Overview on the stock exchange of mauritius finance essay

Finance

There have been widespread and extensive studies on the profitability of momentum strategies on the stock market. Many of these studies had documented that future stock returns can be predicted based on past price returns information and various research on momentum profitability had been made in its various form. The momentum strategy is believed to be in contradiction with the doctrine of the efficient market hypothesis, due to the facts that under the weak form market efficiency, excess return cannot be earned on the portfolio of stocks based on their past returns. Therefore, there are two types of trading strategies that can be used for the prediction of future stocks prices based on past readily available information namely the momentum strategies and the contrarian strategies. Momentum Strategies are believed to generate abnormal returns by buying past winners and selling past losers whereas contrarian strategies are believed to generate excess return by selling past winners and buying past losers. Debondt and Thaler (1985) were the first, to identify the contrarian trading strategy based on past returns. Through their research, they showed that over 3 to 5 years holding period, stocks that performed poorly over the previous year achieved higher returns than stocks that performed well over the same period. However, the famous study presented by Jegadeesh and Titman (1993) gain much recognition since they documented the existence of momentum effects. They showed that a self financing momentum strategy by purchasing winner stocks, that it stocks with high return in the past 6 months and selling loser stocks, that is stocks with low return in the 6 months, result in excess return of 1 % per month. They justified this momentum effect on the fact that investors tend to underreact to the

release of firm-specific information. In 2004, a new momentum strategy emerged which is different from the typical investment strategy based on past returns. George and Hwang (2004, GH henceforth) provided an interesting study, documenting that momentum profits can be generated based on the highest stock price in the previous 52 weeks. They found that buying stocks that were close to their 52 week high and selling stocks that were furthest from their 52 week high generated excess monthly return of 45%. Moreover Liu, Liu and Ma (2010), contributed to George and Hwang's study by investigating in international markets outside the United States. They document that the in a sample of 20 markets, 18 exhibit momentum profits in the 52 week momentum strategy. The 52 week high momentum is believed not to be reversed in the future when holding stocks for too long period of time and it is believed to be a better predictor of future returns rather than using past returns information. As per my research, in Mauritius no study has been conducted on the strength of the 52 week high momentum strategy on the stocks of Mauritius. Therefore, in this thesis, research developed by George and Hwang (2004) has been adopted and applied to a sample of stocks in the Stock Exchange of Mauritius.

5. 2 Objectives of this Study

Assessing the strength of the 52 week high momentum profits on a sample of stocks listed on the official market of the Stock ExchangeComparison of the 52 week high momentum strategy with the price momentum strategy of Jegadeesh and Titman (2003) to determine which of the two is a better predictor of future returns. Investigate which momentum strategy is dominated by the January Effect.

5. 3 Chapter Outline

The present chapter gives an introduction and a brief background on the momentum strategy. The main objectives of the study are also stated. Chapter Two discusses the literature review, both empirical and theoretical on the different momentum strategies and on its various forms. Chapter three gives an overview of the Stock Exchange of Mauritius and on the sectors present in the official market. Chapter Four explains the methodology adopted to calculate the winner and loser stocks for both momentum strategies. It also explains the regression analysis to be used for comparison purposes. Chapter Five presents and discusses the analysis based on the results obtained. Both portfolio analysis and regression analysis results are explained. Chapter Six will draw conclusion on the overall result obtained. It will also include some suggestions about areas for further research. Chapter 2: Literature Review

2. 1 Introduction

Momentum literally means the process of buying stocks with high returns selling stocks with low returns in the recent past so as to generate excess abnormal profits. Fama (1998) had state the momentum strategies as an ‘ open puzzle" and there is an extensive list of research of momentum profits. Nearly every academic had used multiple formations of momentum to provide empirical evidence of the prediction of stock return based on a variety of firm- specific variables and some of them had presented momentum in its various forms. Section 2. 2 discusses the empirical results obtained by various other studies and Section 2. 3 attempts to give some theoretical explanations on the momentum effects.

2. 2 Empirical Results

2. 2. 1 Individual Price Momentum

DeBondt and Thaler (1985) were the first to identify about the momentum anomalies. They reported that that past winners (losers) ultimately become losers (winners) when investing in three to five years horizon. They proceeded with their research by comparing the performance of two groups of companies classified as extreme losers and extreme winners. For each year since 1933, they formed portfolios of the best and the worst performing stocks over the previous three years and then calculated the portfolios return over the five years following portfolio formation. They showed that over 3 to 5 years holding periods, stocks that performed poorly over the previous year achieved higher returns than stocks that performed well over the same period. To be more precise they concluded that " thirty- six months after portfolio formation, the losing stocks have earned about the 25 % more than the winners, even though the latter are significantly more risky". Hence they argued that the difference in returns was due to overreaction in security prices in the sense that extreme losers become too cheap and bounce back and on the other hand extreme winners become too expensive and earn lower subsequent returns. The most celebrated study in the academic literature which documents the momentum phenomenon was by Jegadeesh and Titman (JT) (1993). They believed that the concept of buying stock with high returns (winners) and selling stock with low return (losers) exhibit momentum profits in the medium term. Jegadeesh and Titman had examined the American Stock Exchange (AMEX) for the period of 1965 to 1989, with formation and holding periods between 3 and 12 months. Then they ranked

stocks in an ascending order based on their 3 to 12 month past returns. Based on these rankings, JT had formed ten equally weighted deciles portfolios. The portfolio with the highest return was called the " winners" portfolio and the portfolio with the lowest return was called the " losers" portfolio. In each overlapping period, the strategy was to buy stocks in the winner portfolio and sell stocks in the loser portfolio with the holding period of 3 to 12 months. Hence their finding had added a new angle to the above history by proving that past winners, on an intermediate horizon of 3 to 12 months continue to outperform past losers. Empirically they found that an equally weighted portfolio stocks which finances the purchase of the 10% highest performing stocks with the short sale of the 10% worst-performing stocks, yields returns of approximately 1% per month, when using six-month formation and holding periods. Conrad and Kaul (1998) presented striking evidence suggesting that the momentum profits are attributable to the cross-sectional differences in expected returns rather than to any time-series dependence in returns. They argued that that if realized returns are strongly correlated to expected returns then past winners (losers) that have higher (lower) returns tend to yield higher (lower) expected returns in the future. They investigated stocks listed on the NYSE and AMEX from periods 1962 to 1989 in a way to make their research comparable with the one by Jegadeesh and Titman (1993). They had examined momentum strategies for which the length of the formation and the holding periods are identical; ranging between 1 week and 36 months and their selection was based on the unconditional expected returns of individual stocks and they had separate the cross-section and time-series perspectives of the returns in an

additive form. Hence with the exception of the 1 week/ 1 week strategy, they document that all other strategies are profitable up to and including the 18 month/ 18 months strategy. Thus, Conrad and Kaul confirmed the success of momentum profits on the medium horizons as documented by Jegadeesh and Titman (1993). However, empirical studies (e. g., DeBondt and Thaler, 1987; Grundy and Martin, 2001; Jegadeesh and Titman, 2001) concluded that the link between future price movements and past stock returns is unlikely to be explained by cross-sectional variation in mean stock returns and Jegadeesh and Titman(2002) showed that Conrad and Kaul's results suffer from small sample biases, and when these biases are corrected for in the tests, the variation in mean returns explains very little of the momentum profits. Grundy and Martin (1998) studied momentum profits using the Fama-French three factor risk -adjusted returns model. They investigated the NYSE and AMEX stocks over the period of 1966 to 1995 and they documented profitability of more than 1. 3 % per month using momentum strategies. However, Grundy and Martin (2001) showed that the Fama-French three-factor model cannot explain this price momentum effect. This is because given Fama and French's (1996) finding; momentum phenomenon is recalcitrant to their factor model. Momentum profits to a large extent depend on the autocovariances and cross-autocovariances of stock return and Fama-French factors help explain the cross-section of expected returns, they may not be important in determining the (cross-) autocovariances of returns. Looking at the international context, Rouwenhorst (1998) showed that momentum strategies examined by Jegadeesh and Titman (1993) are not confined to the United States market but instead it is also profitable

outside the United States. He believed that international equity markets exhibit medium term return continuation. Hence, Rouwenhorst (1998) had replicated JT by examining 12 European countries for the period 1980 to 1995 and hereby forming relative strength portfolios. Therefore, Rouwenhorst concluded that " an internationally diversified portfolio of past Winners outperformed a portfolio of past Losers by about one percent per month". His finding was that return associated with momentum strategies are very close to the return reported by JT for the U. S. market, although that t –statistics computed for European stocks are 4. 02 compared to the U. S. market t-statistic which is 3. 07. In short for the six -month/six –month strategy, European market earns 1. 16 % compared to U. S market with 0. 95 %. Moreover, Rouwenhorst concluded that momentum anomaly is present in all countries and holds for both large and small firms, although for smaller firm it is stronger than larger firm. The European evidence is very closely similar to that finding for United States by Jegadeesh and Titman and hence because of this similarity the former also document that the returns on European momentum portfolios are significantly correlated with relative strength strategies in the United States.

2. 2. 2 Industry Momentum

Moskowitz and Grinblatt (1999) evaluated industry momentum as the source of much of the momentum trading profits over intermediate investment horizons (6 to 12 months). They formed value-weighted industry portfolios and ranked stocks based on past industry returns and found that high momentum industries outperform low momentum industries in the six-months after portfolio formation. To see the extent to which the industry

return contributes to momentum profits, they had examined the performance of a " random industry" strategy. They replaced each firm in the winner and loser industries with other firms that are not in these industries, but have the same ranking period returns as the firms that they replace. The random industry portfolios have similar levels of past returns as the winner and loser industry portfolio. Thus, they concluded that that the profitability of a momentum strategy is attributable primarily to momentum in industry factors. They argued that when stocks from past winning industries are bought and stocks from past losing industries are sold, the strategy appears highly profitable after controlling for size, individual stock momentum, the cross sectional dispersion in mean returns and potential microstructure influences. Several other studies had tested the claim made by Moskowitz and Grinblatt (1999). Bacmann, Dubois, and Isakov (2001) documented profitability of momentum strategies of G-7 countries. All the G-7 countries are profitably linked to industry momentum except for Japan. They also found that the profits of momentum strategies are driven by the cross-sectional dispersion of stock indexes especially during expansion periods. Moreover Swinkels (2002) result also indicates that there industry momentum exhibit in America and Europe except in Japan. However, Griffin and Karolyi (1998) had examined the industry momentum in international asset returns for global portfolio diversification strategies by using stock listed on the Dow Jones World Stock Index and found that their result confirm the findings of Heston and Rouwenhorst (1994) that less than 4% of the variation in country index returns can be explained by their industrial

composition. Thus they fail to find the industry momentum claim by Moskowitz and Grinblatt (1999) in international markets.

2. 2. 3 Country Momentum

Country momentum can be defined as the process of buying stocks in countries that have performed well over a certain period and selling stocks in the countries that have underperformed. Richard (1997) tested the national stock market indices of 16 countries using a value weighted model. As a result, he found a momentum effect of 0. 57 per cent per month at six month horizon is statistically insignificant. Thus he concludes that " there is no evidence that loser countries are riskier that winners countries either in terms of standard deviations, covariance with the world market or other risk factors". On the other hand Chan et al (2000) and Bhojraj and Swaminathan (2001) concluded that momentum on a country levels exist. Chan et al (2000) had used Data Stream market indices and a value weighted portfolio where they found significant excess momentum return of 0. 46 per cent per month whereas Bhojraj and Swaminathan (2001) find significant excess return for sample of 38 countries they investigated. Rouwenhorst (1999) in his study examined the size effect of twenty emerging markets using equally weighted portfolios from period 1982 to 1997. Though his analysis, he concluded that an international portfolio of small stocks outperformed international portfolio of large stocks by an average of 8. 28 percent point annualized and value stock outperformed growth stock. Hence he found little evidence of country momentum.

2. 2. 4 52-Weeks High Momentum

The momentum literature recently considers an alternative momentum strategy based on the proximity of a stock's price to its 52-week high price and only a few studies examine the profitability of the 52-week high momentum trading strategy. George and Hwang (2004, GH henceforth) were the first to investigate that the ratio of a stock close' price to its 52 week high price is a good predictor of future returns. Following evidences that stock return do not follow random walk, and that return are predictable, they believed that with stock's current price, readily available as piece of information –the 52 week high price-largely explains the profits from momentum investing. Therefore to test their theory, they used the U. S stocks from 1963 to 2001, created equally weighted portfolios and ranking the stock, from one nearest to their 52 week high price to the one that were furthest away. The top thirty percent began the winner portfolio and the bottom thirty percent the loser portfolio. Hence they found that by buying stock in the winner portfolio and the selling the stocks in the loser portfolio, they were able to produce positive abnormal returns. Moreover, George and Hwang had also compared the price momentum strategies of Jegadeesh and Titman (1993) and industrial momentum of Moskowitz and Grinblatt (1999) to a strategy based on the nearness of a stock's price to its 52-week high. They found " that nearness to the 52-week high is a better predictor of future returns than are past returns, and that nearness to the 52-week high has predictive power whether or not stocks have experienced extreme past returns'. Hence, their result shows that price levels determine momentum effects more than past price returns. Marshall and Cahan (2005) had

examined the effectiveness of GH 52-week high momentum trading strategy in the Australian Market as they wanted to investigate whether this strategy persists in the stock outside United States. They tested the stock listed on the Australian Stock Exchange (ASX) based on the same holding strategy of six months with data from 1990 to 2003. Hence they had found that the 52 week high momentum strategy is very profitable on small and large stocks and on liquid and illiquid stocks. They also found that the risk adjusted returns are significant and the positive abnormal statistically significant returns are even higher than the price momentum of Jegadeesh and Titman (1993) and the industry momentum of Moskowitz and Grinblatt (1999). That is the Australian market 52 week price momentum had generated returns of 2. 14 % per month, as compared with 0. 59% and 0. 16% for the price and industry momentums, respectively. However they had used stocks in the portfolio that were approved to be short sold on Australian market and they did not examine whether the 52-week high momentum profit reverses in the long run, thus providing no test on an important implication of the behavioral models. On a more global scale, Du (2008) tested the 52 week high strategy in the international stock market indices using a sample index data of 18 developed countries that covers the period from 1969 t0 2004. Replicating the methodology of George and Hwang (2004), he proved that price levels dominate past returns in terms of predictive power than the JT (2003) when the 52wk high strategy is paired with the momentum strategy. This is consistent with the George and Hwang (2004) findings that is based on individual stocks. Therefore, when comparing the two individual strategies, Du provided empirical evidence that momentum performs better than the 52

week high strategy even after risk adjustment. However he contradicted George and Hwang 2004 by proving that the continuation of returns coexists with the eventual reversal of returns for both the momentum and 52wk high strategy. Hence he suggested that an overreaction can still occur when investors correct their initial bias. On the other hand, Ching-Hua Yu and Yen-Chih Liu (2012) is one of the few studies that had compared the different momentum strategies' performances. They had compared the 52-week high price momentum generated by George and Hwang (2004), the traditional momentum strategy of Jegadeesh and Titman (1993) and the earning momentum strategy by Chan, Jegadeesh and Lakonishok (1996) in which the latter documented that an unexpected high earning reported by a firm will outperformed an unexpected low earnings hereby resulting in price momentum. They had tested the robustness of these momentum strategies in an emerging market namely the Taiwan's stock market for the time period of 1995 to 2009. Thus they had provided empirical evidence by doing a cross sectional regression analysis introduced by Fama- Macbeth (1973) and portfolio analysis for the comparison of the three momentum strategies and hence concluding that there is significant earnings momentum up to 12 months in the Taiwan Stock Market. However the price momentum and the 52 week high momentum do not exist in the Taiwan Stock Market as these had not reached statistical significance. Moreover Liu et al (2010) also analyses the robustness of the 52 week high momentum strategy in the international stock market based on the methodology of George and Hwang (2004). He analyzed 16 markets out of which sample of data were taken in thirteen European stock markets and three in Asian stock markets. However,

the sample period for the different countries varies because they required at least 50 stocks in each month and some of the countries do not have so much stocks data available. An analysis of the 52 week high momentum as well as a comparison with the Jegadeesh and Titman (JT)' price momentum strategy was also made. As a result, they documented that the 52- week high momentum strategy is robust in the ten out of the sixteen stocks market for which nine of the European stock market showed statistically significant GH momentum profits with average monthly return of 6. 0% to 1. 0% and it also showed the presence of the JT momentum strategy. On the other hand, out of the Asian stock market, Hong Kong proved to be having the GH and JT momentum strategies, with average monthly return of 1 % and 0. 68 % respectively. Moreover, they also proved that GH and JT momentum strategies are highly correlated with correlation of 0. 75 in ten stock markets hereby denoting that both momentum strategies co- exist in the stock markets.

2. 3 Theoretical Explanations

It can be noted that there are various empirical evidences from different studies of abnormal profits using momentum profits strategies but however there is no single explanation of why momentum works. Therefore, most formal attempt to explain this predictability of stock returns utilizes findings in behavioral finance. Hong and Stein (1999) provided a seminal model of information diffusion in relation to changing pricing accuracy and hence based their explanation on the behavior of different sets of traders and how they interact with each other. They model a market populated by two types of traders: " newswatchers" and " momentum traders" which leads to

underreaction at short horizons and overreaction at long horizons. Hong and Stein (1999) assumed that newswatchers make their forecast based on actions that affect the fundamentals alone whereas momentum traders use only simple univariate models based on past price movements to forecasts future price movements. Other assumption they made is that the news is fed slowly to newswatchers allowing the market to adjust slowly to new announcements and this very adjustments made are only underreactions rather than overreactions to the new information. On the other hand, by this price movements, momentum traders react in a way which create a flurry of trading that ends with an overreaction to the announcement. George and Hwang (2004) examine the 52-week high because they believed that their models predict that traders are slow to react, or overreact to good news. They were of viewed that if a stock whose price is at or near its 52-week high is a stock for which good news has recently arrived. Hence using the 52 week as a benchmark and through their analysis, they came up by concluding that on nearness to the 52-week high price as a result of positive announcement traders will be reluctant to buy but the new information is eventually incorporated into the price creating a continuation and with a negative announcement the price are drove away from its 52-week high price as traders are initially unwilling to sell the stock at prices that are as low as the information implies. The information eventually is assimilated and the price falls. Therefore George and Huang compared this scenario to a stock that is neither close nor far from its 52-week high and stating that " at prices that are neither near nor far from the 52-week high, priors adjust more quickly and there is no pronounced predictability when information

arrives". Baberis, Shleifer and Vishny (1998) presented a research on the investor form belief. They uncovered two regularities that is the underreaction of stock prices to news such as earnings announcements, and overreaction of stock prices to a series of good or bad news. They created their one investor and one asset theory basing themselves on the study of Tversky and Kahneman (1974) on the tendency of experimental subjects to view events as typical or representative of some specific class and to ignore the laws of probability in the process. In their model, the earning of asset follow a random walk but the behavior a firm’s earnings moves between two " states" or " regimes". They were of viewed that the asset can be of 2 states; mean reverting and trend focused that is are likely to rise further after an increase. Hence, the investor observes earnings, and uses this information to update his beliefs about which state he is in. That is if the earnings increases and again increases, it shows that the stock is in trend, but if the earning increases and then decreases the investor would believe it was a mean reverting state. Hence using this theory, investors are able to predict the returns of stocks. Daniel, Hirshleifer, and Subrahmanyam (1997) also constructed a model of investor sentiment based on psychological biases namely " investors overconfidence" about the precision of private information and " biased self-attribution" – a rule by which investors essentially believe " heads I win, tails it’s chance". In other words it can be defined as the tendency of investors to attribute positive outcomes to skill and negative outcomes to bad luck. Their theory also state that investors overreact to private information signals and underreact to public information signals. Hence, these particular behaviors cause the market to overreact in

the short term and correct themselves in later periods. De Long, Shleifer, Summers and Waldman (1990a) and Shleifer and Vishny (1997) presented a research stating that arbitrage opportunities is limited because movement in investor sentiment are in part unpredictable. Hence, this leads to arbitrageurs betting against mispricing run the risk atleast in the short run and moving the prices further away from their true fundamental values. As a result " noise trader risk" can lose money in the short run and in case when arbitrageurs are risk adverse and run the risk of losing funds under management when performance is poor, the risk of deepening mispricing reduces the size of the position they take. Therefore, both papers concluded that miss pricing can exist and arbitrage fails to eliminate the mispricing completely. Moreover, they also added that investor sentiment affects security prices in equilibrium. Within the extant literature, it can be noted that there is a wide ample of evidences on the profitability of momentum strategy in most countries' stock market but only few studies on the profitability of the GH 52-week high momentum trading strategy. Therefore, the purpose of this paper will contribute to the above literature by providing a detail analysis and empirical evidence of the economic feasibility of the 52-week high momentum trading strategy. For this paper, we will examine the model developed by George and Hwang (2004) and an analysis will be made so as to know if the 52 –week high price is better predictor of future returns than the price momentum of Jegadeesh and Titman (1993). Chapter 3: Overview on the Stock Exchange of MauritiusThe Stock Exchange of Mauritius LTD (also known as the SEM) was incorporated in 1989 and had as prime objectives to ensure that there is an efficient and well regulated

securities market in Mauritius. The SEM is mainly regulated by the Securities ACT 2005 and the Financial Services Commission (FSC). Now SEM is viewed as a prominent emerging market in Africa and is a member of the World Federation of Exchanges (WFE). The Stock Exchange Market is mainly divided into two markets, namely the Official Market and the Development and Enterprise Market (DEM). The official market has 42 listed companies and DEM had 47 listed companies, all by the end of March 2013. Therefore, the Official Market is further subdivided into 3 main indices, which serves as a tool for investors to assess the performance of the market and to compare the return on specific stocks. The 3 main indices are named and described as follows. SEMDEX, which is usually, an index price of all listed shares and it take into account the share of the stock in relation to the total market capitalization. In order to be included in the SEMDEX, a company must have been incorporated and must be a resident in Mauritius, their share must be listed on the official market and only ordinary share must be included. SEMTRI, which is a total index return and serve as a tool for performance measurement of the market. To total index return take into account capital gains/losses on listed stocks and gross dividends. SEMTRI is also believed to be the best indicator of the overall performance of the market and provide investors with useful benchmark to assess market performance measurement. SEM7- which serve as a benchmark for both domestic and foreign investors to assess the performance of mainly 7 largest good potential shares on the official market. The SEM-7, in assessing the 7 best company take into accounts its average market capitalization, liquidity and invisibility criteria. Moreover, the Official Market is mainly divided into the

following sectors: Bank, Insurance and other FinanceCommerceIndustryInvestmentLeisure and HotelsSugarTransportForeignThe sectors in the official market consist of a particular market share in the official market and this is shown in the chart below in term of its percentage of total market capitalization by the end of December 2012. Chapter 4: Data and Empirical Methodology

4. 1 Introduction

This chapter has as purpose to explain in details the data collected and the methodology model that will be used in order to make the analysis of the strength of 52 week high momentum strategy possible. Section 4. 2 describes the data that have been collected and the sample size for the analysis and the subsequent section will explain the methodology that will be used for computation and the econometric model that will be used for the comparison purposes.

4. 2. Data Collection and Sample Size

In this thesis, stocks will be mainly used in order to analyze the 52 week high price momentum. However, since its establishment the number of firms listed on official market on the Stock Exchange of Mauritius had increased progressively from 5 companies in 1989 to about 42 companies by December 2012. Hence, considering the large number of companies listed on the official market, the time limitation for this thesis and the demanding excels calculations, a sample of 20 firms listed (see appendix 1A) on the official market had been chosen for the analysis and the firms chosen are mainly from the Bank and Insurance Sector, Commerce Sector, Transport

Sector and some few companies in other sectors. The stocks that are representative of the market that is those who have high market capitalization were chosen. The sample of firms is analyzed from the period of January 2006 to January 2013 and for each stocks the following information was needed; daily closing prices and the market capitalization of each individual stock and for every month within the sample period. The firms must have one year prior data to the portfolio formation in order to calculate the ratio of the nearness of the 52-week high price. Thus, daily stocks' prices from the period January 2005 to January 2013 were retrieved from the website of Associated Brokers Ltd in which the stock's prices data are readily available. Market Capitalization data was collected from the Stock Exchange of Mauritius Website and some of the high prices of stock during its previous 12 months for the ratio of the 52-week high momentum was taken from the Stock Exchange of Mauritius' Factbook and some of them had to be identified in the daily stock prices. Microsoft Excel was used to calculate the average monthly returns of stocks upon its formation of winner and loser portfolio at end of each month and to compute the p-value for the portfolio analysis. The Stata Sofware was used to calculate the coefficient and significance of the p value for the overall regression analysis.

4. 2 Model Specification

For the study of the 52 week high momentum profitability, portfolio construction of winners and losers will be made done in accordance to the methodology created by George and Hwang (2004). George and Hwang (2004) believed that based on the nearness of the 52 week high price, a better prediction of the future returns can be made rather than using past

returns and hence the closer is stocks from its 52 week high, the higher returns is expected over its holding period as compared to the stocks furthest from its 52-week high. Therefore, to create this momentum strategy as per George and Hwang (2004), stocks which are near their 52-week high price must be found and this is calculated for each stock at the end of each month using the following formula: Ratio of nearness to the 52 - week high price = Where,= closing price of the stock i at the end of month t= the highest price of the stock during its previous 12-month period (52 week high). The 52 week high period ends on the last day of the month tFrom this above ratio, at the end of month, stocks are ranked from the highest ratio to the lowest ratio, hereby denoting that stocks with the highest ratio are closest to the 52-week high price and stocks with the lowest ratio are furthest from the 52 week high price. From there, equally weighted portfolios are formed where thirty percent, which is the base percentage used by George and Hwang (2004), are assigned to the top ranked as winner portfolio and the thirty percent of the bottom ranked stocks are assigned as loser portfolio. The remaining forty percent of the stocks are assigned as the middle portfolio which is considered as stocks that are generally not invested in by traders. A zero-investment portfolio also known as the winner minus loser portfolio is then created by buying the winner portfolio and selling the loser portfolio. Similar to study of Jegadeesh and Titman (1993), the resulting zero investment portfolios are then evaluated for the subsequent k months where k are holding period which usually varies from 3 to 12 months and also a month is skipped between the ranking period and the holding period . Hence, for this study the holding period for the buy and hold for the stocks in

the portfolio is 6 months. The winner and loser portfolio returns are calculated over its holding period and then averaged. The average monthly stock returns are calculated as follows: Average monthly stock return= Where:= close price at the end of the holding period= end of month close price for a stock one month outn = Length of the holding period in month

4. 2. 1 Pairwise Comparison

In order to assess the extent to which the nearness of 52 -week high is a better momentum strategy than the price momentum strategy, a comparison will be made with celebrated methodology of Jegadeesh and Titman (1993), most commonly referred to as the JT approach. This comparison will also help to determine to what extent the sample of firms taken for the analysis exhibit strong significant GH momentum effect as compared to JT momentum effects. As per the methodology of Jegadeesh and Titman(JT) (1993), stocks will be rank to their past " J" months return, where J usually is 3, 6, 9 and 12 months. In this study, stocks will be ranked based on their past 6 months returns and then equally weighted portfolios will be created, where thirty percent that is the base percentage used by George and Hwang (2004) will be assigned to top listed stocks and will be called the winner portfolio. The other thirty percent will be assigned to the bottom stocks and will be called loser portfolio. A zero-investment will be created by buying the winner portfolio and selling the loser portfolio. The portfolio will be held for K months in which K is usually 3, 6, 9 and 12 months. For the purpose of comparison with the George and Hwang (2004)' momentum strategy, the portfolio will be held for 6 months and here also one month will be skip between the ranking period and the holding period.

The monthly returns of the stocks in its respective portfolio will be done purely on a capital appreciation basis and will be average over its holding period. Then ultimately the Winner (Loser) will be overall average of the winner (loser) portfolios at different formation period.

4. 3 Hypothesis Test for calculation in excel

The t-statistic for the Winner minus loser return is calculated in the spreadsheet itself. In this case, the null hypothesis (was assumed that the winner return is greater and equal to the loser return, and in the alternative hypothesis (is assumed the winner return is less than the loser return. This is described as below:≥ 0 < 0Where, Thus in order to calculate the t statistics, the tails and the type of test need to be specified. Therefore, in this case, it is a one tailed test and it is a type 3 test, for that the mean comes from different stocks and its variance is not the same. The p value is calculated to test whether that the alternative hypothesis is significant at 5 % level.

4. 4 Regression Analysis

Though the above pairwise comparison and portfolio analysis may give a result of the strength of the 52 week high momentum strategy compared to using price momentum, a regression approach will be used for the analytical comparison of the JT and GH strategies so as to give a more powerful and more concrete empirical evidence. The regression adopted by George and Hwang will be used and this is based on the cross- sectional regressions of Fama-Macbeth (1973). This regression analysis will enable this study to compare the GH and JT strategies while controlling the effect of stock size,

bid- ask bounce and other variables. The regression line takes in the following form:(1)Where= dependent variable; return of stock i at month tand independent variable being;= stock return’s i at month t-1 and this is to control the impact of bid-ask bounce on the coefficient estimated.= variable to control for market capitalization(= dummy variables and take the value of 1 if stock i belong to GH winner (loser) portfolio in the formation month t-j (j= 2, 3... 7), and 0 otherwise() = dummy variables and take value of 1 if stock i belong to the JT winner (loser) portfolio formation month t-j (j= 2, 3…7), and 0 otherwise. Hence from the above six cross sectional regression equation, the intercept denotes the risk-free assets and the coefficients are denoted by the following:= excess return generate from the 52 week high price momentum strategy by the winner portfolio= excess return generated from the 52-week high price momentum strategy by the loser portfolio= excess return generated from the JT price momentum strategy by the winner portfolio= excess return generated from the JT price momentum strategy by the loser portfolioHence the above augmented cross sectional regression model will be run in stata software and the coefficient estimate shall be obtained , hereby giving more accurate result about the strength of the 52-week high momentum compared to the price momentum. Chapter 5: Data Analysis and Empirical Result

5. 1 Introduction

This chapter discusses mainly findings and empirical results obtained from the regression analysis. This chapter is divided into two sections. Section 5. 2 will contain the discussion and interpretation of the portfolio analysis of

stocks and it’s performance. In Section 5. 3, the result obtained from the cross sectional regression analysis will be discussed.

5. 2 Portfolio Analysis

The GH momentum strategy is applied in a sample of stocks listed on the official market on the Stock Exchange of Mauritius, in accordance with the method of George and Hwang (2004). Therefore at the end of each month, stocks are ranked based on their current closing price to their past 52 week high price. Then a winner minus loser portfolio is created by buying winner stocks with the highest ratio and selling loser stocks. For purpose of comparison, this study also tests the JT momentum strategy based on the method of Jegadeesh and Titman (1993) where stocks are ranked based on their past 6 months returns. Then again stocks ranked on the top are bought and stocks ranked on the bottom are sold, to see if there is a momentum effects on the stocks by when buying the winner stocks and selling the loser stocks. One month is skipped between the ranking period and the holding period. There is also a rolling strategy that is as one holding period ends, another holding period starts and hence every month new portfolios are formed. The following Table, reports the average monthly return of winner, loser and winner minus loser portfolio from the period January 2006 to January 2013 for the two different trading strategies. For both investment strategies, portfolios of stocks have holding period of 6 months . The sample includes twenty prominent stocks from the official market listed on the Stock Exchange of Mauritius. The winner minus loser return’s p value is also shown in the table.

Table 2: Profit from Momentum Strategies

WinnerLoserWinner-LoserP-valueJT's Price Momentum1. 55%1. 27%0. 28%0. 41452-week High1. 37%1. 18%0. 19%0. 423Source: Author’s computationThe above table reports a zero investment portfolio where the winner portfolio are bought and the loser portfolio are sold, that is the loser return is subtracted from the winner returns. This result shows the profitability of both momentum strategies over the period January 2006 to January 2013. The two investment strategies, showed very low return, with 0. 28% and 0. 19 % for the JT’s price momentum strategy and 52-week high strategy respectively. However, the JT price momentum strategy shows higher momentum profits than that of the GH’s 52 week high momentum strategy and the momentum return are very low so as to be statistically insignificant. The p value being statistically insignificant suggests that both momentum strategies do not work in Mauritius. Table 2 again reports the average monthly return of the winner, loser and winner minus loser portfolio for the two different strategies. Panel A reports the JT’s price momentum where investment strategies is based on the past 6 months returns. Panel B reports the 52 –week high momentum, where the investment strategy is based on the ratio of current price to its highest price within the past 52 week. However, in this table the stocks in the portfolio are held for k subsequent months, where k is three, six, nine and twelve months. For each specific holding period, the average winner and loser return are shown in the second and third column respectively. The momentum profit is shown in the fourth column, with its respective p value in the fifth column. Table 3: Profit from Momentum StrategiesPanel A: JT Price MomentumHolding

periodWinnerLoserWinner-LoserP-valueK= 31. 47 %1. 24%0. 23%0. 421k= 61. 55%1. 27%0. 28%0. 363k= 91. 45%0. 57%0. 87%0. 248k= 120. 87%0. 45%0. 42%0. 375Panel B: 52 High MomentumHolding PeriodWinnerLoserWinner-LoserP-valueK= 31. 33 %1. 00%0. 33%0. 375k= 61. 37%1. 18%0. 19%0. 423k= 91. 57%0. 16%1. 41%0. 129k= 121. 42%1. 27%0. 14%0. 456Source: Author's computationIn Table 3, Panel A reports the investment strategies of JT price momentum. In every holding period, winner returns outperformed loser returns. As the holding period increases, the momentum profits generated also increases, however, with too long holding periods, such as 12 months holding period, the excess return generated decreases. Moreover, due to low returns obtained, the p value is again statistically insignificant. On the other hand, Panel B reports the investment strategies of the 52 week high price. Here also, winner return outperformed loser return, indicating positive momentum effects on the stocks chosen. Holding the stock for 9 months also generates more excess return, same as revealed by JT investing strategy and when holding the stock in the portfolio for a long period such as 12 months, it generates relatively lower return. Therefore, from the table it can be concluded that there is very little evidence to support that there is the 52 week high momentum effect on the stock listed on the stock exchange, even though all winner returns had outperformed loser returns in all holding periods mentioned. All results being statistically insignificant suggests that these investment strategies do not really exist in the stocks listed of stock exchange of Mauritius and this may be attributed to the facts that market return is greater that the portfolio of stocks based on past return or current price to their 52 week high price.

Indeed, looking from the " January effect" perspective in stock markets is believed that stocks will exhibit higher mean returns in January than any other months. Rozeff and Kinney (1976) showed in their study that small firms generate higher returns in January than any other months of the year. On the other hand, De Bondt and Thaler (1985) proved that most momentum profits are derived from the January effects and Roll (1983) attributed that January effect to be a consequence of tax loss selling, that is traders usually sell their loser stocks to realize tax loss benefits at year end. Therefore, Table 4 will show the January effects on momentum profits in the stocks sample analyzed.

Table 4: Profit to Momentum Strategies

Panel A: January Return ExcludedWinnerLoserWinner-Loserp valueJT momentum strategy1. 56%0. 77%0. 78%0. 26452 week high1. 81%1. 12%0. 69%0. 294Panel B: January OnlyWinnerLoserWinner-Loserp valueJT momentum strategy3. 44%2. 58%0. 86%0. 38952 week high2. 68%2. 66%0. 01%0. 264Source: Author’s ComputationTable 4 above shows the average monthly returns of stocks for the two momentum strategies. Panel A shows the two different momentum strategies with average monthly returns excluding January returns. Therefore, Panel A shows much higher momentum profits of 0. 78% and 0. 69 % for the JT’s momentum strategy and 52-week high momentum strategy respectively when January returns are excluded as compared to the monthly returns obtained when January returns are included (refer to Table 2). However, it can be noted that the JT momentum effect is much higher than the 52 week high momentum, as it generates higher positive return. Therefore, this result responds to the argument put

forward by Jegadeesh and Titman(1993) and Grundy Martin(2001) , on the point that strong negative January effects tend to bring down overall momentum profits. On the other hand, Panel B, reports only January Returns for the different momentum strategies. Therefore, it can be noted that the JT momentum strategy exhibit very high positive returns, even higher than the return when January return is excluded from the monthly return. This therefore, corresponds with the argument of Debont and Thaler (1984) that most momentum profits are derived from January effects. As for the 52 week high momentum strategy, with only the January return, the winner and loser return are almost identical, and thus with the net result it can be concluded that momentum profit changes very little when the January returns are excluded. Hence, from the Table 4, it can be noted that there might be positive momentum effect of the JT momentum strategy rather than the 52 week high strategy but with the result being statistically insignificant it can be concluded that the January effect do not really impacts on the stocksTable 5 shows the return correlation between the 52 week high momentum strategy and JT's momentum strategy. This correlation are Pearson calculated on the average monthly return of winner minus loser portfolio for all the months , non January months, and only January for both different investment strategies.

Table 5: Return Correlation between 52-week high momentum strategy and JT momentum strategy.

All Calendar MonthExcluding JanuaryJanuary OnlyPearsonCorrelation0. 7000. 68020. 2796Source: Author's CalculationFrom the above table, it can be noted that both JT momentum and 52 week momentum strategy have highly

positive correlation for all calendar month and non January months with 0. 700 and 0. 6802 respectively. However, the correlation between these two investment strategies is low in the January month only. The positive correlation for the all calendar month and non January months implies that if there are factors that are contributing to the momentum effects of both 52 week momentum strategy and JT momentum strategy, then these factors are more likely to be strongly correlated with each other.

5. 2. 2 Pairwise Comparison between GH and JT momentum strategy

George and Hwang (2004) documented that the JT momentum strategy does not maintain its profitability within the winner and loser groups of GH momentum whereas the 52 week high momentum strategy still maintains its profitability within the winner and loser group of JT momentum strategy, hereby indicating that the ratio of nearness to the 52 week high price is a better predictor of future returns rather than using the past returns as per Jegadeesh and Titman (1993). Table 5 tests the above argument put forward by George and Hwang (2004). Panel A in the following table shows the 52 week high momentum strategy within the winner, middle and loser group as classified by JT's momentum strategy. Panel B shows the portfolio formed by JT's momentum strategy within the winner, middle and loser group as classified by the 52 high week momentum strategy and the p value of the winner minus loser portfolio are shown in parentheses.

Table 6: Pairwise Comparison of the 52 week High and Jegadeesh and Titman's Momentum Strategies.

Panel APortfolio Classified by Jegadeesh and Titman's momentum strategyPortfolio classified by52 –Week highAverageMonthly ReturnAverage Monthly Return (excluding January)WinnerWinner1. 80%1. 81%Loser1. 59%0. 96%Winner-Loser0. 21% (0. 442)0. 86% (0. 192)MiddleWinner1. 32%1. 45%Loser0. 84%1. 23%Winner-Loser0. 48% (0. 339)0. 22% (0. 408)LoserWinner1. 03 %2. 33%Loser0. 07 %0. 18%Winner-Loser0. 95 % (0. 237)2. 15% (0. 089)Panel BPortfolio classified by 52-Week HighPortfolio classified by Jegadeesh and Titman's Momentum StrategyAverageMonthly ReturnAveragemonthly return(excluding January)WinnerWinner1. 13 %1. 22 %Loser0. 78%2. 24%Winner -Loser0. 36% (0. 376)-1. 01% (0. 211)MiddleWinner1. 54 %1. 81%Loser1. 42%1. 05%Winner-Loser0. 4% (0. 363)0. 76 % (0. 348)LoserWinner0. 72%-0. 011%Loser-0. 009 %0. 63%Winner-Loser0. 73% (0. 301)0. 62% (0. 321)Source: Author's ComputationIn the above table, Panel A reports the GH momentum strategy conditioning on the JT momentum strategy. Stocks are sorted first by the ranking of JT momentum strategy. The winner, middle and loser group are further divided into sub groups of winner and loser groups based on GH criteria. Then the GH momentum profits are measured against the JT momentum strategy. It can be noted that within the JT momentum strategy groups , winner and loser, the 52 week high strategy maintain its profitability with 0. 36 % and 0. 73 % respectively. The 52 week high momentum strategy still maintain its profitability when January returns are excluded, that is it does not account for the January effects. Momentum profits generated by the 52 week high momentum strategy within the winner and

loser portfolio of JT momentum strategy are 0. 86% and 2. 15%. On the hand, Panel B report shows the profitability of JT momentum strategy within the winner and loser groups classified by the 52 week high momentum strategy. Stocks are first sorted on the ratio of nearness of the 52 week high and the winner, middle and loser groups created are then further subdivided on the basis of the JT momentum strategy. Therefore, it can be noted that the JT momentum strategy maintains very low profitability within the winner and loser group of 52 week high momentum strategy, with 0. 36% and 0. 76 % respectively. The momentum profit generated is low compared to the profitability maintained by 52 week high momentum strategy in Panel A. Moreover, with the January effect excluded, the JT momentum strategy generates negative return of -1. 01 % and thus does not maintain its profitability within the winner groups . Low return is also generated by JT momentum strategy within the loser groups. Hence this shows that, JT momentum profitability is derived mostly from the January effects conditioning on the 52 week high momentum strategy. Therefore, from this table it can be concluded that the p value in parentheses are not statistically significant. However, with the analysis based on the excess return obtained, it can be said that the 52 week high momentum strategy can proved to be a better predictor of future returns as compared to JT’s momentum strategy in the stocks listed on the stock exchange but the strategy does not work in Mauritius.

5. 3 Regression Analysis

In order to have a better analysis and to know which one between the JH momentum strategies and 52 week momentum strategies generates more

excess return and is a better predictor of future returns, a cross sectional regression analysis by Fama Macbeth (1973) – a two step panel have been conducted in this study. The cross sectional regression is as follows: The above regression line has as independent variables , market capitalization of stocks, dummy variable of JT winner stocks, dummy variable of JT loser's stocks, dummy variable of 52 week high winner' stocks and dummy variable of 52 week high loser' stocks. The coefficients of the independent variables represent the excess returns generated by the two different momentum strategies. The following Table 6, shows the coefficient estimates obtained when running the cross sectional regression and the t-statistics shown in the table, are Newey-West adjusted standard error. For the purpose of this study, we are concerned only with the coefficient estimates and its p value. The table, report a (6, 6) strategies where, portfolio of stocks are formed from the past 6 months returns, and are held for the subsequent 6 months and the 52 week strategy is based on the current price of stock to their past 52 week high price.

Table 6: Cross Sectional Regression with (6, 6) strategies

Monthly Return from (6, 6) strategiesCoefficienttP > | t| Intercept-0. 05931-2. 090. 040-0. 1032-1. 090. 0610. 003492. 230. 0290. 006091. 520. 132-0. 0161-1. 980. 0510. 001460. 590. 5590. 005640. 720. 47552 week highwinner dummy-loser dummy0. 02219JTwinner dummy-loser dummy-0. 00418Source: Author's computationFrom table above, it can be noted that the coefficient estimates of the 52 week high momentum dummy dominates the JT's momentum strategy. The 52 week high momentum dummy generate return of0. 006 % as compared to JT momentum strategy winner with 0. 001

%. A self financing, winner minus loser strategy of 52 week high momentum generates 0. 022% per month as compared to -0. 004 % for the JT momentum strategy. Hence this table supports the argument in Table 4, that is the pairwise comparison of JT momentum strategy and 52 week high momentum strategy where the latter is found to be a better predictor of future returns. In order to assess the profitability of both momentum strategies with January return excluded, the table 7 provides the coefficient estimates of the cross sectional regression with the monthly return excluded.

Table 7: Cross sectional regression result with monthly return excluding January

Monthly Return from (6, 6) strategies (excluding January)

CoefficienttP >| t| Intercept-. 05462-1. 730. 089-. 07623-1. 300. 199. 003301. 770. 082. 005150. 740. 461-. 01798-2. 680. 009-. 00190-0. 280. 781. 001560. 220. 83052 week highwinner dummy-loser dummy0. 2313JTwinner dummy-loser dummy-0. 1988Source: Author’s ComputationFrom the above table , it can be noted that the winner coefficient and loser coefficient for the 52 week high momentum strategy do not differ much when January return are not excluded from the average monthly return (refer to table 6). The loser return of the 52 week high momentum is statistically significant which imply the January effect do impact on the loser returns. The excess return earned in the 52 momentum strategy is 0. 23 % as compared to 0. 022 % when January returns is included, hence clearly indicating that the January effect have an impact on this investment strategy . As for the JT momentum strategy, the excess return on the winner portfolio is negative with -0. 019% whereas the loser

portfolio excess return is positive with 0. 0156. Hence this result differs greatly with the result obtained from the portfolio analysis in section 5. 2 when January return is excluded. The excess return generated on this momentum strategy is -0. 1988, showing that there is no January effect on this investment strategy. However, there is no strong evidence to support the argument that the January effect does have an impact on the excess return generated on the 52 week high momentum because the p value is statistically insignificant.

5. 3. 2 Long Term Reversal

In order to know if there exists a reversal phenomenon the in the 52- week high momentum strategy and the JT momentum strategy, the cross sectional regression described above will be run but now with portfolio of stocks with holding period of 12 months . Table 8, reports monthly returns based on 12 months holding period. The JT momentum strategies was formed based on past 6 months return and held for further 12 months (6, 12) and the 52 week high strategy is based on the ratio of current price to their 52 week high.

Table 8: Cross sectional regression with (6, 12) strategies

Monthly Return from (6, 12) strategies

CoefficienttP ValueIntercept-. 10082-3. 490. 001-. 05521-1. 070. 290. 005973. 750. 000-. 01084-1. 680. 098-. 00760-1. 280. 204. 011212. 030. 046-. 00533-0. 860. 39152 week highwinner dummy-loser dummy-0. 0018JTwinner dummy-loser dummy0. 1174Source : Author’s ComputationTherefore, contrasting Table 6 and the above Table 8, it can be noted that the 52 week momentum strategy’ winner portfolio of stocks for

the 6 months holding period was 0. 006% and it decreases to -. 0. 12 % when holding period is extended to 12 months. As for the 52 week high momentum loser portfolio of stocks, it increases from -0. 02 % with holding period of 6 months, to -0. 007%. Hence, it can found that the winner stocks of the 52 week high momentum would not reversed in the long term, whereas the loser stocks would reversed slightly when the holding period is extended and the winner stock will also not maintained its profitability as it was positive with the 6 months holding period and it became negative in the 12 months holding period. As for Price momentum of JT, the winner portfolio of stocks increases from 0. 001 % with a 6 month holding period to 0. 112 % of 12 months holding period. On the other hand the loser portfolio of stocks decreases from 0. 05% of 6 months holding period to -0. 005 % of 12 months holding period. Thus, 52 week high momentum the reversal of the winner portfolio of stocks will be much stronger than that of the loser portfolio of stocks and moreover this winner portfolio of stocks within the 12 months holding period is statistically significant. The 52 week high momentum strategy and the JT momentum strategy will be now compared in term of mid-term and long -term, denoting the 6 months and 12 months holding period respectively. The self financing portfolio that is winner minus loser portfolio of the 52 week high momentum strategy generate average monthly returns of 0. 022% with a holding period of 6 months, but fell to -0. 0018 % when holding period is extended to 12 months. This result shows, the longer the holding period is, there will be no momentum effect for the 52 week high momentum strategy and also average monthly return is not statistically significant which provide no strong evidence of the reversal in the long

terms. In case of the JT momentum strategy, the winner minus loser portfolio generates average monthly return of -0. 004% within 6 months holding period but as the holding period increases to 12 months, the average monthly returns had increased drastically to 0. 1174 %. Hereby this contradicts the argument put forward in the 52 week high momentum strategy that the longer the period, there is no momentum effect. Hence in the case of the JT momentum strategy there is a long term reversal, the longer the holding period, the more there is a momentum effects. However it should be noted that the result is statistically insignificant and thus there is no strong evidence to support that there is a momentum effect on the sample of stocks taken. This p value being insignificant can be attributed to the facts that investors may be using other investment trading strategies to beat the market rather than these two investment strategies examined.