

The performance of value stocks and growth stocks: Hong Kong stock market 1981-2005

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DECLARATION

I, Bo Li, hereby declare that the work contained in this assignment is my own original work and has not previously in its entirety or in part been submitted at any university for a degree.

Signature:



Date: 24/02/2006

Abstract

This paper investigates whether value stocks outperformed growth stocks in the case of the Hong Kong market over the period 1981 to 2005. The firm size effect on this value and growth study was also taken into account. Both whole sample period and sub sample period returns are studied. The difference between value weighted and equally weighted portfolio returns is considered. Finally, the underlying reason why value stocks have a higher return than growth stocks is tested.

Value stocks outperformed growth stocks in most of the years during 1981 to 2005. The paired t-test shows that the mean return spreads between value stocks and growth stocks are greater than zero by a statistically significant margin. The results of two sub sample periods show a consistent value premium. After controlling the firm size effect, value stocks continued to outperform growth stocks within the same firm size groups. The results of value weighted and equally weighted portfolio returns show that the difference in return between value stocks and growth stocks increases when the equally weighted portfolio returns are calculated. Value stocks seem to be fundamentally riskier than growth stocks if standard deviation is used as risk measure. This is confirmed by the special t-test when it is applied to the standard deviation of value and growth portfolios on the basis of value weighted returns. However, it was found that value stocks were not riskier than growth stocks by a statistically significant margin on the basis of equally weighted returns.

Although a value investment strategy could generate higher returns compared with a growth investment strategy, the high transaction costs involved in regularly rebalancing the portfolio needs to be taken into account.

Opsomming

Hierdie dokument ondersoek of die beleggingsprestasie van waarde-aandele hoër as dié van groei-aandele was in die geval van die Hong Kong aandelemerk gedurende die periode 1981 tot 2005. Die effek van maatskappy-grootte is ook in die studie in ag geneem. Daarbenewens is die hele periode, sowel as korter sub-periodes in ag geneem. Die verskil in beleggingsprestasie van portefeuljes wat saamgestel is op grond van die relatiewe markwaarde van die verskillende onderliggende aandele, is bereken, sowel as portefeuljes waar elke onderliggende aandeel dieselfde gewig het. Ten slotte is ondersoek ingestel na die redes waarom waarde-aandele 'n hoër opbrengs as groei-aandele het.

Waarde-aandele het 'n hoër opbrengs as groei-aandele in die meeste van die jare in die periode 1981 tot 2005 gelewer. Die gepaarde t-toets toon dat die verskil in opbrengs tussen waarde- en groei-aandele statisties beduidend is. Die resultate van die 2 sub-periodes toon eweneens 'n konsekwente waarde-premie. Nadat voorsiening vir die effek van maatskappygrootte gemaak is, het waarde-aandele nog steeds beter as groei-aandele gevaar. Die resultate van markwaarde-geweegde en gelyk-geweegde portefeuljes toon dat die verskil in opbrengs tussen waarde- en groei-aandele toeneem in die geval van gelyk-geweegde portefeuljes. Dit wil voorkom asof waarde-aandele meer riskant as groei-aandele is indien standaard-afwyking as risikomaatstaf gebruik word. Hierdie vermoede word bevestig wanneer die spesiale t-toets toegepas word op die standaard-afwyking van waarde- en groei-portefeuljes in die geval van markwaarde-geweegde portefeuljes. Hierdie ondersoek bevind egter dat waarde-aandele nie meer riskant as groei-aandele met 'n statisties

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beduidende marge is nie indien portefeuljes saamgestel word op die basis van gelyke gewigte van die onderliggende aandele.

Alhoewel 'n waarde-beleggingstrategie dus hoër opbrengste as 'n groei-beleggingstrategie kan genereer, moet die hoë transaksiekoste van gereelde portefeuljebalansering in gedagte gehou word.

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Chapter 1

Introduction

1.1 Introduction

Academics and investors often classify stocks into value and growth categories. Value stocks can be defined as stocks with a high ratio of book to market value equity (BV/MV), earnings to price (E/P), and cash flow to price (C/P) or low past returns and sales growth rates. Value stocks normally feature cheap assets and strong balance sheets. Value investing can be traced back to the value investing principles laid out by the well-known Benjamin Graham, who co-authored a famous book on security analysis in the 1930s that has been the foundation for many subsequent security analysts (Charles P. Jones, 2004: 305).

Growth stocks, on the other hand, can be regarded as stocks with a low ratio of book to value equity (BV/MV), earnings to price (E/P), and cash flow to price (C/P) or high past returns and sales growth rates. Investors expect these stocks to perform well in the future, and they are willing to pay high multiples for this expected growth. Recent examples include Microsoft, Cisco Systems, and Intel (Charles P. Jones, 2004: 305).

Numerous empirical studies have documented that value stocks have produced higher returns than growth stocks in the case of the United States stock market (Fama and French (1992, 1993, 1996, 1998), Lakonishok,

Shleifer, and Vishny (1994) and many others). Empirical studies by Chan, Hamao and Lakonishok (1991, 1993) also confirmed that these results apply to the Japanese stock market.

In recent years, further studies have started to provide new evidence from other countries. Capaul, Rowley and Sharpe (1993) compared the performance of value and growth stocks in six different countries for the period January 1981 to June 1992. They found that value stocks outperformed growth stocks both on a nominal and a risk-adjusted basis. Fama and French (1998) found that value stocks outperformed growth stocks in twelve of thirteen major markets (Europe, Australia, the Far East and the United States) during a 20-year period (from 1975 to 1995). Further studies by Bauman, Conover, and Miller (1998) also provided international evidence confirming this result. Chui and Wei's (1998) study provided new evidence supporting results of previous studies in five Pacific-Basin emerging markets.

There are some country-specific studies providing further evidence. Mukherji, Manjeet, and Yong (1997) provided new evidence regarding the Korean stock market. Yen, Sun, and Yan (2002) also found a value premium in the Singapore stock market. A study by Lam (2002) found that there is a value premium in the Hong Kong stock market for the period 1984-1997. Dimson, Nagel, and Quigley (2003) found a strong value premium in the United

Kingdom stock market.

While there has been some agreement that value stocks outperform growth stocks, the interpretation of why they have done so is still very controversial.

There are four interpretations, which were summarized by Davis, Fama and French (2000):

- This value premium is a chance result unlikely to be observed in another sample. (Black (1993), MacKinlay (1995)).
- This value premium is compensation for risk in a multifactor version of Merton's (1973) intertemporal capital asset pricing model (ICAPM) or Ross's (1976) arbitrage pricing theory (APT).
- This value premium is due to investor overreaction to company performance. (DeBondt and Thaler (1987), Lakonishok, Shleifer, and Vishny (1994))
- This value premium is due to value stocks having similar characteristics, for example they are in the same industry. (Daniel and Titman (1997))

In this paper, my empirical study will take a closer look at the Hong Kong stock market for a longer sample period (1980-2005). The sample stocks are sorted into value portfolios and growth portfolios by only using the book to market value equity ratios, and then the performance of value stocks and growth stocks is examined by calculating different returns. Furthermore, I have

investigated whether value stocks are riskier than growth stocks by looking at the risk measurement of standard deviation. Lastly, I will provide a brief interpretation of my study results.

1.2 Objectives of this study

The academic objective of this study is to investigate whether the value premium, which has been documented in other markets, also exists in the Hong Kong stock market for the period 1980 to 2005.

Previous studies on the Hong Kong market are very limited. When academics found that there is a value premium in the global market, they included the Hong Kong market, but they did not study the Hong Kong market in detail. Lam (2002) and Yen, Sun, and Yan (2002), studied the Hong Kong market by using data from the Pacific- Basin Capital Market (PACAP) database, but the period covered in their study is relatively short compared with previous other studies. My study covers a 25-year period from 1980 to 2005, which is a much longer and updated sample period compared with other studies of the Hong Kong market. Moreover, my study will add new evidence of the positive relationship between book to market value equity ratios and stock returns.

The practical objective of my study is to provide a good understanding of stock

return behavior in the Hong Kong market. This will assist global investors who have an interest in the Hong Kong stock market, when they decide on their investment strategy.

1.3 Brief overview of the Hong Kong stock market

The Hong Kong stock market was started in 1891. It is one of the most established stock markets in the world, classified by the International Finance Corporation (IFC) as a developed market. The Hong Kong stock market is the second largest stock market in Asia and the 6th largest in the world. Non-residents can efficiently trade stocks in Hong Kong. (Online)

The Hong Kong stock market is directly linked to the bullish China economy, which has been growing at a rate of 8-13% per year during the last decade. There is an increasing number of major Chinese corporations whose stocks are listed on the Hong Kong stock market (the H Share Companies) (Online). One of the best ways to invest in China is to purchase stocks of Chinese companies listed in Hong Kong.

In Hong Kong there is a strong presence of the world's major financial institutions: 167 foreign banks including 85 of the world's top 100 banks, 323 overseas securities and commodity trading companies, 122 overseas insurers, and 1,182 unit trusts and mutual funds (online).

So this value and growth empirical academic study cannot miss this important

market. This study will add powerful new country-specific evidence to confirm the previous study results: value stocks outperform growth stocks in the long term. My study results also have some strategic implications for institutional and individual investors who are interested in investing in Hong Kong market.

1.4 Research questions

My study covered the Hong Kong stock market over a period of 25 years and followed the Fama and French study approach with adjustments where necessary to account for characteristics of the Hong Kong stock market. I answered the following research questions.

The primary research question is whether value stocks outperform growth stocks by investigating whether there is a positive relationship between stock returns and the ratio of book to market value of individual stocks.

There are some secondary research questions, which were developed based on the primary question:

- After consideration of firm size, do value stocks still outperform growth stocks?
- Are value stocks riskier than growth stocks in the Hong Kong stock market? (My study only focused on standard deviation as a risk measurement, which is a very limited study and cannot fully answer this

question).

1.5 Chapter outline

The rest of the paper proceeds as follows: the next chapter will present the detail of my literature study relevant to my thesis. Chapter 3 will discuss the data and research methodologies used in my study. Chapter 4 will discuss my test results and investigate the relationship between average stock returns and book-to-market equity ratio. In chapter 5 I will summarize and conclude this paper.

Chapter 2

Literature Review

This chapter reviews the literature relevant to the main research question in my thesis. First, there is a brief overview of the different asset-pricing anomalies, which were extensively investigated by earlier studies. Second, the literature about value and growth stocks in different countries is reviewed. Lastly, the different interpretations of why value stocks outperform growth stocks are reviewed. The chapter concludes with a summary of the potential research issues.

2.1 The early studies of the asset-pricing anomaly

Sharpe (1964), Lintner (1965), and Black (1972) developed the Capital Asset Pricing Model (CAPM). The single factor Capital Asset Pricing Model (CAPM) demonstrates that the cross-sectional stock returns are linearly related to the market beta (β), with an intercept equal to zero. However, soon after the formation of the CAPM model, numerous academics started to perform empirical tests on the robustness of this model in explaining stock returns. Several asset-pricing anomalies were found.

Basu (1977) tested the relationship between earnings to price ratios (E/P) and stock returns. He found that stocks with a higher E/P ratio produced higher returns than stocks with a lower E/P ratio. Banz (1981) tested the firm size effect. Firm size was measured by the market value of equity. He found that

small firm size stocks outperformed large firm size stocks. Basu (1983) confirmed the higher returns for the stocks with a higher E/P ratio even after the firm size effect was taken into account.

Rosenberg, Reid and Lanstein (1985) also presented evidence against the CAPM model. They found that stocks with high book to market value equity ratios (BV/MV) had significantly higher returns than stocks with low BV/MV. Since the sample period for this study was fairly short (1973-1984), this empirical study did not receive as much attention as some of the other studies. However, when Chan, Hamao and Lakonishok (1991) found similar results in the Japanese stock market, BV/MV began to receive serious attention as a variable that could be used to explain stock returns.

De Bondt and Thaler (1987) found that past "loser" portfolios outperformed past "winner" portfolios. This provided further evidence against the one factor CAPM model. The group with higher cumulative excess returns is defined as "winner" and the group with lower cumulative excess returns is defined as "loser".

Laxmi Chand, Bhandari (1988) tested another asset pricing anomaly: the debt to equity ratio (D/E). They found that stocks with a higher D/E ratio had higher returns than stocks with a lower D/E ratio.

2.2 Value and growth studies

According to the numerous studies on this subject, value stocks can be defined as stocks with a higher ratio of book to market value equity (BV/MV), earnings to price (E/P), cash flow to price (C/P) or stocks with a lower past return and expected sales growth rate. On the other hand, growth stocks can be regarded as stocks with the opposite characteristics. Most empirical studies found that value stocks outperformed growth stocks in the case of the U.S. stock market. In recent years, further empirical studies confirmed the U.S. findings in the case of other stock markets. However, there are still several financial economists who are not convinced by this conclusion.

2.2.1 Fama and French's studies of the United States market

Fama and French's (1992) study can be regarded as a landmark for this subject. They investigated the joint roles of the market beta (β), firm size, leverage, earnings to price ratio (E/P), and book to market value equity ratio (BV/MV) in the explanation of cross-sectional returns of the NYSE, AMEX, and NASDAQ stocks over the period 1963 to 1990. All the accounting information and market data were collected from the Center for Research in Security Prices (CRSP) and the COMPUSTAT database.

Fama and French followed Fama and MacBeth's (1973) cross-sectional

regression approach. Each month the cross-sectional stock returns were regressed on these different fundamental variables, which were hypothesized to explain expected stock returns. The time-series of the monthly regression slopes then provided standard tests whether different fundamental variables are statistically significant in explaining stock returns.

Fama and French first performed an informal test on the explanatory power of firm size and market beta for the average stock return respectively. They first formed 10 portfolios based on firm size, and then stocks in the same size group were subdivided into another 10 portfolios based on each stock's pre-ranking β . The 24 to 60 monthly returns prior to the portfolio formation date were used to estimate the pre-ranking β . The equal-weighted monthly returns were calculated to compare the performance of each individual portfolio. Post-ranking β for each stock was equal to the portfolio's β to which they belonged. This portfolio post-ranking β was estimated on the basis of the average monthly returns of the size- β portfolios. The value weighted NYSE, AMEX, and NASDAQ indices were used as a proxy for the market portfolio during the period July 1963 to December 1990.

On the basis of the above informal test, Fama and French found that the small firm size stocks with a higher post-ranking β had higher returns than the large firm size stocks with a lower post-ranking β . This seems to be consistent with

the CAPM model. However, the result of double-sorted portfolios showed no relationship between the average return and post-ranking β . Even the result of the single pre-ranking β -sorted portfolios showed a flat relationship between the average return and post-ranking β .

Fama and French further tested the power of all these fundamental variables in explaining the cross-sectional stock returns by following the Fama- MacBeth (1973) regression approach. They estimated the average slopes of the market beta, firm size, leverage (total asset/market equity (A/ME) and total asset/book equity (A/BE)), earnings to price ratio (E/P), and book to market value equity (BV/MV) over the period July 1963 to December 1990. The results showed that the slope for the market β was 0.15 with a standard error of 0.46. This standard error is relatively low compared with those of other fundamental variables. The other variables all showed a consistent slope and the absolute standard errors ranged from 2.28 for E/P to 5.71 for BV/MV. When all the fundamental variables were combined to explain stock returns, the regression results showed that the firm size and BV/MV ratio together dominated other variables in explaining stock returns and captured the variation of stock returns.

Fama and French concluded:

- This empirical test does not support the CAPM model, in which the average stock returns are positively related to market beta only.

- The firm size and book to market value equity ratio together seem to capture the cross sectional variation of the average stock returns over the period 1963 to 1990 in the U.S stock market.

Fama and French (1993) performed an asset-pricing test by using Black Jensen, and Scholes' (1972) time-series regression approach. The excess returns (monthly stock returns minus one-month Treasury bill rate) were regressed on those fundamental variables instead of the monthly stock returns. They found that a three-factor model could be used to explain the cross-sectional stock returns of the portfolios sorted by firm size and book to market value equity ratio (BV/MV). This model is represented by the following equation:

$$E(R_i) - R_f = B_i [E(R_m) - R_f] + S_i (\text{SMB}) + H_i (\text{HML}) \quad (2.1)$$

Where $E(R_i) - R_f$ is the expected return on a portfolio in excess of the risk-free rate of return, which can be explained by the sensitivity to the following three factors: (1) the expected excess return on a market portfolio $E(R_m) - R_f$; (2) the return difference between a small size stock portfolio and a large size stock portfolio (SMB, small minus big), which could also be regarded as a zero-investment portfolio of long small size stocks and short large size stocks; (3) The return difference between a portfolio with high BV/MV and a portfolio

with low BV/MV (HML, high minus low), which could be regarded as another zero-investment portfolio of long high BV/MV stocks and short low BV/MV stocks. B_i , S_i and H_i are the coefficients in the time series regression.

Fama and French (1994) found that the three-factor pricing model could also be used to explain industry returns. Distressed industries had higher coefficients on the HML factor. Conversely, strong industries had lower coefficients on the HML factor.

In 1996, Fama and French extended their asset pricing test to the following variables: the earning to price ratio (E/P), cash flow to price ratio (C/P), sales growth, the reversal of long-term returns (documented by DeBondt and Thaler (1985)) and short-term returns (documented by Jegadeesh and Titman (1993)). They hypothesized that the three-factor pricing model could also be used to explain portfolio returns sorted by the above fundamental variables. In order to test this hypothesis, they revised the above equation to the following:

$$R_i - R_f = \alpha_i + B_i (R_m - R_f) + S_i(\text{SMB}) + H_i(\text{HML}) + \varepsilon_i \quad (2.2)$$

Where: α_i is the intercept for this regression.

If this hypothesis is true, the intercepts should be close to zero for all portfolios

sorted by all different variables and the loadings on the three factors should show similar patterns to those found in their previous study.

Their test results showed that the intercepts for the portfolios sorted by E/P, C/P, sales growth, and long term past return were close to zero. They found that the portfolios with low E/P, low C/P, high sales growth and high long-term past return (winner) had negative coefficients on the HML factor. This is consistent with the negative HML factor coefficient of the portfolios with a low book to market value equity ratio. Conversely, the portfolios with high E/P, high C/P, low sales growth and low long-term past return (loser) had positive coefficients on the HML factor, which is consistent with the positive HML factor coefficients of the portfolios with a high book to market value equity ratio. However, their test results showed that the three-factor model could not explain the continuation of short-term returns, which were documented by Jegadeesh and Titman (1993). They found that the stocks with low short-term past returns had positive coefficients on the HML factor and the stocks with high short-term past returns had negative coefficients on the HML factor.

Fama and French further formed two-dimensional portfolios, which were suggested by Lakonishok, Shleifer, and Vishny (1994). They found that sorting stocks based on two fundamental variables could more accurately distinguish between strong and distressed stocks and produced larger average return

spreads. Their findings showed that the three-factor model had little trouble in explaining the two-dimensional portfolio returns.

In conclusion, the series of studies by Fama and French confirm that value stocks do outperform growth stocks. The three-factor model seems to explain most of the portfolio returns. At the same time they also suggested, "The three-factor model is just a model. It surely does not explain stock returns on all securities and portfolios" (Fama and French, 1996: 82). They found that this three-factor model could not be used to explain the continuation of short-term returns, which was documented by Jegadeesh and Titman (1993).

2.2.2 Other studies of the U.S. market

The series of studies by Fama and French have prompted a number of subsequent empirical studies on this subject in the U.S. stock market. They studied the U.S. stock market by using different data sources, different methods or different definitions of value and growth. Some of the results of these empirical studies are even inconsistent with Fama and French.

Lakonishok, Shleifer, and Vishny (LSV) (1994) used past sales growth, cash flow to price ratio (C/P) and earnings to price ratio (E/P) to classify value stocks and growth stocks. In their study the stocks with a high past sales growth rate

are regarded as growth stocks and the stocks with a low past sales growth rate are regarded as value stocks. The stocks with high C/P and E/P ratios are regarded as value stocks and the opposite is growth stocks.

LSV formed both one-dimensional and two-dimensional portfolios. The portfolios were purchased and held for 5 years. They found that return spreads between value stocks portfolios and growth stocks portfolios were significantly positive over the period April 1968 to April 1990. They further tested the result by only focusing on the large stocks. They found that the result was consistent with the whole sample study. Their further regression analysis demonstrated that past sales growth and the C/P ratio captured other variables in explaining stock returns. This result is inconsistent with Fama and French. In addition, they even found the book to market value equity ratios were less powerful in explaining stock returns.

Barbee, Mukherji and Raines (1996) argued that maybe some other variables, which were not included by Fama and French, could have significant explanatory power of stock returns. After considering some other studies, they presumed that maybe sales to price ratio (S/P) and debt to equity ratio (D/E) had more power in explaining stock returns.

They followed Fama and French's approach and included BV/MV ratio, firm

size, S/P ratio and D/E ratio in their regression test. Their results showed that S/P and D/E dominated the roles of the BV/MV ratio and firm size in explaining stock returns over the period 1979 to 1991. However, they also pointed out that their findings needed to be tested by using a new data source.

Jensen, Johnson, and Mercer (1997) re-examined the relationships between stock returns, firm size and the book to market value equity ratio (BV/MV) by using the NYSE and AMEX data. The study covered the period from 1965 to 1994. They found that the small firm size stocks had significantly higher returns than the large firm size stocks. They also found a value premium over this sample period. Furthermore, they tested the influence of monetary policy on this relationship. They found that small firm stocks (value stocks) produced statistically significantly higher returns than large firm stocks (growth stocks) only during expansive monetary periods. However, in a restrictive environment there was little evidence to support the higher returns of the small firm size stocks and value stocks. In addition, they found that stock returns in an expansive monetary environment greatly exceed stock returns in a restrictive environment. This finding implies that macroeconomic indicators seem to have an effect on the relationship between fundamental variables and stock returns.

Lougharan (1997) found that there was a significant positive relationship between stock returns and book to market value equity ratio (BV/M) in the

small firm size stocks group. However, he could not find a significant positive relationship in the large firm size stocks group. He also indicated that the small firm size stocks had low liquidity, so the value approach might not be a practical investment option for most investors. This study left a question: is there a value premium in the medium firm size stocks group?

Dhatt, Kim, and Mukherji (1999) focused only on those stocks that are used to compose the Russell 2000 Index, which "excluded the 1000 largest stocks and included the stocks that are ranked 1001 through 3000 in terms of total market capitalization" (Dhatt, Kim, and Mukherji, 1999:61). The stocks included in this study can therefore be regarded as the medium firm size stocks. Moreover, since the smallest size stocks are excluded in the Russell 2000 Index, there is also no liquidity problem. They formed portfolios based on the E/P, S/P, and BV/MV ratios respectively with consideration of the firm size effect. In addition, they also formed portfolios by a combination of the E/P, S/P, and BV/MV ratios. The results demonstrated that the large firm size stocks outperformed the small firm size stocks among the Russell 2000 index stocks. The value stocks portfolio had higher returns than the growth stocks portfolios in the case of all the portfolio formation methods. The portfolio sorted by the S/P ratio had the highest return spread (8.40 pps) between value and growth stock portfolios. The portfolio sorted by the E/P ratio had the lowest return spread (5.28 pps). They concluded that the S/P ratios were a better measure of value and growth

than the E/P and BV/MV ratios. This result differs from that of Fama and French, namely that BV/MV ratio had the strongest explanatory power. However, this study confirmed that there still was a value premium in the medium firm size stocks group.

Black (1993) and MacKinlay (1995) showed that the value premium was simply due to sample-specific data (data snooping bias). It means that the value premium only occurs during certain periods in the U.S. stock market cycle. Kothari, Shanken, and Sloan (1995) found that the Compustat database had potential data selection bias due to back-filling problems. It seems to have an effect on the previous studies' results.

Barber and Lyon (1997) tested the data-snooping bias hypothesis by using a holdout sample (financial firms), which were excluded in Fama and French's (1992) study. They followed the same approach as Fama and French. Their results showed a positive relation between book to market value equity ratios and stock returns and a negative relation between firm size and stock returns. These results are consistent with Fama and French's findings for non-financial firms.

Barber and Lyon also tested the data selection bias, which was documented by Kothari, Shanken, and Sloan (1995). Firstly, they divided the whole sample

period into two sub periods (1973-1984 and 1984-1994). A value premium was found in both sub sample periods. Secondly, they tested their results again by choosing firms that are included in the COMPUSTAT database for at least five years prior to 1973. This could avoid the back-filling problems. Their results confirmed the positive relationship between book to market value equity ratios (BV/MV) and stocks returns. Thirdly, they re-examined the firm size effect after controlling the book to market value equity ratios. They found a consistent small firm size premium. These three findings can be used to confirm that selection bias is not a significant problem in testing the relationship between stock returns, book to market value equity ratios and firm size.

Davis (1994) provided further evidence against data-snooping bias. He studied the cross-section of stock returns by using a fresh sample database covering the period July 1940 to June 1963. The accounting data was collected from the annual Moody's Industrial Manuals instead of the COMPUSTAT database. Since this dataset had not been used by previous studies, this study can be regarded as having no data-snooping bias.

On the basis of this dataset, Davis found that the stocks with higher book to market value equity ratios (BV/MV) and earnings yields generated higher expected returns. He concluded that a value premium existed for the period prior to the development of the COMPUSTAT database. This result is

consistent with Fama and French (1992) and some other studies.

The latest study was done by Chan and Lakonishok (2004) who performed a test based on a dataset covering the period 1969 to 2001. They found that value stocks outperformed growth stocks over the whole sample period. Notably, they found that growth stocks had a much higher return than value stocks in the late 1990s. They explained "the differences across the performance of equity classes in the late 1990s were not grounded on fundamental patterns of profitability growth. Instead, the most plausible interpretation of the events of the late-1990s is that investor sentiment reached exaggerated levels of optimism about the prospects for technology, media and telecommunications stocks. The resulting valuations were hard to reconcile with economic logic". (Chan and Lakonishok, 2004: 84)

2.2.3 Value and growth studies in other markets

There is general agreement that value stocks outperform growth stocks in the U.S. stock market. Academics have questioned whether this value premium could be found in the case of the other markets. Unfortunately, lack of data limited the studies of the non-US markets in earlier times. Only in recent years have researchers started to examine the value premium in the markets of other countries.

2.2.3.1 Japanese stock market studies

Chan, Hamao, and Lakonishok's (1991) paper studied the Japanese stock market. They intended to contrast their empirical study with the previous studies in the U.S. stock market. In their study the dataset covered a period from 1971 to 1988. It included both non-manufacturing firms and delisted companies, so survivorship bias was avoided from their study. They applied both Seemingly Unrelated Regression (SUR) methodology and Fama-MacBeth methodology in their analysis. They also employed different portfolio formation methods: (1) portfolios were sorted solely by earnings yield, firm size, cash flow yield, and book to market value equity ratios. (2) Portfolios were formed by three of these variables in a different order. One variable divided stocks into four groups first, and then the second variable subdivided the stocks in these four groups into another four groups. The third variable divided the stocks in these 16 groups into 4 groups. Finally they got 64 portfolios (4×4×4).

Chan, Hamao, and Lakonishok found consistent results based on both test methodologies. These results were: there was a significant relationship between these fundamental variables and expected stock returns in the Japanese market. Book to market value equity ratios positively related to

expected stock returns. Cash flow yields also positively related to expected stock returns. Firm size had a negative relation with expected stock returns. Earnings yield could be used to explain stock returns, when it was considered separately or combined with firm size. Once cash flow yield and book to market value equity ratios were included, earnings yield lost power in explaining stock returns and even had a negative impact on stock returns.

2.2.3.2 UK studies

Leledakis and Davidson (2001) tested the relationships between different fundamental variables and the cross-sectional stock returns in the case of the London stock market. They classified value and growth stocks by using book to market value equity ratio (BV/MV), sales to price ratio (S/P), and dividend to earning ratio (D/E). Due to the effect of firm size on the value and growth study, the portfolios were formed taking firm size into account. Their findings showed that value stocks outperformed growth stocks based on all three classifications. They also found a premium for the small firm size stocks. They further performed Fama-MacBeth's cross-sectional regression test. The results demonstrated that S/P dominated both BV/MV and firm size in explaining cross-sectional stock returns. This result was inconsistent with Fama and French's findings in the case of the U.S. market. However, they did not deny the BV/MV and firm size influence on the cross-sectional stock returns. The

explanatory power of D/E is also captured by S/P. This study verified that the value premium also existed in the case of the London stock market.

Dimson, Nagel, and Quigley (2003) further studied the London stock market based on a much longer sample period - 1955 to 2001. They only focused on the book to market value equity ratio (BV/MV) and firm size effect. They found that value stocks still outperformed growth stocks after controlling the firm size effect over this longer sample period in the London stock market.

In addition, Dimson, Nagel, and Quigley tried to implement the small value investment strategy. They found that portfolio turnover is very large due to sales of stocks that crossed breakpoints, delisting, and dividends in each year. About 40 percent of portfolio market cap had to be traded each year. Moreover, small-cap stocks are not liquid, so the trading cost involved in this investment strategy is quite high. They concluded that a value premium existed around the world. However, implementation of this investment strategy must take to the high transaction costs into account.

2.2.3.3 Global market studies

Capaul, Rowley and Sharpe (1993) found that value stocks have higher returns than growth stocks in France, Germany, Japan, and the United

Kingdom over the period 1981 to 1992.

Bauman, Conover, and Miller (1998) extended Capaul, Rowley and Sharpe's (1993) study. They covered a 10-year sample period (from 1986 to 1996) and included all the stock markets in the MSCI EAFE (Europe, Australia, and the Far East) index and the Canada market. They formed value portfolios and growth portfolios by using four fundamental variables: price to earnings ratio (P/E), price to cash flow ratio (P/CF), price to book value ratio (P/B), and dividend yield. They formed both internationally diversified portfolios and country-specific portfolios.

They found that the internationally diversified value portfolios outperformed growth portfolios over the whole sample period. Moreover, they examined the international portfolios year by year and found that value stocks outperformed growth stocks in 7 out of 11 years. The country-specific study showed that value stocks tended to outperform growth stocks in each country. However, in each country the value stock portfolios exhibited a less consistently favorable performance over growth stocks than the internationally diversified portfolios. They suggested that "value stock strategy appears more likely to be successful when portfolios are internationally diversified in comparison with country-specific portfolios" (Bauman, Conover, and Miller, 1998: 85). They also found that the small firm size internationally diversified stocks portfolio had a

higher return than the large firm size portfolio.

They subsequently formed portfolios by combining P/E, P/CF, P/B, and dividend yield with firm size. They found a return spread between value stocks and growth stocks in the large and medium firm size groups. However, in the small firm size group there was not a significant return spread between value stocks and growth stocks.

Fama and French (1998) studied the value premium by including the U.S. market and 12 major EAFE (Europe, Australia, and the Far East) markets over the period 1974 to 1994. The U.S. market data was collected from both CRSP and COMPUSTAT databases. The 12 major EAFE markets data was extracted from the electronic version of Morgan Stanley's Capital International Perspectives (MSCI).

They followed a similar study approach to their previous studies on the U.S. market. They found that the global value stocks portfolio had higher returns than the global growth stocks portfolio. The value stocks portfolio also outperformed the growth stocks portfolio in 12 out of 13 markets. These results confirmed the robustness of the value premium in international stock markets.

Arshanapalli, Coggin, and Doukas (1998) provided powerful international

evidence by using a fresh database: the Independence International Associates, Inc. of Boston. They included 18 stock markets and covered a much longer sample period - 1975 to 1995. The look-ahead bias and survivorship bias were avoided in their study. Moreover, they classified the stocks in each country into different industrial groups (energy, material, equipment, consumer, services, and financial). Then the stocks in each industrial group were sorted into value portfolios and growth portfolios. Their results demonstrated that the value premium existed in most of the stock markets. Even after considering the firm size effect, value stocks still had a higher return than growth stocks in all the stock markets. They further tested Fama and French's (1996) three-factor asset pricing model by using both individual country and regional industry portfolios. The use of industrial portfolios allowed the variation of slopes of the factors over time, which is not allowed in Fama and French's (1996) empirical study and some other studies. Their findings showed that this three-factor model could also be used to explain the portfolio returns of individual countries and regional industries. They found a value premium in all cases, which is consistent with Fama and French's findings. However, they found that value stocks were not fundamentally riskier than growth stocks when risk is measured by the coefficient of variation. This is inconsistent with Fama and French and some others' findings.

2.2.3.4 Emerging market studies

Chui and Wei (1998) investigated the relationships of stock returns with market beta (β), book to market value equity ratio (BV/MV), and firm size in five Pacific-Basin emerging markets: Hong Kong, Korea, Malaysia, Taiwan, and Thailand. They collected the accounting information and monthly stock return data from the PACAP database, which is compiled by the University of Rhode Island. A 16-year sample period was covered from 1977 to 1993.

They found that the stocks with a high BV/MV ratio (value stocks) produced higher returns than stocks with a low BV/MV ratio (growth stocks) in four markets: Hong Kong, Korea, Malaysia and Thailand. However, they found no return difference between value stocks and growth stocks in the case of the Thailand market. Interestingly, they found that the large firm size stocks had higher returns than the small firm size stocks in the Hong Kong market. This result is against some others findings in other markets.

Chui and Wei followed Fama and Macbeth's (1973) approach and tested the significance of BV/MV, firm size, and market beta in explaining stock returns in the case of these five Pacific-Basin emerging markets. Since Lo and Mackinlay (1990) argued that portfolio formation based on BV/MV and firm size might exaggerate the relationship between stock returns and the two fundamental variables, they applied regression tests for both portfolios and individual firms.

They also applied Maximum Likelihood Estimator (MLE) and Ordinary Least Square (OLS) estimation methods in their regression tests. Their empirical test results showed that the market beta could not be used to explain stock returns in all these five stock markets, which is consistent with previous studies. However, the findings about BV/MV and firm size are quite different in these five markets. They found that firm size was significant in all the markets in explaining stock returns, but the significance of BV/MV was only found in Hong Kong, Korea, and Malaysia. In addition, they also suggested that “the degree of relation between the average return and BV/MV coincides with the value of the average BV/MV in a country” (Chui and Wei, 1998: 291), which means that if the average value of BV/MV in one stock market is relatively higher than in the other markets, there will be a more significant relationship between stock returns and BV/MV in that market.

Ding, Chua, and Fetherston (2004) performed a further study on the East Asian countries' stock markets. They excluded Korea, Indonesia and Japan in their study. The dataset was collected from the PACAP database and covered a much longer sample period – from 1976 to 1997. They focused their study on the relationship between BV/MV and stock returns with consideration of the firm size effect, risk (stock beta, stock volatility, debt-to-equity), liquidity (average monthly trading volume) and growth potential (asset turnover, net profit, profit margin, return on assets, return on equity). Previous studies only

considered the firm size effect when they tested the performance of value stocks and growth stocks. They formed portfolios by the combination of two of three fundamental variables (E/P, BV/MV, and D/P). Instead of equally weighted portfolio returns, they computed value-weighted returns for all the portfolios.

They found that the value premium is country-specific in the East Asian market. Value stocks outperformed growth stocks in Hong Kong, Japan, Malaysia, and Singapore. However, value stocks had lower returns than growth stocks in Indonesia, Taiwan, and Thailand. Moreover, they found a negative and significant relationship between stock returns and firm size in the value stocks portfolio in Hong Kong and Malaysia and in the growth stocks portfolio in Japan, Malaysia, Singapore and Taiwan. They found no risk and liquidity effect on the value premium in all the markets. Growth potential effects were very different in different countries. These effects were also very different when different measures are used as a proxy for growth potential (asset turnover, net profit, profit margin, return on assets, return on equity). In their study they also found that the large firm size stocks had higher returns than the small firm size stocks in the Hong Kong market, which is consistent with Chui and Wei's (1998) finding.

Mukherji, Dhatt, and Kim (1997) took a closer look at the Korean stock market.

They investigated the relationship between cross-sectional stock returns and some fundamental variables (BV/MV, S/P, E/P, debt to equity (D/E), firm size and market beta) over the period 1982 to 1993. Their findings demonstrated that the stocks with high BV/MV, D/E, and S/P had higher returns than the stocks with low BV/MV, D/E, and S/P. They also found that firm size negatively related to stock returns. Their finding suggested that E/P and market beta had little explanatory power. They also indicated that BV/MV and S/P captured other variables in explaining stock returns and that D/E can be used as a proxy for risk instead of beta.

The above studies indicate that the relationship between the performance of value stocks and growth stocks is very complex in the emerging markets. This topic needs to receive much more attention in academic studies and real investment decision-making processes. Ding, Chua, and Fetherston (2004) suggested that in the emerging stock markets, the more developed the stock market, the closer the stock market return behavior is to the U.S. stock market.

2.2.4 Hong Kong studies

Lam (2002) took a closer look at the Hong Kong stock market. In this study Lam included the following fundamental variables: leverage, earnings to price ratio (E/P), market beta (β), firm size, book to market value equity ratio (BV/MV). They tested the relationship between stock returns and these

fundamental variables. The sample period covered was from 1984 to 1997. This study followed Fama and French's (1992) approach. He found a positive relationship between stock returns and three variables (BV/MV, E/P, and leverage) and a negative relationship between stock returns and firm size.

Lam also followed Fama and MacBeth's (1973) approach in performing a regression test. He found that the one factor market beta could not be used to explain stock returns. Moreover, the book to market value equity ratios captured the explanatory power of leverage. Finally he found that the combination of firm size, book to market value equity ratio (BV/MV) and E/P ratio seemed to capture other variables in explaining stock returns in the case of the Hong Kong market over the sample period 1984 to 1997. This result is inconsistent with Fama and French's three-factor model. In this case the three factors are replaced with firm size, BV/MV and E/P ratios.

2.3 Interpretations of why value stocks outperform growth stocks.

There is general agreement that value stocks have higher returns than growth stocks around the world, but the interpretations of why they have done so are still very controversial. The current literature shows that there are four different interpretations: compensation for risk, potential bias from data source, error in investors' expectations and the value premium is not compensation for risk, but

similar characteristics in the value portfolio determine this excess return.

2.3.1 Compensation for risk

Fama and French (1992: 451) suggested that the BV/MV should be a direct indicator of the relative prospects of firms. In other words, "the firms with high BV/MV ratios are persistently strong performers, while the economic performance of high BV/MV firms is persistently weak" (Fama and French, 1992: 451). They concluded that the BV/MV ratios must be a proxy for fundamental risk on the assumption of rational asset pricing.

Fama and French (1993) developed a three-factor asset-pricing model. They found that the HML factor (zero investment portfolios of long stocks with high BV/MV and short stocks with low BV/MV) captured the variation of stock returns together with two other factors: the market portfolio and the SMB factor. They once again confirmed that "BV/MV proxies for sensitivity to common risk factors in stock returns" (Fama and French, 1993: 5).

2.3.2 Potential bias

The early study by Banz and Breen (1986) had already shown that the ex-post-selection bias and look-ahead bias in the COMPUSTAT database had an effect on the firm size effect and the E/P effect. Further arguments by Black

(1993) and MacKinlay (1995) showed that the value premium was just sample-specific (data snooping bias). This means that the value premium only occurs in certain time periods.

Kothari, Shanken, and Sloan (1995) suggested that the COMPUSTAT database had potential data selection bias due to back-filling problems, which is similar to ex-post-selection bias. They suggested, "A useful pricing model must be trusted to work under a wide variety of conditions and not just for a limited set of portfolios" (Kothari, Shanken, and Sloan, 1995: 221). They suggested that the survivorship bias associated with data sources and the sample-specific problem might be used to explain the excess return for value stocks.

2.3.3 Error in expectations

De Bondt and Thaler's (1988) past "winner" and past "loser" study found that the past "loser" portfolios had higher excess returns than the past "winner" portfolios after portfolio formation. They explained that most investors "overreact" to unexpected and dramatic news events. In general, investors underestimated the excess return for past "loser" stocks and overestimated the excess returns for past "winner" stocks, which can be described as error-in-investors' expectations.

Lakonishok, Shleifer, and Vishny (1994) examined the contrarian investing strategy, which can be regarded as a sub value investment strategy. Contrarian investors believe that “naïve” investors expect that growth stocks with good past performance will continue this good performance in the future and that value stocks with bad past performance will continue this bad performance in the future. Contrarian investors bet against those investors who extrapolate past performance too far into the future.

Lakonishok, Shleifer, and Vishny (1994) tested whether the pattern of past, expected, and actual future growth rate is consistent with this extrapolation model. Instead of measuring performance by excess stock returns as in De Bondt and Thaler’s (1988) study, they used past growth in sales to measure past performance and used C/P and E/P to measure expected performance. The results proved that the “naïve” investors did extrapolate past performance too far into the future. In fact, value stocks actually had a higher growth rate than expected and growth stocks had a lower actual growth than expected.

Both Porta (1996) and Bauman and Miller (1997) directly tested the error-in-expectation hypothesis by using securities research analysts’ earnings forecasts. Their study results were consistent with De Bondt and Thaler’s (1988) and Lakonishok, Shleifer, and Vishny’s (1994) statements that investors overestimated the growth rate for growth stocks and underestimated the

growth rate for value stocks.

The results of the above studies demonstrate that the value premium is not compensation for the distress factors associated with value stocks. Lakonishok, Shleifer, and Vishny's (1994) study results suggest that investors have consistently overestimated future growth rates for growth stocks relative to value stocks, which might be used to explain why value stocks outperform growth stocks.

2.3.4 Characteristics

Daniel and Titman (1997) advocated that the high return associated with stocks with a high BV/MV (value stocks) was because of similar characteristics of those stocks - not as compensation for risk as was identified by Fama and French.

They argued, "If the three-factor pricing model is correct, then a high book-to-market stock with a low HML factor loading should have a low average return. In contrast, if prices are based on characteristics rather than on factor loadings, then a high book-to-market stock should have a high expected return regardless of its loading" (Daniel and Titman, 1997: 15).

In order to test this hypothesis, they first formed 9 portfolios based on the book to market value equity ratios (BV/MV) and firm size. Then they subdivided each of these 9 portfolios into 5 groups based on the firm's pre-formation HML factor loadings. The resulting 45 portfolios included the stocks with the same size and BV/MV ratios, but with different loadings on the HML factors. The result showed that there was no significant return difference among different risk loading portfolios within the stocks with the same BV/MV ratios and firm size. So they concluded that the value premium is not compensation for risk, but the same characteristics determined this excess return.

2.4 Conclusions

The extensive studies on this subject have shown the robustness of the value premium around the world. However, no real theoretical basis has been documented in this field and some exceptions still occurred in these studies. The most controversial question is the interpretation of the value premium. Further studies need to be done on the basis of better statistical methods, much longer sample periods and a deeper understanding of stock return behavior. My study on the Hong Kong stock market is a small contribution to the continuous study of this subject.

Chapter 3

Data and Methodology

3.1 Data collection

All the market and accounting information of this study is collected from two primary data sources: the Pacific-Basin Capital Market (PACAP) database and Reuters. The relevant market and accounting information for the period December 1980 to June 2001 is collected from the PACAP database. Due to the PACAP database only providing the Hong Kong market data until December 2001, the relevant market and accounting information for the period December 2000 to July 2005 is collected from Reuters' historic financial database on the Hong Kong market. In total, a 25-year sample period is covered by this study and the whole sample period is divided into 24 study periods, which is shown in table 3.1. The sample period covered in this study is a relatively up to date study compared with the previous study on the Hong Kong market. Fama and French (1992) excluded financial firms in their study on the U.S. market. They argued that the financial firms' capital structure was different from other firms, which probably generated some bias in the value and growth study. However, as suggested by Lam (2002), the test results on the Hong Kong market do not change significantly by excluding financial firms, so in my study all the companies listed on the Hong Kong market which meet the minimum data requirements are included. Due to the design difference between the PACAP database and the Reuters database, the specific market and accounting data of the sample stocks is described independently as

follows:

3.1.1 Pacific-Basin Capital Market (PACAP) database

The PACAP database was established to meet the growing demand for information relevant to Asia-Pacific capital markets by the PACAP Research Centre at the University of Rhode Island in the U. S. The PACAP database includes a comprehensive, computerized capital markets database for eight Pacific-Basin countries (Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand) on a continuous and systematic basis. Consequently, the PACAP databases are an extremely valuable source of information for academic research, teaching, portfolio management, and capital market development.

The dataset that is used in this study for the period December 1980 to June 2001 is extracted from the PACAP Hong Kong market database. The specific items are described as follows:

- Monthly Return with cash dividend reinvested (July 1981-June 2001): the monthly return is calculated on the basis of the daily holding period return. The daily holding period return is calculated as follows:

$$\text{DRETWD}_t = (P_t - P_{t-1} + D_t) / P_{t-1}$$

Where:

DRETWD_t = Holding Period Return for date t.

P_t = Price per share at the end of date t

P_{t-1} = Price per share at the end of date t-1, the time period immediately preceding time period t

D_t = cash distributions received during time period t

On the basis of the daily holding period return, the PACAP database calculates the monthly return as follows:

$$\text{MRETWD}_i = \prod_{t=1}^n (1 + \text{DRETWD}_t) - 1$$

Where:

MRETWD_i = monthly return with cash dividend reinvested for month i

DRETWD_t = daily return with cash dividend reinvested at trading day t during month i

n = number of trading days in month i.

- Total stockholder's equity (1980-1999): it represents cumulative net contributions by stockholders plus retained earnings (User's Guide,

2002, PACAP Database).

- Total market value for each sample stock at the end of June each year t. (1981-2000)
- Number of stocks outstanding (1980-1999): it represents the number of shares of common stock outstanding at the fiscal year end (User's Guide, 2002, PACAP Database).
- Ending price of common stock (1980-1999): it represents the last price of the company common stock quoted on Hong Kong Stock Exchange for the fiscal year (User's Guide, 2002, PACAP Database)

3.1.2 Reuters

Reuters is a global information company providing indispensable information tailored for professionals in the financial services, media and corporate markets. Some 330,000 financial market professionals working in the equities, fixed income, foreign exchange, money, commodities and energy markets around the world use Reuters' products (Reuters). The dataset that is used in my study for the period December 2000 to June 2005 is taken from Reuters' financial product service on the Hong Kong stock market. The items that are collected from Reuters are a little different from those datasets taken from the PACAP database. All the items are described as follows:

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- Monthly Closing price of each stock (June 2000 – June 2005): The closing trade value for a stock on the last trading day of a month which is often the same as the Last Trade price of the day (Reuters). The Reuters database has already made adjustments for this closing price due to capital changes, which results in the price being comparable after the capital change.
 - Gross value of the dividend of each stock (July 2001- June 2005): The value of the dividend before the effect of taxation has been applied, without any adjustments due to capital changes. (Reuters)
 - Average shares (2000-2003): The average number of ordinary shares in issue during the financial year. The Company or Group uses this number in the calculation of its Earnings per Share value.
 - Stockholder's equity of each stock in the company's fiscal year end financial report (2000-2003): the value of the stockholders' interest in the Company or Group expressed in Hong Kong Dollars.

3.2 Sample selection criteria

On the basis of the two databases (PACAP and Reuters) a 25-year sample period is covered from December 1980 to June 2005. The market and accounting information that these two databases provided is not complete for all the listed companies on the Hong Kong market. Some information is

missing due to non-availability and some stocks have no monthly return data recorded in certain months due to infrequent trading. In order to exclude those stocks without enough information, the sample stocks must meet the following selection criteria:

- In each year $t-1$, a stock must have stockholder's equity, number of stock outstanding (1980-1999), average shares (2000-2003), and end of year stock market price data available. Any stocks without the above data are excluded from the study of year $t-1$.
- In each year t , a stock must have total market value in June available in its monthly return data. Any stocks without this data are excluded from that year's study.
- Due to non-trading in certain months, any stocks without monthly return records for more than 3 months from July of year t to June of year $t+1$ are excluded from the study of year t .
- The stocks with negative stockholder's equity are excluded from this study in each year t .

The first two criteria are used to exclude the stocks without the necessary information. The third criterion is used to exclude the stocks with infrequent trading problems. The stocks with negative book value of equity are excluded by the fourth criterion. The number of sample stocks that are included in each study period is shown in table 3.1. It shows that the number of sample stocks

increased from a low of 115 for the period July 1984 to June 1985 to a high of 925 for the period July 2004 to June 2005. The number of stocks included in this study is a more complete sample compared with previous studies on the Hong Kong market.

Table 3.1
Number of stocks in each study period

Study Period	No. Of stocks
07/1981-06/1982	141
07/1982-06/1983	122
07/1983-06/1984	117
07/1984-06/1985	115
07/1985-06/1986	133
07/1986-06/1987	170
07/1987-06/1988	203
07/1988-06/1989	231
07/1989-06/1990	248
07/1990-06/1991	260
07/1991-06/1992	267
07/1992-06/1993	317
07/1993-06/1994	378
07/1994-06/1995	429
07/1995-06/1996	470
07/1996-06/1997	479
07/1997-06/1998	509
07/1998-06/1999	444
07/1999-06/2000	546
07/2000-06/2001	602
07/2001-06/2002	660
07/2002-06/2003	782
07/2003-06/2004	829
07/2004-07/2005	925

3.3 Data processing

On the basis of the raw data collected from both the PACAP database and Reuters, the raw data is processed into the following three variables for each stock: ratio of book value to market value of equity (BV/MV), firm size and monthly return. The whole sample period is divided into a 24 period study. The following sections will discuss those variables independently.

3.3.1 Book value to market value of equity (BV/MV)

The objective of this study is to investigate the return difference between value stocks and growth stocks. There are four definitions of value stocks and growth stocks in the literature, which have been mentioned in chapter 1. This study regards the ratio of book value to market value of equity as the only definition for value and growth stocks. This definition is considered as the most stable measurement of value and growth. In order to sort all the sample stocks into value and growth portfolios for the period July year t to June year $t+1$, the ratio of book value to market value of equity (BV/MV) is computed at the end of December of year $t-1$. For the period 1980 to 1999, based on the information collected from the PACAP database, the book value of equity is equal to a firm's total stockholder's equity reported on the firm's balance sheet in year $t-1$ and the market value of equity is equal to the number of common stocks outstanding times the closing price of common stocks in year $t-1$. However,

based on the information collected from Reuters for the period 2000 to 2003, the market value of equity is equal to the average shares issued in year $t-1$ times the closing trade value for the stock on the last day of December in year $t-1$.

3.3.2 Firm size

Another objective of this study is to test whether the value portfolio still has a higher return than growth stocks after controlling for firm size. The firm size is defined as the total market value of equity at the end of June in each year t , which is used to match the study period July year t to June year $t+1$. The firm size over the period 1981 to 2000 is directly collected from the monthly return file in the PACAP database. It represents the market value of individual stocks at the end of June in each year t (User's Guide, 2002, PACAP database). This market value is computed by the PACAP database as follows:

$$TMV_t = CLSPRC_t * SHROUT_t$$

Where:

TMV_t = Total market value at the end of June in year t

$CLSPRC_t$ = Last closing price of June in year t

$SHROUT_t$ = Number of shares outstanding at the end of June in year t

For the period 2001 to 2004, this study followed the same computation method as the PACAP database used. However, due to the non-availability of the number of shares outstanding at the end of June in Reuters, this study used the average number of issued shares in fiscal year t , which is roughly equal to the number of shares outstanding at the end of June in year t . The computation is generalized as follows:

$$TMV_t = CLSPRC_t \cdot SHROUT_t$$

Where:

TMV_t = Total market value (approximate) at the end of June in year t

$CLSPRC_t$ = Last closing price of June in year t , and

$SHROUT_t$ = Average number of issued shares in year t .

3.3.3 Monthly return

The monthly return data for the period July 1981 to June 2001 is directly collected from the PACAP database.

Reuters does not provide the monthly return data directly for the period July 2001 to June 2005. However, Reuters does provide the monthly closing price and dividend data in its Hong Kong market database. Therefore the approximate monthly holding period return is computed by me as follows:

$$\text{MRETWD}_i = (P_i - P_{i-1} + D_i) / P_{i-1}$$

Where:

MRETWD_i = Holding period return for month i .

P_i = Closing price for a stock on the last day of month i

P_{i-1} = Closing price for a stock on the last day of month $i-1$

D_i = Cash distributions received during month i

3.4 Methodology

The major objective of this study is to compare the performance of value stocks with growth stocks. As mentioned in the previous section, this study not only includes industrial firms, but also includes financial firms. A 25-year sample period (1980-2005) is covered by this study. The accounting information and market data that are related to this study are gathered from PACAP and Reuters. On the basis of this dataset, this study follows Fama and French's (1993) approach, with adjustments where necessary to account for characteristics of the Hong Kong stock market data. This study is carried out in a step-by-step fashion in the remainder of this chapter.

3.4.1 Portfolio formation

The first step is to sort all the sample stocks into different portfolios in each study period, which enables us to calculate the return of those portfolios and compare their performance. As mentioned in the previous section, in each study period, I form two kinds of portfolio: the BV/MV portfolios before and after controlling for firm size. The following two sections will describe them respectively.

3.4.1.1 BV/MV portfolio formation

The BV/MV portfolios are formed based on the BV/MV ratios of each stock. At the end of June in year t , all sample stocks are ranked on the basis of BV/MV ratios in year $t-1$. The bottom 30% stocks are grouped into a growth portfolio (G), the top 30% stocks are grouped into a value portfolio (V) and the medium 40% stocks are left as a neutral portfolio (N). This procedure is replicated in each of these 24 study periods. Finally, I formed 72 portfolios for the whole sample period.

3.4.1.2 Firm Size and BV/MV portfolio formation

There are numerous studies which have documented that there is a significant negative relationship between firm size and stock returns (Banz (1981) and

Bauman (1998)). Fama and French (1992) also point out that there is a negative correlation between the average value of firm size and the book-to-market equity ratio (BV/MV) in the U.S. market. Typically, a part of the value premium may be due to the size effect. In the case of the Hong Kong market, the correlation coefficient between the BV/MV ratio and firm size (MVE) is presented in table 3.2. During the whole sample period there are negative correlation coefficients (from -0.2135 to -0.0753) between the BV/MV ratio and market cap, which implies that the stock with a higher BV/MV ratio tends to be the stock with a small market cap and the stock with a lower BV/MV ratio tends to be the stock with a large market cap. This is consistent with Banz's (1983) and Bauman's (1998) study. Table 3.2 shows that the average market cap of the value portfolios is lower than the average market cap of the growth portfolios in all the years.

In order to focus our study on the BV/MV effect, this study pursues the Fama and French (1993) approach and forms two-dimensional value and growth portfolios. At the end of June in year t , all the stocks are ranked by firm size, which is defined as a firm's market value of equity in June of each year t . The bottom 30% is grouped into a small size portfolio (S), the top 30% is grouped into a large size portfolio (L), and the middle 40% is grouped into a medium size portfolio (M). Furthermore, all stocks in the same size portfolio are ranked by BV/MV ratios based on year $t-1$. The bottom 30% is grouped into a

growth portfolio (G), the top 30% is grouped into a value portfolio (V), and the middle 40% is grouped into a neutral portfolio (N). Lastly, in each year t , 9 portfolios are formed as follows: large size-value portfolio (LV), large size-neutral portfolio (LN), large size-growth portfolio (LG), medium size-value portfolio (MV), medium size-growth portfolio (MG), medium size-neutral portfolio (MN), small size-value portfolio (SV), small size-growth portfolio (SG), small size-neutral portfolio (SN). This procedure is replicated in each year over the 25-year sample period. A total of 216 portfolios are formed for the whole sample period. The stocks in the same size portfolio are sorted into value and growth portfolios, which enables us to focus on the value versus growth study.

Table 3.2
Average Market Cap for BV/MV Portfolios and Correlation Coefficient
between BV/MV ratios and Market Cap

<i>Time Period</i>	<i>Average Market Cap</i>			<i>Correlation Coefficient</i>
	<i>V</i>	<i>N</i>	<i>G</i>	<i>BV/MV and Market Cap</i>
07/1981-06/1982	555.62	2025.50	2310.17	-0.1652
07/1982-06/1983	615.27	1899.52	1682.51	-0.1731
07/1983-06/1984	640.40	1020.28	1774.86	-0.1812
07/1984-06/1985	622.20	874.87	1662.50	-0.1467
07/1985-06/1986	657.30	1588.25	2554.90	-0.2029
07/1986-06/1987	242.96	1505.47	2592.92	-0.1230
07/1987-06/1988	796.70	2120.47	4875.72	-0.2031
07/1988-06/1989	1499.90	1879.58	4419.94	-0.1645
07/1989-06/1990	1715.32	1561.60	3248.66	-0.1051
07/1990-06/1991	1783.74	2314.16	5117.36	-0.1483
07/1991-06/1992	2485.85	2352.43	4836.41	-0.1147
07/1992-06/1993	2443.93	3176.42	7452.64	-0.1610
07/1993-06/1994	3192.67	3230.80	7380.33	-0.1095
07/1994-06/1995	3667.67	2596.66	8226.64	-0.0876
07/1995-06/1996	1915.07	1941.28	10584.43	-0.1545
07/1996-06/1997	1327.52	2815.58	12241.74	-0.1590
07/1997-06/1998	2249.95	5271.10	15222.93	-0.1449
07/1998-06/1999	1442.06	1056.65	11297.32	-0.0911
07/1999-06/2000	720.28	2042.32	11292.69	-0.0757
07/2000-06/2001	1067.20	2299.80	20029.01	-0.0773
07/2001-06/2002	1140.77	6507.64	16899.78	-0.0934
07/2002-06/2003	1001.16	6236.02	10869.66	-0.0712
07/2003-06/2004	4942.19	6407.78	9798.74	-0.0417
07/2004-07/2005	6290.19	6813.98	16254.87	-0.0426

3.4.2 Return

In order to compare the performance of value portfolios and growth portfolios which were formed by the last step, the next step is to compute returns for those individual stocks and portfolios. This study applied two return calculation

methods for individual stocks: geometric mean monthly return (GM) and annual compound return (ACR). Loughran (1997) found that, for U.S. stocks, the return spread between value portfolios and growth portfolios is reduced when value weighted portfolio returns instead of equally weighted returns are used. So, in order to establish whether the results of Loughran's study of the U.S market still apply in the case of the Hong Kong market, both value weighted and equally weighted portfolio returns are calculated in this study.

The average value weighted monthly return and equal weighted monthly return of value and growth portfolios for the whole sample period and sub sample periods are calculated. The whole sample period is separated into two sub sample periods: July 1981 to June 1997 and July 1997 to June 2005. Most of the previous studies on the Hong Kong market investigated stock return behaviors over the period before the Asian financial crisis (before 1997), so our first sub sample period (1981 to 1997) is comparable with those previous studies. The sub sample period after Asian financial crisis enables us to investigate whether the result is different compared with the result of first sub sample period.

The majority of firms in the Hong Kong market have December as the end of their fiscal year. The Hong Kong stock exchange normally requires accounting information to be made public within three to six months of their fiscal year-end.

In order to ensure that accounting information is known before the returns are calculated, this study follows Fama and French's (1993) approach: the average monthly return and annual compound return are computed for the period which starts on 1 July of year t to 30 June of year $t+1$ (one study period). The six months gap is conservative, which enables the average return to match the accounting information in year $t-1$. It also avoids a possible look-ahead bias (see Banz and Breen). The specific method of calculation is shown below.

3.4.2.1 Geometric mean monthly return for individual stocks

Because the Geometric Mean (GM) return calculates the compound rate of return based on the ending value of the investment versus its beginning value, the GM is considered a superior measure of the long-term mean rate of return.

The computation of GM can be generalized as follows:

$$GM = \left[\prod_{i=1}^{12} (1 + MRETWD_i) \right]^{1/12} - 1$$

Where:

GM = the geometric mean monthly return for a stock

$MRETWD_i$ = the monthly return for month i (the monthly returns cover the period July in year t to June in year $t+1$)

3.4.2.2 Annual compound return for individual stocks

On the basis of the geometric mean monthly return, the computation of annual compound returns can be generalized as follows:

$$ACR = \left[\prod_{i=1}^{12} (1 + MRETWD_i) \right] - 1$$

Where:

ACR = annual compound return for a stock

MRETWD_i = the monthly return for month i (the monthly returns cover the period July in year t to June in year t+1)

3.4.2.3 Value weighted portfolio return

The value weighted portfolio return is equal to the weighted average of the returns for the individual stocks included in a portfolio. The weights for each stock in a portfolio are equal to the proportion of total market value in that portfolio. The value weighted portfolio return can be simplified as follows:

$$VWPR_t = \sum_{j=1}^n W_j R_j$$

Where:

W_j = the percentage of total market value in the portfolio for stock j in year t

R_j = the geometric mean monthly return or annual compound return for

stock j in year t

$VWPR_t$ = value weighted portfolio return for year t

3.4.2.4 Equal weighted portfolio return

The equal weighted portfolio return implies that investors invest the same amount in each of the different stocks in the portfolio. The computation of this equal weighted portfolio return can be generalized as follows:

$$EVPR_t = \sum_{j=1}^n R_j/n$$

Where:

R_j = geometric mean monthly returns or annual compound returns for stock j in the portfolio.

n = the number of stocks in the portfolio.

$EVPR_t$ = the equal weighted portfolio return for year t

3.4.2.5 Cumulative annual compound return for portfolios

The cumulative annual compound returns for each portfolio enable us to assess their total performance over the whole sample period from July 1981 to June 2005. In this study the cumulative return for each portfolio just simply product of the annual compound returns. This can be generalized as follows:

$$CACR = \prod_{i=t}^{24} ACR_i$$

Where:

CACR= Cumulative annual compound return for a portfolio

ACR_i = Value weighted annual compound return for a portfolio in the time period i

3.4.3 Risk

Another sub-objective in this study is to test Fama and French's (1992, 1993, 1995, 1996) hypothesis that value stocks have a higher return than growth stocks because value stocks are riskier than growth stocks. In order to perform this test, we regarded standard deviation as the only risk measure and compared the standard deviation difference between value stocks and growth stocks. The computation of standard deviation in this study is generalized as follows:

$$SD = \left[\sum_{t=1}^N [R_t - E(R)]^2 / N \right]^{1/2}$$

Where:

SD = the standard deviation for a portfolio

R_t = the value weighted or equal weighted return for a portfolio in the period t

$E(R)$ = the mean return for the whole sample period

N = the number of study periods (24 study periods covered by this study)

3.5 Tests of significance

The above calculation of portfolio returns and standard deviations can determine whether value stocks outperform growth stocks and whether value stocks are riskier than growth stocks. However, in order to confirm our results statistically, we further formulate the following two hypotheses and test whether the results that we obtained for the whole sample period are statistically significant. Due to the short period of the two sub sample periods, the hypothesis test may generate certain errors. We are therefore not going to perform a hypothesis test for the results of these two sub sample periods.

3.5.1 Hypothesis 1

The primary research objective of this study is to investigate whether value stocks outperform growth stocks. In order to test whether the return of value stocks is greater than the return of growth stocks by a statistically significant margin, we perform a one-tailed paired comparison test (Upper tail). The paired comparison test is used to compare the differences between the paired

observations from two dependent samples. In this study the value and growth portfolios are not fully independent. The hypothesis test is structured as follows:

$$H_0 : \mu_d \leq \mu_{dz} \text{ versus } H_a : \mu_d > \mu_{dz}$$

Where:

μ_d = the population mean monthly return difference between value and growth portfolios.

μ_{dz} = Hypothesized mean monthly return difference between value and growth portfolios, which is equal to zero.

The hypothesis can be tested with a t-distribution test statistic. The t-test is a widely used hypothesis test that employs a test statistic that follows a t-distribution. The t-test is based on the assumption that the populations are approximately normally distributed and that the population variance is unknown.

The t-statistic is computed as follows:

$$t = (\bar{d} - \mu_{dz}) / s_{\bar{d}}$$

Where:

\bar{d} = the mean return difference between the value and growth portfolios

over the whole sample period

$s_{\bar{d}}$ = standard error of the mean return difference between the value and

growth portfolios = s_d/\sqrt{n}

s_d = standard deviation of the return difference between the value and

growth portfolios = $\left[\sum_{i=1}^n (d_i - \bar{d})^2 / (n-1) \right]^{1/2}$

d_i = the return difference between the value and growth portfolios in each study period

n = the number of study periods (24 study periods in this study)

In order to conduct the paired t-test, the t-statistic is compared with a critical t-value. This hypothesis test is conducted at three different levels of significance (1%, 5% and 10%) with 23 degrees of freedom.

On the basis of the t-statistic and the critical t-value, the decision that can be made is the following:

If the t-statistic is less than the critical t-value, the null hypothesis that value stocks underperform growth stocks cannot be rejected, concluding that the value portfolio return is not greater than the growth portfolio return by a statistically significant margin.

If the t-statistic is greater than the critical t-value, the null hypothesis that value stocks underperform growth stocks can be rejected, concluding that the value portfolio return is greater than the growth portfolio return by a statistically significant margin.

3.5.2 Hypothesis 2

In this study we want to investigate whether value stocks are riskier than growth stocks. Risk is measured by standard deviation. In order to test whether the standard deviation of the value portfolio is statistically greater than the standard deviation of the growth portfolio, we perform a hypothesis test, which is structured as follows:

$$H_0 : \sigma_v^2 \leq \sigma_g^2 \text{ versus } H_a : \sigma_v^2 > \sigma_g^2$$

where σ_v^2 is the variance of the value stocks portfolio and σ_g^2 is the variance of the growth stocks portfolio.

Since the value and growth portfolios are formed on the basis of the same Hong Kong market, the returns of these two portfolios are not fully independent. The normal F-distribution test may therefore be not the proper test statistic. Glass & Stanley (1970, sec. 14.7) provided a t-test for the case where the two

samples are actually pairs of observations, which is suitable for this study. The t-test statistic is shown as follows:

$$t = (V_1 - V_2) / \left[(1 - r_{12}^2) \times 4 \times V_1 \times V_2 / (n - 2) \right]^{1/2}$$

Where:

V_1 = the higher of the value and growth portfolio variance

V_2 = the lower of the value and growth portfolio variance

r_{12} = the correlation coefficient between the value and growth portfolios

n = the number of study periods (24 study periods in this study)

The hypothesis test is conducted at a 5 percent level of significance. The critical t-value is obtained from the t-distribution table at a 5 percent level of significance with $n-2$ (22) degrees of freedom for both the value portfolio and the growth portfolio.

On the basis of the t-statistic and the critical t-value, the decision that can be made is the following:

If the t-statistic is less than the critical t-value, the null hypothesis cannot be rejected, concluding that the variance of the value stocks portfolio is not higher than the variance of growth portfolio by a statistically significant margin at a 5 percent level of significance.

If the t-statistic is greater than the critical t-value, the null hypothesis can be rejected, concluding that the variance of the value stocks portfolio is greater than the variance of the growth stocks portfolio by a statistically significant margin at a 5 percent level of significance.

Chapter 4

Results and Analysis

4.1 Introduction

The results of the empirical analysis are divided into two sections. The first section (section 4.2) presents the results of portfolios formed on the basis of BV/MV ratios. In particular, strong evidence is provided that value stocks outperform growth stocks. This finding is consistent with Fama and French's study on the U.S. market, as well as some other studies.

Section 4.3 presents the empirical results of portfolios formed on the basis of BV/MV ratios where firm size is also taken into consideration. The results indicate that value stocks still outperform growth stocks even after taking the size effect into account. But it does show that the return spread between value stocks and growth stocks in the small firm size group is larger than the return spread in the large firm size group.

4.2 Results of BV/MV Portfolios

The following four sections (4.2.1, 4.2.2, 4.2.3, 4.2.4) present the results of portfolios that are formed on the basis of BV/MV ratios. Section 4.2.1 reports the correlation coefficients between the stocks' average monthly return and BV/MV ratios in each year. Section 4.2.2 presents the annual performance of BV/MV portfolios. Section 4.2.3 reports the cumulative performance of BV/MV

portfolios over the whole sample period. In the last section the whole sample period is divided into two sub sample periods.

4.2.1 Correlation Coefficients

Year-by-year correlation coefficients between the geometric mean monthly returns and BV/MV ratios are provided in Table 4.1. The correlation coefficients are negative in 5 years and positive in another 19 years. The positive correlation coefficients indicate that the stocks with higher BV/MV ratios (value stocks) produce a higher return than growth stocks. The negative correlation coefficients imply that the stocks with lower BV/MV ratios (growth stocks) produced a higher return than value stocks. The correlation coefficients only provide a preliminary result for this study. In the following section, further studies are undertaken to explore this relationship.

Table 4.1

Correlation Coefficients for BV/MV Ratios and Stock Returns, 1981-2005

<i>Time Period</i>	<i>BV/MV and GM</i>
07/1981-06/1982	0.0573
07/1982-06/1983	-0.1947
07/1983-06/1984	0.1302
07/1984-06/1985	0.2896
07/1985-06/1986	-0.0153
07/1986-06/1987	0.1261
07/1987-06/1988	0.2860
07/1988-06/1989	0.0908
07/1989-06/1990	0.1394
07/1990-06/1991	0.1342
07/1991-06/1992	0.1848
07/1992-06/1993	0.1900
07/1993-06/1994	0.1070
07/1994-06/1995	0.0537
07/1995-06/1996	-0.0422
07/1996-06/1997	0.1206
07/1997-06/1998	-0.0130
07/1998-06/1999	0.0465
07/1999-06/2000	-0.0902
07/2000-06/2001	0.3560
07/2001-06/2002	0.1172
07/2002-06/2003	0.2166
07/2003-06/2004	0.1704
07/2004-07/2005	0.1313
Median	0.1233

4.2.1 Annual portfolio Performance

Tables 4.2 and 4.3 reflect the performance of the portfolios formed on the basis of BV/MV ratios in each year from July 1981 to June 2005. Portfolio V, representing value stocks, consists of the top 30% of the sample stocks with the highest BV/MV ratios. Portfolio N consists of 40% of the sample stocks with the next-highest BV/MV ratios. Portfolio G, representing growth stocks, consists of the last 30% of the sample stocks with the lowest BV/MV ratios. The return spread between value and growth portfolios is reported in the last column. In table 4.2 the performance of each portfolio is measured as the value weighted geometric mean monthly return of the stocks. In table 4.3 the stock returns are equal weighted within the portfolio.

In table 4.2 the value stock portfolio outperforms the growth stock portfolio in 15 out of 24 years. The relative performance of value and growth portfolios is similar to the results derived from the correlation coefficients in table 4.1. The average value weighted geometric mean monthly return over the whole sample period for portfolio V is 0.80%, or 0.59% higher than for portfolio G. The paired t-test confirms that this average return difference is greater than zero by a statistically significant margin at a 5% significance level (t-test statistic=1.942, greater than the critical t-value of 1.714). Furthermore, the risk-adjusted return, measured as the return-to-risk ratio (the average geometric mean monthly

return divided by the standard deviation), for portfolio V at 23.76% is substantially higher than for portfolio G at 7.97%. The standard deviation of returns for portfolio V at 3.37% is moderately higher than for portfolio G at 2.67%. It seems to show that value stocks are riskier than growth stocks. The t-test rejects the null hypothesis that the variance of the value stocks is lower than the variance of the growth stocks ($t=2.560$, greater than the critical t-value of 1.717). We can conclude that value stocks are riskier than growth stocks by a statistically significant margin on the basis of value weighted returns.

In table 4.3 the number of years in which the value stock portfolio outperforms the growth stock portfolio increases to 21 years out of 24 years. The average monthly return over the whole sample period increases to 0.93% for the value portfolio and declines to -0.75% for the growth portfolio. So it leads to a much wider return spread (1.68%) between the value and growth portfolios. Loughran (2001) reports a similar wider return spread in the case of the U.S market. The standard deviation of returns for value stocks at 3.47% is also moderately higher than for growth stocks at 3.07%. It seems to show that value stocks are still riskier than growth stocks. However, the t-test can not reject the null hypothesis that the variance of the value stocks is lower than the variance of the growth stocks ($t=1.298$, less than the critical t-value of 1.717). This result

is inconsistent with the result in table 4.2. We conclude that value stocks are not riskier than growth stocks by a statistically significant margin on the basis of equally weighted returns.

Table 4.2

Value Weighted Portfolio Average Monthly Returns by Year for BV/MV Portfolios, 1981-2005

Time Period	V	N	G	Return Spread V-G
07/81-06/82	-3.09%	-1.96%	-3.39%	0.30%
07/82-06/83	-2.90%	-2.42%	-2.63%	-0.27%
07/83-06/84	-0.60%	-0.69%	-0.48%	-0.12%
07/84-06/85	5.84%	3.83%	4.43%	1.41%
07/85-06/86	-0.14%	1.19%	1.07%	-1.21%
07/86-06/87	6.33%	5.11%	4.02%	2.32%
07/87-06/88	0.59%	-1.50%	-0.89%	1.48%
07/88-06/89	-0.54%	-0.73%	-1.65%	1.11%
07/89-06/90	3.75%	3.82%	2.70%	1.04%
07/90-06/91	0.08%	0.85%	0.41%	-0.33%
07/91-06/92	5.11%	4.19%	3.03%	2.08%
07/92-06/93	1.24%	0.98%	1.50%	-0.26%
07/93-06/94	1.70%	1.66%	0.86%	0.84%
07/94-06/95	-0.88%	-0.07%	0.51%	-1.39%
07/95-06/96	1.43%	1.01%	1.60%	-0.17%
07/96-06/97	2.93%	1.57%	2.92%	0.01%
07/97-06/98	-8.72%	-8.30%	-4.97%	-3.75%
07/98-06/99	4.08%	1.54%	3.45%	0.63%
07/99-06/00	-2.52%	-7.12%	-2.34%	-0.18%
07/00-06/01	-0.44%	0.57%	-2.35%	1.91%
07/01-06/02	-0.92%	-1.04%	-3.99%	3.07%
07/02-06/03	-0.35%	-0.04%	-2.28%	1.94%
07/03-06/04	4.07%	3.17%	2.06%	2.01%
07/04-07/05	3.14%	1.49%	1.53%	1.61%
Mean	0.80%	0.30%	0.21%	0.59%** (t=1.942)
Standard Deviation	3.37%	3.15%	2.67%	0.70%** (t=2.560)
Return to Risk	23.76%	9.37%	7.97%	

** Significant at 5% level

Table 4.3

**Equal Weighted Portfolio Average Monthly Returns by Year for BV/MV
Portfolios, 1981-2005**

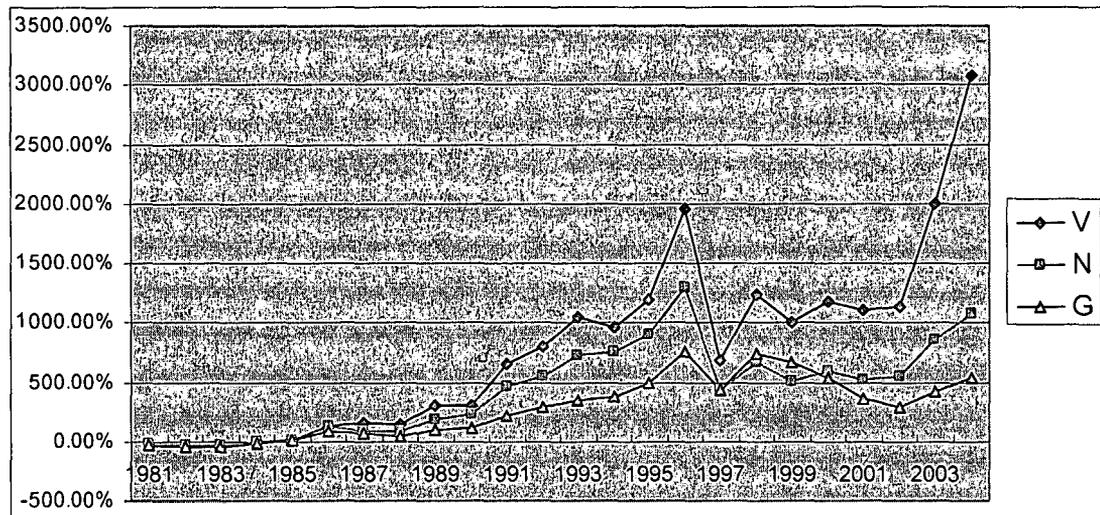
<i>Time Period</i>	<i>V</i>	<i>N</i>	<i>G</i>	<i>Return Spread V-G</i>
07/81-06/82	-1.60%	-2.36%	-3.08%	1.48%
07/82-06/83	-4.09%	-2.44%	-3.03%	-1.06%
07/83-06/84	-0.18%	-0.94%	-1.30%	1.12%
07/84-06/85	6.36%	3.56%	2.64%	3.72%
07/85-06/86	-0.21%	0.24%	-0.28%	0.06%
07/86-06/87	7.05%	5.28%	4.46%	2.59%
07/87-06/88	2.28%	0.33%	-0.06%	2.33%
07/88-06/89	-1.64%	-1.19%	-2.88%	1.25%
07/89-06/90	5.73%	4.73%	4.71%	1.01%
07/90-06/91	-0.40%	-1.43%	-1.46%	1.06%
07/91-06/92	3.85%	2.90%	1.72%	2.12%
07/92-06/93	3.17%	2.85%	0.73%	2.44%
07/93-06/94	-0.14%	-1.87%	-1.02%	0.88%
07/94-06/95	-2.02%	-2.30%	-2.41%	0.40%
07/95-06/96	0.37%	0.57%	0.57%	-0.19%
07/96-06/97	4.57%	3.69%	2.44%	2.13%
07/97-06/98	-8.16%	-8.45%	-8.59%	0.43%
07/98-06/99	3.20%	1.32%	1.44%	1.76%
07/99-06/00	-1.07%	-0.31%	-0.06%	-1.00%
07/00-06/01	1.02%	-0.94%	-3.62%	4.64%
07/01-06/02	-0.57%	-0.85%	-3.71%	3.14%
07/02-06/03	-0.84%	-1.75%	-5.44%	4.60%
07/03-06/04	3.71%	1.67%	1.06%	2.65%
07/04-07/05	1.97%	0.68%	-0.77%	2.74%
Mean	0.93%	0.13%	-0.75%	1.68%*** (t=5.370)
Standard Deviation	3.47%	2.94%	3.07%	0.4%(t=1.298)
Return to Risk	26.83%	4.25%	-24.33%	

*** Significant at 1% level

The above results indicate that value investors should not be concerned about lower returns in certain years. The value investing strategy outperforms growth investing on both a monthly return and a risk-adjusted basis over a long period. These results are consistent with previous studies regarding the return spread between value and growth stocks (Fama and French's (1992) study on the U.S market and some other studies on other developed markets). Interestingly, the comparison of results of value weighted and equal weighted portfolio returns seems to suggest that value investors should invest the same amount in each stock within their portfolio. However, most investors follow a value-weighted approach to avoid a tracking error problem.

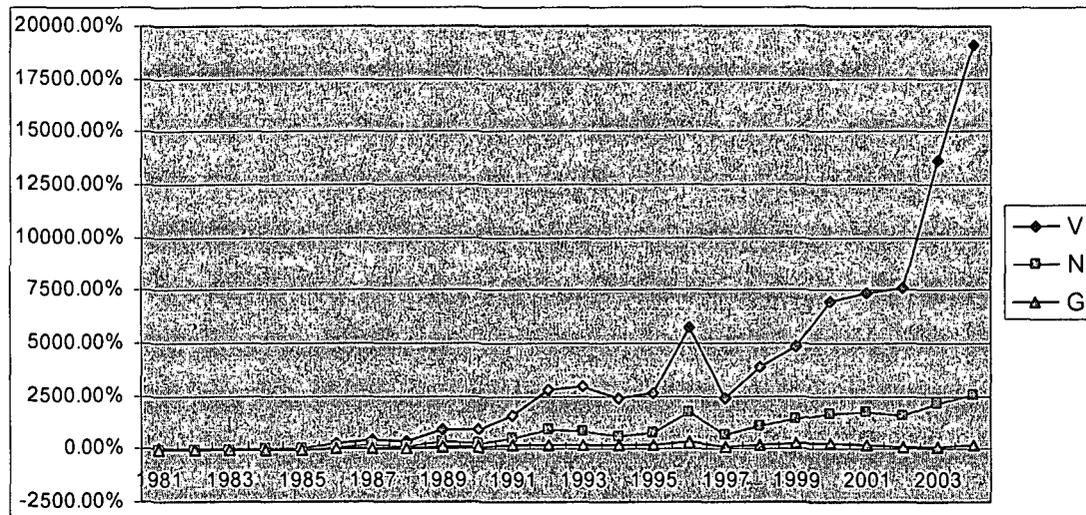
4.2.2 Cumulative Return

The cumulative performance of BV/MV portfolios is illustrated by Figure 4.1 on the basis of value weighted portfolio returns. The value portfolio consistently outperforms the growth and neutral portfolios over the whole sample period (1981-2005). By the end of the sample period (June 2005), an investor who had restricted his investment to value stocks (value weighted) would have gained 2531.09% more in absolute terms than one who had held growth stocks. A neutral portfolio would have gained a 527.91% higher return than a portfolio of growth stocks.

Figure 4.1. Cumulative Return of BV/MV portfolios on the Basis of Value**Weighted Portfolio Returns, July 1981 – June 2005**

The cumulative equal weighted portfolio returns for BV/MV portfolios are reported in figure 4.2. It presents a similar pattern to the results in figure 4.1. In addition, the cumulative return difference between BV/MV portfolios is bigger. This is similar to the results shown in section 4.2.1. If an investor had restricted his investment to value stocks over the whole sample period, he would have generated a return of 19067.59%, or 16487.65% higher in absolute terms than a neutral portfolio and 18917.29% higher than a portfolio of growth stocks.

Figure 4.2. Cumulative Return of BV/MV portfolios on the Basis of Equal Weighted Portfolio Returns, July 1981 – June 2005



The above results seem to imply that value investing generates a substantially higher return than growth investing. However, in their study of a value investment strategy in the U.K. market, Dimson, Nagel and Quigley (2003) argue that annual portfolio rebalancing results in substantial portfolio turnover, which will generate high transaction costs in turn. This also applies to the Hong Kong market. Therefore, value investors in the Hong Kong market also need to consider the transaction costs involved in value investing. Obviously, a similar argument would apply if a growth investment strategy had been followed.

4.2.3 Sub Sample Period Results

The whole sample period is divided into two sub sample periods: the periods before the Asian financial crisis (1981-1997) and after the Asian financial crisis (1997-2005). The results over the period 1981 to 1997 enable us to compare our result with previous studies on the Hong Kong market. 1997 to 2005 is a very important period for the Hong Kong market. Hong Kong experienced a financial crisis in 1997. In the same year, England transferred control of Hong Kong back to China. By the end of 2004 the total market capitalization of Hong Kong stocks had surged to HKD6695.9bn. This is 45% higher than the peak in 1997. More notably, the late 1990s witnessed the stunning boom in growth stocks and the "dot-com" mania. Investors' appetite for technology, media, and telecommunications issues reached feverish heights, and propelled prices of such stocks to stellar levels (Chan and Lakonishok, 2004: 79). Therefore the period 1997 to 2005 is a very important period for the Hong Kong market, which cannot be ignored in this study.

4.2.3.1 1981-1997

Table 4.4 reports the performance of BV/MV portfolios for the period before the Asian financial crisis. The performance is measured by calculating both value and equal weighted portfolio returns, which are presented in panel 1 and panel 2 respectively.

Panel 1 shows an average monthly return difference of 0.43% between value and growth portfolios over the period July 1981 to June 1997. Furthermore, even after returns are adjusted for risk, the value stock portfolio has a higher return per unit of risk (standard deviation) at 45.67% than the growth stock portfolio (38.44%). In panel 2, when the portfolio return is equal weighted, a wider return spread (1.33%) is evident. This finding is consistent with our results for the whole sample period (see section 4.2.1).

This sub sample period is similar to the Lam (2002) and Chui Wei (1998) studies on the Hong Kong market. In comparing our findings with theirs, our study confirms that the value stock portfolio outperforms the growth portfolio for the period before the Asian financial crisis on the basis of a sample that includes significantly more stocks than their studies.

Table 4.4

Average Returns of the BV/MV Portfolios for the Sub Sample Period 1981-1997

<i>Panel 1: Value Weighted Geometric Mean Monthly Return</i>				
	V	N	G	V-G
Mean	1.30%	1.05%	0.88%	0.43%
Standard Deviation	2.85%	2.27%	2.28%	
Return to Risk	45.67%	46.26%	38.44%	
<i>Panel 2: Equal Weighted Geometric Mean Monthly Return</i>				
Mean	1.44%	0.73%	0.11%	1.33%
Standard Deviation	3.34%	2.70%	2.53%	
Return to Risk	43.25%	26.89%	4.33%	

4.2.3.2 1997-2005

The performance of value, neutral and growth portfolios over the period July 1997 to June 2005 is reported in Table 4.5, panels 1 and 2.

Chan and Lakonishok (2004) established that a growth stock portfolio outperformed a value portfolio in the period July 1999 to June 2000. This is confirmed by the results in table 4.2 and 4.3. However, this has had no effect on the out-performance of the value portfolio over the whole period July 1997 to June 2005. The return difference between the value and growth portfolios was even bigger (0.91%) compared with the period 1981 to 1997 (0.43%). It is also evident that the BV/MV portfolios generated a negative average monthly return due to the market downturn during this period. These results confirm market movements have no effect on the out-performance of a value stock portfolio. These findings also confirm that value investing was a more favorable investment strategy for investors during the period after the Asian financial crisis.

Overall, these findings on both sub sample periods suggest that value stocks, with higher BV/MV ratios, consistently outperform growth stocks, with lower BV/MV ratios. Our findings confirm the results of previous studies on the Hong Kong market regarding the value premium. This study also confirms that the effect of the BV/MV ratio on stock return is not sample specific (see chapter 2).

Table 4.5**Average Returns of the BV/MV Portfolios for the Sub Sample Period 1997-2005**

<i>Panel 1: value weighted geometric mean monthly return</i>				
	V	N	G	V-G
Mean	-0.21%	-1.22%	-1.11%	0.91%
Standard Deviation	4.25%	4.20%	3.06%	
Return to Risk	-4.87%	-28.94%	-36.36%	
<i>Panel 2: equal weighted geometric mean monthly return</i>				
Mean	-0.09%	-1.08%	-2.46%	2.37%
Standard Deviation	3.73%	3.20%	3.50%	
Return to Risk	-2.49%	-33.68%	-70.42%	

4.3 Results of BV/MV portfolios after controlling for firm size

As discussed in chapter 3, the firm size effect on the stock return has an influence on the study of the BV/MV ratio effect. In order to account for the firm size effect in this study, we perform a test on the BV/MV portfolios after controlling for firm size. Firstly, the stocks are sorted into large, medium and small market cap groups. Thereafter the stocks in the same market cap groups are sorted again into value, neutral and growth portfolios based on their BV/MV ratios.

4.3.1 Performance of BV/MV and firm size portfolios for the whole sample period

Table 4.6 presents the average returns for those portfolios formed on the basis of both BV/MV ratios and firm size. Following the same format as in section 4.2, both value and equal weighted portfolio returns are reported.

Panel 1 presents the performance of BV/MV portfolios subdivided into large, medium and small market cap stocks over the whole sample period, where the monthly portfolio returns are value weighted. Value stock portfolios consistently outperform growth stock portfolios across the three market cap groups. The out-performance is more pronounced for small and medium market cap groups. The value portfolio has a 0.78% higher average monthly return than the growth portfolio in the large market cap group. In the medium market cap group, the value portfolio outperforms the growth portfolio by 1.53% per month. The value portfolio generates a 1.46% higher average monthly return than the growth portfolio in the small market cap group. Additionally, all the mean return differences between the value portfolio and the growth portfolio are tested to confirm significance. The t-statistics (see the last column in table 4.6) indicate that the mean return differences between the value portfolio and the growth portfolio in all three market cap groups are statistically significantly greater than zero. The t-test statistic is equal to 1.678 for large market caps

(significant at a 10% level), 3.767 for medium market caps (significant at a 1% level), and 3.687 for small market caps (significant at a 1% level).

In panel 2, when the portfolio returns are equally weighted, the results show a similar pattern to panel 1. It confirms the test results of section 4.2 that the return spread between value and growth stocks portfolios across all market cap groups becomes wider than those in panel 1 (value weighted portfolio returns). The t-statistics also tend to be larger than those in panel 1.

The risk-adjusted returns for all the BV/MV and firm size portfolios are also reported in table 4.7. Value stock portfolios consistently have a higher return per unit of risk (standard deviation) than growth stock portfolios.

If we compare all BV/MV and firm size portfolios on the basis of both value weighted and equal weighted portfolio returns, it is obvious that the small market cap value stock portfolio generates the highest return. This result provides a favorable investment strategy for investors. If investors focus on the small market cap and higher BV/MV ratio stocks, their investment will generate the highest return compared with the other portfolios.

Table 4.6**Average Returns of BV/MV portfolios after controlling for firm size
1981-2005**

<i>Panel 1: Value Weighted Average Geometric Mean Monthly Return</i>					
	V	N	G	V-G	T-statistic
L	0.69%	0.52%	-0.09%	0.78%*	1.678
M	0.31%	-0.39%	-1.22%	1.53%***	3.767
S	1.09%	0.73%	-0.37%	1.46%***	3.687
<i>Panel 3: Equal Weighted Average Geometric Mean Monthly Return</i>					
L	0.66%	0.19%	-0.61%	1.26%***	2.625
M	0.42%	-0.23%	-1.26%	1.69%***	4.625
S	1.37%	0.93%	-0.21%	1.58%***	4.214

* Significant at 10% level

*** Significant at 1% level

Table 4.7**Risk Adjusted Returns of BV/MV portfolios after controlling for firm size
1981-2005**

<i>Panel 1: Return to Risk of Value Weighted Geometric Mean Monthly Return</i>			
	V	N	G
L	22.10%	15.60%	-2.96%
M	8.73%	-13.90%	-40.43%
S	26.97%	22.42%	-11.04%
<i>Panel 2: Return to Risk of Equal Weighted Geometric Mean Monthly Return</i>			
L	20.06%	6.20%	-18.49%
M	12.07%	-7.65%	-40.46%
S	34.13%	27.69%	-6.11%

4.3.2 Cumulative Returns for BV/MV Portfolios after controlling for firm size

The cumulative performance of BV/MV portfolios within the same firm size groups is illustrated by Figure 4.3 through 4.5 on the basis of value weighted portfolio monthly returns.

Figure 4.3 illustrates that the large size neutral stocks (LN) portfolio consistently outperforms the other two portfolios within the large firm size group. The large size value stocks portfolio (LV) does outperform the large size growth stocks portfolio (LG) over the period before the Asian financial crisis. However, there is no significant return difference between the LV and the LG portfolios in the late 1990s. LG even outperforms LV. And then from 2000 the large size value stocks portfolio starts to outperform the large size growth stocks portfolio again. Over the whole sample period, the LV and LN portfolios achieved a similar total return (1392.08% for LV, 1394.00% for LN). The LG portfolio achieved a very low return at 180.78% over the whole sample period. The negative return for the large size growth stocks portfolio over the period 2000 to 2003 is the major reason for the low return of the LG portfolio.

In the medium firm size group, the medium size value stocks portfolio (MV) consistently outperforms the other two portfolios over the whole sample period.

The medium size growth stocks portfolio (MG) even shows a negative return over the whole sample period. At the end of June 2005 the medium size value stocks portfolio generated a return of 1187.68%, the medium size neutral stocks portfolio (MN) generated a return of 249.34% and the medium size growth stocks portfolio generated a negative return of -50.85%.

Figure 4.5 illustrates the total performance of BV/MV portfolios within the smallest firm size group. In this smallest firm size group value stocks consistently outperform growth stocks. However, value stocks and neutral stocks show a similar performance over the whole sample period. The neutral stocks even outperform value stocks over the period 1997-2002. The return difference between the value stocks and neutral stocks increases after 2002. Finally, the small size value stocks portfolio (SV) produced the highest return at 47743.28%, the small size neutral stocks portfolio (SN) produced a return of 24517.54% and the small size growth stocks portfolio (SG) produced a return of 1206.41%.

If we compare the total performance of all these nine portfolios, we see that the small value stocks portfolio outperformed all other portfolios over the whole sample period (1981-2005), which is consistent with other studies. However, in the case of the Hong Kong market the medium size growth stocks portfolio showed the lowest cumulative return – not the large size growth stocks

portfolio. This is not in line with the experience of other studies. The cumulative return of the small size neutral stocks portfolio is only lower than the small size value stocks portfolio and clearly higher than the others. The cumulative returns of four of the other portfolios are more or less the same (the large size neutral stocks portfolio, the large size value stocks portfolio, the medium size value stocks portfolio and the small size growth stocks portfolio). The large size growth stocks portfolio and the medium size neutral stocks portfolio show a similar poor performance.

Figure 4.3 Cumulative returns of BV/MV portfolios within large firm size stocks, July 1981- June 2005

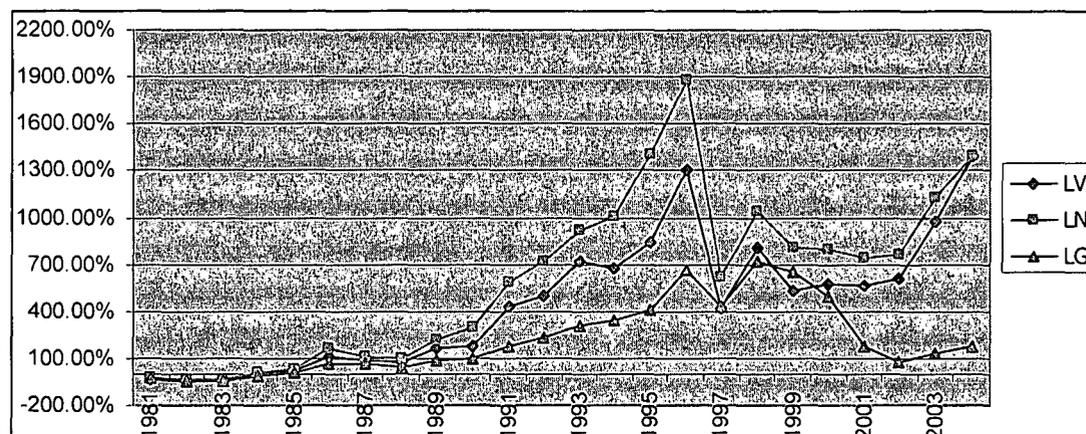


Figure 4.4 Cumulative returns of BV/MV portfolios within medium firm size stocks, July 1981- June 2005

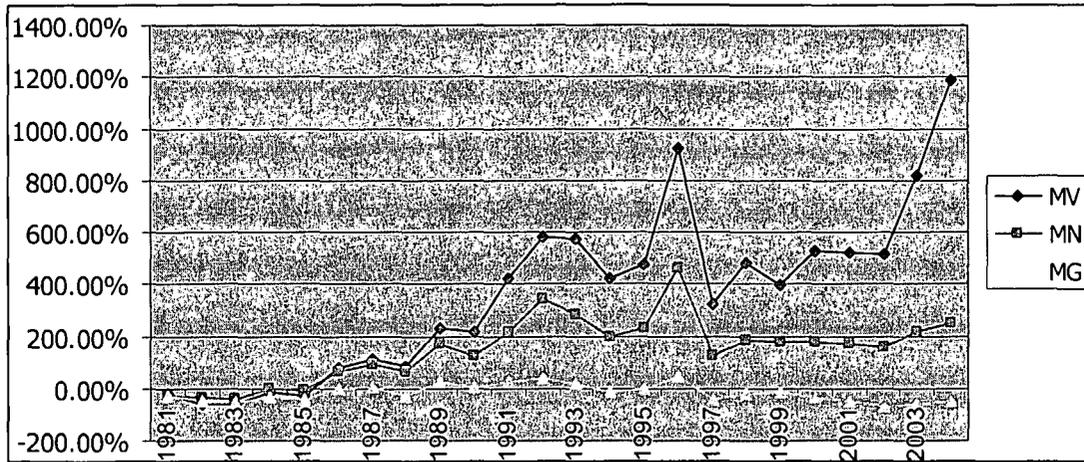
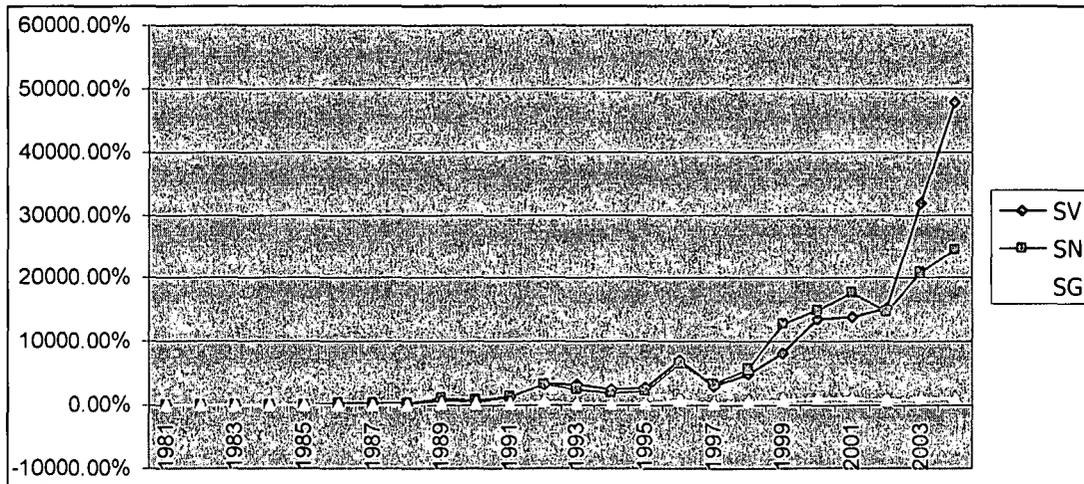


Figure 4.5 Cumulative returns of BV/MV portfolios within small firm size stocks, July 1981- June 2005



4.5 Conclusions

The empirical analyses presented above find that value portfolios outperform growth portfolios in most of the years from July 1981 to June 2005, but growth portfolios do outperform value portfolios in certain years. The results presented for the whole sample period indicate that value portfolios outperform growth portfolios over the long term. Even when the whole sample period is subdivided into two sub sample periods (before and after Asian financial crisis), value portfolios consistently generate a higher return than growth portfolios in both periods. If we simply look at the standard deviation of returns, the value portfolio is riskier than the growth portfolio on the basis of both value weighted and equally weighted returns. This result is consistent with the Fama and French view that the higher return produced by a value portfolio is compensating for its higher risk. However, the t-test only confirmed the statistically significant variance difference between value and growth portfolios based on value weighted returns and could not confirm a statistically significant variance difference between value and growth portfolios based on equal weighted returns.

Furthermore, when the influence of firm size on the performance of value and growth portfolios is controlled by the two-dimensional portfolio formation method, the value portfolio consistently outperforms the growth portfolio in all

three market cap groups on the basis of the average monthly return over the whole sample period. Consistent with the study conducted by Lam (2002), the small market cap value stocks portfolio (SV) generates the highest return of all nine portfolios. In the small size group, the return difference between the value and growth portfolios is the largest compared with the medium market cap and large market cap groups.

However, on the basis of cumulative returns the value portfolio only consistently outperforms the growth portfolio and the neutral portfolio in the medium size stocks group. In the large firm size group the neutral portfolio instead of the value portfolio shows the highest return. In the small firm size group the value portfolio shows a consistently higher return than the growth portfolio, but the value portfolio and the neutral portfolio show a similar performance before 2002. The return difference between them only increased after 2002.

Chapter 5

Summary, Conclusions and Recommendations

5.1 Summary

Numerous studies have documented that value stocks outperform growth stocks in the long term. In this paper we examined whether the value premium still exists in the case of the Hong Kong market.

There are several studies providing evidence that value stocks do outperform growth stocks in the Hong Kong market. However, those studies have certain shortcomings: the sample period only covers the period before the Asian financial crisis and the sample stocks that were included in those studies are limited. In our study the sample period is updated to June 2005.

All the necessary accounting and market information were collected from the PACAP database (1980-2001) and Reuters (2000-2005). The raw data was processed and adjusted to fit into this study.

We followed Fama and French's (1992) approach with some consideration of the specific characteristics of the Hong Kong market data. The stocks were first sorted into value and growth portfolios based on their book-to-market value equity ratios. Subsequently two-dimensional portfolios were formed based on book-to-market value ratios and allowing for the firm size effect. After formation of these portfolios, the performance of value and growth stock

portfolios was computed. The different measurements used in this study are summarized as follows:

- Both value weighted and equally weighted geometric mean monthly returns were calculated for each portfolio
- In order to compute the total performance of each portfolio for the whole period, the value weighted annual returns were compounded
- In order to compare the return volatility of the portfolios, the standard deviations and the coefficients of variation were calculated
- The risk-adjusted returns were calculated, which enable us to compare the performance of the portfolios based on the return per unit of risk.

Finally, the results were tested by two statistical tests: the paired t-test for the return difference between the value stocks portfolio and growth stocks portfolio, and the special t-test for the variance difference between the value stocks portfolio return and the growth stocks portfolio return.

5.2 Conclusions

After this extensive study we can conclude that value stocks outperformed growth stocks in the case of the Hong Kong market over the period from July 1981 to June 2005. This result is consistent with previous studies on some other markets as well as the Hong Kong market.

The detailed conclusions that we can make are summarized as follows:

- Value stocks outperformed growth stocks in most of the years over the period July 1981 to June 2005, but not all the years.
- Although growth stocks have generated a higher return than value stocks in certain periods, value stocks outperformed growth stocks for the whole sample period on both the average geometric mean monthly return and risk-adjusted return basis. The paired t-test showed that the return difference between value stocks and growth stocks was statistically significant.
- The standard deviation seemed to show that value stocks were fundamentally riskier than growth stocks. However, the special t-test only confirmed this result in the case of the value weighted returns and could not confirm it in the case of the equally weighted returns. This is only partially consistent with Fama and French's view.

-
- The whole sample period was divided into two sub sample periods: before and after the Asian financial crisis. The results show a consistent value premium in both periods.
 - In our study firm size was also taken into account. The results show that value stocks still outperformed growth stocks within similar firm size groups on the basis of the average monthly return over the whole sample period.
 - On the basis of the cumulative returns value stocks did generate a higher return than growth stocks within the similar firm size groups. However, in the large firm size group growth stocks appeared to generate a higher return than value stocks in the late 1990s and neutral stocks consistently outperformed value stocks. In the small firm size group value stocks showed a similar performance to neutral portfolio.
 - If the total performance of all these nine BV/MV and firm size portfolios is compared, it showed that the small value stocks portfolio earned the highest return compared with the other portfolios. However, the portfolio that produced the lowest return was not the large growth stocks portfolio. This is inconsistent with some other studies.
 - In our study both value weighted and equally weighted returns are presented. It shows that the return spread between value and growth stocks is enlarged when the equally weighted return is used. This result is consistent with Lougran's study on the U.S. market.

5.3 Recommendations

The results of this study imply that patient value investors would produce a higher return than growth investors in the Hong Kong market. Typically, the small value investor would generate the most favorable return. However, value investors need to pay attention to the high transaction costs that are generated by the annual rebalancing of the value stock portfolios. This is suggested by Dimson, Nagel and Quigley (2003) in the U.K. study.

In this study we tried to interpret the underlying reason why value stocks have higher returns than growth stocks. Modern finance theory states that the higher returns compensate for higher risk. Although our study confirms that value stocks are riskier than growth stocks by a statistically significant margin on the basis of value weighted returns, it was found that this was not the case for portfolios constructed on the basis of equally weighted returns. Because our study is rather limited, there may be some other reasons for the higher return of value stocks. Although several studies have been done in the U.S, further investigation is necessary in the case of the Hong Kong market.

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Appendix 1**Average Ratios of BV/MV, 1981-2005**

Time Period	High	Medium	Low
07/1981-06/1982	1.5334	0.6410	0.2857
07/1982-06/1983	2.2310	0.9202	0.3655
07/1983-06/1984	3.3284	1.4146	0.5841
07/1984-06/1985	3.0707	1.3451	0.5187
07/1985-06/1986	2.3571	1.1338	0.4419
07/1986-06/1987	2.6154	1.0205	0.4181
07/1987-06/1988	1.4794	0.7486	0.2926
07/1988-06/1989	1.9018	0.8994	0.3206
07/1989-06/1990	2.0852	0.9300	0.3740
07/1990-06/1991	2.0793	1.0590	0.3863
07/1991-06/1992	2.0718	0.9940	0.3644
07/1992-06/1993	2.0304	0.8768	0.3463
07/1993-06/1994	1.8549	0.7514	0.3000
07/1994-06/1995	1.7445	0.6802	0.2550
07/1995-06/1996	2.8488	1.1720	0.4600
07/1996-06/1997	3.1452	1.2393	0.4603
07/1997-06/1998	2.5333	0.9871	0.3423
07/1998-06/1999	4.0867	1.3753	0.4743
07/1999-06/2000	7.3163	2.0990	0.6420
07/2000-06/2001	5.4957	1.3828	0.3351
07/2001-06/2002	4.0176	1.1139	0.2372
07/2002-06/2003	3.9454	1.0353	0.2176
07/2003-06/2004	5.8546	1.2695	0.3415
07/2004-07/2005	3.9743	1.0484	0.3021
Mean	3.0667	1.0891	0.3777

Appendix 2

Value Weighted Geometric Mean Monthly Returns of BV/MV Portfolios, 1981-1997

Time Period	V	N	G	V-G
07/1981-06/1982	-3.09%	-1.96%	-3.39%	0.30%
07/1982-06/1983	-2.90%	-2.42%	-2.63%	-0.27%
07/1983-06/1984	-0.60%	-0.69%	-0.48%	-0.12%
07/1984-06/1985	5.84%	3.83%	4.43%	1.41%
07/1985-06/1986	-0.14%	1.19%	1.07%	-1.21%
07/1986-06/1987	6.33%	5.11%	4.02%	2.32%
07/1987-06/1988	0.59%	-1.50%	-0.89%	1.48%
07/1988-06/1989	-0.54%	-0.73%	-1.65%	1.11%
07/1989-06/1990	3.75%	3.82%	2.70%	1.04%
07/1990-06/1991	0.08%	0.85%	0.41%	-0.33%
07/1991-06/1992	5.11%	4.19%	3.03%	2.08%
07/1992-06/1993	1.24%	0.98%	1.50%	-0.26%
07/1993-06/1994	1.70%	1.66%	0.86%	0.84%
07/1994-06/1995	-0.88%	-0.07%	0.51%	-1.39%
07/1995-06/1996	1.43%	1.01%	1.60%	-0.17%
07/1996-06/1997	2.93%	1.57%	2.92%	0.01%
Mean	1.30%	1.05%	0.88%	0.43%
Standard Deviation	2.85%	2.27%	2.28%	
Return to Risk	45.67%	46.26%	38.44%	

Appendix 3

Value Weighted Geometric Mean Monthly Returns of BV/MV Portfolios, 1997-2005

Time Period	V	N	G	V-G
07/1997-06/1998	-8.72%	-8.30%	-4.97%	-3.75%
07/1998-06/1999	4.08%	1.54%	3.45%	0.63%
07/1999-06/2000	-2.52%	-7.12%	-2.34%	-0.18%
07/2000-06/2001	-0.44%	0.57%	-2.35%	1.91%
07/2001-06/2002	-0.92%	-1.04%	-3.99%	3.07%
07/2002-06/2003	-0.35%	-0.04%	-2.28%	1.94%
07/2003-06/2004	4.07%	3.17%	2.06%	2.01%
07/2004-07/2005	3.14%	1.49%	1.53%	1.61%
Mean	-0.21%	-1.22%	-1.11%	0.91%
Standard Deviation	4.25%	4.20%	3.06%	
Return to Risk	-4.87%	-28.94%	-36.36%	

Appendix 4

Equal Weighted Geometric Mean Monthly Returns of BV/MV Portfolios, 1981-1997

Time Period	V	N	G	V-G
07/1981-06/1982	-1.60%	-2.36%	-3.08%	1.48%
07/1982-06/1983	-4.09%	-2.44%	-3.03%	-1.06%
07/1983-06/1984	-0.18%	-0.94%	-1.30%	1.12%
07/1984-06/1985	6.36%	3.56%	2.64%	3.72%
07/1985-06/1986	-0.21%	0.24%	-0.28%	0.06%
07/1986-06/1987	7.05%	5.28%	4.46%	2.59%
07/1987-06/1988	2.28%	0.33%	-0.06%	2.33%
07/1988-06/1989	-1.64%	-1.19%	-2.88%	1.25%
07/1989-06/1990	5.73%	4.73%	4.71%	1.01%
07/1990-06/1991	-0.40%	-1.43%	-1.46%	1.06%
07/1991-06/1992	3.85%	2.90%	1.72%	2.12%
07/1992-06/1993	3.17%	2.85%	0.73%	2.44%
07/1993-06/1994	-0.14%	-1.87%	-1.02%	0.88%
07/1994-06/1995	-2.02%	-2.30%	-2.41%	0.40%
07/1995-06/1996	0.37%	0.57%	0.57%	-0.19%
07/1996-06/1997	4.57%	3.69%	2.44%	2.13%
Mean	1.44%	0.73%	0.11%	1.33%
Standard Deviation	3.34%	2.70%	2.53%	
Return to Risk	43.25%	26.89%	4.33%	

Appendix 5

Equal Weighted Geometric Mean Monthly Returns of BV/MV Portfolios, 1997-2005

Time Period	V	N	G	V-G
07/1997-06/1998	-8.16%	-8.45%	-8.59%	0.43%
07/1998-06/1999	3.20%	1.32%	1.44%	1.76%
07/1999-06/2000	-1.07%	-0.31%	-0.06%	-1.00%
07/2000-06/2001	1.02%	-0.94%	-3.62%	4.64%
07/2001-06/2002	-0.57%	-0.85%	-3.71%	3.14%
07/2002-06/2003	-0.84%	-1.75%	-5.44%	4.60%
07/2003-06/2004	3.71%	1.67%	1.06%	2.65%
07/2004-07/2005	1.97%	0.68%	-0.77%	2.74%
Mean	-0.09%	-1.08%	-2.46%	2.37%
Standard Deviation	3.73%	3.20%	3.50%	
Return to Risk	-2.49%	-33.68%	-70.42%	

Appendix 6

Value Weighted Annual Compound Returns of BV/MV Portfolios,
1981-2005

Time Period	V	N	G	V-G
07/1981-06/1982	-28.93%	-17.93%	-31.49%	2.56%
07/1982-06/1983	-24.48%	-21.68%	-25.41%	0.93%
07/1983-06/1984	-4.76%	-5.33%	-2.63%	-2.13%
07/1984-06/1985	102.58%	63.90%	76.63%	25.95%
07/1985-06/1986	1.42%	17.77%	18.67%	-17.24%
07/1986-06/1987	122.54%	89.56%	71.78%	50.76%
07/1987-06/1988	10.01%	-14.22%	-7.78%	17.79%
07/1988-06/1989	-3.52%	-6.36%	-13.95%	10.43%
07/1989-06/1990	59.91%	60.39%	40.41%	19.50%
07/1990-06/1991	2.83%	14.70%	7.78%	-4.95%
07/1991-06/1992	84.89%	69.82%	46.94%	37.94%
07/1992-06/1993	19.68%	16.62%	22.09%	-2.41%
07/1993-06/1994	27.35%	27.72%	14.21%	13.15%
07/1994-06/1995	-7.90%	2.94%	8.65%	-16.54%
07/1995-06/1996	22.37%	17.11%	23.52%	-1.15%
07/1996-06/1997	57.95%	38.65%	45.45%	12.50%
07/1997-06/1998	-61.87%	-61.66%	-37.15%	-24.72%
07/1998-06/1999	70.94%	43.59%	54.63%	16.31%
07/1999-06/2000	-16.77%	-20.68%	-7.55%	-9.22%
07/2000-06/2001	15.12%	13.27%	-17.76%	32.88%
07/2001-06/2002	-5.54%	-9.38%	-27.11%	21.57%
07/2002-06/2003	2.00%	4.73%	-15.33%	17.33%
07/2003-06/2004	70.20%	47.65%	32.54%	37.66%
07/2004-07/2005	51.43%	21.43%	23.62%	27.81%
Mean	23.64%	16.36%	12.53%	11.11%
Standard Deviation	44.98%	34.75%	32.37%	
Return to Risk	52.57%	47.07%	38.71%	

Appendix 7

Value Weighted Annual Compound Returns of BV/MV Portfolios, 1981-1997

Time Period	V	N	G	V-G
07/1981-06/1982	-28.93%	-17.93%	-31.49%	2.56%
07/1982-06/1983	-24.48%	-21.68%	-25.41%	0.93%
07/1983-06/1984	-4.76%	-5.33%	-2.63%	-2.13%
07/1984-06/1985	102.58%	63.90%	76.63%	25.95%
07/1985-06/1986	1.42%	17.77%	18.67%	-17.24%
07/1986-06/1987	122.54%	89.56%	71.78%	50.76%
07/1987-06/1988	10.01%	-14.22%	-7.78%	17.79%
07/1988-06/1989	-3.52%	-6.36%	-13.95%	10.43%
07/1989-06/1990	59.91%	60.39%	40.41%	19.50%
07/1990-06/1991	2.83%	14.70%	7.78%	-4.95%
07/1991-06/1992	84.89%	69.82%	46.94%	37.94%
07/1992-06/1993	19.68%	16.62%	22.09%	-2.41%
07/1993-06/1994	27.35%	27.72%	14.21%	13.15%
07/1994-06/1995	-7.90%	2.94%	8.65%	-16.54%
07/1995-06/1996	22.37%	17.11%	23.52%	-1.15%
07/1996-06/1997	57.95%	38.65%	45.45%	12.50%
Mean	27.62%	22.10%	18.43%	9.19%
Standard Deviation	45.29%	33.90%	31.75%	
Return to Risk	60.99%	65.19%	58.05%	

Appendix 8

Value Weighted Annual Compound Returns of BV/MV Portfolios, 1997-2005

Time Period	V	N	G	V-G
07/1997-06/1998	-61.87%	-61.66%	-37.15%	-24.72%
07/1998-06/1999	70.94%	43.59%	54.63%	16.31%
07/1999-06/2000	-16.77%	-20.68%	-7.55%	-9.22%
07/2000-06/2001	15.12%	13.27%	-17.76%	32.88%
07/2001-06/2002	-5.54%	-9.38%	-27.11%	21.57%
07/2002-06/2003	2.00%	4.73%	-15.33%	17.33%
07/2003-06/2004	70.20%	47.65%	32.54%	37.66%
07/2004-07/2005	51.43%	21.43%	23.62%	27.81%
Mean	15.69%	4.87%	0.74%	14.95%
Standard Deviation	46.30%	35.77%	32.33%	
Return to Risk	33.88%	13.61%	2.28%	

Appendix 9

Equal Weighted Annual Compound Returns of BV/MV Portfolios,
1981-2005

Time Period	V	N	G	V-G
07/1981-06/1982	-7.68%	-20.31%	-27.68%	19.99%
07/1982-06/1983	-34.29%	-16.52%	-27.77%	-6.52%
07/1983-06/1984	0.71%	-4.24%	-9.26%	9.97%
07/1984-06/1985	121.46%	64.07%	57.59%	63.87%
07/1985-06/1986	9.28%	9.82%	8.62%	0.66%
07/1986-06/1987	142.77%	104.16%	78.32%	64.45%
07/1987-06/1988	47.34%	15.61%	8.84%	38.50%
07/1988-06/1989	-12.42%	-8.06%	-22.13%	9.72%
07/1989-06/1990	126.89%	82.78%	94.16%	32.73%
07/1990-06/1991	-0.47%	-11.29%	-10.83%	10.36%
07/1991-06/1992	64.07%	51.91%	31.41%	32.66%
07/1992-06/1993	66.74%	71.50%	14.24%	52.50%
07/1993-06/1994	6.15%	-12.27%	-2.45%	8.60%
07/1994-06/1995	-18.66%	-20.37%	-16.07%	-2.59%
07/1995-06/1996	11.42%	16.26%	19.01%	-7.58%
07/1996-06/1997	111.13%	118.92%	55.70%	55.44%
07/1997-06/1998	-56.70%	-56.65%	-55.05%	-1.65%
07/1998-06/1999	58.60%	42.60%	38.78%	19.81%
07/1999-06/2000	24.42%	33.24%	22.14%	2.28%
07/2000-06/2001	42.11%	14.27%	-7.37%	49.48%
07/2001-06/2002	6.19%	3.86%	-20.41%	26.60%
07/2002-06/2003	2.78%	-6.55%	-35.89%	38.67%
07/2003-06/2004	78.60%	32.28%	35.02%	43.58%
07/2004-07/2005	39.35%	18.54%	6.47%	32.88%
Mean	34.57%	21.82%	9.81%	24.77%
Standard Deviation	52.95%	42.82%	36.92%	
Return to Risk	65.30%	50.94%	26.56%	

Appendix 10

Equal Weighted Annual Compound Returns of BV/MV Portfolios,
1981-1997

Time Period	V	N	G	V-G
07/1981-06/1982	-7.68%	-20.31%	-27.68%	19.99%
07/1982-06/1983	-34.29%	-16.52%	-27.77%	-6.52%
07/1983-06/1984	0.71%	-4.24%	-9.26%	9.97%
07/1984-06/1985	121.46%	64.07%	57.59%	63.87%
07/1985-06/1986	9.28%	9.82%	8.62%	0.66%
07/1986-06/1987	142.77%	104.16%	78.32%	64.45%
07/1987-06/1988	47.34%	15.61%	8.84%	38.50%
07/1988-06/1989	-12.42%	-8.06%	-22.13%	9.72%
07/1989-06/1990	126.89%	82.78%	94.16%	32.73%
07/1990-06/1991	-0.47%	-11.29%	-10.83%	10.36%
07/1991-06/1992	64.07%	51.91%	31.41%	32.66%
07/1992-06/1993	66.74%	71.50%	14.24%	52.50%
07/1993-06/1994	6.15%	-12.27%	-2.45%	8.60%
07/1994-06/1995	-18.66%	-20.37%	-16.07%	-2.59%
07/1995-06/1996	11.42%	16.26%	19.01%	-7.58%
07/1996-06/1997	111.13%	118.92%	55.70%	55.44%
Mean	39.65%	27.62%	15.73%	23.92%
Standard Deviation	58.44%	47.34%	38.00%	
Return to Risk	67.86%	58.35%	41.40%	

Appendix 11

Equal Weighted Annual Compound Returns of BV/MV Portfolios,
1997-2005

Time Period	V	N	G	V-G
07/1997-06/1998	-56.70%	-56.65%	-55.05%	-1.65%
07/1998-06/1999	58.60%	42.60%	38.78%	19.81%
07/1999-06/2000	24.42%	33.24%	22.14%	2.28%
07/2000-06/2001	42.11%	14.27%	-7.37%	49.48%
07/2001-06/2002	6.19%	3.86%	-20.41%	26.60%
07/2002-06/2003	2.78%	-6.55%	-35.89%	38.67%
07/2003-06/2004	78.60%	32.28%	35.02%	43.58%
07/2004-07/2005	39.35%	18.54%	6.47%	32.88%
Mean	24.42%	10.20%	-2.04%	26.46%
Standard Deviation	41.44%	31.50%	33.85%	
Return to Risk	58.92%	32.38%	-6.02%	

Appendix 12

Sub Period Average Returns for the BV/MV Portfolios

1981-1997

1997-2005

Panel 1: Value Weighted Geometric Mean Monthly Return

	V	N	G	V-G	V	N	G	V-G
Mean	1.30%	1.05%	0.88%	0.43%	-0.21%	-1.22%	-1.11%	0.91%
Standard Deviation	2.85%	2.27%	2.28%		4.25%	4.20%	3.06%	
Return to Risk	45.67%	46.26%	38.44%		-4.87%	-28.94%	-36.36%	

Panel 2: Equal Weighted Geometric Mean Monthly Return

Mean	1.44%	0.73%	0.11%	1.33%	-0.09%	-1.08%	-2.46%	2.37%
Standard Deviation	3.34%	2.70%	2.53%		3.73%	3.20%	3.50%	
Return to Risk	43.25%	26.89%	4.33%		-2.49%	-33.68%	-70.42%	

Panel 3: Value Weighted Annual Compound Return

Mean	27.62%	22.10%	18.43%	9.19%	15.69%	4.87%	0.74%	14.95%
Standard Deviation	45.29%	33.90%	31.75%		46.30%	35.77%	32.33%	
Return to Risk	60.99%	65.19%	58.05%		33.88%	13.61%	2.28%	

Panel 4: Equal Weighted Annual Compound Return

Mean	39.65%	27.62%	15.73%	23.92%	24.42%	10.20%	-2.04%	26.46%
Standard Deviation	58.44%	47.34%	38.00%		41.44%	31.50%	33.85%	
Return to Risk	67.86%	58.35%	41.40%		58.92%	32.38%	-6.02%	

Appendix 13

Average Returns of the BV/MV Portfolios for the Whole Sample Period

<i>Panel 1: Value Weighted Geometric Mean Monthly Return</i>				
	V	N	G	V-G
Mean	0.80%	0.30%	0.21%	0.59%
Standard Deviation	3.37%	3.15%	2.67%	
Return to Risk	23.76%	9.37%	7.97%	
<i>Panel 2: Equal Weighted Geometric Mean Monthly Return</i>				
Mean	0.93%	0.13%	-0.75%	1.68%
Standard Deviation	3.47%	2.94%	3.07%	
Return to Risk	26.83%	4.25%	-24.33%	
<i>Panel 3: Value Weighted Annual Compound Return</i>				
Mean	23.64%	16.36%	12.53%	11.11%
Standard Deviation	44.98%	34.75%	32.37%	
Return to Risk	52.57%	47.07%	38.71%	
<i>Panel 4: Equal Weighted Annual Compound Return</i>				
Mean	34.57%	21.82%	9.81%	24.77%
Standard Deviation	52.95%	42.82%	36.92%	
Return to Risk	65.30%	50.94%	26.56%	

Appendix 14

Average Returns of BV/MV Portfolios after Controlling Firm Size for Whole Sample Period

<i>Panel 1: Value Weighted Average Geometric Mean Monthly Return</i>				
	V	N	G	V-G
L	0.69%	0.52%	-0.09%	0.78%
M	0.31%	-0.39%	-1.22%	1.53%
S	1.09%	0.73%	-0.37%	1.46%
<i>Panel 2: Value Weighted Average Annual Compound Return</i>				
L	18.81%	18.33%	9.42%	9.38%
M	20.47%	10.70%	2.44%	18.03%
S	45.89%	36.83%	20.27%	25.62%
<i>Panel 3: Equal Weighted Average Geometric Mean Monthly Return</i>				
L	0.66%	0.19%	-0.61%	1.26%
M	0.42%	-0.23%	-1.26%	1.69%
S	1.37%	0.93%	-0.21%	1.58%
<i>Panel 4: Equal Weighted Average Annual Compound Return</i>				
L	20.80%	16.32%	8.77%	12.03%
M	22.99%	13.78%	3.07%	19.92%
S	52.15%	43.05%	25.31%	26.84%

Appendix 15

Risk Adjusted Returns of BV/MV Portfolios after Controlling Firm Size for Whole Sample Period

<i>Panel 1: Return to Risk of Value Weighted Geometric Mean Monthly Return</i>			
	V	N	G
L	22.10%	15.60%	-2.96%
M	8.73%	-13.90%	-40.43%
S	26.97%	22.42%	-11.04%
<i>Panel 2: Return to Risk of Value Weighted Annual Compound Return</i>			
L	47.73%	48.56%	28.87%
M	41.71%	30.88%	7.26%
S	62.47%	62.99%	39.67%
<i>Panel 3: Return to Risk of Equal Weighted Geometric Mean Monthly Return</i>			
L	20.06%	6.20%	-18.49%
M	12.07%	-7.65%	-40.46%
S	34.13%	27.69%	-6.11%
<i>Panel 4: Return to Risk of Equal Weighted Annual Compound Return</i>			
L	47.52%	42.64%	25.66%
M	44.73%	36.24%	8.51%
S	71.47%	67.40%	43.90%

Appendix 16

Standard Deviations of Average Returns for the BV/MV Portfolios after Controlling Firm Size, 1981-2005

<i>Panel 1: Standard Deviation of Value weighted Geometric Mean Monthly Return</i>			
	V	N	G
L	3.13%	3.33%	2.98%
M	3.58%	2.78%	3.02%
S	4.03%	3.23%	3.39%
<i>Panel 2: Standard Deviation of Value weighted Annual Compound Return</i>			
L	39.40%	37.75%	32.65%
M	49.07%	34.66%	33.53%
S	73.46%	58.47%	51.10%
<i>Panel 3: Standard Deviation of Equal Weighted Geometric Mean Monthly Return</i>			
L	3.27%	3.08%	3.28%
M	3.52%	2.96%	3.13%
S	4.01%	3.35%	3.49%
<i>Panel 4: Standard Deviation of Equal Weighted Annual Compound Return</i>			
L	43.77%	38.28%	34.17%
M	51.40%	38.01%	36.10%
S	72.97%	63.87%	57.66%

Appendix 17

Value Weighted Geometric Mean Monthly Returns of BV/MV Portfolios in Large Size Stocks, 1981-2005

Time Period	<i>LV</i>	<i>LN</i>	<i>LG</i>	<i>LV-LG</i>
07/1981-06/1982	-3.09%	-2.24%	-2.87%	-0.21%
07/1982-06/1983	-1.59%	-2.59%	-2.36%	0.77%
07/1983-06/1984	-0.46%	-0.22%	-0.97%	0.51%
07/1984-06/1985	4.95%	4.57%	4.42%	0.53%
07/1985-06/1986	0.81%	1.39%	1.54%	-0.73%
07/1986-06/1987	4.69%	5.64%	2.71%	1.99%
07/1987-06/1988	-1.04%	-1.77%	-0.31%	-0.74%
07/1988-06/1989	-0.71%	-0.90%	-1.46%	0.74%
07/1989-06/1990	3.27%	3.91%	2.37%	0.90%
07/1990-06/1991	0.25%	1.67%	0.13%	0.12%
07/1991-06/1992	5.35%	4.51%	2.83%	2.52%
07/1992-06/1993	0.99%	1.26%	1.32%	-0.34%
07/1993-06/1994	2.44%	1.59%	1.43%	1.01%
07/1994-06/1995	-0.68%	0.62%	0.61%	-1.29%
07/1995-06/1996	1.56%	2.37%	0.94%	0.63%
07/1996-06/1997	2.42%	1.98%	3.23%	-0.81%
07/1997-06/1998	-8.49%	-8.76%	-3.74%	-4.75%
07/1998-06/1999	4.19%	2.84%	3.45%	0.74%
07/1999-06/2000	-3.29%	-6.59%	-2.47%	-0.82%
07/2000-06/2001	-0.92%	-0.48%	-2.76%	1.84%
07/2001-06/2002	-0.26%	-0.72%	-7.75%	7.50%
07/2002-06/2003	0.09%	0.05%	-5.08%	5.16%
07/2003-06/2004	3.39%	2.80%	1.60%	1.79%
07/2004-07/2005	2.74%	1.54%	1.07%	1.67%
Mean	0.69%	0.52%	-0.09%	0.78%
Standard Deviation	3.13%	3.33%	2.98%	
Return to Risk	22.10%	15.60%	-2.96%	

Appendix 18

Value Weighted Geometric Mean Monthly Returns of BV/MV Portfolios in Medium Size Stocks, 1981-2005

Time Period	<i>MV</i>	<i>MN</i>	<i>MG</i>	<i>MV-MG</i>
07/1981-06/1982	-2.47%	-2.90%	-3.08%	0.61%
07/1982-06/1983	-6.16%	-2.06%	-3.25%	-2.91%
07/1983-06/1984	-0.66%	-2.25%	-0.93%	0.27%
07/1984-06/1985	6.36%	3.86%	0.74%	5.63%
07/1985-06/1986	-1.46%	-1.09%	-1.56%	0.10%
07/1986-06/1987	7.26%	3.77%	4.00%	3.26%
07/1987-06/1988	1.05%	0.44%	-0.36%	1.41%
07/1988-06/1989	-1.35%	-1.50%	-3.65%	2.31%
07/1989-06/1990	4.43%	3.72%	3.98%	0.44%
07/1990-06/1991	-0.69%	-1.89%	-2.03%	1.34%
07/1991-06/1992	3.82%	2.11%	0.82%	3.00%
07/1992-06/1993	1.90%	2.07%	0.43%	1.47%
07/1993-06/1994	-0.70%	-1.73%	-2.16%	1.46%
07/1994-06/1995	-2.32%	-2.45%	-3.34%	1.02%
07/1995-06/1996	0.15%	0.39%	0.16%	-0.01%
07/1996-06/1997	3.30%	2.49%	2.37%	0.93%
07/1997-06/1998	-8.51%	-8.93%	-9.66%	1.15%
07/1998-06/1999	2.17%	0.88%	1.21%	0.97%
07/1999-06/2000	-2.90%	-1.61%	-0.41%	-2.49%
07/2000-06/2001	0.98%	-1.02%	-4.49%	5.47%
07/2001-06/2002	-0.79%	-1.20%	-3.75%	2.96%
07/2002-06/2003	-0.73%	-1.64%	-4.49%	3.76%
07/2003-06/2004	2.74%	1.23%	0.30%	2.45%
07/2004-07/2005	2.07%	0.03%	-0.10%	2.17%
Mean	0.31%	-0.39%	-1.22%	1.53%
Standard Deviation	3.58%	2.78%	3.02%	
Return to Risk	8.73%	-13.90%	-40.43%	

Appendix 19

Value Weighted Geometric Mean Monthly Returns of BV/MV Portfolios in Small Size Stocks, 1981-2005

Time Period	SV	SN	SG	SV-SG
07/1981-06/1982	-4.34%	-1.33%	-2.36%	-1.99%
07/1982-06/1983	-4.56%	-2.19%	-3.74%	-0.82%
07/1983-06/1984	0.92%	0.42%	-0.91%	1.82%
07/1984-06/1985	5.27%	3.60%	4.01%	1.26%
07/1985-06/1986	-0.27%	0.47%	0.31%	-0.58%
07/1986-06/1987	6.97%	6.07%	4.75%	2.22%
07/1987-06/1988	3.02%	2.16%	0.41%	2.62%
07/1988-06/1989	-2.33%	-0.66%	-3.18%	0.86%
07/1989-06/1990	7.64%	6.88%	7.89%	-0.24%
07/1990-06/1991	-1.61%	-1.83%	-1.66%	0.05%
07/1991-06/1992	3.92%	2.99%	0.77%	3.16%
07/1992-06/1993	6.16%	4.21%	0.46%	5.70%
07/1993-06/1994	-0.68%	-2.65%	-2.34%	1.66%
07/1994-06/1995	-2.56%	-2.52%	-3.70%	1.14%
07/1995-06/1996	0.07%	0.45%	-0.10%	0.17%
07/1996-06/1997	5.98%	4.96%	4.02%	1.95%
07/1997-06/1998	-8.31%	-7.10%	-8.07%	-0.23%
07/1998-06/1999	3.45%	2.02%	1.46%	1.99%
07/1999-06/2000	-0.07%	3.01%	0.63%	-0.70%
07/2000-06/2001	2.06%	-1.08%	-1.46%	3.52%
07/2001-06/2002	-1.32%	-0.31%	-0.94%	-0.38%
07/2002-06/2003	-0.24%	-2.57%	-4.97%	4.74%
07/2003-06/2004	4.54%	2.06%	0.93%	3.60%
07/2004-07/2005	2.37%	0.34%	-1.18%	3.56%
Mean	1.09%	0.73%	-0.37%	1.46%
Standard Deviation	4.03%	3.23%	3.39%	
Return to Risk	26.97%	22.42%	-11.04%	

Appendix 20

Equal Weighted Geometric Mean Monthly Returns of BV/MV Portfolio in Large Size Stocks, 1981-2005

Time Period	LV	LN	LG	LV-LG
07/1981-06/1982	-3.25%	-2.48%	-3.02%	-0.23%
07/1982-06/1983	-2.04%	-3.85%	-2.24%	0.20%
07/1983-06/1984	-0.11%	-1.19%	-0.91%	0.81%
07/1984-06/1985	4.59%	4.46%	3.25%	1.34%
07/1985-06/1986	0.54%	1.50%	2.63%	-2.09%
07/1986-06/1987	6.57%	5.67%	3.88%	2.69%
07/1987-06/1988	-0.48%	-1.57%	-0.22%	-0.26%
07/1988-06/1989	-0.97%	-1.11%	-2.61%	1.64%
07/1989-06/1990	3.79%	3.88%	2.28%	1.51%
07/1990-06/1991	-0.05%	-0.04%	-0.06%	0.01%
07/1991-06/1992	4.73%	4.26%	3.28%	1.45%
07/1992-06/1993	0.91%	0.70%	1.15%	-0.24%
07/1993-06/1994	1.37%	0.49%	0.25%	1.12%
07/1994-06/1995	-1.01%	-1.28%	-0.71%	-0.30%
07/1995-06/1996	1.02%	1.50%	1.63%	-0.61%
07/1996-06/1997	2.90%	2.18%	1.55%	1.35%
07/1997-06/1998	-8.92%	-8.66%	-7.78%	-1.14%
07/1998-06/1999	3.60%	1.90%	1.10%	2.50%
07/1999-06/2000	-3.08%	-2.55%	-0.63%	-2.45%
07/2000-06/2001	-1.03%	-1.08%	-4.61%	3.57%
07/2001-06/2002	-0.52%	-1.14%	-5.79%	5.27%
07/2002-06/2003	0.53%	-0.59%	-7.78%	8.30%
07/2003-06/2004	3.68%	2.67%	1.45%	2.23%
07/2004-07/2005	2.97%	0.90%	-0.68%	3.64%
Mean	0.66%	0.19%	-0.61%	1.26%
Standard Deviation	3.27%	3.08%	3.28%	
Return to Risk	20.06%	6.20%	-18.49%	

Appendix 21

Equal Weighted Geometric Mean Monthly Returns of BV/MV Portfolios in Medium Size Stocks, 1981-2005

Time Period	MV	MN	MG	MV-MG
07/1981-06/1982	-1.72%	-2.79%	-2.98%	1.26%
07/1982-06/1983	-4.96%	-1.56%	-2.68%	-2.28%
07/1983-06/1984	-1.28%	-2.20%	-1.06%	-0.23%
07/1984-06/1985	6.73%	4.57%	0.90%	5.83%
07/1985-06/1986	-1.29%	-1.22%	-1.90%	0.61%
07/1986-06/1987	7.28%	4.24%	4.41%	2.87%
07/1987-06/1988	0.91%	0.92%	-0.13%	1.04%
07/1988-06/1989	-1.78%	-1.25%	-3.67%	1.90%
07/1989-06/1990	4.62%	4.17%	4.41%	0.22%
07/1990-06/1991	-0.52%	-2.07%	-2.52%	2.00%
07/1991-06/1992	3.30%	2.41%	0.58%	2.72%
07/1992-06/1993	2.16%	2.85%	0.34%	1.82%
07/1993-06/1994	-0.93%	-1.87%	-2.32%	1.39%
07/1994-06/1995	-2.35%	-2.42%	-3.45%	1.09%
07/1995-06/1996	0.09%	0.00%	0.27%	-0.18%
07/1996-06/1997	4.00%	2.97%	2.35%	1.64%
07/1997-06/1998	-8.34%	-9.05%	-9.81%	1.46%
07/1998-06/1999	2.25%	0.80%	1.26%	1.00%
07/1999-06/2000	-2.50%	-1.32%	-0.34%	-2.16%
07/2000-06/2001	0.80%	-0.92%	-4.37%	5.17%
07/2001-06/2002	-0.62%	-1.07%	-4.02%	3.40%
07/2002-06/2003	-0.85%	-1.87%	-5.04%	4.19%
07/2003-06/2004	3.07%	1.04%	0.29%	2.78%
07/2004-07/2005	2.15%	0.18%	-0.87%	3.02%
Mean	0.42%	-0.23%	-1.26%	1.69%
Standard Deviation	3.52%	2.96%	3.13%	
Return to Risk	12.07%	-7.65%	-40.46%	

Appendix 22

Equal Weighted Geometric Mean Monthly Returns of BV/MV Portfolios in Small Size Stocks, 1981-2005

Time Period	SV	SN	SG	SV-SG
07/1981-06/1982	-3.02%	0.39%	-2.39%	-0.63%
07/1982-06/1983	-5.11%	-2.76%	-3.65%	-1.46%
07/1983-06/1984	0.44%	0.60%	-0.59%	1.03%
07/1984-06/1985	5.86%	3.38%	3.59%	2.27%
07/1985-06/1986	0.13%	0.55%	-0.23%	0.36%
07/1986-06/1987	7.30%	6.32%	4.98%	2.32%
07/1987-06/1988	4.21%	2.78%	1.09%	3.13%
07/1988-06/1989	-1.93%	-0.99%	-2.49%	0.56%
07/1989-06/1990	7.50%	7.41%	7.77%	-0.28%
07/1990-06/1991	-0.89%	-1.68%	-1.45%	0.56%
07/1991-06/1992	3.50%	2.77%	1.13%	2.36%
07/1992-06/1993	6.42%	5.25%	0.75%	5.67%
07/1993-06/1994	-0.70%	-2.88%	-2.29%	1.60%
07/1994-06/1995	-2.62%	-2.24%	-3.93%	1.30%
07/1995-06/1996	0.07%	0.60%	-0.38%	0.45%
07/1996-06/1997	6.19%	5.28%	5.43%	0.76%
07/1997-06/1998	-8.00%	-6.69%	-7.90%	-0.10%
07/1998-06/1999	3.61%	2.02%	1.67%	1.94%
07/1999-06/2000	1.49%	3.81%	1.51%	-0.02%
07/2000-06/2001	2.99%	-0.73%	-1.49%	4.48%
07/2001-06/2002	-0.84%	-0.29%	-0.99%	0.14%
07/2002-06/2003	-0.36%	-2.81%	-5.38%	5.02%
07/2003-06/2004	4.67%	1.80%	1.12%	3.55%
07/2004-07/2005	1.99%	0.36%	-1.02%	3.00%
Mean	1.37%	0.93%	-0.21%	1.58%
Standard Deviation	4.01%	3.35%	3.49%	
Return to Risk	34.13%	27.69%	-6.11%	

Appendix 23

Equal Weighted Annual Compound Returns of BV/MV Portfolios in Large Size Firms, 1981-2005

Time Period	LV	LN	LG	LV-LG
07/1981-06/1982	-30.00%	-17.44%	-28.55%	-1.46%
07/1982-06/1983	-18.49%	-31.26%	-22.39%	3.90%
07/1983-06/1984	-0.01%	-6.41%	-8.61%	8.60%
07/1984-06/1985	87.65%	77.79%	60.45%	27.19%
07/1985-06/1986	8.00%	23.61%	53.33%	-45.32%
07/1986-06/1987	129.00%	100.53%	71.03%	57.97%
07/1987-06/1988	-3.49%	-13.58%	2.45%	-5.94%
07/1988-06/1989	-7.94%	-9.62%	-20.33%	12.38%
07/1989-06/1990	59.41%	60.46%	34.53%	24.88%
07/1990-06/1991	1.28%	5.39%	2.72%	-1.44%
07/1991-06/1992	78.91%	73.14%	51.22%	27.69%
07/1992-06/1993	13.55%	13.08%	17.78%	-4.22%
07/1993-06/1994	24.07%	13.62%	9.56%	14.51%
07/1994-06/1995	-8.77%	-11.64%	-1.35%	-7.42%
07/1995-06/1996	17.82%	25.75%	24.03%	-6.21%
07/1996-06/1997	57.14%	59.51%	34.77%	22.37%
07/1997-06/1998	-64.53%	-60.76%	-48.34%	-16.19%
07/1998-06/1999	60.04%	44.97%	27.66%	32.38%
07/1999-06/2000	-27.53%	-12.62%	17.79%	-45.32%
07/2000-06/2001	5.98%	2.44%	-27.41%	33.40%
07/2001-06/2002	-2.53%	-5.72%	-32.23%	29.69%
07/2002-06/2003	12.60%	0.96%	-50.21%	62.81%
07/2003-06/2004	60.63%	43.44%	39.98%	20.64%
07/2004-07/2005	46.37%	16.09%	2.62%	43.75%
Mean	20.80%	16.32%	8.77%	12.03%
Standard Deviation	43.77%	38.28%	34.17%	
Return to Risk	47.52%	42.64%	25.66%	

Appendix 24

Equal Weighted Annual Compound Returns of BV/MV Portfolios in
Medium Size Firms, 1981-2005

Time Period	MV	MN	MG	MV-MG
07/1981-06/1982	-13.88%	-23.91%	-27.49%	13.61%
07/1982-06/1983	-41.00%	-6.34%	-23.52%	-17.48%
07/1983-06/1984	-11.07%	-13.93%	-8.56%	-2.51%
07/1984-06/1985	127.49%	85.93%	37.74%	89.75%
07/1985-06/1986	-11.25%	-5.69%	-12.22%	0.97%
07/1986-06/1987	147.08%	84.43%	74.09%	72.99%
07/1987-06/1988	16.43%	22.10%	12.23%	4.21%
07/1988-06/1989	-13.38%	-9.13%	-30.26%	16.88%
07/1989-06/1990	80.27%	72.22%	83.41%	-3.14%
07/1990-06/1991	-0.81%	-17.55%	-21.58%	20.76%
07/1991-06/1992	54.44%	43.89%	12.74%	41.70%
07/1992-06/1993	35.96%	57.24%	10.05%	25.91%
07/1993-06/1994	-3.38%	-14.28%	-14.10%	10.71%
07/1994-06/1995	-23.02%	-21.92%	-31.32%	8.30%
07/1995-06/1996	8.86%	6.14%	16.68%	-7.82%
07/1996-06/1997	105.39%	73.21%	58.96%	46.43%
07/1997-06/1998	-57.13%	-59.59%	-60.70%	3.57%
07/1998-06/1999	39.33%	28.23%	38.07%	1.26%
07/1999-06/2000	-11.94%	-1.43%	8.32%	-20.26%
07/2000-06/2001	23.67%	0.56%	-19.05%	42.71%
07/2001-06/2002	2.17%	1.50%	-26.96%	29.13%
07/2002-06/2003	-1.55%	-5.84%	-34.47%	32.92%
07/2003-06/2004	57.34%	22.99%	22.60%	34.74%
07/2004-07/2005	41.78%	11.78%	9.08%	32.69%
Mean	22.99%	13.78%	3.07%	19.92%
Standard Deviation	51.40%	38.01%	36.10%	
Return to Risk	44.73%	36.24%	8.51%	

Appendix 25

Equal Weighted Annual Compound Returns of BV/MV Portfolios in Small Size Firms, 1981-2005

Time Period	SV	SN	SG	SV-SG
07/1981-06/1982	-26.88%	17.68%	-22.87%	-4.01%
07/1982-06/1983	-41.36%	-20.65%	-34.16%	-7.20%
07/1983-06/1984	7.66%	9.52%	1.41%	6.25%
07/1984-06/1985	116.08%	54.10%	72.04%	44.03%
07/1985-06/1986	8.55%	26.95%	7.00%	1.56%
07/1986-06/1987	154.09%	125.09%	101.43%	52.66%
07/1987-06/1988	89.67%	53.49%	37.87%	51.80%
07/1988-06/1989	-12.93%	-6.45%	-13.61%	0.69%
07/1989-06/1990	212.66%	148.16%	174.17%	38.49%
07/1990-06/1991	-4.34%	-16.12%	-11.89%	7.55%
07/1991-06/1992	60.34%	51.11%	25.36%	34.98%
07/1992-06/1993	151.79%	154.85%	15.32%	136.47%
07/1993-06/1994	1.23%	-24.37%	-14.39%	15.63%
07/1994-06/1995	-23.20%	-18.66%	-21.40%	-1.80%
07/1995-06/1996	8.20%	21.08%	16.19%	-7.99%
07/1996-06/1997	148.01%	184.02%	169.55%	-21.54%
07/1997-06/1998	-54.12%	-45.62%	-52.15%	-1.97%
07/1998-06/1999	59.42%	78.85%	49.53%	9.89%
07/1999-06/2000	105.12%	134.34%	51.76%	53.36%
07/2000-06/2001	97.94%	47.44%	27.75%	70.19%
07/2001-06/2002	5.81%	20.02%	10.56%	-4.75%
07/2002-06/2003	14.93%	-18.87%	-34.64%	49.57%
07/2003-06/2004	125.15%	39.70%	44.25%	80.90%
07/2004-07/2005	47.73%	17.61%	8.38%	39.35%
Mean	52.15%	43.05%	25.31%	26.84%
Standard Deviation	72.97%	63.87%	57.66%	
Return to Risk	71.47%	67.40%	43.90%	

Appendix 26

Value Weighted Annual Compound Returns of BV/MV Portfolios in Large Size Firms, 1981-2005

Time Period	LV	LN	LG	LV-LG
07/1981-06/1982	-30.08%	-19.12%	-28.06%	-2.02%
07/1982-06/1983	-14.31%	-24.03%	-23.83%	9.52%
07/1983-06/1984	-3.79%	0.52%	-9.78%	5.99%
07/1984-06/1985	85.48%	75.51%	75.42%	10.05%
07/1985-06/1986	10.65%	19.46%	28.68%	-18.03%
07/1986-06/1987	79.77%	101.95%	47.76%	32.01%
07/1987-06/1988	-10.35%	-17.88%	-1.78%	-8.58%
07/1988-06/1989	-6.17%	-8.44%	-11.34%	5.16%
07/1989-06/1990	48.95%	60.78%	33.77%	15.18%
07/1990-06/1991	4.24%	25.35%	2.52%	1.72%
07/1991-06/1992	89.14%	73.95%	42.49%	46.65%
07/1992-06/1993	13.40%	17.95%	19.35%	-5.95%
07/1993-06/1994	37.14%	24.42%	20.98%	16.16%
07/1994-06/1995	-5.75%	9.69%	9.59%	-15.33%
07/1995-06/1996	22.62%	35.16%	13.41%	9.21%
07/1996-06/1997	48.31%	32.18%	51.21%	-2.90%
07/1997-06/1998	-62.60%	-63.66%	-29.75%	-32.85%
07/1998-06/1999	72.02%	57.32%	53.41%	18.61%
07/1999-06/2000	-29.62%	-19.54%	-7.89%	-21.73%
07/2000-06/2001	5.74%	-1.53%	-20.69%	26.43%
07/2001-06/2002	-0.88%	-6.59%	-53.24%	52.36%
07/2002-06/2003	5.59%	3.40%	-35.45%	41.04%
07/2003-06/2004	52.14%	40.99%	30.49%	21.65%
07/2004-07/2005	39.73%	22.19%	18.91%	20.82%
Mean	18.81%	18.33%	9.42%	9.38%
Standard Deviation	39.40%	37.75%	32.65%	
Return to Risk	47.73%	48.56%	28.87%	

Appendix 27

Value Weighted Annual Compound Returns of BV/MV Portfolios in Medium Size Firms, 1981-2005

Time Period	MV	MN	MG	MV-MG
07/1981-06/1982	-22.07%	-25.19%	-28.40%	6.32%
07/1982-06/1983	-48.93%	-11.50%	-27.74%	-21.20%
07/1983-06/1984	-4.89%	-15.40%	-7.45%	2.56%
07/1984-06/1985	116.57%	73.33%	38.60%	77.97%
07/1985-06/1986	-11.74%	-3.65%	-9.66%	-2.07%
07/1986-06/1987	145.16%	74.71%	64.66%	80.50%
07/1987-06/1988	17.11%	15.16%	9.21%	7.90%
07/1988-06/1989	-9.77%	-12.21%	-30.94%	21.17%
07/1989-06/1990	75.10%	62.49%	71.32%	3.78%
07/1990-06/1991	-3.20%	-16.31%	-16.30%	13.09%
07/1991-06/1992	63.67%	40.04%	15.09%	48.58%
07/1992-06/1993	30.62%	41.08%	11.80%	18.82%
07/1993-06/1994	-0.51%	-13.30%	-11.98%	11.48%
07/1994-06/1995	-22.53%	-22.45%	-30.31%	7.77%
07/1995-06/1996	9.41%	11.18%	15.41%	-6.00%
07/1996-06/1997	78.67%	69.63%	50.53%	28.15%
07/1997-06/1998	-58.70%	-59.67%	-59.31%	0.61%
07/1998-06/1999	37.09%	24.48%	36.55%	0.54%
07/1999-06/2000	-15.08%	-2.03%	7.83%	-22.92%
07/2000-06/2001	27.05%	-0.76%	-23.79%	50.84%
07/2001-06/2002	-0.81%	-2.45%	-25.75%	24.94%
07/2002-06/2003	-1.31%	-4.64%	-31.54%	30.22%
07/2003-06/2004	50.39%	25.09%	23.59%	26.80%
07/2004-07/2005	39.96%	9.26%	17.04%	22.92%
Mean	20.47%	10.70%	2.44%	18.03%
Standard Deviation	49.07%	34.66%	33.53%	
Return to Risk	41.71%	30.88%	7.26%	

Appendix 28

Value Weighted Annual Compound Returns of BV/MV Portfolios in Small Size Firms, 1981-2005

Time Period	SV	SN	SG	SV-SG
07/1981-06/1982	-37.48%	-6.93%	-22.81%	-14.67%
07/1982-06/1983	-37.78%	-16.00%	-35.54%	-2.25%
07/1983-06/1984	14.00%	7.06%	-2.85%	16.84%
07/1984-06/1985	95.05%	58.93%	74.26%	20.79%
07/1985-06/1986	3.37%	24.25%	12.07%	-8.70%
07/1986-06/1987	142.47%	115.54%	93.43%	49.04%
07/1987-06/1988	51.81%	42.59%	30.37%	21.44%
07/1988-06/1989	-18.46%	-2.46%	-21.79%	3.34%
07/1989-06/1990	245.01%	132.56%	178.84%	66.17%
07/1990-06/1991	-12.56%	-17.27%	-14.62%	2.06%
07/1991-06/1992	68.46%	55.80%	17.81%	50.65%
07/1992-06/1993	148.93%	124.90%	11.33%	137.60%
07/1993-06/1994	2.15%	-22.29%	-16.16%	18.31%
07/1994-06/1995	-22.87%	-21.44%	-17.70%	-5.17%
07/1995-06/1996	9.09%	19.67%	22.97%	-13.88%
07/1996-06/1997	150.11%	171.64%	94.99%	55.12%
07/1997-06/1998	-55.80%	-47.08%	-52.25%	-3.55%
07/1998-06/1999	57.15%	66.62%	47.38%	9.77%
07/1999-06/2000	61.51%	121.17%	34.93%	26.57%
07/2000-06/2001	66.20%	16.95%	28.91%	37.29%
07/2001-06/2002	2.62%	17.25%	11.42%	-8.80%
07/2002-06/2003	8.86%	-16.44%	-30.92%	39.78%
07/2003-06/2004	109.02%	41.29%	37.83%	71.19%
07/2004-07/2005	50.57%	17.63%	4.58%	45.99%
Mean	45.89%	36.83%	20.27%	25.62%
Standard Deviation	73.46%	58.47%	51.10%	
Return to Risk	62.47%	62.99%	39.67%	