PREDICTABILITY OF HONG KONG STOCK RETURNS BY USING GEARING RATIO

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ABSTRACT

The purpose of our study is to examine the ability of the debt ratio to predict Hong Kong stock market stock returns in long run. Our test period is from Jan 1, 1999 to May 1, 2008. Sixty companies in the Hang Seng Composite Index were included in our samples for the research. We found Leverage ratios could not have been used to predict cumulative abnormal returns or buy-and-hold abnormal returns in our test period. The correlation between Leverage ratios and abnormal returns is not significant. We also found other commonly used ratios, such as price-to-earnings ratio, price-to-book ratio and market value are better indicators of abnormal returns than Leverage ratios.

Keywords: Capital Structure, Leverage, Abnormal Stock Returns, Debt Ratios

EXECUTIVE SUMMARY

The purpose of our study is to examine the ability of debt ratios to predict Hong Kong stock market stock returns in the long run. Our paper is based on the Muradoglu and Wittington (2001) study of predictability of UK stock returns.

Our samples of 60 companies are selected from 198 companies of Hang Seng Composite Index by, 1). deducting 26 companies in financial sectors, whose Leverage ratios have different interpretations from the others; 2). deducting 80 companies that were not listed before Jan. 1, 1999 for 10-year analysis; 3). deducting 3 companies that had changed the fiscal period end date during the observing periods for preventing the difference in fiscal year calculation; 4). deducting 9 companies that have important data missing or unavailable , such as annual reports; and 5). deducting 20 companies which have financial year ended other than Dec 31.

In contrast with the study on the U.K. market done by Muradoglu and Whittington in 2001, we find out that Leverage ratios could not have been used to predict cumulative abnormal returns (CAR) or buy-and-hold abnormal returns (BHAR). Based on the data we used, the correlation between Leverage Ratios and abnormal returns is not significant. The abnormal returns show random patterns to the Leverage level in the seven 3-year period and the overall sample.

We realized that other common used ratios or indicators, Price-to-Earnings ratio (P/E), Price-to-Book ratio (P/B) and Market Value (MV), have stronger power to search for abnormal returns than the Leverage ratio. All P/E, P/B, and MV are negatively correlated to the abnormal returns.

We also put the Leverage, P/E, P/B, and MV in pairs for forming investment strategies. We found out that P/B and MV are the best partners in looking for abnormal returns. Low P/B with low MV generates the highest CAR and BHAR, and high P/B with high MV generates the lowest CAR and BHAR. In order to receive higher than average abnormal returns, investors would be better to look at companies with low P/E, low P/B, and low MV. Our findings are consistent with Lam (2002). He found in his study firm size, book-to-market and earnings-price capture cross section return variation in his test period for the Hong Kong stock market. Our findings also are consistent with the Fama and French (1992, 1995, and 1996). Portfolios form based on book-to-market and the size explain return anomalies better.

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To my parents, my wife, Maggie, my son, Isaac, and my daughter, Arella.

M. N.

To my dear mother, who encourages and motivates me to pursue higher education.

K. W.

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INTRODUCTION

For years investors have been seeking for a fast and easy way to detect future abnormal earnings. Using financial ratios is one of the investment strategies. The ratios, book-to-market, price-to-earnings, size, and various others were used in the previous papers to test for their ability in predicting abnormal earnings. Some studies show the debt-to-equity ratio has the power to forecast future abnormal earnings (Muradoglu and Wittington 2001) while others have proved that the book-to-market ratio, size and market returns combined which are the best ways to explain abnormal earnings (Fama and French 1992).

The gearing ratio, also known as the Leverage ratio, is one of the most important ratios for evaluating firms' capital structure. Several studies on the gearing ratio concluded that it is a strong indicator for the abnormal returns in US and UK stock market (Bhandari1988, Muradoglu and Wittington 2001). We are interested in the gearing ratio's ability in predicting abnormal earnings in the Hong Kong stock market.

The research hypothesis in our paper is whether the abnormal stock returns in the Hong Kong stock market can be predicted through the examination of the gearing ratio. Our paper is based on the predecessors' paper by Muradoglu and Wittington (2001) *Predictability of UK Stock Returns by Using Leverage Ratios*.

We chose the Hong Kong market because it is one of the major stock markets in Asia. It has a long history, and is well regulated. Hong Kong is a gateway for foreigners to invest in China, the world's fastest growth economy.

The observing period for this research is from May 1, 1999 to April 30, 2008. The raw data starts from July 1, 1998 to September 30, 2008. The period covers 2 cycles in the market. The market hit the lowest during the Asian financial crisis in 1998, and peaked its highest during the dot com period of the year 2000. The market crashed again while the SARS attacked Hong Kong in 2003, and peaked in 2007 due to the rumour that the Chinese government would allow the people in mainland China to invest in Hong Kong stock market.

LITERATURE REVIEW

In the literature review we first go over the prior research papers on the debt-to-equity ratio and its relationship to stock abnormal earnings. We then examine the multi-factor explanations of asset pricing anomalies. Finally, we review the literature on ratio analysis on the Hong Kong stock market.

Prior Research Papers on the Debt-to-equity Ratio

In this section we look at the capital structure theory and the prior studies on this topic. Modigliani and Miller (1958) capital structure irrelevance principle states in absence of taxes, bankruptcy costs, and in a world of complete and perfect information, the value of a firm is unaffected by the firm's financing decisions. It does not matter if the firm's capital is raised by issuing stocks or selling debts. The higher return for the leveraged firm's equity is due to the risk premium associated with the Leverage. Therefore, according to their principle, the debt-to-equity ratio can not serve as the indicator for the abnormal returns. However, several studies done in the past for the US and UK markets have showed that there is a strong relationship between the debt-to-equity ratio and common stock returns.

Bhandari (1988) tested in the paper *Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidenc*e the relationship between ratios of debt-to-equity and common stock returns. His data included the two years sub-periods from 1948-1949 to

1980 –1981 for the US stock market. The number of stocks in the sample periods range from 331 to 1241, with an average of 728. Because the author used data from the COMPUSTAT database, the data excluded the stocks that no longer exist at the end of the period. The samples used in this paper are survival stocks only. The result shows that the expected common stock returns are related to the debt-to-equity ratio. The relationship is the strongest in January with the coefficient of 0.64 percent per month. The estimated overall coefficient is 0.13 percent per month. Bhandari concluded in his paper that the expected returns on common stocks are positively related to the debt/equity ratio (Bhandari 1988). Bhandari also concluded that the premium associated with the debt/equity ratio is not likely to be the risk premium.

Furthermore, Hull's 1999 paper *Leverage ratio, Industry Norms, and Stock Price Reaction: An Empirical Investigation of Stock-for-Debt Transactions* also provided proof that there is an optimal or investors' preferred capital. The paper tested the hypothesis that the firms' debt-to-equity ratios moving toward the industry average have a positive market response than the firms moving away from the industry average debt-to-equity ratio.

In the paper, Hull tested 338 samples where firms' debt-to-equity ratios are moving closer to or away from the industry average through common stock offering during 1970-1988. He collected three sets of data for each of the 338 samples, pre-DE ratio, post-DE ratio and industry average. The Pre-DE ratio is the firms' debt-to-equity ratio before the result announcement. The Post-DE ratio is derived from the firm's Pre-DE ratio adjusted

for planned changes in the stock or debt in the announcement. Lastly, the industry average is the medium DE ratio for all firms with the same Standard Industry Classification code.

Hull studied the effect of the changes in the debt-to-equity ratio in relation to the industry average on both short-term (-5 to + 5 days around the announcing date) and long-term (-220 to -2 days) cumulative abnormal returns. The short-term stock return result showed that the favourable is the "closer to" groups. The paper reported that the "closer to" group in the 3-day average announcement period have an average of 1.5% return higher than the "away from" group. He also looked at the cumulative stock return in excess market return for the period from -220 to -2 days, and found the "away from" group have a lower return than the "closer to" group.

The research result supported the hypothesis, the firms debt-to-equity ratio moving toward the industry average have a positive market response than the firms moving away from the industry average debt-to-equity ratio. The moving closer groups had a 1.5% high return than the moving away groups in the 3 days average announcement period. He further concluded that there is an optimal capital structure, and to some extent, the industry debt-to-equity norms represent the optimal debt-to-equity ratio.

Muradoglu and companies had done several research papers on the capital structure (debt-to-equity ratio) and abnormal returns. The first one in the series is the *Predictability of UK Stock Returns by Using Leverage Ratios* (Muradoglu and Whittington 2001). Their

sample included the 170 companies listed at the British FTSE-350 index returns from 1990 to 1999. The companies were ranked according to the degree of the Leverage that they had, and grouped into 10 Deciles where Decile 1 has the lowest debt-to-equity ratio and Decile 10 has the highest ratio. Their result showed that companies with low Leverage ratios had higher returns than the companies' with high Leverage ratios. In fact, the result showed "if an investor were to invest in the first Deciles and has an average debt burden of 3.4%, he would be able to earn a cumulative abnormal return of 13.7% in three years time." The authors concluded that the strategy based on the debt-to-equity ratio would have outperformed the market during the testing period.

In Muradoglu next paper, he, Bakke and Kvernes aimed at constructing a long-term investment strategy based on the gearing ratio. In addition to testing the gearing ratio and its ability to predict abnormal returns, Muradoglu, Bakke and Kvernes (2005) also conducted robustness tests on ratios, such as size, book-to-market and price-to-earnings ratios, which influence the abnormal returns. Their sample included 52 FTSE 100 listed companies, and excluded the financial companies for the period of 1991 to 2002. Their result showed that companies with low gearing ratios outperform the market in long run. Regarding the robustness tests they found out that the book-to-market ratio do not have any significant contribution to excess returns. Low gearing ratios generates excess returns regardless PE levels. However, a combination of the low gearing ratio and low PE generates the highest excess returns. With regard to the size they found out that the only portfolio which generates significantly positive excess returns was the small cap and high gearing portfolio.

Muradoglu and Sivaprasad (2006) further tested the debt-to-equity ratio and the abnormal returns in their article *Capital Structure and Firm Value: An Empirical Analysis of Abnormal Returns*. In this article, they divided their samples into different risk classes based on industry classifications. The sample included the 2637 companies listed on the London Stock exchange from 1965 to 2004. The results were consistent with the pervious studies. They found that, for the most risky classes, abnormal returns decrease with the Leverage, and firms with low Leverage ratios can earn significantly high returns than the firms with high Leverage. They also reported that, for oil, gas, and utility industries, the abnormal earnings increased with the Leverage. Their results are robust with regard to other factors, such as the price-to-earnings ratio, size, market risk and book value.

Multifactor Explanations of Asset Pricing Anomalies

Despite the studies discussed above, Fama and French's studies found that there are multi-factors in asset return anomalies and the debt-to-equity ratio is not one of them. In this section, we will go over Fama and French (1992), Fama and French (1995) and Fama and French (1996) empirical researches.

Fama and French's (1992) paper *The Cross-Section of Expected Stock Returns* tested the ability of two variables, the size and the book-to-market ratio, in explaining the variance in stock returns associated with the market beta β, size, Leverage, book-to-market equity and earnings-price ratios. Their data included all non-financial firms in NYSE, AMEX, and NASDAQ for the period from 1962 – 1989. The research found that there is a strong

relation between stock returns and size, and the relationship between stock returns and the book-to-market ratio was even stronger than the size to returns.

The paper reported the relationship between β and the average return disappeared in more recent periods (it referred to 1963-1990). The test did not support the positive relationship between the average stock returns and the β. It also pointed out that "factors like size, E/P, Leverage, and book-to-market are all scaled version of a firm's stock price…it is reasonable to expect that some of them are redundant for explaining average returns". In addition, the test result revealed that the combination of the size and the book-to-market ratio is able to capture the cross-section variation in the average stock returns.

In their 1995 paper *Size and Book-to-Market factors in Earnings and Returns,* Fama and French tested the relationship between firms size and the book-to-market to stock prices by looking at the relation between size and the book-to-market to firms earnings. The ultimate goal for their paper is to reach a rational explanation for the significant relation between firm size and the book-to-market to stock price. They based their test on two hypotheses, "1, there is a common risk factors in returns associated with size and book-to-market, and 2. the size and book-to-market patterns in returns can be explained by the behaviour of earnings". The result shows that size and the book-to-market are related to firm profitability. Fama and French also found that the market and the size factors in earnings help explain the market and the size factors in returns. However, there is no evidence that the returns respond to the book-to-market factor in earnings. Although there

was no supporting evidence, the authors thought that noise is the main contributing factor for the failure to find more evidence of common factors in earnings driving returns.

Fama and French's 1996 article *Multifactor Explanations of Asset Pricing Anomalies* identified a three factors model, which provides explanations of asset pricing anomalies. The three factors include the overall market excessive return, firm size and the firm's book-to-equity ratio. Fama and French used the same sample in this paper as they did in 1993. The samples were divided into 25 portfolios by their sizes and book-to-market ratios. The portfolios showed higher returns for small stocks and high returns for higher book-to-market ratio. They concluded, "three-factor risk return relation is a good model for the returns on portfolios formed on size and book-to-market-equity". They also stated that the three-factor model explains the return patterns in portfolios, which were formed on characteristics, such as size, earnings/price, cash flow/price, book-to-market, and sales growth. Their discovery is useful in the real world applications. Based on their test result, forming portfolios based on the size and the book-to-market giving investors better returns than traditional portfolios formed by the mean-variance theory.

Ratio Analysis on Hong Kong Stock Market

The literature written in English related to ratios analysis for the Hong Kong stock market is very limited. We were only able to find one paper in English that relates to our topic. Lam's (2002) paper *The Relationship Between Size, Book-to-Market Equity Ratio, Earnings–Price Ratio, and Return for the Hong Kong Stock Market* studied the relationship between the stock return and firm size, the Leverage, book-to-market ratio, and earnings-price ratio. His study covered 100 firms continuously listed on the Hong

Kong Stock exchange for the period from July 1984 to June 1997. He excluded financial firms from the study because they have on average higher Leverage ratios. The paper followed Fama and French (1992) in defining size and variables related to accounting information. The results were tested for sub-periods and across the months. January effect was also tested, and the result showed that January effect does not drive the test result.

He concluded in his paper that, β is not able to explain returns. But the firm size, book-to-market, and earnings-price capture cross section return variation in the tested period. He reported that the book value and the Leverage can also explain the cross section variation; however, those can be discarded because their effects are dominated by the size, book-to-market and earning-price. In addition he suggested the three factors model (size, book-to-market, and earning-price) to be served as the risk proxy, instead of β, for the Hong Kong stock market. Lam suggested two practical implications for his findings. First, investors and managers should evaluate their portfolios by comparing them with portfolios which have similar size, book-to market equity and earning-price ratios. Second, Risk Proxy based on the three factors can be used to measure the cost of capital when calculating the present value of investments.

DATA AND METHODOLOGY

The purpose of this study is to examine the ability of debt ratios in predicting company stock returns in the long run. We initiated the work as Muradoglu and Whittington (2001) did for the U.K. market. They started from the FTSE-350 index, which incorporates the largest 350 companies by capitalization, for stock picking. There are 1,090 companies listed at the main board of Hong Kong as of November 30, 2008. The samples we use are constituted by the companies listed in the Main Board of Hong Kong, and included in the Hang Seng Composite Index, which is composed by about the top 200 listed companies and worth greater than 90% of the total value of the whole Hong Kong market.

The sample covers the period from Jan. 1, 1999 to May 1, 2008. Historical prices are available from some financial information providers, e.g. Yahoo! Finance; however, the free data are only available up to January 1, 2003 for non blue chips companies. The missing data could be searched from the newspaper database at any public library in Hong Kong, or purchased from the Hong Kong Exchanges and Clearing Limited, HKEX, or a few financial information providers, like AASTOCKS.com. The data of the historical prices, background information, annual report announcement dates, and outstanding shares of the companies used in this research are from the HKEX and HKEXnews database. The data are stored in two sub-parts of the database, prior to June 25, 2007 and since June 25, 2007. We have to search both sub-parts in order to retrieve the data we use in this research. Since companies' submission of soft copy of disclosures

to HKEX was not mandatory for some types of company information prior to February 15, 2002, some missing data of company information are from annual reports and company websites.

The data of Debts, Price-to-Earnings, and Price-to-Book ratios come from Thomson's Datastream; however, there are a few P/E data missing. We used the data from annual reports and followed the definition of the ratio by Thomson's Datastream for calculating the missing data. We calculated the ratios from the year (t) before the missing year (t-1) to the year after the missing year (t+1), and compared the first and the last data to the existing data from Thomson's Datastream for verification. The data of "t-1" and "t+1" we calculated are the same as Thomson's Datastream given, so we use our calculation of year (t) for the missing data.

Table 1: Comparison of the Two Researches

This table compares the two studies.

	Muradoglu and Whittington	Ng and Wang	Ratio
Market	United Kingdom	Hong Kong	N/A
Period	1990/01/01 - 1999/05/01	1999/01/01 - 2008/05/01	N/A
Index	FTSE-350	Hang Seng Composite Index	N/A
Samples	170	60	2.83 : 1
Listed Companies at the Beginning of the Period	2015	680	2.96 : 1
Market Capitalization at the Beginning of the Period[1]	USD 831,231,783,000	USD 343,566,500,000	2.42 : 1

[1] The historical market capitalization of the Hong Kong market is from the World Federation of Exchange. The prices are quoted in U.S. dollar. The historical market capitalization of the UK market is from the London Stock Exchange, LSE. The prices are quoted in British Pound. The historical exchange rates are from the tool FXHistory provided by Oanda Corporation.

The final sample, from 198 companies of the Hang Seng Composite Index, is formed by, 1). deducting 26 companies in financial sectors, whose Leverage ratios have different interpretations from other sectors; 2). deducting 80 companies that were not listed before Jan. 01, 1999 for 10-year analysis; 3). deducting 3 companies that had changed the fiscal period end date during the observing periods for preventing the difference in fiscal year calculation; and 4). deducting 9 companies that have important data missing or unavailable, such as annual reports.

Table 2: Financial Year End

The table summarizes the financial year-ended data for the remaining 80 companies from the sample deduction.

Financial Year-End	Number of Company	Percentage
March 31st	9	11.25%
June 30th	9	11.25%
September 30th	1	1.25%
December 31st	61	76.25%
Others	0	0.00%
Total	80	100.00%

More than three-fourths of the remaining companies, 61 out of 80, or 76.25%, have a Balance Sheet date of December 31st; 9 companies, or 11.25%, use June 30th as the financial year-end, 9 companies, or 11.25%, use March 31st; and 1 company, or 1.25%, uses September 30th. Similar to Muradoglu and Whittington (2001), we have the most companies that have the year-end date of December 31st. Since the number '61' is a prime number and is not divisible, we deducted one more company from the list so that the remaining companies can be separated in groups. We decided to remove Swire Pacific Limited "B" (Ticker: 00087) because it is the only B shares from the list, since

the data from Thomson's Datastream are the same in A shares and B shares and we see that as duplication.

Our final samples are 60 companies that have year-end on December 31st with completed ratios and stock prices data. Muradoglu and Whittington (2001) mentioned that annual reports are announced and published in the U.K. about four months after the end of the fiscal period in general. In Hong Kong Main Board issuers must publish annual reports not later than 4 months after the date upon which the financial period ended. To verify the companies announced and published their annual reports between January 1st and April 30th each year, we searched the HKEXnews database from the year 1998 to 2008 and confirmed that none of our samples has an annual report announcement out of the period.

We followed Barber and Lyon (1997), Vijh(1999), and Muradoglu and Whittington (2001) methodologies for calculating long run stock returns. 3-year stock returns for the selected companies are calculated by the log difference of consecutive closing prices, which are adjusted for dividends, splits and right issues, on a daily basis. There are seven 3-year periods from May 1, 1999 to April 31, 2008. We used the closing price of the last trading day before May 1 each year for the return calculation. For those seven periods, there are between 737 to 748 trading days. We used the minimum, 737 days, to calculate the returns for the overall calculation, which has the comparison of returns of 420 observations from different periods.

Table 3: The Number of Trading Day

The number of trading day in the seven 3-year periods. We used the minimum, 737 days, for the overall calculation.

	START DATE	END DATE	NO. OF TRADING DAY
Period 1, P1	30/4/1999	30/4/2002	737
Period 2, P2	30/4/2000	30/4/2003	738
Period 3, P3	30/4/2001	30/4/2004	741
Period 4, P4	30/4/2002	30/4/2005	748
Period 5, P5	30/4/2003	30/4/2006	742
Period 6, P6	30/4/2004	30/4/2007	742
Period 7, P7	30/4/2005	30/4/2008	742

Our research starts with the Leverage ratio. The methodology, presenting the evidence at the portfolio level, is the same as the one in Muradoglu and Whittington (2001). Sixty companies are ranked by the Leverage ratio and sorted into Deciles. The Capital Gearing Ratio (Data-stream code: 731) which Muradoglu and Whittington (2001) used is defined as:

$$\text{Gearing Ratio} = \frac{\text{Preferred Shares} + \text{Subordinated Debt} + \text{Total Loans} + \text{Short-term Loans}}{\text{Total Capital Employed} + \text{Short-term Debt} + \text{Intangible Assets} + \text{Future Tax Liabilities}}$$

We have 60 data for each of the 7 periods, and 420 observations for the overall calculation. We divided the 60 samples from each period into 10 groups with 6 companies each for the yearly analysis, and divided the 420 observations into 10 groups for the overall calculation. We put the companies into the Deciles starting from the lowest Leverage ratio to the highest Leverage ratio. Therefore, the companies with the lowest Leverage ratio go into Decile 1 and the companies with the highest Leverage ratio go into Decile 10.

The Price-to-Earnings ratio, the Price-to-Book ratio, and the Market Value of the companies are also used in the analysis. At May 1 of year t, the information we use are P/E(t-1), P/B(t-1), and MV(April 30, t). The definitions of P/E and P/B are from Thomson's Datastream.

$$P/E(i,t-1) = \frac{\text{Closing Price of i on the last trading day in year t-1}}{\text{Earning Per Share as reported for i}}$$

$$P/B(i,t-1) = \frac{\text{Market Cap of i on the last trading day in year t-1}}{\text{Common Equity of i on the last trading day in year t-1}}$$

$$MV(i,\text{April 30, t}) = \text{Outstanding Shares of i} * \text{Closing Price at April 30 of year t}$$

We followed the methods in Barber and Lyon (1997) and Vijh(1999) to calculate the three-year cumulative abnormal returns, CAR, the three-year buy and hold abnormal returns, BHAR, and the test statistics. The equation of the market adjusted abnormal returns is:

$$AR_{it} = R_{it} - R_{mt}, \quad \text{for day t}$$

R_{it} is the return of the company i for day t, and R_{mt} is the return of the market, the Hang Seng Index, HSI, for day t. The returns are calculated from the log differences of two consecutive prices, that is, $\ln((P_t/P_{t-1}))$.

The cumulative abnormal returns, CAR, for company i are calculated by:

$$CAR_{it} = \sum AR_{it}, \qquad t = 1 \text{ to } 737$$

The Buy-and-hold abnormal returns, BHAR, for company i are calculated by:

$$BHAR_{it} = (\prod (1 + AR_{it})) - 1, \qquad t = 1 \text{ to } 737$$

The formulas of test statistics for testing the null hypothesis, that the mean cumulative or buy-and-hold abnormal returns are equal to zero, are:

$$T_{CAR} = CAR(it) / (\sigma(CAR_{it}) / \sqrt{n})$$

$$T_{BHAR} = BHAR_{it} / (\sigma(BHAR_{it}) / \sqrt{n})$$

n is the number of companies and CAR(it) and BHAR(it) are the sample average. σ(CAR(it)) and σ(BHAR(it)) are the sample standard deviations of abnormal returns for the sample of n companies.

We are also interested in understanding ratio combinations in finding excessive returns. Muradoglu, Bakke, and Kvernes (2005) combined the Leverage ratio with P/E, Book-to-market, and MV for finding the best pair ratios that generated the most excessive returns.

Table 4: Twenty-four Portfolios Based on Ratios Combinations

Twenty-four portfolios are formed by the combination of the level of the Leverage, P/E, P/B, and MV.

1st Ratio	2nd Ratio
Low Leverage	Low P/E
Low Leverage	High P/E
High Leverage	Low P/E
High Leverage	High P/E
Low Leverage	Low P/B
Low Leverage	High P/B
High Leverage	Low P/B
High Leverage	High P/B
Low Leverage	Low MV
Low Leverage	High MV
High Leverage	Low MV
High Leverage	High MV
Low P/E	Low P/B
Low P/E	High P/B
High P/E	Low P/B
High P/E	High P/B
Low P/E	Low MV
Low P/E	High MV
High P/E	Low MV
High P/E	High MV
Low P/B	Low MV
Low P/B	High MV
High P/B	Low MV
High P/B	High MV

In this study, we replaced the Book-to-market, with P/B. P/B is the reciprocal of B/M, and is readily available. We extended the work to group P/E, P/B, and MV. For ratios combination calculations we divided the 420 overall observations into two groups by the level of a ratio, the 1st ratio. Each group has 210 observations. The 210 observations with the low ratio go into the low group, and the rest of the 210 observations with the high

ratio go into the high group. We then divided each group into two sub-groups by sorting the second ratio. There are 24 sub-groups within these combinations. Table 4 above shows the list of these 24 groups.

FINDINGS

Overall Result

The overall results are presented in Table 6. For the overall sample, the average Leverage ratio for Decile 1 to Decile 10 are 1.9%, 9.8%, 15.1%, 20.5%, 25.2%, 29.2%, 32.9%, 38.2%, 43.7%, and 65.4% respectively. The standard deviations are 2.1%, 1.9%, 1.6%, 1.3%, 1.4%, 1.3%, 1.3%, 1.6%, 2.0%, and 22.2% respectively. The standard deviation in Decile 10 is the highest among other Deciles. It shows that the samples in Decile 10 are dispersed.

Unlike the finding of Muradoglu & Whittington, there is no obvious relation between CAR and BHAR and the debt-to-equity ratio. The levels of CAR and BHAR do not seem to follow the increase or decrease of the debt-to-equity ratio. Moving from Decile 1 to 3, the abnormal returns seem to decrease with the increase in the debt-to-equity ratio. From Decile 3 to 5 the abnormal returns increase with the increase in the debt-to-equity ratio. The abnormal returns reduce again from Decile 5 to Decile 6. Lastly, the abnormal returns seem to be the highest and increase the most when the debt-to-equity ratio increased from Decile 7 (average ratio 32.8%) to Decile 10 (average ratio 65.4%).

Since there is no particular correlation for the level of CAR or BHAR with the increase or decrease in the debt-to-equity ratio, we conclude that the debt-to-equity ratio is not able to explain the Hong Kong stock market abnormal returns for the period from 1999-2008.

Figure 1: The Overall CAR & BHAR

Figure 1 shows the relationship between CAR & BHAR and the debt-to equity ratio. The companies with the lowest Leverage ratio go into Decile 1 and the companies with the highest Leverage ratio go into Decile 10.

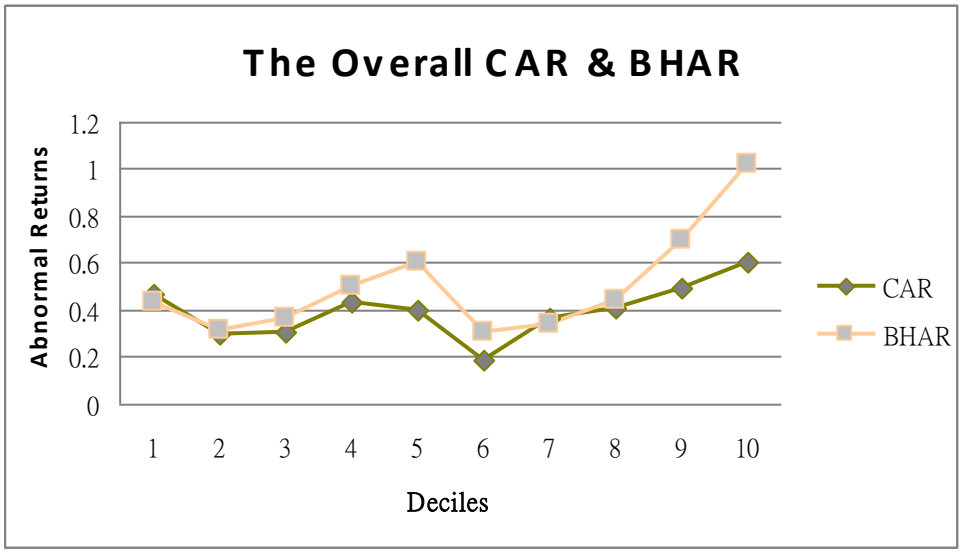


Table 5: The Overall Results

The columns represent the average Leverage ratio, CAR, T-stat of the CAR, BHAR, T-stat of the BHAR, P/E(t-1), P/B(t-1), and MV for the Deciles.

	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	1.9	0.5	5.4	0.4	3.8	13.6	2.3	12,620.2
Decile 2	9.8	0.3	3.6	0.3	2.4	15.4	2.4	52,047.0
Decile 3	15.1	0.3	2.7	0.4	2.4	25.8	2.3	71,102.2
Decile 4	20.5	0.4	4.4	0.5	2.9	19.6	1.1	33,618.1
Decile 5	25.2	0.4	3.7	0.6	2.4	9.4	1.1	28,456.9
Decile 6	29.2	0.2	1.9	0.3	1.1	14.9	1.2	47,571.9
Decile 7	32.9	0.4	4.0	0.3	2.5	15.9	1.1	14,157.4
Decile 8	38.2	0.4	3.9	0.4	2.8	19.0	1.3	21,579.7
Decile 9	43.7	0.5	3.8	0.7	3.1	22.2	2.0	28,540.4
Decile 10	65.4	0.6	4.5	1.0	3.4	4.4	1.9	8,878.8

Our finding is different from the result of Muradoglu and Whittington's paper. Muradoglu and Whittington, using U.K. data, found out that a decreasing trend exists as the Leverage ratio increases from Decile 1 to Decile 8, and the abnormal returns increase from Decile 8 to Decile 10, which are the classes for companies that have the highest Leverage. In our overall samples, the abnormal returns go up and down from Decile 1 to

Decile 6, then increase from Decile 7 to Decile 10. Decile 10, the group for companies with the highest Leverage, has the most abnormal returns. Notes that the gap between CAR and BHAR increases from Decile 8 to Decile 10. The standard deviations of the BHAR in Decile 9 and 10 are large as well (Decile 9: 1.45, Decile 10: 1.95).

We also examined the existence of the link between the Leverage and the abnormal returns. We plotted the 420 observations into scatter diagrams for understanding the relationship between Leverage and the CAR and BHAR in Hong Kong market. The graphing tool generated the regression lines. The slopes of the trend lines (CAR: 0, BHAR: 0.004) tell us that the Leverage level does not have any meaning to cumulative abnormal returns and is little related to buy-and-hold abnormal returns. For a 10% increase in Leverage, there is a 4% increase in BHAR.

Figure 2: Scatter Diagram of the Overall CAR and Leverage

The slope of the trend line is 0.0002. The Leverage level does not have any meaning to the cumulative abnormal returns, CAR.

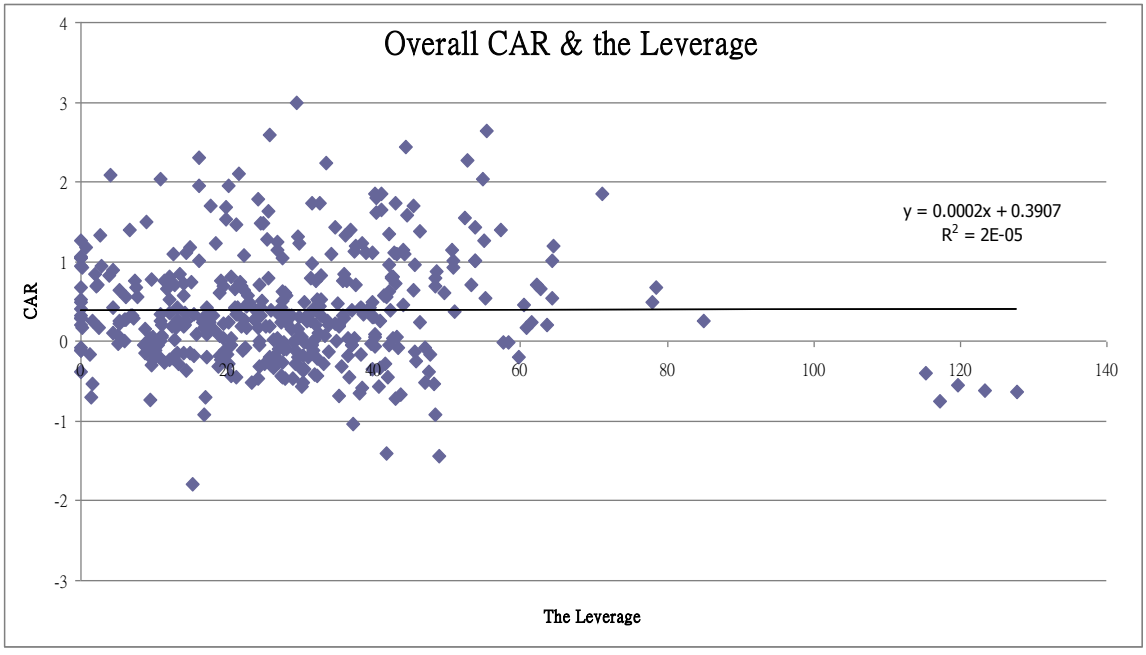
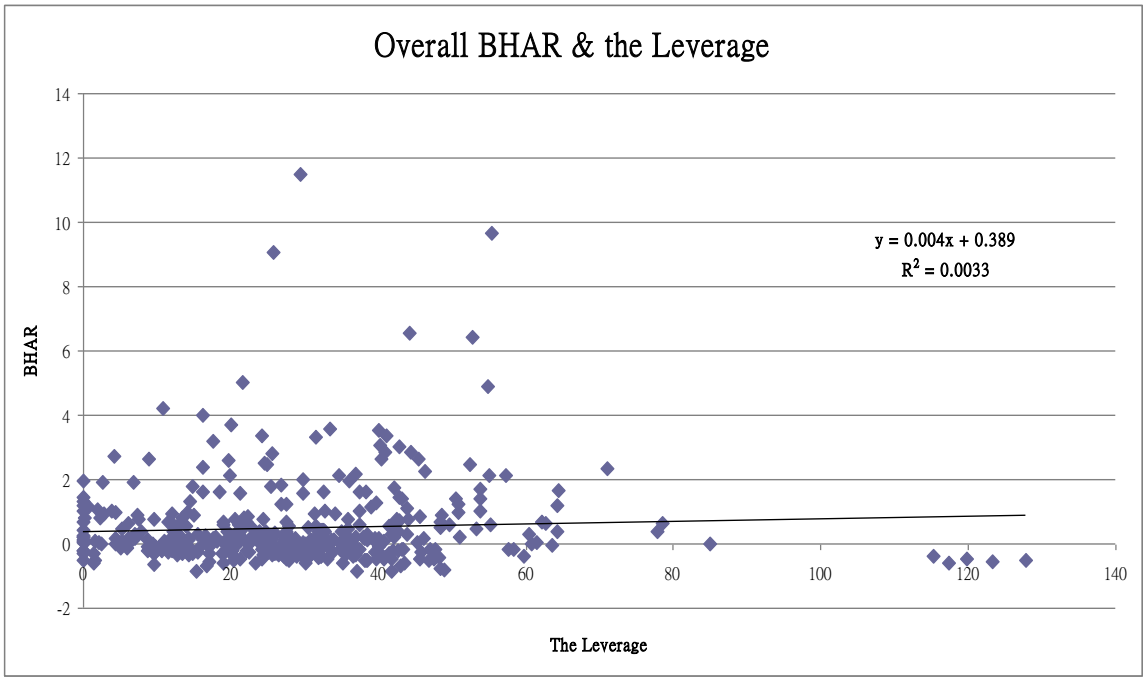


Figure 3: Scatter Diagram of the Overall BHAR and Leverage

The slope of the trend line is 0.004. The Leverage level is merely related to the buy-and-hold abnormal returns. For a 10% increase in Leverage, there is a 4% increase in BHAR.

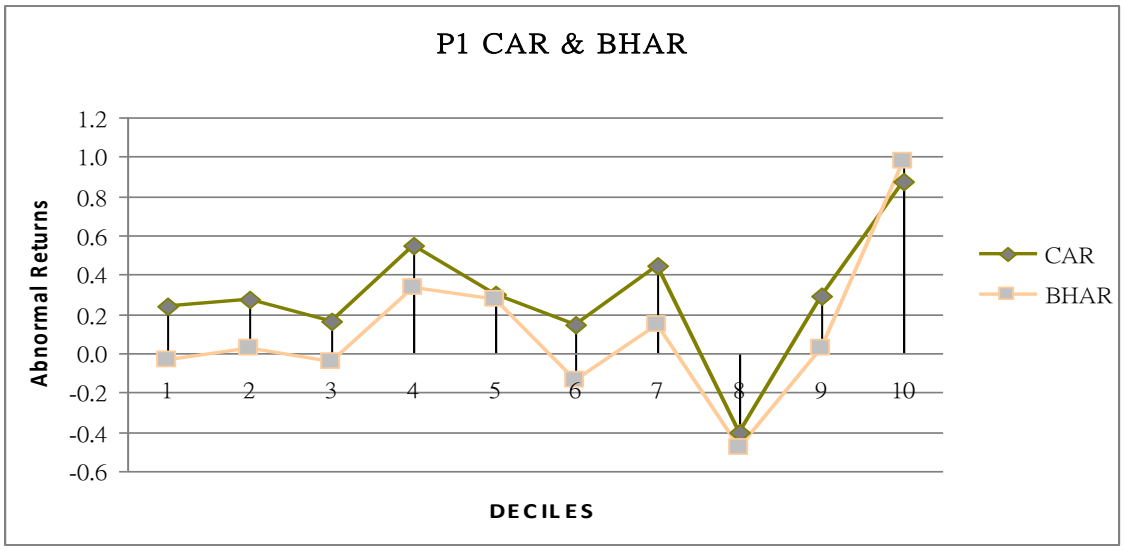


Sub-period Results

Figure 4 to Figure 10 summarize the abnormal returns with ratios of 10 Deciles in 7 periods. We present the result in numeral form in Table 6 with other ratios. The Deciles in each period are sorted by the Leverage ratio from the lowest to highest. There is neither a strong evidence that the Leverage ratio is negatively correlated to both abnormal returns, nor a common pattern on the relation of the Leverage and both abnormal returns for all periods. For comparison we include Muradoglu and Whittington's sub-period results in Appendix 1.

Figure 4: Period 1 (1999-2002) CAR & BHAR

The CAR and BHAR for Period 1, 1999-2002.



The result in Period 1 is similar to the overall result. As the Figure shows, the CAR and BHAR increase or decrease out of step with the Deciles, except for the Deciles 8 to 10. In Deciles 8 to 10, the returns increase as the Leverage ratio increases.

Figure 5: Period 2 (2000-2003) CAR & BHAR

In period 2 the returns peaked at Decile 5 and Decile 9.

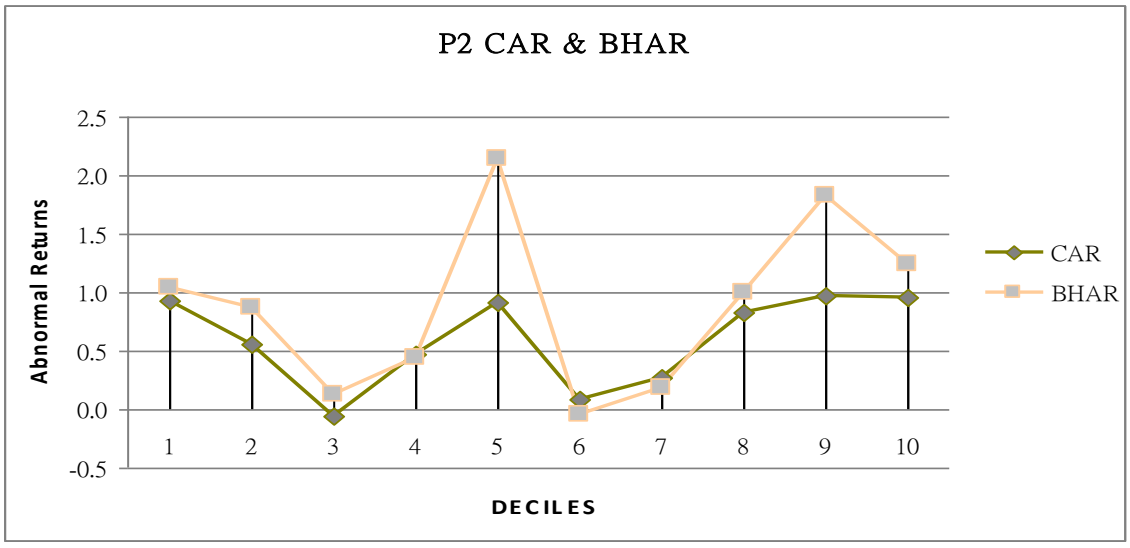


Figure 6: Period 3 (2001-2004) CAR & BHAR

Period 3 is similar to period 1 and the overall result. The returns peak at Decile 4 and Decile 10. There seems to be a relationship between the returns and the Leverage ratio in Decile 7 to 10.

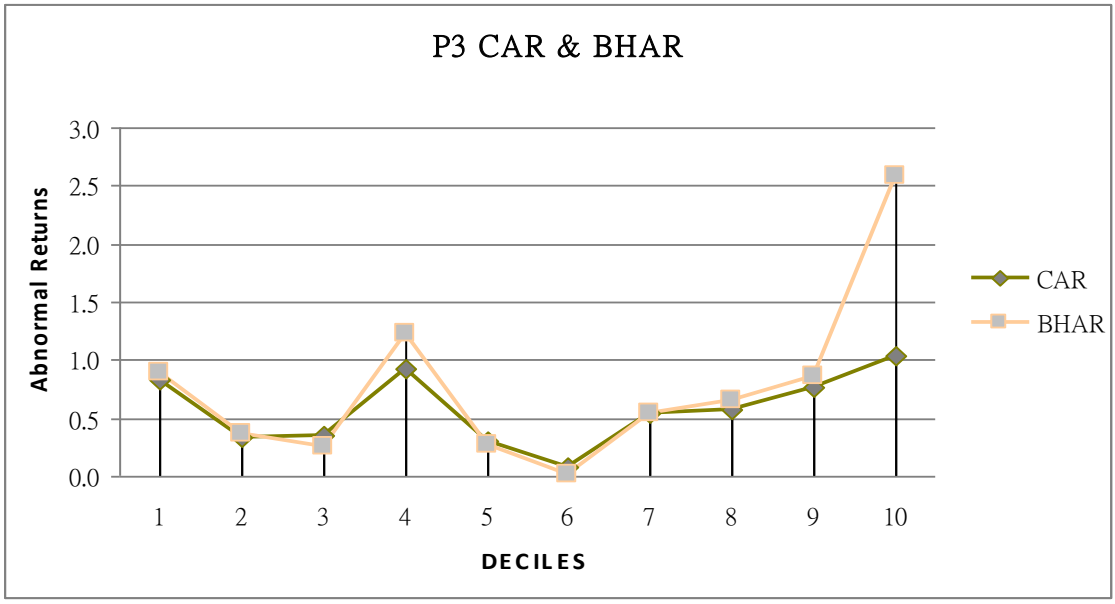


Figure 7: Period 4 (2002-2005) CAR & BHAR

Figure 7 reports the returns decrease from Decile 1 to 2 and increase from Decile 2 to 3. The returns drop to the lowest level in Decile 6 and peak at Decile 10.

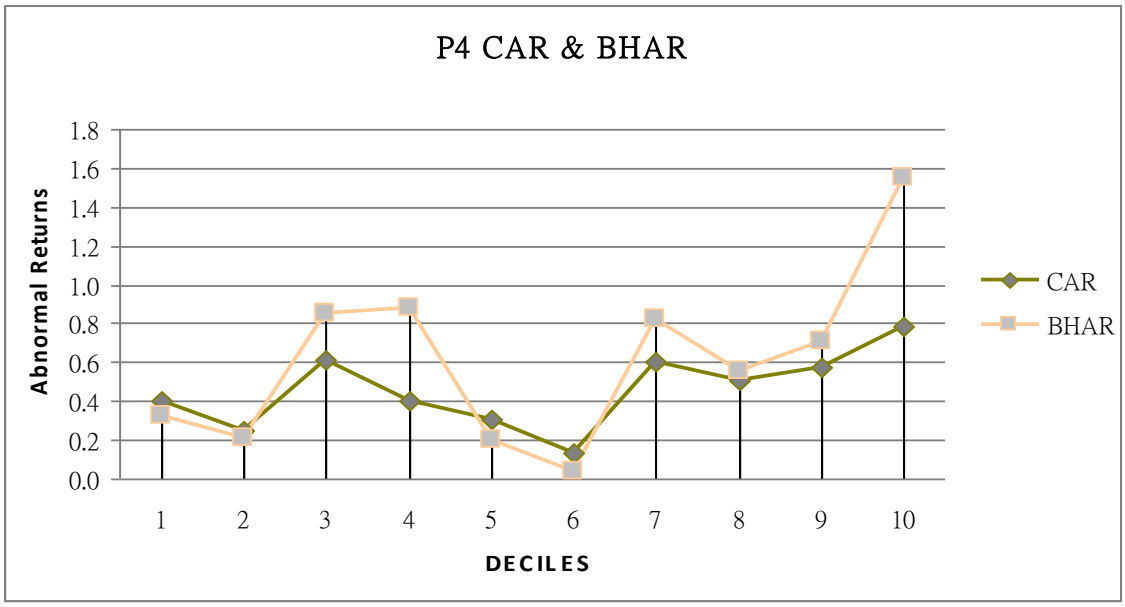


Figure 8: Period 5 (2003-2006) CAR & BHAR

In period 5 the portfolio of Decile 6, with an average 30.2% of the Leverage ratio, earns the highest returns.

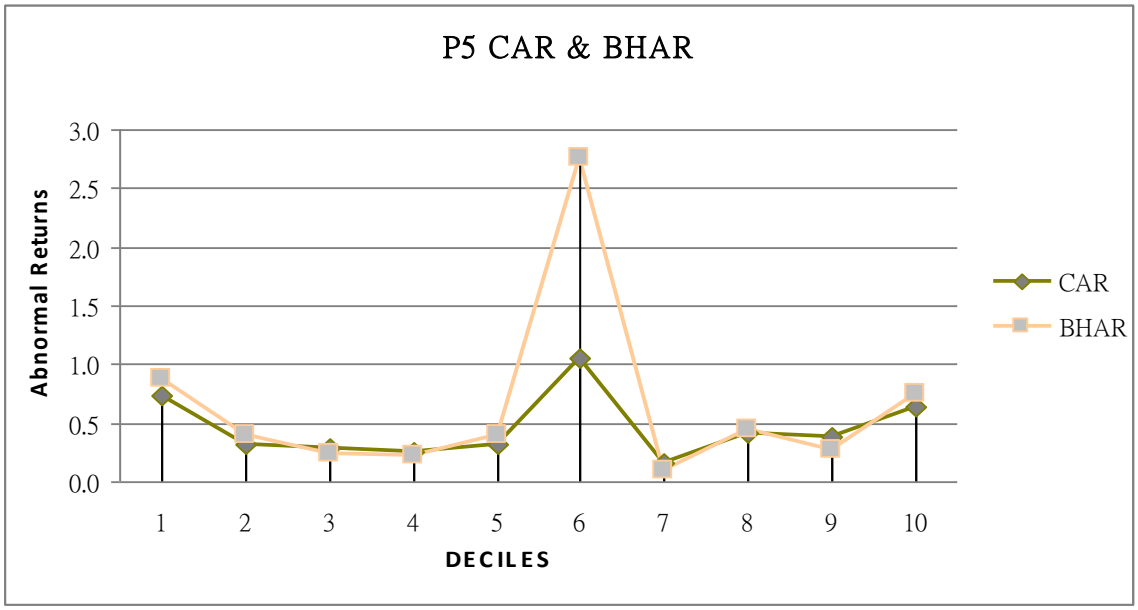


Figure 9: Period 6 (2004-2007) CAR & BHAR

Period 6 reports a completely different result from the overall, Period 1, and Period 3 results. Decile 3 earns the highest returns, and the returns decline with the increase in the Leverage ratio. The returns rise from the bottom Decile 7 to Decile 10.

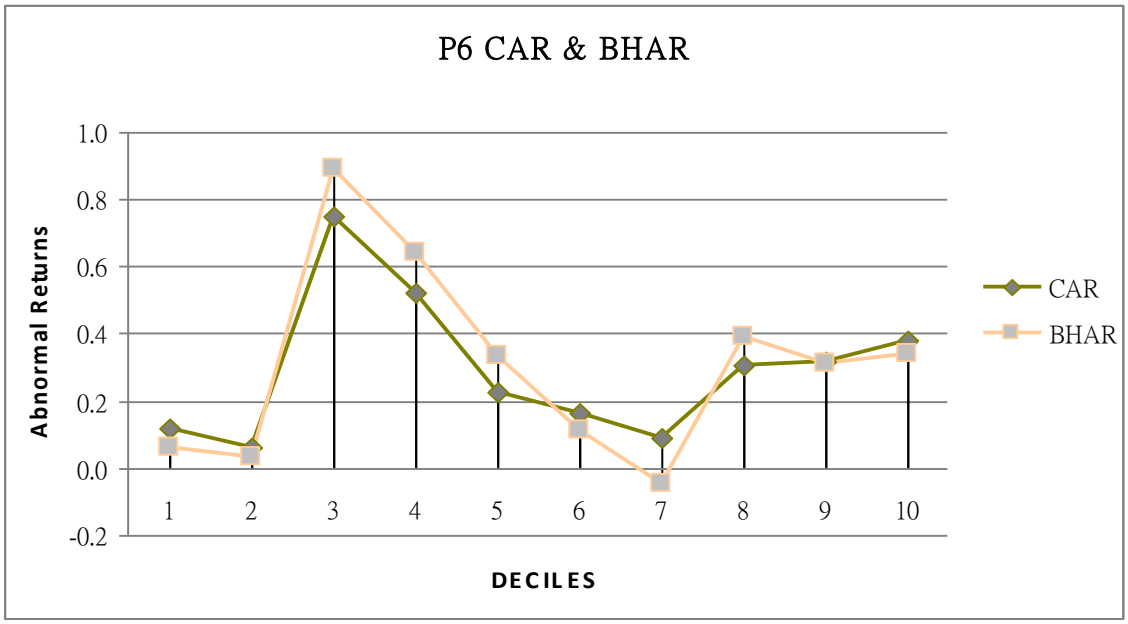
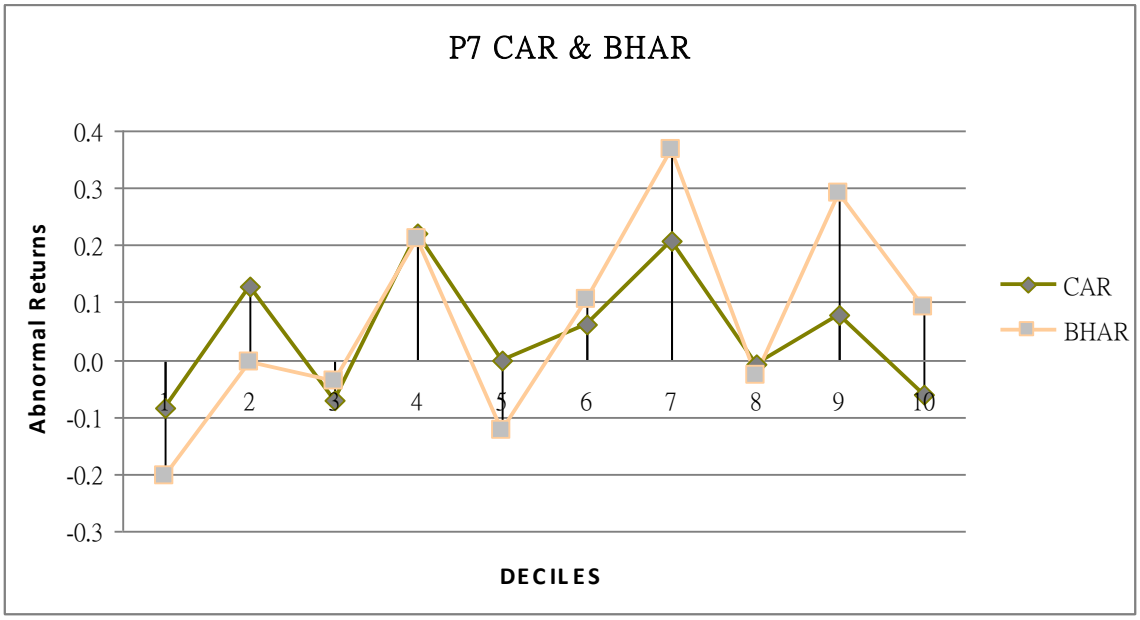


Figure 10: Period 7 (2005-2008) CAR & BHAR

Figure10 shows strong evidence that there is no relationship between CAR & BHAR and the Leverage ratio. CAR and BHAR raise and fall eight times in period 7. The Figure shows that the CAR and BHAR do not follow the changes in the Leverage.



All figures in Period 2 to 7 (Figure 5 to 10) have unique shapes. They do not provide any evidence that CAR and BHAR are related to the debt-to-equity ratio. In Period 2 (Figure 5) the companies in Decile 5 and Decile 9 have the most abnormal returns. Period 3 (Figure 4) is similar to period 1 and the overall result. The firms with the highest debt-to-equity ratio produce the largest abnormal returns. In Period 4 the returns decrease from Decile 1 to 2 and increase from Decile 2 to 3. The returns drop to the lowest level in Decile 6 and peak at Decile 10. In Period 5 the portfolio of Decile 6, with an average 30.2% of the Leverage ratio, earns the highest returns. Period 6's Decile 3 earns the highest returns, and the returns decline with the increase in the Leverage ratio. The returns rise from the bottom Decile 7 to Decile 10. Period 7 has a different result. Decile 3 and 4 are the best performers with the highest CAR and BHAR. There are a few times that the CAR and BHAR have big differences in all periods. The standard deviations of BHAR in those times are high (Period 2 – Decile 5: 3.66, Period 3 – Decile 10: 3.60,

Period 4 – Decile 10: 2.58, Period 5 – Decile 6: 4.59). In our research there is no evidence that the debt-to-equity ratio is a good indicator of finding abnormal earnings.

Table 6: 7 Periods Results

The columns represent the average Leverage ratio, CAR, T-stat of the CAR, BHAR, T-stat of the BHAR, P/E(t-1), P/B(t-1), and MV for the Deciles in 7 periods.

P1 (1999-2002)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	3.5	0.2	1.5	0.0	-0.3	13.1	1.7	24,298.4
Decile 2	11.4	0.3	1.1	0.0	0.1	12.8	2.1	65,736.2
Decile 3	16.8	0.2	1.0	0.0	-0.3	12.4	1.0	36,037.6
Decile 4	22.4	0.5	2.5	0.3	1.3	6.8	0.8	11,149.3
Decile 5	27.3	0.3	1.1	0.3	0.6	10.0	0.8	12,095.2
Decile 6	30.2	0.1	0.8	-0.1	-1.1	10.0	0.9	8,226.2
Decile 7	34.3	0.4	2.5	0.1	0.8	30.8	2.3	29,897.9
Decile 8	39.4	-0.4	-1.5	-0.5	-3.4	17.0	0.9	6,068.2
Decile 9	45.3	0.3	1.0	0.0	0.1	35.8	1.3	49,354.7
Decile 10	59.3	0.9	2.9	1.0	2.4	-21.1	1.2	11,057.9

P2 (2000-2003)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	2.3	0.9	7.4	1.0	4.6	11.8	1.4	9,129.7
Decile 2	11.2	0.6	1.6	0.9	1.2	22.8	3.7	55,611.9
Decile 3	16.2	-0.1	-0.2	0.1	0.4	58.2	5.1	222,385.7
Decile 4	19.6	0.5	1.8	0.4	1.0	15.6	0.9	11,853.2
Decile 5	23.3	0.9	2.0	2.1	1.4	39.2	0.8	3,668.2
Decile 6	28.6	0.1	0.5	0.0	-0.3	32.5	1.0	92,727.3
Decile 7	33.4	0.3	1.2	0.2	0.8	11.4	0.9	22,518.9
Decile 8	38.0	0.8	3.4	1.0	1.8	5.3	0.6	3,425.6
Decile 9	42.4	1.0	2.1	1.8	1.7	42.7	6.3	10,680.0
Decile 10	54.9	1.0	4.6	1.2	3.1	5.5	1.2	12,559.7

P3 (2001-2004)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	0.5	0.8	6.7	0.9	4.1	7.6	1.1	4,207.1
Decile 2	8.6	0.3	1.4	0.4	1.1	20.0	5.1	66,807.3
Decile 3	14.8	0.3	6.3	0.3	3.8	13.3	0.8	14,316.4
Decile 4	20.5	0.9	3.8	1.2	2.6	8.4	0.4	3,611.6
Decile 5	27.4	0.3	1.1	0.3	0.9	17.9	0.8	23,550.2
Decile 6	30.8	0.1	0.4	0.0	0.1	24.6	2.3	194,675.1
Decile 7	33.3	0.5	1.6	0.5	1.3	11.6	1.1	9,091.6
Decile 8	37.6	0.6	2.6	0.6	1.8	12.7	1.0	22,112.5
Decile 9	43.4	0.8	2.6	0.9	1.7	13.9	1.0	3,492.0
Decile 10	69.6	1.0	2.2	2.6	1.8	1.4	-0.3	8,254.8

P4 (2002-2005)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	1.1	0.4	2.7	0.3	1.6	15.4	2.4	11,432.1
Decile 2	7.7	0.3	1.6	0.2	1.2	12.9	2.2	19,928.3
Decile 3	14.7	0.6	1.6	0.9	1.4	15.4	1.0	50,273.5
Decile 4	20.7	0.4	1.1	0.9	1.0	9.7	1.4	89,032.3
Decile 5	24.0	0.3	2.4	0.2	1.4	15.1	0.8	16,542.8
Decile 6	28.4	0.1	1.7	0.0	0.6	13.5	0.8	25,891.1

Decile 7	32.3	0.6	1.6	0.8	1.2	30.4	1.0	6,605.3
Decile 8	35.9	0.5	1.8	0.6	1.6	18.7	0.9	54,284.2
Decile 9	42.3	0.6	2.0	0.7	1.6	19.3	1.0	13,295.5
Decile 10	70.0	0.8	1.9	1.6	1.5	10.1	-1.1	5,957.1

P5 (2003-2006)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	2.1	0.7	2.3	0.9	1.9	13.7	2.0	10,171.4
Decile 2	9.1	0.3	1.4	0.4	0.9	11.8	1.9	14,824.9
Decile 3	13.9	0.3	1.9	0.2	1.7	9.7	0.6	28,143.0
Decile 4	21.2	0.3	1.6	0.2	1.4	10.8	1.1	69,282.8
Decile 5	25.4	0.3	1.2	0.4	1.0	22.6	1.2	20,144.1
Decile 6	30.1	1.1	2.3	2.8	1.5	8.6	0.5	13,930.6
Decile 7	32.1	0.2	1.1	0.1	0.6	9.2	1.0	7,187.8
Decile 8	38.4	0.4	1.6	0.4	1.1	13.8	1.2	34,653.9
Decile 9	42.1	0.4	1.9	0.3	1.2	10.9	1.1	9,314.2
Decile 10	66.6	0.6	2.6	0.7	2.0	8.3	-1.1	4,405.1

P6 (2004-2007)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	2.5	0.1	0.6	0.1	0.3	20.7	4.4	19,885.6
Decile 2	10.3	0.1	0.4	0.0	0.2	14.8	1.6	47,195.2
Decile 3	14.9	0.7	2.4	0.9	2.1	19.6	2.2	75,791.0
Decile 4	20.1	0.5	1.9	0.6	1.5	22.1	1.7	15,229.1
Decile 5	25.0	0.2	0.8	0.3	0.8	-13.1	1.0	28,994.1
Decile 6	28.1	0.2	1.0	0.1	0.7	14.6	1.3	21,120.8
Decile 7	33.8	0.1	0.6	0.0	-0.4	15.9	1.6	22,959.0
Decile 8	39.6	0.3	1.0	0.4	0.8	22.4	2.1	8,014.6
Decile 9	44.8	0.3	1.4	0.3	1.2	24.0	1.7	53,248.6
Decile 10	69.6	0.4	1.8	0.3	1.8	8.4	11.2	7,475.4

P7 (2005-2008)	Leverage (t-1)	CAR	T-Stat (CAR)	BHAR	T-Stat (BHAR)	P/E(t-1)	P/B(t-1)	MV
Decile 1	1.8	-0.1	-0.8	-0.2	-2.3	17.4	4.0	20,354.6
Decile 2	10.6	0.1	1.0	0.0	0.0	12.4	1.4	48,690.6
Decile 3	15.0	-0.1	-0.3	0.0	-0.1	49.8	3.0	111,063.7
Decile 4	19.3	0.2	0.9	0.2	0.7	16.7	1.5	24,946.3
Decile 5	24.1	0.0	0.0	-0.1	-0.9	15.1	1.4	27,944.0
Decile 6	27.4	0.1	0.2	0.1	0.3	11.2	1.2	17,091.6
Decile 7	30.9	0.2	0.7	0.4	0.7	15.0	1.6	36,974.9
Decile 8	38.6	0.0	0.0	0.0	-0.1	17.3	2.1	20,114.8
Decile 9	46.3	0.1	0.2	0.3	0.5	18.1	1.1	57,892.5
Decile 10	66.4	-0.1	-0.2	0.1	0.2	14.2	1.9	11,122.2

Compare Our Samples with Muradoglu and Whittington's Samples

For better understanding the difference in the results, we compared the Hong Kong stock market returns in our test period, April 30, 1999 to April 30, 2008, with the UK Stock market returns in Muradogle and Whittington's (2001) test period, April 30, 1990 to

April 30, 1999. We used the FTSE 100 index for the UK market, and Hang Seng Index for the Hong Kong market.

Figure 11: Hang Seng Index and FTSE

The correlation between the two markets in different observing period is 0.73. Even though the correlation is high, the trends of Leverage ratios to the abnormal returns in the two markets are not similar as proved in previous section.

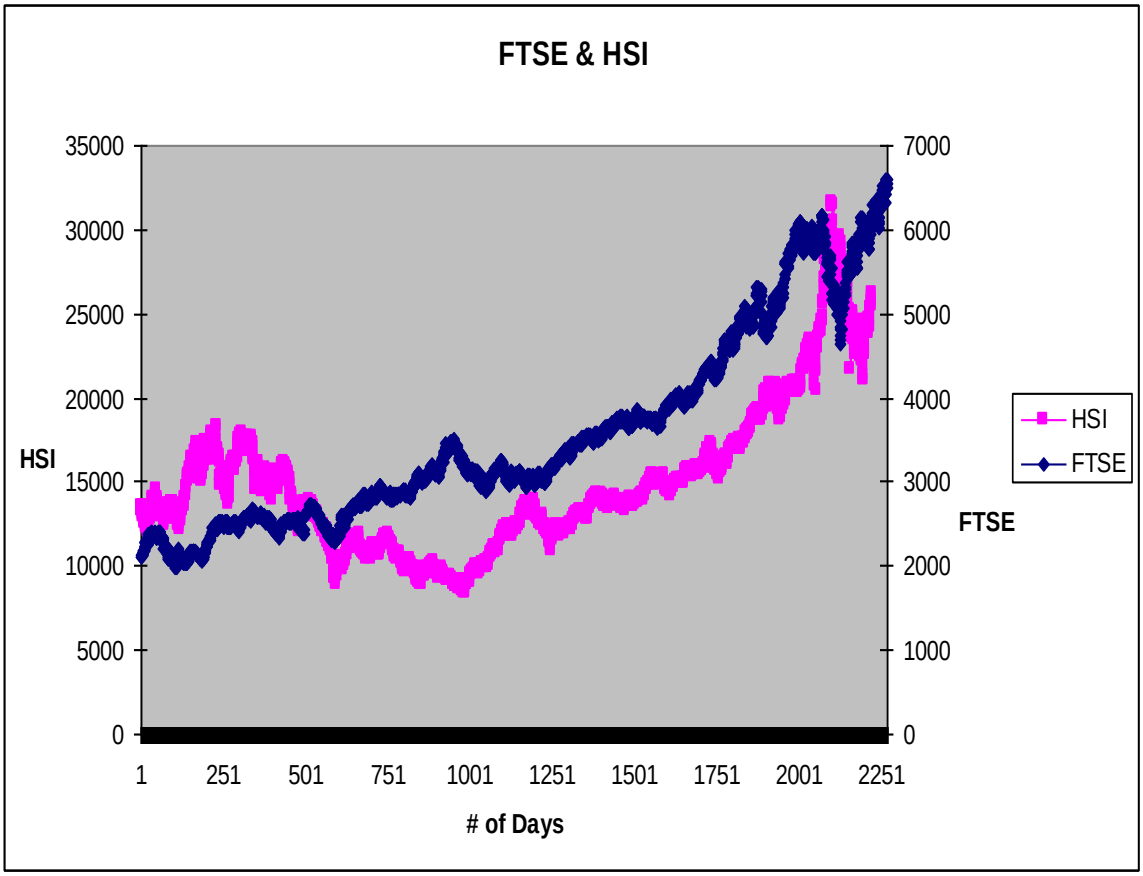


Table 7: The Correlations between Periods of Two Researches

The sixth periods of both markets have the highest correlation, 0.95. However, the trends of Leverage ratios to the abnormal returns are not similar.

	HKP1	HKP2	HKP3	HKP4	HKP5	HKP6	HKP7
UKP1	-0.26	-0.79	0.14	0.64	0.62	0.74	0.64
UKP2	-0.78	-0.67	0.34	0.80	0.75	0.89	0.84
UKP3	-0.08	-0.82	-0.35	0.68	0.73	0.61	0.60
UKP4	-0.55	-0.59	0.34	0.51	0.83	0.85	0.75
UKP5	-0.60	-0.89	0.10	0.87	0.84	0.93	0.88
UKP6	-0.68	-0.82	0.22	0.79	0.88	0.95	0.89

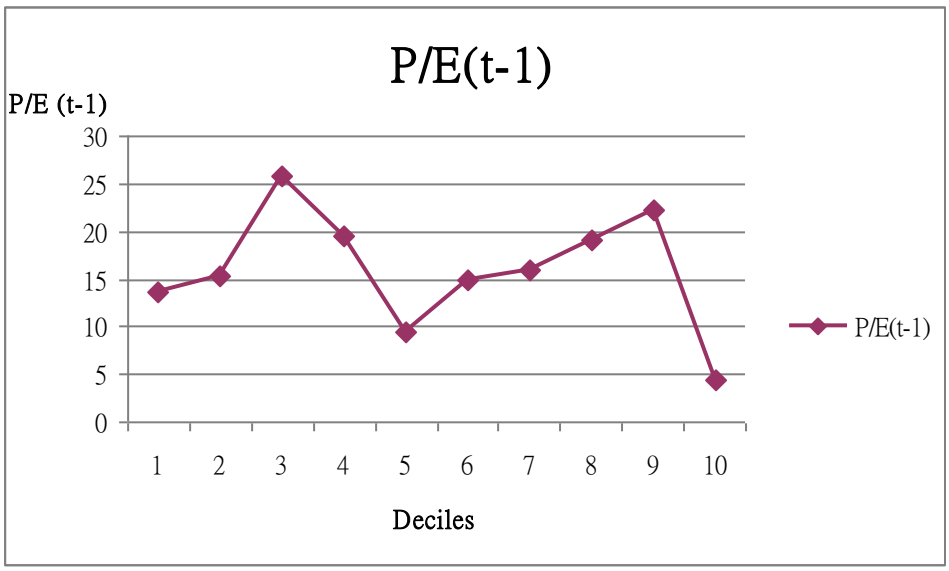
The correlation between the two markets in the two observing period is 0.73. Even though the correlation is high, the trends of Leverage ratios to the abnormal returns in the two markets are not similar. If we compare the markets by periods, as Table 7 shows, the sixth periods of both markets have the highest correlation, 0.95. However, the trends of Leverage ratios to the abnormal returns are not similar.

Strategies Based on Multiple Ratios

Since our research shows that the gearing ratio is not a powerful tool to explain the abnormal returns in the Hong Kong stock market, we added other ratios in this study to see their abilities in finding excessive returns. Before this, we looked at the relationship between the Leverage and the other ratios. The ratios that we added are the Price-to-earnings ratio (P/E), the Price-to-book ratio (P/B), and the Market Value (MV).

Figure 12: P/E of the Overall Samples

The relationship between the P/E (t-1) and the levels of the debt-to-equity ratio.



The data of P/E is from Thomson's Datastream. We used P/E(t-1) for year t calculation. The average P/E for Decile 1 to 10 are 13.6x, 15.4x, 25.8x, 19.6x, 9.4x, 14.9x, 15.9x, 19.0x, 22.2x, and 4.4x respectively. Note that the companies in Decile 10 have the lowest average P/E and the companies in Decile 3 have the highest. From Figure 12 we saw that the relationship between the Leverage and the P/E is about a M-shape. P/E increases as the Leverage increases from Decile 1 to 3. P/E decreases from the highest, Decile 3, to Decile 5, and increase again to Decile 9. For the companies with the highest Leverage, their P/E is the lowest.

Figure 13: Scatter Diagram of the Overall CAR and P/E

The relationship between the P/E and the cumulative abnormal returns. For a 10x increase in the P/E, the CAR decrease by 4%.

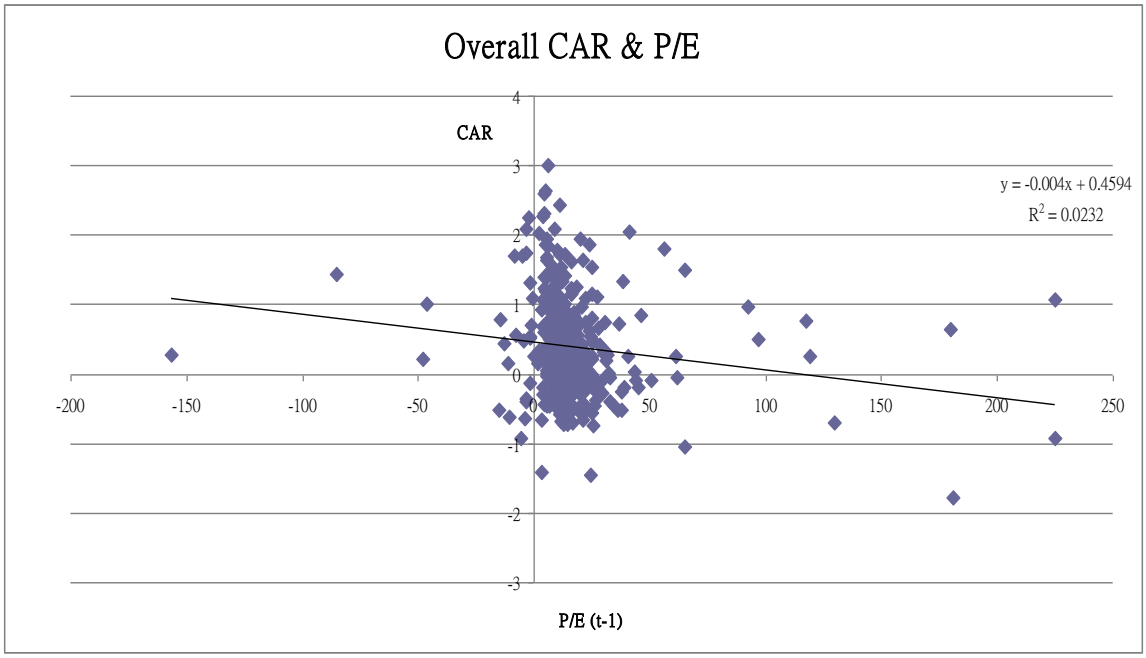
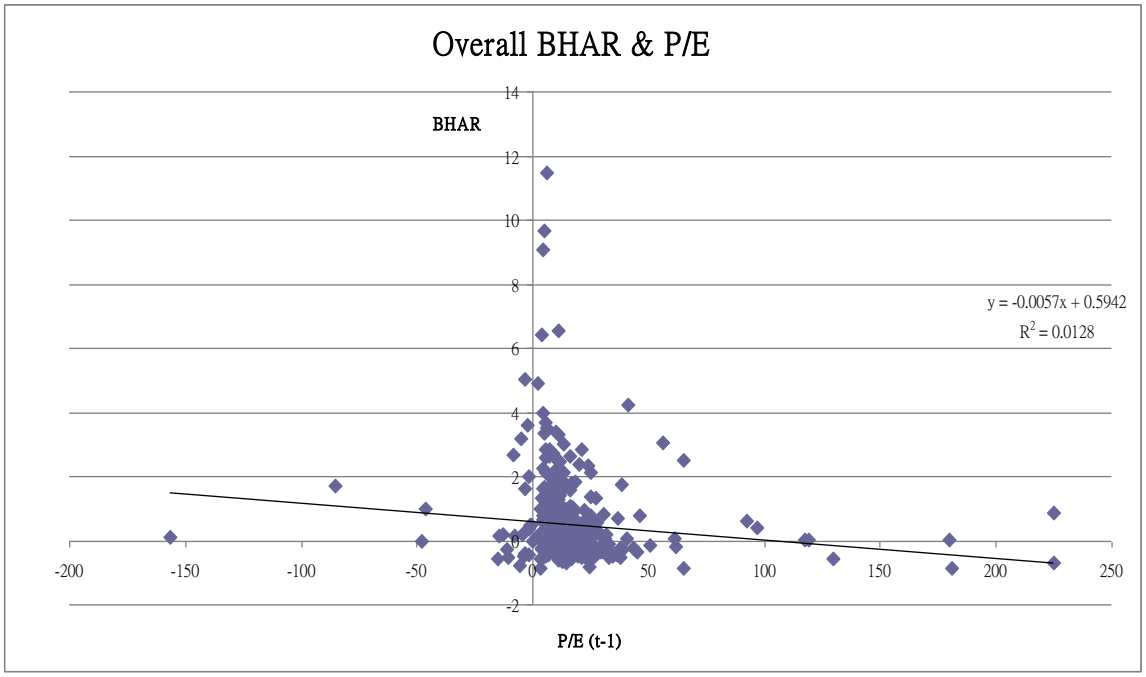


Figure 14: Scatter Diagram of the Overall BHAR and P/E

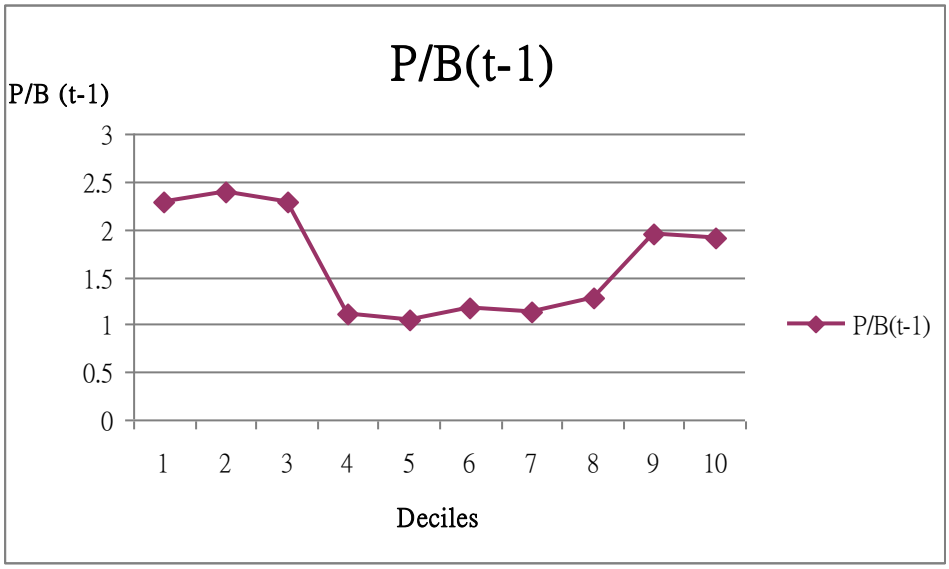
The relationship between the P/E and the buy-and-hold abnormal returns. For a 10x increase in the P/E, the BHAR decreases by 5%.



We then looked at the P/E ratio to the abnormal returns. From the above two Figures, we saw that there is a negative relationship between P/E and the abnormal returns. The lower the P/E, the higher the abnormal returns, and vice versa. For a 10x increase in P/E, the CAR decreases by 4% and the BHAR decreases by 5%.

Figure 15: P/B of the Overall Samples

The relationship between the P/B (t-1) and the levels of the debt-to-equity ratio.



The data of P/B is from Thomson's Datastream as well. We used P/B(t-1) for year t calculation. The average P/B for Decile 1 to 10 are 2.3x, 2.4x, 2.3x, 1.1x, 1.1x, 1.2x, 1.1x, 1.3x, 2.0x, and 1.9x respectively. From Decile 1 to 3, P/Bs are the highest among others. P/Bs are low from Decile 4 to Decile 7. The P/B increases from Decile 8 and stay high at Decile 9 and 10. Decile 2 has the highest and Decile 5 has the lowest average P/B. From the above Figure, we see that the relationship between the Leverage and the P/B is about a U-shape. The P/B is high when the company has very low or high Leverage, and the P/B is low when the Leverage is moderate.

Figure 16: Scatter Diagram of the Overall CAR and P/B

The relationship between the P/B and the cumulative abnormal returns. For a 1x increase in the P/B, the CAR decreases by 2%.

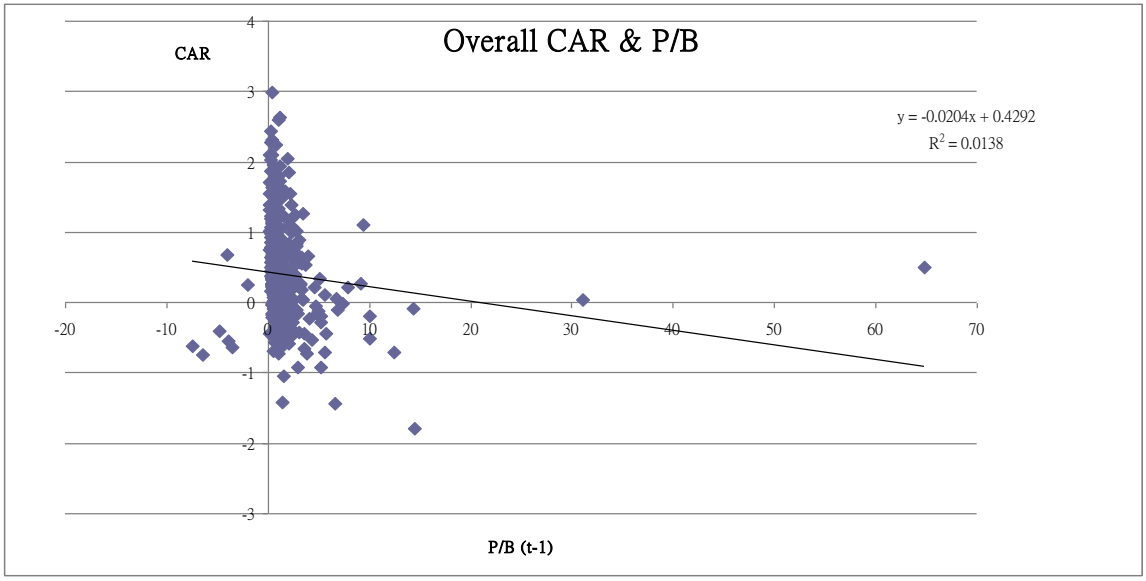
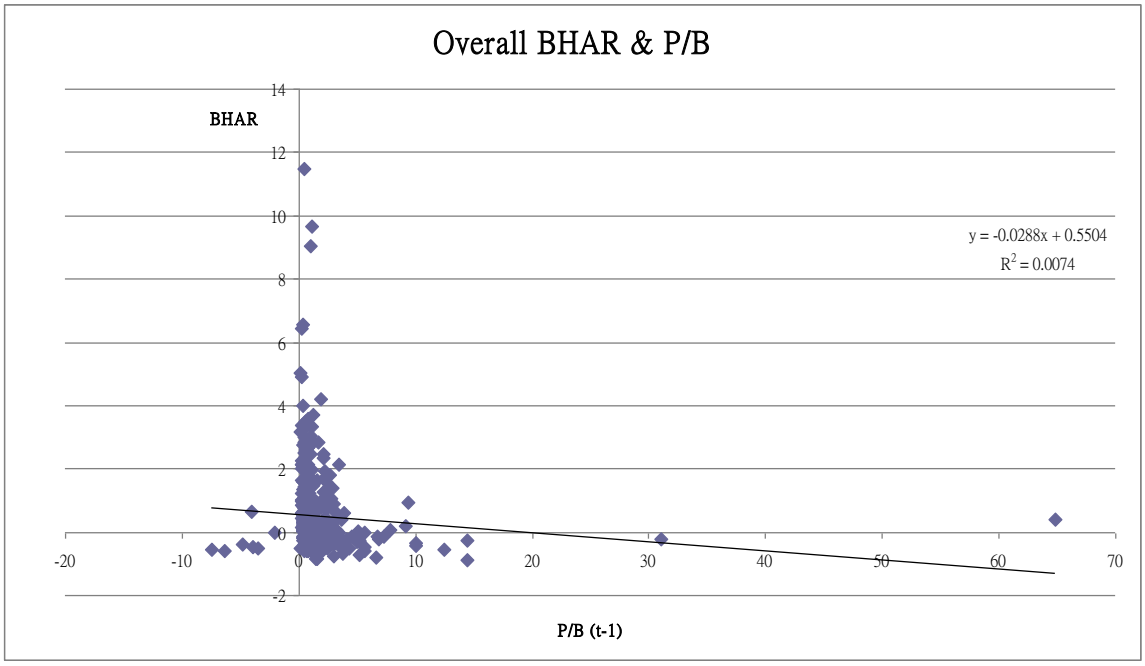


Figure 17: Scatter Diagram of the Overall BHAR and P/B

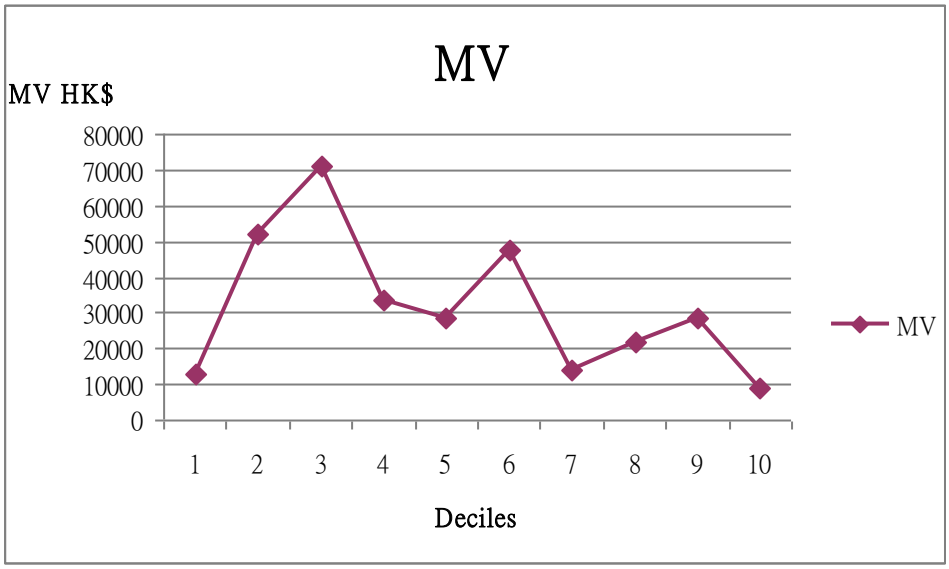
The relationship between the P/B and the buy-and-hold abnormal returns. For a 1x increase in the P/B, the BHAR decrease by 2.8%.



Next, we looked at the P/B ratio to the abnormal returns. From the above two Figures, we see that there is a negative relationship between the P/B and the abnormal returns. The lower the P/B, the higher the abnormal returns, and vice versa. For a 1x increase in the P/B, the CAR decreases by 2% and the BHAR decrease by 2.8%.

Figure 18: MV of the Overall Samples

The relationship between the Market Value and the levels of the debt-to-equity ratio.



We calculated the market value from the method we stated above in "Data and Methodology". We used the MV(April 30, year t) for year t calculation. The averages MV for Decile 1 to 10 are 12,620.23, 52,046.98, 71,102.21, 33,618.12, 28,456.92, 47,571.88, 14,571.43, 21,579.71, 28,540.38, and 8,878.81 respectively (in millions Hong Kong dollar). The average MV increases from Decile 1 to 3. There is a weak downward trend from Decile 3 to 10. Large companies tend to have low to moderate level of debt, and small companies tend to have either high or low debt.

Figure 19: Scatter Diagram of the Overall CAR and MV

The relationship between the Market Value and the cumulative abnormal returns.

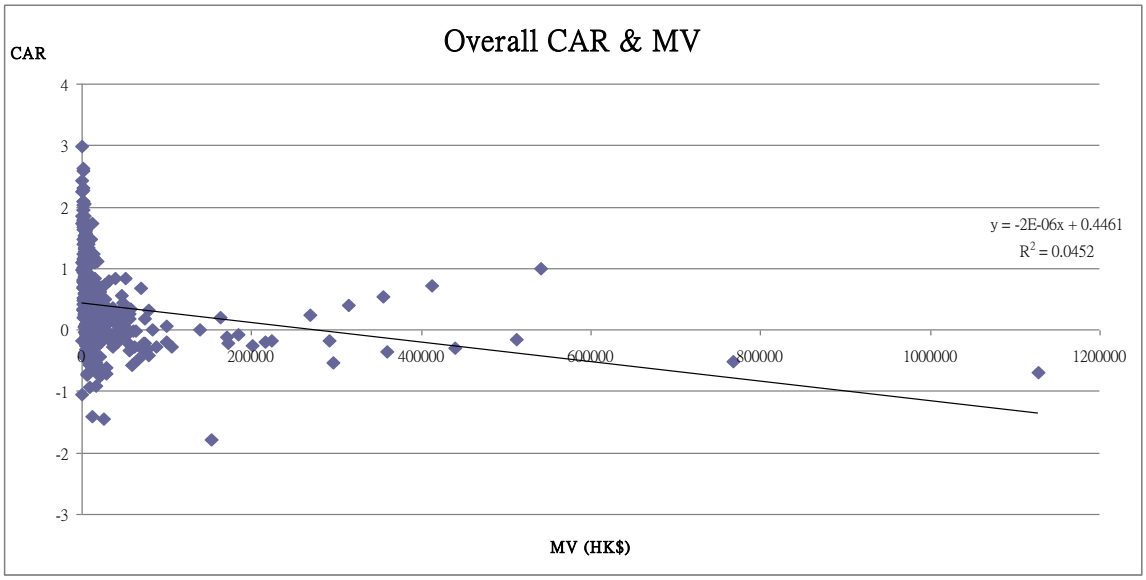
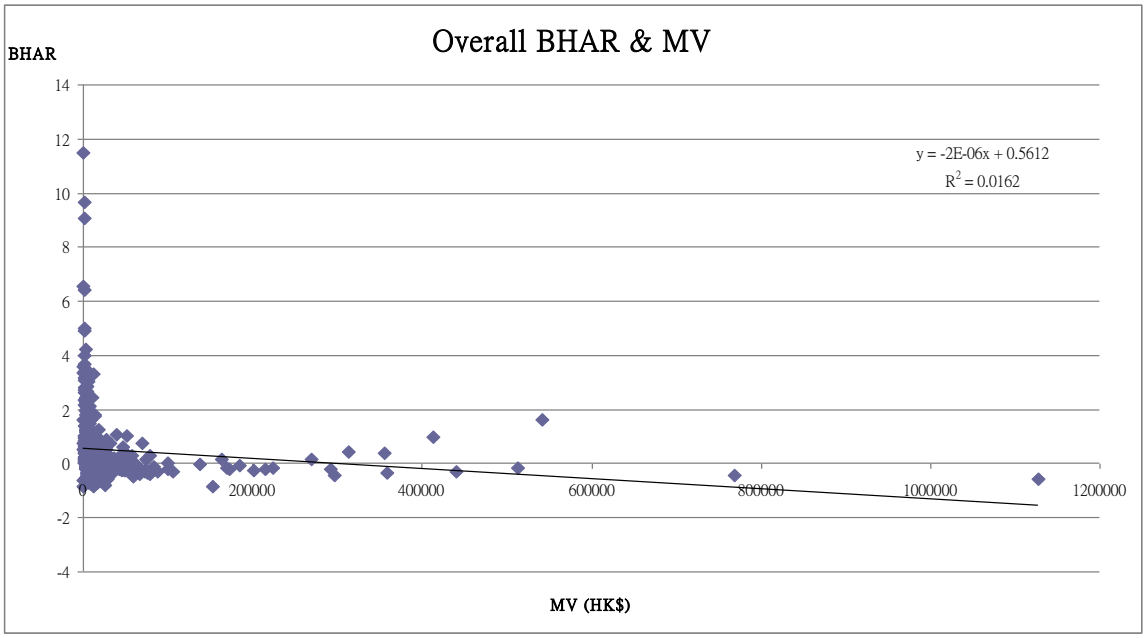


Figure 20: Scatter Diagram of the Overall BHAR and MV

The relationship between the Market Value and the buy-and-hold abnormal returns.



The last one we looked at is the MV to the abnormal returns. From the above two Figures, we also see that there is a negative relationship between the MV and the abnormal returns. The lower the MV, the higher the abnormal returns, and vice versa. From the scatter graphs, we found out that the P/E, the P/B, and the MV are useful in finding abnormal returns.

We compared the usefulness of the ratios by combining any two of the ratios to form portfolios. The original idea was from Muradoglu, Bakke, and Kvernes (2005). On top of the comparison of gearing ratio with other ratios, we extended it to the comparison between the P/E, the P/B, and the MV.

Table 8: CAR by Different Combined Strategies

The cumulative abnormal returns and the T-stat of the combined strategies.

	CAR	T-stat (CAR)
Low P/E, Low MV	89.8%	12.48
Low P/B, Low MV	89.6%	13.63
High Leverage, Low MV	81.2%	11.68
Low P/E, Low P/B	66.8%	9.32
Low Leverage, Low MV	63.3%	9.71
High Leverage, Low P/B	61.1%	8.67
High Leverage, Low P/E	59.2%	7.58
Low Leverage, Low P/E	53.7%	8.51
Low Leverage, Low P/B	53.6%	8.83
Low P/E, High P/B	45.8%	6.66
High P/B, Low MV	43.3%	6.04
High P/E, Low MV	42.4%	6.83
High P/E, Low P/B	38.1%	6.74
Low P/B, High MV	27.1%	5.84
High Leverage, High P/E	23.4%	3.81
Low P/E, High MV	22.8%	4.35
Low Leverage, High P/B	22.0%	3.80
Low Leverage, High P/E	21.9%	3.97
High Leverage, High P/B	21.5%	3.12
Low Leverage, High MV	12.3%	2.74
High P/E, High P/B	7.5%	1.32
High P/E, High MV	3.2%	0.68
High Leverage, High MV	1.3%	0.26
High P/B, High MV	-1.9%	-0.40

We first tested the cumulative abnormal returns. The results are listed and sorted by the CAR, from the highest to the lowest, at the table above. The top three winners are Low P/E & Low MV (89.8%), Low P/B & Low MV (89.6%), and High Leverage & Low MV (81.2%). All three combinations have Low Market Value strategy. The top three losers are High P/B & High MV (-1.9%), High Leverage & High MV (1.3%), and High P/E & High MV (3.2%). All three combinations have High Market Value strategy.

From the combinations in the list, we see that low P/E and low P/B, besides low MV, are the characteristics that generate high abnormal incomes, and vice versa. We also see High Leverage and Low Leverage at both sides of abnormal returns. If we divide the table in two parts, we would see High or Low Leverage with Low P/E, Low P/B, or Low MV at the top half, and see High or Low Leverage with High P/E, High P/B, or High MV at the bottom half. Market Value, MV, seems to be the best ratio compared to others for searching stocks with high cumulative abnormal returns. The Leverage in our research is not a strong indicator of finding abnormal returns.

Table 9: BHAR by Different Combined Strategies

The buy-and-hold abnormal returns and the T-stat of the combined strategies.

	BHAR	T-stat (BHAR)
Low P/E, Low MV	137.9%	6.81
Low P/B, Low MV	120.4%	7.20
High Leverage, Low MV	113.8%	6.21
Low P/E, Low P/B	93.4%	5.47
High Leverage, Low P/E	92.0%	4.95
High Leverage, Low P/B	80.9%	4.93
Low Leverage, Low MV	78.6%	5.80
Low P/E, High P/B	65.5%	4.36
Low Leverage, Low P/B	64.5%	5.13
High P/B, Low MV	62.2%	3.98
Low Leverage, Low P/E	53.7%	5.12
High P/E, Low MV	41.0%	4.45
High P/E, Low P/B	36.2%	4.55
High Leverage, High P/B	31.3%	2.55
Low Leverage, High P/B	24.3%	2.95
Low Leverage, High P/E	21.8%	3.01
Low P/B, High MV	21.3%	3.38
Low P/E, High MV	21.0%	3.13
High Leverage, High P/E	20.2%	2.57
Low Leverage, High MV	10.2%	1.94
High P/E, High P/B	5.9%	0.87
High P/E, High MV	1.1%	0.25
High Leverage, High MV	-1.5%	-0.27
High P/B, High MV	-2.8%	-0.63

We then studied the buy-and-hold abnormal returns. The results are listed and sorted by the BHAR, from the highest to the lowest, at the table above. The top three winners are Low P/E & Low MV (137.9%), Low P/B & Low MV (120.4%), and High Leverage & Low MV (113.8%). Low Market Value strategy is used in all three combinations. The top three losers are High P/B & High MV (-2.8%), High Leverage & High MV (-1.5%), and High P/E & High MV (1.1%). High Market Value strategy is used in all three combinations. The rankings of both the winners and losers are the same as the ones in CAR.

From the combinations in the list, we also see that low P/E and low P/B, besides low MV, are the characteristics that generate high abnormal incomes, and vice versa. We also see High Leverage and Low Leverage at both sides of abnormal returns. If we divide the table in two parts, we would see High or Low Leverage with Low P/E, Low P/B, or Low MV at the top half, and see High or Low Leverage with High P/E, High P/B, or High MV at the bottom half. Market Value, MV, seems to be the best ratio compared to others for searching stocks with high buy and hold abnormal returns. Again, Leverage in our study is not a strong indicator of finding abnormal returns. Our findings are consistent with Lam 2002. He found in his research that firm size, book-to-market, and earnings-price capture cross section return variation in the Hong Kong stock market. Our findings are also consistent with the Fama and French (1992, 1995, and 1996). Portfolios form based on book-to-market and the size explain return anomalies better. Instead of using the book-to-market ratio, we used the available P/B.

CONCLUSIONS

We used the data over the period 1998 to 2008 in the Hong Kong stock market for this research. In contrast with the study on the U.K. market done by Muradoglu and Whittington in 2001, we found out that Leverage Ratios could not have been used to predict cumulative abnormal returns (CAR) or buy-and-hold abnormal returns (BHAR), even though the correlation of the two observing periods is high at 0.73. For the data we used, the correlation between Leverage Ratios and abnormal returns is not significant. The abnormal returns show random pattern to the Leverage level in the seven 3-year period and the overall sample.

We found out that other commonly used ratios or indicators, the Price-to-Earnings ratio (P/E), the Price-to-Book ratio (P/B), and the Market Value (MV), have stronger power to search for abnormal returns than the Leverage Ratio. All the P/E, the P/B, and the MV are negatively correlated to the abnormal returns.

We also put the Leverage, the P/E, the P/B, and the MV in pairs for forming investment strategies. We found out that the P/B and the MV are the best partners in looking for abnormal returns. Low P/B with low MV generates the highest CAR and BHAR, and high P/B with high MV generates the lowest CAR and BHAR. In order to receive higher than average abnormal returns, investors are better to look at companies with low P/E,

low P/B, and low MV. Our findings are consistent with Lam 2002. He found in his study firm size, the book-to-market and earnings-price capture cross section return variation in his tested period in the Hong Kong stock market. Our findings are also consistent with the Fama and French (1992, 1995, and 1996). Portfolios form based on book-to-market and the size explain return anomalies better.

The sample size of this study is relatively small, compared to Muradoglu and Whittington (2001) (1:2.83). The size and the number of listed company of the two markets are different as well. From the World Federation of Exchanges and London Stock Exchange, the ratio of the market capitalizations of the Hong Kong and the UK markets is about 1:2.42. And the ratio of the number of listed company is 1:2.96, which is close to the ratio in sampling. The Hong Kong stock market has been expanding for the last 10 years. The number of listed company increased to 1,090 (+60.29%). In this research we deleted 80 companies from the Hang Seng Composite Index because of new listed. For future similar studies on the market, part or all of the deleted companies would be included for increasing the sample size.

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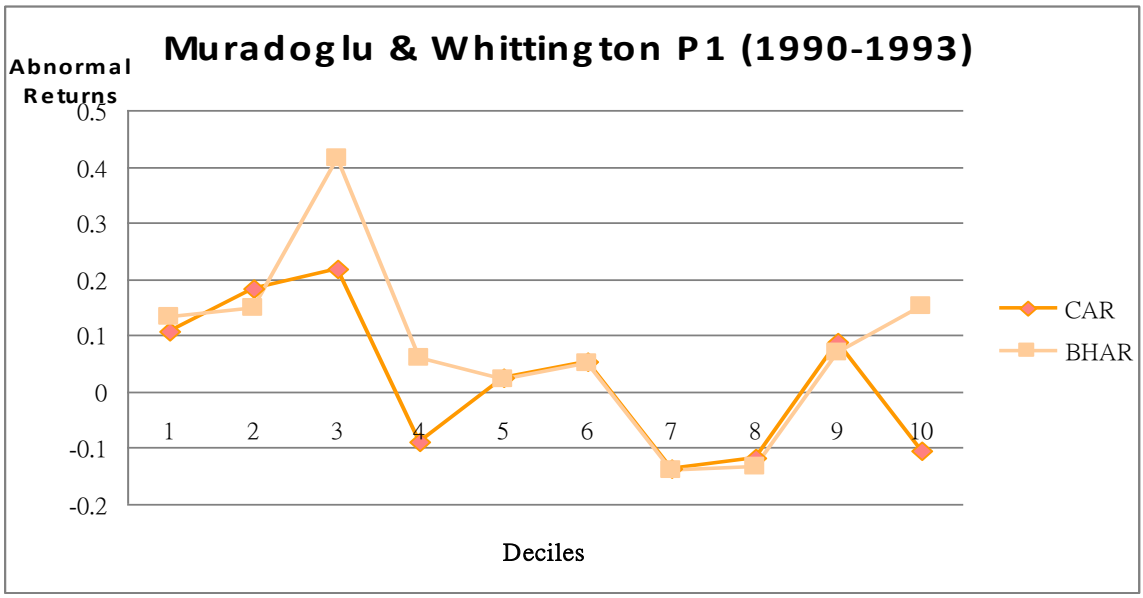
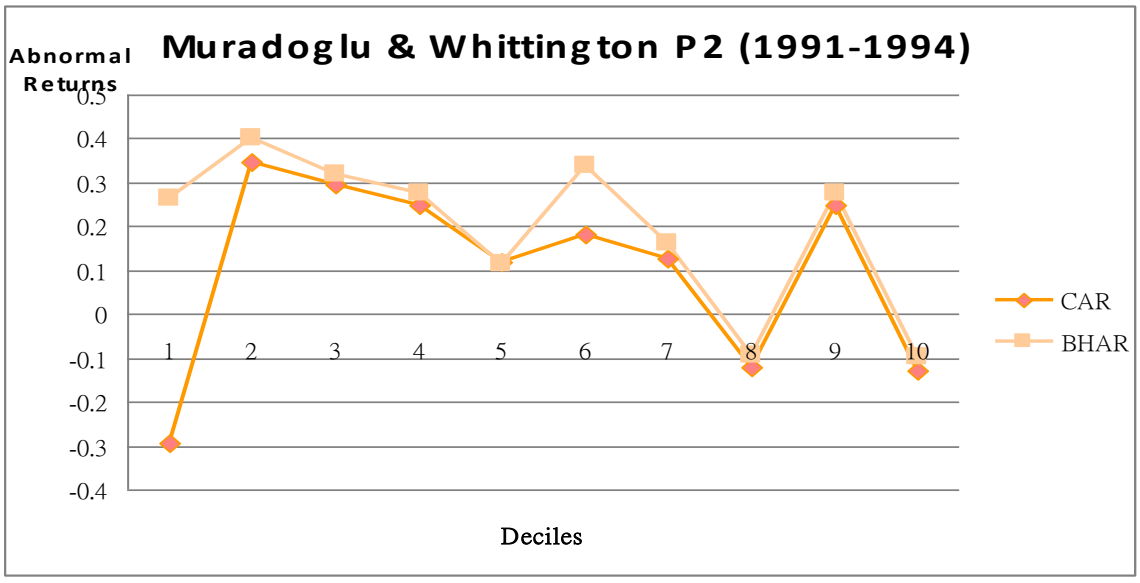
EXHIBIT 1 MURADOGLU & WHITTINGTON SUB-PERIOD CAR & BHAR

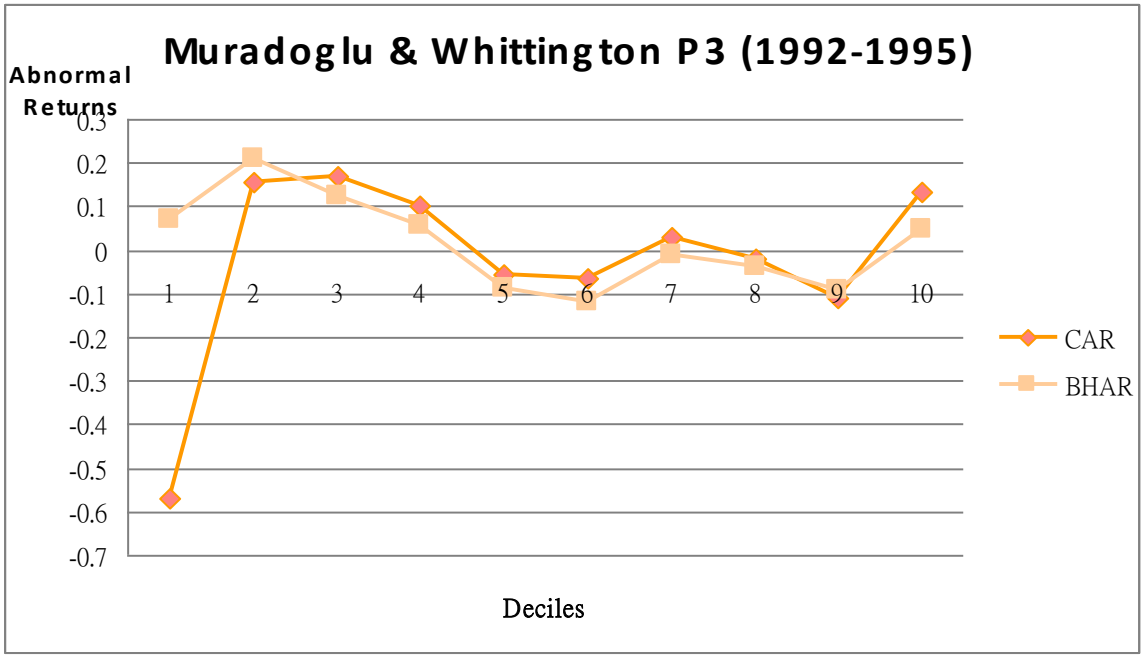
Muradoglu & Whittington Period 1 (1990-1993) CAR & BHAR



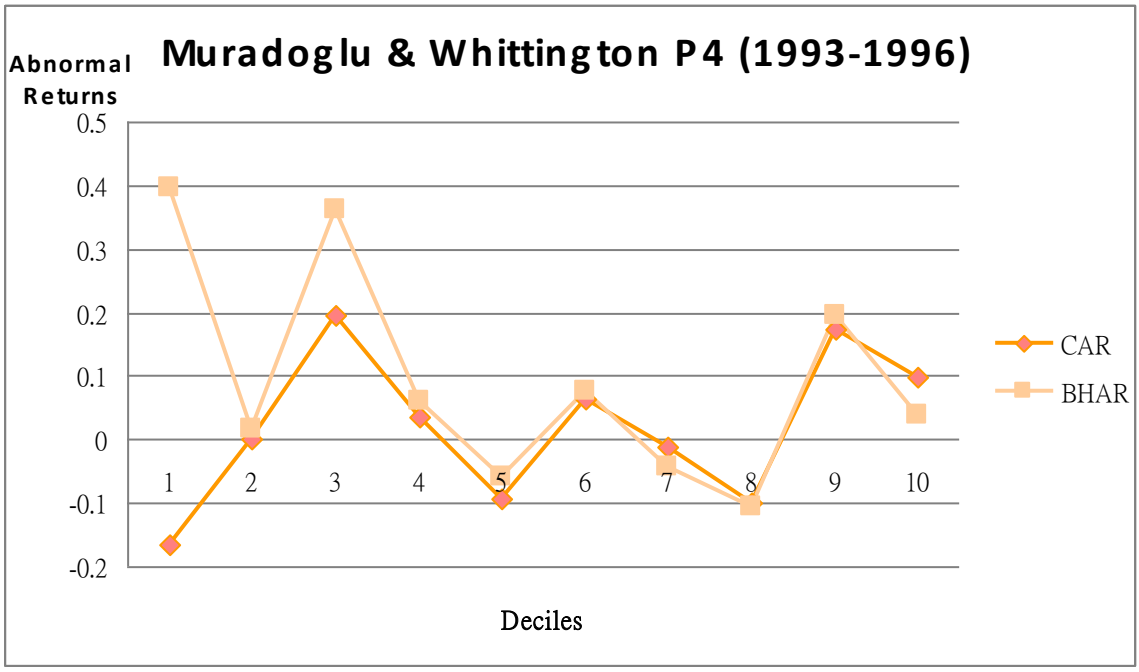
Muradoglu & Whittington Period 2 (1991-1994) CAR & BHAR



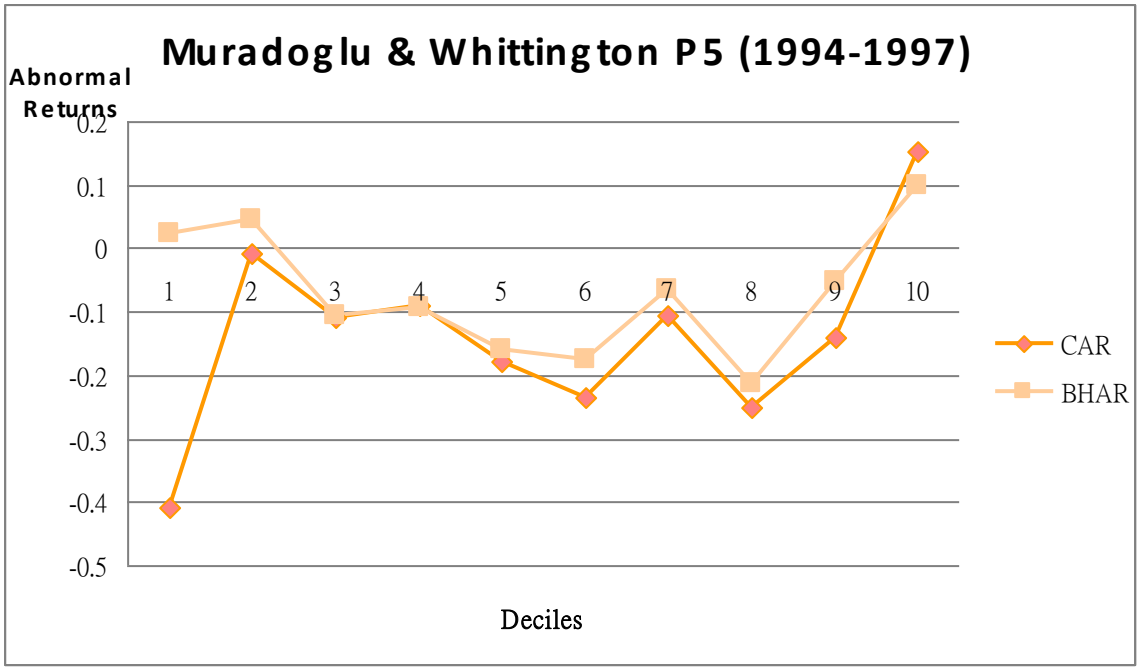
Muradoglu & Whittington Period 3 (1992-1995) CAR & BHAR



Muradoglu & Whittington Period 4 (1993-1996) CAR & BHAR



Muradoglu & Whittington Period 5 (1994-1997) CAR & BHAR



Muradoglu & Whittington Period 6 (1995-1998) CAR & BHAR