return over a month) and subsequent return relationship in the U.S. market by using both portfolio and firm-level analysis. They indicate that investors have a preference over lottery-type stocks and irrationally overprice those stocks, which generate an extreme positive payoff. However, in this research, I show that in the Indian and Singapore market, investors underprice the MAX and high IVOL stocks meaning that these two markets have a positive MAX effect, which is in line with Canadian Market (Aboulamer et al. 2016). On the other hand, the Finnish and Turkish markets show a negative and significant MAX and IVOL effect in line with the U.S., European and Chinese markets. I also show that the Singapore stocks market has a positive momentum effect and no short-run reversal.

Since in the real market setting, investors are not always fully diversified, the issue of idiosyncratic volatility (IVOL) becomes relevant. Hence in the recent literature, researchers are giving considerable attention to the IVOL-return relationship in the cross-section. Initially, Ang et al. (2006) show the negative and significant relationship between idiosyncratic volatility and expected return in the U.S. with 22 other different advanced markets. However, conventional asset pricing theories advocate a positive risk-return relationship because they assumed that investors are rational and fully diversified. This kind of puzzling contradictory evidence and theories demand more research in this particular area. In our research, we also intend to reveal the puzzling IVOL effect and whether it can overpower the impact of the MAX effect in different market settings.

To debunk this puzzling MAX-IVOL and return relationship, exploring the nature of investor's investment behavior is important. Friedman and Savage (1948) indicate that people invest both insurance (for risk reduction) and lottery tickets (which increase risk) together, which is not consistent with rational behavior and standard risk preference mean-variance relation. For the same reason, investors overprice or underprice stocks due to high MAX or the presence of high IVOL. Aabo et al. (2017) argue that IVOL also an indicator of noise trading. They show that the absolute idiosyncratic volatility exhibits a positive and significant relationship to mispricing, meaning that high IVOL induces noise trading in the stock market. In this research, the results are also somewhat puzzling. We find a Positive IVOL-MAX effect in two markets and a Negative IVOL-MAX effect in the other two markets.

The classic portfolio theory of Markowitz (1952a) indicates that investors are mean-variance optimizers and invest only in fully diversified portfolios. Depends on this basic principle, the conventional asset pricing theory such as the Capital Asset Pricing Model (CAPM) of Sharp (1964), Lintner (1965), and Mossin (1966), proposes that expected returns on individual stocks include a risk premium for

the only systematic component of variance risk – the part of overall variation of stock returns which is described by the deviation of returns on the market portfolio. In this setting, the remaining part of variance risk, which is generally referred to as the firm-specific or idiosyncratic risk, is presumed to be diversified away by the rational investors and, therefore, should not command any risk premium. Although the modern financial theory is built on the premise that investors are always risk-averse and hence diversify, this assumed investor behavior does not accord well with the observed investor attitude under actual market situations. For certain exogenous motives such as transaction costs, imperfect information, liquidity requirements, and various institutional constraints, *viz.*, restricted shareholding, and short sales restrictions, some investors might fail to diversify in the manner recommended by the financial theory (see, Odean, 1999 and Goetzmann and Kumar, 2008 for empirical evidence).

In addition, there is also some indication that investors have a preference for lottery-like assets – the ones that have a relatively small probability of a large payoff. Indeed, ruling out the risk-seeking attitude of individuals from standard financial theory is much easier than ruling it out from their behavior. Decades earlier, Friedman and Savage (1948) note that risk aversion and risk-seeking share roles in our behavior – people who purchase insurance plans often buy lottery tickets as well. Acknowledging the potential role of risk-seeking behavior in investment decision making, Markowitz himself, in a separate paper (1952b), posits that some investors prefer to take large chances of a small loss for a small chance of a large gain. Recently, Barberis and Huang (2008) model the cumulative prospect theory (Tversky and Kahneman, 1992) and show that investors' errors in probability weighting of events might cause them to overvalue stocks that have a small chance of a large positive return. Since investors tend to pay more for stocks that show extreme positive returns, these stocks demonstrate lower returns in the future. Consistent with these theoretical predictions, Bali et al. (2011) document a persistent and significant lottery premium in the U.S. stock market. In this thesis, we also show that in the Turkish and Finnish markets, the MAX effect is negative and significant.

The aim of this research is to show that in addition to risk aversion, we may also find risk-seeking behavior in stock markets. The empirical analysis will give us an idea that many emerging and frontier market participants tend to overprice or underprice the stock value. Human attitudes toward gambling can be traced back to prehistoric societies. There are many psychological and socioeconomic reasons that fix our inclination to risk and gamble. Too much optimism and aggressive thinking about own returns, the excess hope of higher than actual wealth, and avoidance of attention towards danger and regret are some of the factors that can explain risk-seeking behavior. Friedman and Savage (1948) explained the lottery puzzle: though people understand what the risk is, they might take it to separate themselves; it can be the only way for them to develop their economic condition. Inclination towards high-MAX stocks by

overpricing those is also an indication of investor's risk-seeking attitude and preference for lottery-like stocks.

Since the traditional financial models cannot establish the course of financial asset pricing, nowadays, many researchers have initiated to detect the behavior of investors. This thesis also would like to explore the intensity of investor emotion-affects stock prices in a few important markets. This kind of study would play a substantial role in figuring out the reasons behind the stock market crashes. Researchers have long puzzled over consumers' concurrent demand for (risk-reducing) insurance and (risk-increasing) lottery tickets (Friedman and Savage 1948). Given such demand, it would appear that both selling insurance and selling lottery tickets might make long-run rewards. These patterns appear inconsistent with rational behavior and standard risk preferences in a mean-variance world. The stocks that have high volatility may assist the mispricing effect. These stocks tend to be overvalued or undervalued and, therefore, open to arbitrage. In this regard, a characteristic of lottery stocks is the idiosyncratic volatility, which is needed to be addressed.

The probability that some members in financial markets perform irrationally has appeared in the finance literature since the time of Keynes (1936). The proposition that these "noise traders" can have an impact on asset prices has been frequently disputed. However, numerous recent articles demonstrate the conditions under which rational arbitrageurs do not abolish sentimental mispricing. The inclination towards gambling is deeply rooted in the human spirit. This plea with games of chance can be traced back at least a few centuries. A complicated set of psychological, biological, religious, and socioeconomic reasons mutually controls an individual's tendency to gamble (e.g., France (1902), Brenner (1983), Walker (1992)). In this study. According to Kumar (2009), despite its intuitive charm, it has been challenging to find out direct evidence of gambling-motivated investment choices for at least two causes. First, people's gambling inclinations (preference for lottery-like stocks) and portfolio choices are not directly detected. Second, an exact and well-established definition of stocks that might be professed as instruments for gambling does not exist. In this whole thesis, we try to find the investor's tendency of overpricing or underpricing stocks associated with high MAX and IVOL in a few emerging and small integrated developed markets.

1.1. List of original publications

i)   Ali, S. R.M., Hasan, M. N., & Östermark, R. (2020). Are idiosyncratic risk and extreme positive return priced in the Indian equity market?. *International Review of Economics & Finance*, *70*, 530–545.

ii)   Ali, S. R.M., Rahman, M. A., Hasan, M. N., & Östermark, R. (2020). Positive IVOL-MAX effect: A study on the Singapore Stock Market. *The North American Journal of Economics and Finance*, *54*, 101245.

iii)   Ali, S. R.M., Ahmed, S., & Östermark, R. (2020). Extreme returns and the investor's expectation for future volatility: Evidence from the Finnish stock market. *The Quarterly Review of Economics and Finance*, *76*, 260–269.

iv)   Ali, S. R. M., Ahmed, S., Hasan, M. N., & Östermark, R. (2021). Predictability of extreme returns in the Turkish stock market. *Emerging Markets Finance and Trade*, *57*(2), 482–494.

v)   Ali, S. R.M. (2020). Do momentum and reversal matter in the Singapore stock market?. *Asia-Pacific Journal of Accounting & Economics,* 1–17.

Contributions by the author: Conceptualization, writing-original draft, coding, validation, formal analysis, data curation, review & editing.

2. The rationale for the study

Investigating investors' speculative behavior in general and preference for lottery-like payoffs, in particular, is important as it may help resolve some of the well-documented asset pricing anomalies that standard financial theory cannot capture (Statman, 2002; Bali et al. 2011). For example, both IPOs and private equities typically earn low average returns than those suggested by standard asset pricing theory. It could be the case that these assets have highly positively skewed returns (lottery-life payoffs) and are overpriced by the investors. In addition, this type of analysis has special relevance in the context of frontier stock markets for at least a couple of reasons. First, comparing aggregate stock preferences of individual and institutional investors in the US, Kumar (2009) finds that, similar to state lotteries, lottery-like stocks are more attractive to a relatively less sophisticated individual investor clientele, whereas institutions tend to show a relative aversion for those stocks. In addition, he identifies that those who are poor, young, less educated single men who live in urban areas, undertake non-professional jobs, and belong to a specific minority group invest more in lottery-like stocks. Since the majority of emerging stock markets are driven predominantly by less sophisticated and information-constrained individual retail investors, they are not unlikely to exhibit a strong preference for stocks with lottery features. For example, Morck at el. (2000) mentioned that emerging markets have synchronous stock price movements, and the systematic component of returns variation is big in emerging markets, which is consistent with noise trader risk. Given the demography of the many emerging countries, one cannot rule out a priori that the retail investor clientele does not significantly share the socioeconomic profile of the U.S. investors who are usually attracted to lottery-like stocks. Second, unlike well-developed stock markets and many emerging ones, arbitrage opportunities for rational investors are extremely limited in many emerging stock markets. It operates under a complete short sale ban, and there is no derivative market for arbitrageurs to create necessary artificial positions to correct the mispricing induced by the aggregate demand of the investors with a preference for lottery-type stocks.

3. Methodology

Two widely accepted methodologies are used in all five essays in this thesis. One is the portfolio approach, and the other one is Fama-Macbeth (1973) regression framework. In the portfolio approach, any functional form is not used; hence this approach has the advantage of being non-parametric. In order to establish and characterize the presence of lottery premium, I mainly use Fama-Macbeth (1973) regression framework. This approach is widely used in finance literature. Fama-MacBeth (1973) is a two-pass regression model wherein the first stage we estimate beta by time series.

$$R_t = a + BF_t + e_t$$

The second stage involves a cross-sectional regression of each time period of return by estimated beta from previous time series regression.

$$R_t = \lambda_{0t} + \lambda_t \hat{B}_t + e_t$$

The variable of interest among F_t is extreme return in month t, which is defined as the maximum daily return within the previous month. A negative and significant coefficient on this variable indicates the presence of a lottery premium. Also include other stock characteristics that are found in the literature to have an effect on expected returns as control variables, *viz.*, the market beta, the market capitalization, the book-to-market ratio, the return in the previous month (to capture short-term reversal effect), the return over the past 11 months (to capture momentum effect), a measure of stock liquidity, stock's idiosyncratic volatility and idiosyncratic skewness. The second stage regression can be run using OLS, GLS (Shanken 1985ab), or WLS (Litzenberger and Ramaswamy 1979)

The rationale for using the Fama–Macbeth framework is that here we first estimate the average coefficients by using time series regression, and then we use cross-sectional regression with those estimated betas. There are several advantages (see Goyal 2012) of the Fama–MacBeth approach. First, it can easily handle panel data that are not balanced. In addition, the distribution of the risk premium estimates does not depend on the number of stocks, which may vary from time to time. Second, even though we use constant betas, this framework is flexible to allow for time-varying betas. Third, it may be a possibility that autocorrelation in returns leads to autocorrelation problems in risk premium estimates. This is easily considered by Newey–West (1987) kind corrections to variance formulas.

Intuitively, CAPM offers a very powerful prediction of expected return as well as a good risk management technique. However, in the empirical test, the performance of this model is very poor. For example, the empirical work of Black, Jensen, and Scholes (1972), where they used the CAPM approach to find out the beta, was criticized in the sense that one factor is not enough for describing expected return sufficiently. For an adequate description of expected return, consideration of more factors is mandatory. Moreover, the oversimplification of assumptions associated with the CAPM approach demonstrated by Fama and

French (2004) is another problem of this model. That is why the uni-factor asset pricing model is no longer a reliable framework for modern researchers. Instead, they prefer multi-factor models with many explanatory variables that are perceived as more realistic and accurate.

Nowadays, idiosyncratic risk is one of the widely used topics among research communities. An increasing trend of using idiosyncratic volatility as a major risk factor in recent papers is documented by Campbell et al. (2001). Moreover, according to them, idiosyncratic volatility is the major cause of total volatility. That means idiosyncratic risk is the major risk factor for those investors who hold under diversified portfolios. Elements of declining idiosyncratic volatility from the late 90's traced by Brandt et al. (2010). They mentioned that the increasing trend of idiosyncratic volatility from 1962 to 1997 is not a time trend rather provoked by the speculative nature of trading among retail investors.

Measurement of coefficients of factors to explain expected return has been proposed by a number of other different approaches. Among them, the most frequent approach that has been used over the past 40 years is to estimate betas based on a rolling beta method of monthly observations, as in Fama-MacBeth (1973). Beta Coefficients can be measured by many other approaches like Shanken (1990), Ferson et al. (1999). Another approach, used by Andersen et al. (2005), Ghysels and Jacquier (2006), Lewellen and Nagel (2006), and Hooper, Ng, and Reeves (2008) where the introduced high-frequency data to measure realized beta

Fama-MacBeth (1973) framework was a methodological revolution. Since its inception, this is one of the successful techniques used by modern researchers. To test the CAPM, a regression on security or portfolio returns (the explained variable) on their betas (the explanatory variable) is necessary. However, this beta is estimated with errors, and this can be mitigated easily by Newey-West (1987) standard error correction methods.

4. Data and sample

The dataset includes the associated stock market's stock-related data from different time periods, mainly from Compustat and Thomson Reuters Datastream. The sample periods are chosen to obtain data of a cross-section of stocks. To alleviate potential survivorship bias in the results, all dead and delisted common stocks are included in the samples.

In the Indian market paper, we use the daily data for all firms available on the Indian stock exchange from January 1990 to July 2018. We get the data comprising 4616 firms from the Compustat database. In two Singapore Market papers, we use similar daily data for all firms available on the Singapore stock exchange from January 1990 to December 2017. The data comprising 986 firms (all available active and dead securities) is downloaded from the Compustat database. The book to market ratio is not used in this paper as a control since the book value is not available for all firms. In the Finnish market paper, we collect daily return and market value data from Datastream for all available stocks listed in the Helsinki Stock Exchange for the period from January 1999 to December 2018. The starting of our sample period corresponds to the year Euro was introduced as the official currency in Finland, three years before the introduction of Euro banknotes and coins on January 1, 2002. For the entire sample period, 1999–2018, we have, on average, 143 stocks per year with a minimum and a maximum number of 131 and 158 stocks per year, respectively. In the Turkish Market paper, our sample includes daily stock price data of all active equities (an average of 246 firms each year) listed in Borsa Istanbul denominated in local currency for the period from January 2007 to January 2017. We start our sample from 2007 because we want to check the effect of extreme returns for the most recent periods. We conduct a subsample analysis for the period from January 2010 to January 2017 to eliminate the impact of the financial crisis of 2008. We use the BIST 100 return index as a market return, and the risk-free rate is the 10-year government bond rate (downloaded from yahoo finance). All other data is downloaded from the Datastream database. In all papers, and the monthly Fama-French (1993) factor from the Dartmouth webpage.

5. Summary of the results of five essays

The results of five essays provide speculative investment nature of market participants of two big emerging markets (India and Turkey) and two small-integrated (Singapore and Finland) markets. Results indicate that investors are not properly diversified and possess a tendency to overvalue or undervalue stocks. In the Indian market, the results are quite interesting, and we show that both IVOL and MAX have significantly positive and persistent effects in this market, which is in line with the Canadian and Singapore market (See Aboulamer et al. 2016, Ali et a. 2020). Though most of the other major markets have Negative MAX effects like the U.S., European and Chinese markets. In subsamples, we document that small firms have positive IVOL and MAX effects in the Indian market. Moreover, after including all the controls, in contrast to the finding of Bali et al. (2011), the IVOL and MAX effects are significantly negative for the large firms in this market, implying the investors' response to IVOL and MAX with the perception of low growth prospects of large firms.

In the Singapore market, the highly volatile stocks are also generating better returns in the subsequent month, which means there is a positive and significant relationship exists between the stock's idiosyncratic volatility (IVOL) and its subsequent month's return in the Singapore market. I the case of small market-statistic firms, this positive IVOL effect is stronger than the Large capital firms. In addition, this paper shows that the IVOL is the true effect of this market rather than MAX. In the Singapore market, we see that both IVOL_CAPM and IVOL_FF survive after the inclusion of MAX and MIN as control. Moreover, the positive MAX effect vanished when we put IVOL as control, meaning that the results are still puzzling: IVOL remains significantly positive, while MAX turns from a positive to its common negative effect. Apart from the IVOL_MAX effect, in this thesis, I include another article where I show the existence of positive momentum return in the short run but no subsequent price reversal. Rather, price momentum lasts in the long run. It also validates that momentum profit is higher for the small and highly volatile firms rather than the large stable firms. Both portfolio level and firm-level cross-sectional analyses are used to show the relationships.

Just like other major markets, the MAX effect is negative and significant in the Turkish equity market, meaning that extreme return (high MAX) generating stocks show lower performance in the next month in this market. More clearly, there is a strong negative relationship between the firm's maximum (MAX) daily returns over the previous month and its succeeding stock returns. In the Finnish stock market, the MAX effect is also in line with the Turkish market, but months associated with the investor's high expectation for future volatility are accompanying by low MAX effect in this market, meaning that the MAX effect is smaller during high VIX periods when the expectation for future volatility is high. This result is consistent with prior literature, where they show that high sentiment states (low VIX periods) are associated with the very high MAX effect.

6. Conclusion

High IVOL_MAX stocks are attention-grabbing stocks that induce investors to overprice or underprice assets from their true value. Hence this topic is an issue of huge debate over the last few decades, and still, this is a puzzling matter where more research is important. In this thesis, we find a statistically significant relation between lagged IVOL- MAX and future returns. This relation is positive for two markets and negative for the other two markets in this thesis, which indicates the diversified responses of market participants in different market settings. We use stock market data from four different countries to find out the asset pricing anomalies and investors' tendency to mispricing. In the Indian market, both IVOL and MAX have significantly positive and persistent effects on expected returns, meaning that investors have an overall tendency to underprice the securities. We find a similar pattern of mispricing in the Singapore market. We also detect a positive momentum effect and no subsequent price reversal in the Singapore market in another article. However, in the Turkish and Finnish markets, we find a negative and significant max effect, which is in line with other major markets like the U.S., China, and European markets as a whole. In the Turkish market, we show that extreme return (high MAX) generating stocks show lower performance in the next month. More explicitly, there is a strong negative relationship between the firm's maximum (MAX) daily returns over the previous month and its succeeding stock returns. In the Finnish market, high fear months, i.e., months associated with the investor's high expectation for future volatility, are accompanying by the low MAX effect, implying that investors reluctant to gamble in high MAX stocks when they have high expectations for future volatility.

7. Introducing the papers

a) Are Idiosyncratic Risk and Extreme Positive Return Priced in the Indian Equity Market?

Abstract

In this paper, we examine whether the IVOL (Idiosyncratic Volatility) and MAX (Extreme Positive Return) can predict future returns in the Indian stock market where a short sale is restricted with no naked short sale allowed. We find that both IVOL and MAX have significantly positive and persistent effects on expected returns in this market. In subsamples, we document that small firms have positive IVOL and MAX effects. However, more interestingly, after including all the controls, in contrast to the finding of Bali et al. (2011), the IVOL and MAX effects are significantly negative for the large firms in this market, implying the investors' response to IVOL and MAX with the perception of low growth prospects of large firms. We use both portfolio level and firm-level Fama-Macbeth cross-sectional analysis to show the effects.

Status

b) No IVOL and MAX anomaly: A Study on Singapore Stock Market

Abstract

This paper demonstrates a positive and significant IVOL effect in the Singapore Stock Market, meaning that the highly volatile stocks are showing better returns in the subsequent month. More explicitly, there is a strong positive relationship between stock's idiosyncratic volatility (IVOL) and its subsequent month's return in the Singapore equity market. This positive IVOL effect is stronger only for small market-statistic firms. But for the Large capital firms, the positive IVOL effect is insignificant. In addition, this paper shows that the relationship between maximum daily return over a month (MAX) and the subsequent month's return is positive and significant in this market. However, IVOL is the true effect of this market rather than MAX.

Status

c) Extreme returns and the investor's expectation for future volatility: Evidence from the Finnish stock market

Abstract

We examine the significance of extreme positive returns of the previous month (MAX) as a return predictor in the Finnish stock market. We show that high fear months, i.e., months associated with the investor's high expectation for future volatility, are accompanying with low MAX effect, implying that investors reluctant to gamble in high MAX stocks when they have high expectations for future volatility.

Status

d) Predictability of Extreme Returns in the Turkish Stock Market

Abstract

In this paper, we show that extreme returns can predict future returns in the Turkish stock market. We find that extreme return (high MAX) generating stocks show lower performance in the next month in this market. More explicitly, there is a strong negative relationship between the firm's maximum (MAX) daily returns over the previous month and its succeeding stock returns. Our results are robust in both firm-level cross-sectional and portfolio-level analysis

Status

e) Do Momentum and Reversal Matter in the Singapore Stock Market?

Abstract

This paper shows the presence of positive momentum return in the short run but no subsequent price reversal in the Singapore Market. Rather price momentum continues in the long run. It also demonstrates that momentum profit is higher for the small and highly volatile firms rather than the large stable firms. Both portfolio level and firm-level cross-sectional analyses are used to show the relationships.

Status

Reference

Aabo, T., Pantzalis, C., & Park, J. C. (2017). Idiosyncratic volatility: An indicator of noise trading?. *Journal of Banking & Finance*, *75*, 136–151.

Aboulamer, A., & Kryzanowski, L. (2016). Are idiosyncratic volatility and MAX priced in the Canadian market?. *Journal of Empirical Finance*, *37*, 20–36.

Andersen, T. G., Bollerslev, T., Diebold, F. X., & Wu, J. (2005). A framework for exploring the macroeconomic determinants of systematic risk. *American Economic Review*, *95*(2), 398–404.

Bali, T.G., Cakici, N., Whitelaw, R.F.(2011). Maxing out: Stocks as lotteries and the cross-section of expected returns. *Journal of Financial Economics* 99, 427–446.

Barberis, N., Huang, M., 2008. Stocks as lotteries: The implications of probability weighting for security prices. *American Economic Review* 98, 2066–2100.

Black, F., Jensen, M. C., & Scholes, M. (1972). The capital asset pricing model: Some empirical tests. *Studies in the theory of capital markets*, *81*(3), 79–121.

Brandt, M. W., Brav, A., Graham, J. R., & Kumar, A. (2009). The idiosyncratic volatility puzzle: Time trend or speculative episodes?. *The Review of Financial Studies*, *23*(2), 863–899.

Brenner, R. (1983). History--The human gamble.

Campbell, J. Y., Lettau, M., Malkiel, B. G., & Xu, Y. (2001). Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk. *The Journal of Finance*, *56*(1), 1–43.

Fama, E.F., MacBeth, J.D., 1973. Risk, return, and equilibrium: Empirical tests, *Journal of Political Economy* 81, 607–636.

Fama, E. F., & French, K. R. (2004). The capital asset pricing model: Theory and evidence. *Journal of economic perspectives*, *18*(3), 25–46.

Ferson, W. E., & Harvey, C. R. (1999). Conditioning variables and the cross section of stock returns. *The Journal of Finance*, *54*(4), 1325–1360.

France, C. J. (1902). The gambling impulse. *The American Journal of Psychology*, *13*(3), 364–407.

Friedman, M., Savage, L.J., 1948. The utility analysis of choices involving risk, *Journal of Political Economy* 56, 279–304.

Ghysels, E., & Jacquier, E. (2006). Market beta dynamics and portfolio efficiency. *Available at SSRN 711942*.

Goetzmann, W., Kumar, A., 2008. Equity portfolio diversification. *Review of Finance* 12, 433–463.

Goyal, A. (2012). Empirical cross-sectional asset pricing: a survey. *Financial Markets and Portfolio Management*, *26*(1), 3–38.

Hooper, V. J., Ng, K., & Reeves, J. J. (2008). Quarterly beta forecasting: An evaluation. *International Journal of Forecasting*, *24*(3), 480–489.

Keynes, J. M. (1936). The general theory of employment, interest and money (1936). Kessinger Publishing.

Kumar, A. 2009. Who gambles in the stock market? *Journal of Finance* 64, 1889–1933.

Lewellen, J., & Nagel, S. (2006). The conditional CAPM does not explain asset-pricing anomalies. *Journal of financial economics*, *82*(2), 289–314.

Lintner, J., 1965. Security prices, risk, and maximal gains from diversification. *Journal of Finance* 20, 587–615.

Litzenberger, R. H., & Ramaswamy, K. (1979). The effect of personal taxes and dividends on capital asset prices: Theory and empirical evidence. *Journal of financial economics*, *7*(2), 163–195.

Markowitz, H., 1952a. Portfolio selection. *Journal of Finance* 7, 77–91.

Markowitz, H., 1952b. The utility of wealth. *Journal of Political Economy* 60, 151–158.

Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: why do emerging markets have synchronous stock price movements?. *Journal of financial economics*, *58*(1-2), 215–260.

Mossin, J., 1966. Equilibrium in a capital asset market. *Econometrica* 34, 768–783.

Newey, W.K., West, K.D.(1987) A simple, positive semi-definite heteroskedasticity and auto-correlation consistent variance–covariance matrix. *Econometrica* 55, 703–708.

Odean, T. 1999. Do investors trade too much?. *American Economic Review* 89, 1279–1298.

Sharpe, W.F., 1964. Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance* 19, 425–442.

Shanken, J. (1985a). Multivariate tests of the zero-beta CAPM. *Journal of financial economics*, *14*(3), 327–348.

Shanken, J. (1985b). Multi-beta CAPM or equilibrium-APT?: a reply. *The Journal of Finance*, *40*(4), 1189–1196.

Statman, M., 2002. Lottery players/Stock traders. *Financial Analysts Journal* 58, 14–21.

Tversky, A., Kahneman, D., 1992. Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty* 5, 297–323.

Walker, M. B. (1992). *The psychology of gambling*. Pergamon Press.