Investing in REITS: Contrarian versus Momentum

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Paper presented at PRRES 2009 Conference, Sydney, Australia
18-21 January 2009.

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Abstract

Notwithstanding the preponderance of evidence supporting the superiority of the contrarian investment strategy, other researchers have adduced evidence in support of superior performance from momentum investment strategy. This paper uses data for REITS stocks traded on the NYSE, AMEX and NASDAQ from 1990 to 2007 to ascertain the relative superiority of the contrarian and momentum REITS investment strategies. Furthermore, the paper is aimed at ascertaining the rationale for value/growth premium, if any (i.e. if risk is a credible explanation for value/growth premium). The value-growth paradigm forms the theoretical basis of the paper. Two methods: a simple sorting procedure based on the book-to-market value ratio (for contrarian) and six-months price momentum (for the momentum strategy) vis-à-vis Fama-French model are used to examine the time-varying risk of value and growth REIT portfolios. This is followed by a stochastic dominance test to verify the relative performance and risk of value and growth REIT portfolios. While the results show that both strategies provide superior performance, that of the momentum strategy is limited to only twelve months holding period. The growth premium for the momentum strategy, in addition to not being statistically significant, declines after twelve months. In contrast, the superior performance of the contrarian strategy increases over time and is found to be statistically significant for holding periods of more than, or equal to, six months. Furthermore, the results show that the superior performances are not a compensation for risk. This implies that investor psychology could be the driver for the value/growth premia.

Key words: Value REIT, growth REIT, portfolio performance, time-varying risk, contrarian strategy, momentum strategy..

Introduction

"Buying low, selling high" is a popular phrase among the investing community. Similarly, various groups of investors employ growth/value investment strategies in an attempt to improve the performance of their portfolio of investments. While growth investors short/long loser/winner stocks, value investors long companies that are underpriced and short those that are overpriced. According to Graham and Dodd (1934), investors tend to overemphasize near-term prospects by overpricing "favourable" companies and underpricing those which seem to have relatively poor prospects. However, available evidence overwhelmingly demonstrates that the original contrarian (i.e value) strategy based on price-to-earning (P/E) ratio sorting criterion worked flawlessly for decades [Dreman (1998)]. Similar results are replicated by using the following accounting measures of performance: earnings-to-price ratios (E/P), cash flow-to-price ratio (C/P) and book value-to-price ratio (B/M) – as well strategies based on low/high measures of earning per share (EPS) growth (Capual, 1993) as sorting criteria. According to De Bondt and Thaler (1985), this investment approach earns excess returns of about 8 percent per year.

A large number of empirical studies (e.g. Fama and French, 1992, 1996, 1998; Capual *et al*., 1993; Chan *et al*., 1993, 2000, 2003; Lakonishok *et al*., 1994; Haugen, 1995; Arshanapali *et al*., 1998; Bauman *et al*., 1998, 1999, 2001; Levis and Liodakis, 2001; Bauman *et al*., 2001; Antoniou *et al*., 2006; Ooi et al., 2007 and Addae-Dapaah *et. al* ., 2007) have shown that value investment strategy outperforms growth investment strategies.

However, another school of thought argues that the value strategy may not always outperform momentum strategy. Though there might have been little documentation that momentum strategy beats the market as observed by Dreman (Dreman, 1998), there is sufficient evidence that returns from momentum trading exhibit positive autocorrelation with the short and medium-term (see Michaely *et al.,*

1995; Rouwenhorst, 1998; Hart et al., 2003; Ellis and Thomas, 2004; Erb and Harvey, 2006; and Galariotis *et. al.,* 2007).

Jegadeesh and Titman (1993) suggest that the momentum strategy performes commendably over a short-term horizon. Chan *et al.* (1996) find continuation of returns over the medium term due to possible underreaction to earnings information. Miffre and Rallis (2007) discover that momentum strategy generates superior returns in the commodity futures market while contrarian strategy yields no excess returns.

Although there is overwhelming weight of extant research findings supporting the cotrarian strategy, value investing is rarely fashionable among investors (Braham,1999). On the other hand, momentum trading is popularly utilized by fund managers as investors are less likely to complain if a “winner” company falls short in performance than investing on a “loser” company which miserably fails *ab initio*.

Given the paradoxical views on value and momentum strategies, this paper sets out to ascertain the relative profitability of contrarian and momentum strategies. Both strategies are scarcely found in the extant real estate literature although the strategies are hot topics in the finance literature. The study contributes to knowledge by helping to fill the gap in the extant real estate literature and providing evidence to help fund managers and investors in REITs to make sound investment decisions. Thus, the threefold objectives of the paper are to:

1) Ascertain the comparative advantage(s), in terms of performance, of REIT contrarian and momentum strategies;
2) Assess the possibility of combining both investment strategies, and the effect(s) of such combination on returns; and
3) Evaluate the relative risk of the various approaches.

In view of this, the next section provides a brief review of the relevant finance literature on both strategies after which, a specific set of research hypotheses are formulated. This is followed by a discussion on data management and sourcing, and the contrarian strategy model. The next section is devoted to the empirical model estimation, analyses and discussion of results. The last section deals with concluding remarks.

Literature Review – *Contrarian Investment Strategies*

Dreman (1982) and Chan (1988) state that a contrarian stock selection strategy involves the buying of "loser" stocks and short selling "winner" stocks. Given investor psychology and the market overreaction hypothesis that the stock market overreacts to news and events, "winners" stocks tend to be overvalued while "losers" stocks are undervalued. The contrarian investor can therefore exploit this generic investor mentality to capitalize on the inefficiency of the market to reap financial gains when stock prices revert to their intrinsic values.

This controverts the efficient Market Hypothesis (EMH) which states that market price of securities fully reflect all available information and provide unbiased estimates of the underlying values [Jagric *et al*, (2005)].Though many empirical evidence supports EMH, stock prices may not always reflect the best estimates of stocks' real worth as the inappropriate market response to information can result in market inefficiency [Smidt (1968)]. These inefficiencies are exploited by contrarian investors who act against the crowd to invest in "losers" to reap excess return.

The superiority of value over growth investing is well documented in the finance literature (see for example: Kahneman and Tversky, 1982; De Bondt and Thaler, 1985; Haugen, 1995; Porterba and Summers, 1988; Fama and French, 1988, 1992,

1993, 1995, 1996, 1998; Lakonishok *et al.,* 1994; Balvers *et al.,* 2000; Levis and Liodakis, 2001; Anttoniou et al., 2006; Capaul *et al.,* 1993; Tse *et al.,* 1995; Brouwer *et al.,* 1997; Mun *et al.,* 1999; Bauman et al., 1998, 2001 and Cai, 1997). The main controversy about the contrarian strategy centres on the rationale for the value premium.

Competing explanations for value superiority include risk premiums – traditional view – (Fama and French, 1993, 1995, 1996), systematic errors in investors' expectations and analysts' forecasts – i.e. naïve investor expectations of future growth and research design induced bias – behavioural finance paradigm – (see for example, La Porta *et al*., 1997; Bauman & Miller, 1997; La Porta, 1996; Dechow & Sloan, 1997; Lakonishok *et al*., 1994; Lo and MacKinlay, 1990; Kothari *et al*., 1995) and the existence of market frictions, faulty research design and data-snooping (Amihud and Mendelson, 1986; Black, 1993; Kothari *et al.,* 1995; Banz and Breen, 1986; Lo and MacKinlay, 1990; Mun *et al.,* 2001; Badrinath and Omesh, 2001). The traditional view, led by Fama and French (1993, 1995, 1996), is that the superior performance is a function of contrarian investment being relatively risky. This school of thought argues that the expected risk premium for value strategy is higher during bad times and lower during good times as value-firms are more prone to financial distress, and thus, strongly attributes value premium to time-varying risk factors (see also Chan, 1988; Ball and Kothari, 1989; Kothari and Shanken, 1992; Petkova and Zhang, 2005; Lettau and Wachter, 2007).

However, Lakonishok *et al.* (1994), MacKinlay (1995), La Porta *et al*. (1995, 1997), Daniel and Titman (1996) have found that risk-based explanations do not provide a credible rationale for the observed return behaviour (see Jaffe *et al.,* 1989; Chan *et al.,* 1991; Chopra *et al.,* 1992; Capaul *et al.,* 1993; Dreman and Lufkin, 1997; Bauman *et al.,* 1998, 2001; Nam *et al.,* 2001; Gomes *et al.,* 2003 and Chan and Lakonishok (2004). Similarly, the research design and data-snooping criticisms have been controverted by Lakonishok *et al.* (1994), Davis (1994, 1996), Fama and French (1998), Bauman and Conover (1999), Bauman *et al*., (2001), Chan and

Lakonishok (2004), Mun *et al.* (2001), Badrinath and Omesh (2001) and Gregory *et al.,* 2003).

Momentum Investment strategies

The sorting criterion for differentiating growth from value stocks depends on the type of momentum strategy in question –price/earnings. Price momentum investing involves buying/selling stocks that have performed relatively well/poorly in the recent past. Thus, Bird and Whitaker (2004) use 6-month price (return) momentum to segregate stocks portfolio into value and growth stocks. On the other hand, the earnings momentum strategy is founded on the close relationship between reported earnings or analysts' earnings forecast and future investment earnings. Ball and Brown (1968) state that announcement of unexpected earnings is likely to affect earnings momentum. Foster et al. (1984) find that standardized unexpected earnings help to predict future returns. Furthermore, Bird and Whitaker (2004) use the standard deviation of analysts' forecast at any point in time as a sorting criterion.

These sorting criteria are based on the belief that average stock returns are related to past performance and thus, to a certain extent, are predictable. De Bondt and Thaler (1985) and Jegadeesh and Titman (1993, 2001) investigate the performance of various strategies in the stock market to conclude short-term price continuation in the equity market. Michaely et al. (1995) find evidence in the US stock market in support of the momentum strategy. Rouwenhorst (1998) concludes from analyses of a sample of 2,190 stocks from 12 European countries from 1978 to 1995 that momentum returns are not limited to a particular market – they are evident internationally in countries like Austria, Belgium, Demark, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom. This is concurred by Hart et al. (2003) in their analyses of 32 emerging markets (see also, Ellis and Thomas, 2004). Gonenc and Karan (2003) document that growth portfolios outperform value portfolios in the Istanbul Stock Exchange.

Jansen and Verschoor (2004) find growth premium in their study on four emerging markets, namely: the Czech Republic, Hungary, Poland, and Russia.

Erb and Harvey (2006) show that a momentum strategy based on a 12-month ranking period and a 1-month holding period is profitable in commodity futures markets. Similarly, Miffre *et al.* (2007) identify 13 profitable momentum strategies that can generate 9.38% average return a year in the commodity futures markets.

Why momentum strategies work

In contrast to the rich array of testable hypotheses supporting value strategies, there is a woeful shortage of potential explanations for momentum (Chan *et al.*, 1996). Fama and French (1996) show that a three-factor model of returns fails to explain intermediate-horizon price momentum (see Rouwenhorst, 1998). Moskowitz and Grinblatt (1999) claim that a significant component of firm-specific momentum returns can be explained by industry factors. However, the evidence in Grundy and Martin (1998) suggests otherwise.

Conrad and Kaul (1998) argue that the profitability of momentum strategies could be entirely due to *cross-sectional* variation in expected returns (see Lo and MacKinlay, 1990; Jegadeesh and Titman, 1993). The possibility of the momentum premium being a compensation for risk has been mooted but no clear evidence has been adduced to substantiate it. It would appear that the most credible proposed rationale for the momentum premium is the behavioural hypothesis – under-reaction and overreaction behavior of investors. Barberis *et al.* (1998), Daniel *et al.* (1998), and Hong and Stein (1999), provide evidence that momentum profits arise from inherent biases in the way investors interpret information. Chan *et al.* (1996) find that medium-term return continuation can be explained in part by underreaction to earnings information. An earnings momentum strategy may benefit from underreaction to information announcements related to short-term

earnings, while a price momentum strategy may benefit from the market's slow response to a broader set of information, including longer-term profitability.

According to the overreaction hypothesis, investors tend to overreact to events, buying “winner” stocks due to over-optimism and shorting “loser” stocks as a result of over-pessimism. Hence, when induced by positive feedbacks, "trend-chasers" reinforce movements in stock prices even in the absence of fundamental information. This explains why the returns (both positive and negative) for past winners and losers can be substantial. However, this trend has been found to be temporary (DeLong et al., 1990).

In view of the above discussion, it is hypothesized that:

a) Both value and momentum strategies provide excess return;
b) A “hybrid” portfolio of value and momentum strategies provide superior returns to “pure” portfolios of either value or momentum strategy; and
c) Value and momentum premia are a compensation for risk.

These hypotheses will be operationalised through statistical tests.

Data Sourcing and Management

The paper uses B/M ratio (value strategy) and the 6-month price momentum to sort REITs return data from 1990 to 2007 obtained from Datasteam to sort REIT stocks into quintile portfolios. All REITs traded on NYSE, AMEX and NASDAQ (with the exception of those with negative and extreme B/M values – i.e. the highest and lowest 0.5% - see Ooi et al., 2007) from 1990 to 2007 are used for the study. Commencing the portfolio construction from 1990 is due to the difference between pre- and post-1990 equity REITs. The pre-1990 REITs were “passive” pass-through vehicles with limited growth potential; and growth opportunities were minimally captured in the valuation of the equities. However, valuation of REITs changed in the 1990s with the emergence of active management and high growth potential REIT.

The cheap (value) portfolio consists of REITs in the top 20% quintile of B/M ratio (BM1) while the expensive (growth) portfolio consists of REITs in the lowest 20% quintile of book-to-market ratio (BM5). The remaining REIT stocks are placed in the intermediate portfolios (see Table 1). This system of classification is consistent with Chan et al. (1991) and Bauman et al. (1998, 2001).

Table 1

Furthermore, the paper follows Bird and Whitaker (2004) in using the 6-months price momentum criterion in sorting quintile portfolios for the momentum strategy. The lowest/highest ranked 20% loser/winner stocks over the preceding 6-months constitute the value/growth portfolio (PM1/PM5). The analyses are based on quarterly, half-yearly, yearly, two and three-yearly rolling window. A simple holding period return is used for the quarterly holding period. However, continuous compounding returns (log returns) are used for the multi-period holding horizons. This is motivated by Campbell et al. (1997).

$$r_t(k) = \log(1+R_t) + \log(1+R_{t-1}) + ... + \log(1+R_{t-k+1}) \quad \text{(Campbell et al., 1997)} \quad (1)$$

where,

R_t, R_{t-1} … R_{t-k+1} refers to the quarterly returns for each period.

Is the Premium a function of Risk?

Based on the risk-based explanation suggested by Chan (1988), common factors for winner and loser stocks are not constant over time. Hence, if REIT is very much driven by time-varying common factors like market risk, then value REITs may show similar results to be riskier than growth REITs in the holding period as superior returns are generally accompanied by higher portfolio risk [Fama and French (1992)]. Four conventional risk measures, namely standard deviation, coefficient of variation (CV), beta derived from the Sharpe-Linter's CAPM model,

as well as the factor loading derived from Fama and French (1996) multifactor asset pricing model are used to compare the risk inherent in value and growth properties. This is supplemented with stochastic model analysis.

Time Varying Risk

Sharpe-Linter's CAPM model is used to test whether time-varying market risks may explain the contrarian and momentum profits.

$$R_p - R_f = \alpha_p + \beta_p (R_M - R_f) + \varepsilon_t \quad (2)$$

$$R_L - R_W = \alpha^c + \beta^c (R_M - R_f) + \varepsilon_t \quad (3)$$

$$R_W - R_L = \alpha^m + \beta^m (R_M - R_f) + \varepsilon_t \quad (4)$$

Where,

R_p : portfolio returns of REIT stock

R_f : 1-month Treasury bill rate (proxy for risk-free rate)

R_M: market return

α_i : the intercept, the average excess return on the portfolio after adjusting for the known risk factors

β_p : beta of the portfolio

R_L : portfolio returns of loser portfolio

R_W : portfolio returns of winner portfolio

β^c : beta of contrarian strategy

β^m : beta of momentum strategy

The portfolio returns generated from the contrarian and momentum strategies are tested via Eq. (2)-(4) to investigate the effect of time-varying market risks. In addition, the F & F three factor model is used to further investigate the rationale for value/momentum premium.

$$R_p - R_f = \alpha_p + \beta_p (R_M - R_f) + s_p\,SMB + h_p\,HML + \varepsilon_t \qquad (5)$$

Where,
SMB : small minus big;
HML : high minus low or Value (H) – Growth (L)

The SMB accounts for the return spread between small and large cap firms. The inclusion of this factor is to show whether excess returns are a function of the small firm effect. The HML, on the other hand, accounts for the return spread between value and growth stocks. Data on the various factors are obtained from French's website

Stochastic Dominance

The most widely known and applied efficiency criterion for evaluating investments is the mean-variance model. An alternative approach is the stochastic dominance (*SD*) analysis, which has been employed in various areas of economics, finance and statistics (Levy, 1992; Al-khazali, 2002; Kjetsaa and Kieff, 2003). The efficacy and applicability of *SD* analysis, and its relative advantages over the mean-variance approach have been discussed and proven by several researchers including Hanoch and Levy (1969), Hadar and Russell (1969), Rothschild and Stiglitz (1970), Whitmore, 1970, Levy (1992), Al-khazali (2002) and Barrett and Donald (2003). According to Taylor and Yodder (1999), *SD* is a theoretically unimpeachable general model of portfolio choice that maximizes expected utility. It uses the entire probability density function rather than simply summarizing a distribution's features as given by its statistical moments.

The SD rules are normally specified as first, second, and third degree *SD* criteria denoted by *FSD*, *SSD*, and *TSD* respectively (see Levy, 1992; Barrett and Donald, 2003; Barucci, 2003). There is also the nth degree *SD*. In order to determine if a relation of stochastic dominance between two data streams exists, the cumulative distribution functions (CDF) of the samples are computed so that the value of CDF at У is the proportion of the samples that are no greater than У [Davidson (2006]. The FSD assumes that every expected utility maximizer values more than less regardless of his attitude towards risk. For every non-decreasing function, the value portfolio dominates the growth portfolio by the first degree if its expected utility of the cumulative function is greater.

$$\int^{x}_{-\infty} u(t)\, dV(t) \geq \int^{x}_{-\infty} u(t)\, dG(t) \qquad (6)$$

Where,

$\int^{x}_{-\infty} u(t)\, dV(t)$ = marginal utility of value portfolio

$\int^{x}_{-\infty} u(t)\, dG(t)$ = marginal utility of growth portfolio

The other commonly used test is the SSD which assumes that investors are risk-averse. Given that *F* and *G* are the cumulative distribution functions of two mutually exclusive risky options *X* and *Y*, *F* dominates *G* (*FDG*) *SSD,* denoted FD_2G, if and only if,

$$\int^{x}_{-\infty} dV(t) \geq \int^{x}_{-\infty} dG(t) \qquad (7)$$

The third-order stochastic dominance (TSD) assumes that the third derivative of utility to be positive:

$$(\text{i.e. } U'''(x) \geqslant 0).$$

The TSD posits that investors exhibit decreasing absolute risk aversion (Kjetsaa and Kieff, 2003). A higher degree *SD* is required only if the preceding lower degree *SD* does

not conclusively resolve the optimal choice problem. Thus, if FD_1G, then for all values of x, $F(x) \leq G(x)$ or $G(x) - F(x) \geq 0$. Since the expression cannot be negative, it follows that for all values of x, the following must also hold:

$\int_{-\infty}^{x} [G(t) - F(t)]dt \geq 0$; that is, FD_2G (Levy and Sarnat, 1972; Levy, 1998)

Furthermore, the *SD* rules and the relevant class of preferences U_i imply that a lower degree *SD* is embedded in a higher degree *SD*. The economic interpretation of the *SD* rules for the family of all concave utility functions is that their fulfilment implies that $E_F U(x) > E_G U(x)$ and $E_F(x) > E_G(x)$; i.e. the expected utility and return of the preferred option must be greater than the expected utility and return of the dominated option.

Results – *"Pure" Value and Momentum Portfolios*

Table 2 reports the performance of the quintile portfolios for both strategies and their corresponding spreads for the respective holding periods.

Table 2

The value-growth spreads (Panel 1 of Table 2) demonstrate the superior performance of the contrarian REITs investment strategy. Four of the five investment horizons registered positive value-growth spreads which are statistically significant at the conventional levels. It is only the quarterly holding period which recorded a negative value-growth spread, which is not statistically significant. The poor performance of the value strategy in the quarterly holding period is expected as the strategy is not meant for the short term. According to Davis (1994), short database may lead to misleading results – It takes time for stock prices to revert to the mean. This is why the value-growth spread increases with the length of the holding period.

Similarly, the momentum strategy provided superior returns for all the holding periods than its value counterpart (Panel 2 of Table 2). However, unlike the

contrarian strategy, the momentum spreads are virtually statistically insignificant for all the holding periods except the 12-month (yearly) holding period which is significant at the 0.10 level. This is quite surprising as the extant literature (see De Bondt and Thaler, 1985; Jegadeesh and Titman, 1993, 2001) attests to sort-term price continuation in the equity market. The results in Panel 2 of Table 2 imply that the momentum spread, and thus, the momentum strategy, is virtually of no business significance.

"Hybrid" Value and Momentum Portfolio

The correlations among the REIT portfolio returns (for one-year holding period) for the two strategies are presented in Table 3 – The correlations for the other holding periods may be obtained from the authors. The figures in Table 3 reveal that diversification benefits could be reaped from any combination of the portfolios. The highest diversification benefits would be generated from a combination of BM1 with all the remaining three portfolios (especially BM5) as BM1 is negatively correlated with the others.

Table 3

The performance of the "hybrid" portfolios are presented in Table 4.

Table 4

A comparison of Tables 2 and 4 reveal that over the 6-month holding period (Panel 1) reveal that 32 of the 36 "hybrid" portfolios outperformed the "pure" portfolios. Similarly, 29 (of which 12 are statistically – Panel 3 of Table 4) of the 36 "hybrid" portfolios outperformed their "pure" counterparts over the two-year holding period. In contrast, the "hybrid" portfolios performed very poorly against their "pure" counterparts over the one-year holding period – 32 of the 36 "hybrid" portfolios underperformed their "pure" counterparts. Given the results in Table 4, the best REIT investment strategy would be to long cheap losers and cheap winners. This controverts Lee and Swaminathan (2000), Swaminathan and Lee (2000) and Bird and Whitaker (2004) who have found the best strategy to be to short expensive

losers and long cheap losers. This contrasting result could be attributed to the fundamental differences in the valuation of REIT stocks and other equity stocks.

Is The Premium a Compensation for Risk?

The conventional risk measures and those calculated on the basis of Equations (2) – (5) are presented in Tables 5 and 6. The results in Table 5 show that the growth portfolios (based on B/M ratio) are virtually riskier than their value counterparts. Similarly, the value (loser) portfolios (based on price momentum) are riskier than their growth counterparts. These results imply that the premia for both value and momentum strategies are not a compensation for risk.

Table 5

The results in Table 6 replicate those in Table 5. The betas for the value/momentum premia (Cheap-Expensive/Winner-Loser portfolios – Table 6) are not statistically significant. This indicates that market risk alone does not explain value and momentum premia. The significantly higher R^2 for the F & F three factor analysis relative to the CAPM model also suggests that the firm size effect and value-growth spread contribute to the explanation of the portfolio returns.

The average systematic risk of the value portfolio is lower than that of the growth portfolio (0.079 vs. 0.242 and 0.122 vs. 0.364). Similarly, the HML factor from the multifactor model for value REITs is lower than that of growth REITs (Panel 2 of Table 6). This is similar to the findings of Ooi *et al.* (2007). However, the alphas for the cheap portfolio are neither consistent nor statistically significant to make any conclusion. The negative intercepts for the expensive and loser portfolios (Panel 1 of Table 6) and for all portfolios (Panel 2 of Table 6) also suggest that there may not be any excess returns to be gained from these strategies. It must also be noted that the alphas and betas for “Expensive” and “Loser” are statistically significant (Panel 2 of Table 6) to imply that the risk outweighs the reward. Moreover, the beta for “Winner” (Panel 2 of Table 6) is statistically significant relative to the

corresponding negative alpha to suggest that the risk for the "Winner" portfolio (momentum strategy) outweighs its reward. Given the results in Table 2 (Panel 2) which imply that the momentum strategy has no practical business significance, these results are somewhat troublesome for the momentum strategy.

In contrast, the negative alpha and the beta for the "Cheap" portfolio (Value strategy) – Panel 2 of Table 6 – are statistically insignificant to indicate that any reward from the value strategy cannot be attributed to market risk.

The results of the *SD* analyses for holding periods with statistically significant value/momentum spreads (Figures 1-5) confirm the above conclusion that the premia are not a compensation for risk. While Figures 1 to 3 show that VD_2G to appeal to risk averse investors and investors with decreasing risk aversion, Figure 4 reveals that VD_1G to appeal to all classes of investors regardless of their attitude towards risk. This implies that the value strategy (especially over investment horizon of not less than three years), presages a higher probability of success (and therefore safer) than the growth strategy. Similarly, Figure 5 reveals that investing in winners (momentum strategy) is safer than investing in losers (WD_2L).

Conclusion

The paper set out to investigate the relative performance (in terms of return and risk) of value and momentum REIT investment strategies. Apart from the quarterly holding period, the results attest to statistically significant (at both 0.10 and 0.05 levels) value premium for the remaining holding periods under investigation (especially investment horizons of not less than two years). In contrast the momentum premium is found to be statistically significant (at 0.10 level) only for the yearly investment horizon. This implies that value REIT investing is more profitable than momentum REIT investing. Furthermore, the result of all the risk analyses reveals that the return for the value strategy (and thus, the value premium) is not a compensation for risk. However, the beta for the growth (momentum) strategy is found to be highly/fairly statistically significant (0.01 and 0.05 levels).

This, vis-à-vis the relatively low statistical significance of the momentum premium (at 0.10 level) for the yearly investment horizon is very troublesome for the momentum strategy. This goes against conventional financial theory but that is why the term “value premium anomaly” exists. This implies that investors have much to gain by investing in value REITs. Moreover, the results show that the best investment strategy would be holding a “hybrid” portfolio by longing both cheap losers and cheap winners.

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Table 1: Characteristics of Value and Growth Portfolio (1990 – 2004)

	BM5[g]	BM4	BM3	BM2	BM1[v]	All Firms
Common Stocks						
B/M	0.249	0.453	0.651	0.915	6.062	1.67
REIT Stocks						
B/M	0.330	0.552	0.702	0.907	1.726	0.840
ME	1450	1354	1000	547	222	917
VO	13353	1354	9890	5816	3343	8989

Note:
REIT stocks are sorted into five quintile portfolios on the basis of B/M calculated from market-to-book value taken from Datastream. ME is the market value of the equity in US$ millions. VO is the turnover by volume in US$ millions.The B/M ratios for common stocks (1990-2005) are obtained from K.R. French's Data Library.

[v]Value
[g]Growth

Table 2: Holding Period Returns to contrarian and momentum portfolio (1990 to 2004)

Panel 1: Sorting by book-to-market ratio

Holding period	BM5 [g]	BM4	BM3	BM2	BM1 [v]	BM1-BM5	Positive spread in (BM1-BM5)
3 months	0.022	0.011	0.012	0.017	0.021	-0.001	38/60
6 months	0.019	0.019	0.021	0.029	0.037	0.018*	40/60
12 months	0.047	0.040	0.045	0.059	0.073	0.026*	41/60
24 months	0.105	0.076	0.095	0.115	0.150	0.045**	42/60
36 months	0.162	0.122	0.144	0.176	0.210	0.048**	42/60

Panel 2: Sorting by 6-months price momentum

Holding period	PM5 [v]	PM4	PM3	PM2	PM1 [g]	PM1-PM5	Positive spread in (PM1-PM5)
3 months	0.013	0.014	0.015	0.013	0.019	0.006	31/60
6 months	0.016	0.023	0.028	0.027	0.032	0.016	39/60
12 months	0.087	0.101	0.112	0.117	0.121	0.035*	39/60
24 months	0.036	0.046	0.056	0.060	0.064	0.028	36/60
36 months	0.156	0.159	0.166	0.168	0.170	0.013	30/60

Note: REIT stocks are sorted into the five quintile portfolios on the basis of B/M and 6-months price momentum. The returns in the table are buy-and-hold equally-weighted log returns. Statistical significance is reported for the cheap-expensive and winner-loser portfolios.

[v] Value

[g] Growth

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 3: Correlations of equally-weighted portfolio ln returns (Based on 12- month holding period)

	PM5	PM1	BM5	BM1
PM5	1	0.686574789	0.794580177	-0.06396469
PM1	0.686574789	1	0.743190397	-0.06711871
BM5	0.794580177	0.743190397	1	-0.44686586
BM1	-0.06396469	-0.06711871	-0.44686586	1

Note:
PM – portfolios using 6-month price momentum as sorting criterion
BM – portfolios using book-to-market ratio as sorting criterion

Table 4 Equally weighted ln returns for portfolios of intersection of B/M and 6-month price momentum (1990-2004)

	Losers	PM4	PM3	PM2	Winners	Winners-Losers
Panel 1: Book-to-market and 6-month price momentum over 6-month holding period						
Expensive	0.047	0.042	0.046	0.046	0.051	0.035
	(0.785)	(0.652)	(0.358)	(0.372)	(0.202)	(0.784)
BM4	0.035	0.043	0.047	0.046	0.051	0.036
	(0.737)	(0.654)	(0.326)	(0.338)	(0.172)	(0.715)
BM3	0.037	0.045	0.049	0.048	0.053	0.037
	(0.610)	(0.818)	(0.450)	(0.470)	(0.246)	(0.551)
BM2	0.044	0.052	0.056	0.056	0.060	0.045
	(0.241)	(0.537)	(0.888)	(0.836)	(0.732)	(0.143)
Cheap	0.052*	0.060	0.064	0.064	0.068	0.053**
	(0.076)	(0.163)	(0.318)	(0.278)	(0.624)	(0.029)
Cheap-Expensive	0.033	0.041	0.045	0.045	0.049	0.034
	(0.850)	(0.528)	(0.242)	(0.249)	(0.125)	(0.863)
Panel 2: Book-to-market and 6-month price momentum over 1-year holding period						
Expensive	0.089	0.093	0.103	0.107	0.111	0.075
	(0.488)	(0.948)	(0.485)	(0.272)	(0.236)	(0.165)
BM4	0.076	0.086	0.096	0.100*	0.104	0.068
	(0.794)	(0.636)	(0.204)	(0.090)	(0.089)	(0.377)
BM3	0.081	0.091	0.101	0.106	0.109	0.073
	(0.541)	(0.941)	(0.366)	(0.177)	(0.164)	(0.178)
BM2	0.095	0.105	0.115	0.119	0.123	0.087***
	(0.120)	(0.268)	(0.785)	(0.875)	(0.690)	(0.010)
Cheap	0.109**	0.119	0.129	0.133	0.137	0.101***
	(0.025)	(0.048)	(0.189)	(0.315)	(0.523)	(0.001)
Cheap-Expensive	0.062	0.072	0.082**	0.086***	0.090***	0.054
	(0.538)	(0.117)	(0.016)	(0.004)	(0.006)	(0.869)
Panel 3: Book-to-market and 6-month price momentum over 2-year holding period						
Expensive	0.195	0.205	0.216	0.221	0.226	0.139***
	(0.433)	(0.821)	(0.676)	(0.485)	(0.347)	(0.000)
BM4	0.163	0.177	0.188*	0.193**	0.197**	0.111**
	(0.655)	(0.191)	(0.060)	(0.034)	(0.021)	(0.049)
BM3	0.182	0.196	0.207	0.212	0.217	0.130***
	(0.697)	(0.740)	(0.313)	(0.194)	(0.124)	(0.001)
BM2	0.202	0.215	0.227	0.232	0.236	0.149***
	(0.193)	(0.364)	(0.844)	(0.908)	(0.695)	(0.000)
Cheap	0.236***	0.250***	0.261**	0.266**	0.271*	0.184***
	(0.005)	(0.003)	(0.023)	(0.050)	(0.098)	(0.000)
Cheap-Expensive	0.132*	0.146***	0.157***	0.162***	0.167***	0.080
	(0.066)	(0.001)	(0.000)	(0.000)	(0.000)	(0.581)

Notes:
The P-values are computed and reported in the parentheses
* Statistically significant at 10% level
** Statistically significant at 5% level
*** Statistically significant at 1% level

Table 5: Summary Statistics on Risk Measures for Value and Growth REIT Portfolios (1990-2004)

	BM5[g]	BM4	BM3	BM2	BM1[v]
Panel 1: 3-month holding period using book-to-market ratio					
Mean	0.022	0.011	0.012	0.017	0.021
Standard Deviation	0.069	0.033	0.033	0.036	0.039
Coefficient of Variation	3.170	2.973	2.707	2.186	1.881
Panel 2: 6-month holding period using book-to-market ratio					
Mean	0.019	0.019	0.021	0.029	0.037
Standard Deviation	0.060	0.049	0.048	0.048	0.056
Coefficient of Variation	3.161	2.526	2.266	1.673	1.524
Panel 3: 1-year holding period using book-to-market ratio					
Mean	0.047	0.040	0.045	0.059	0.073
Standard Deviation	0.078	0.076	0.068	0.057	0.079
Coefficient of Variation	1.652	1.896	1.506	0.976	1.085
Panel 4: 2-year holding period using book-to-market ratio					
Mean	0.105	0.076	0.095	0.115	0.150
Standard Deviation	0.101	0.116	0.090	0.085	0.093
Coefficient of Variation	0.965	1.528	0.948	0.741	0.621
Panel 5: 3-year holding period using book-to-market ratio					
Mean	0.162	0.122	0.144	0.176	0.210
Standard Deviation	0.115	0.126	0.117	0.100	0.100
Coefficient of Variation	0.708	1.032	0.809	0.566	0.476

	PM5[v]	PM4	PM3	PM2	PM1[g]
Panel 6: 3-month holding period using price momentum criterion					
Mean	0.013	0.014	0.015	0.013	0.019
Standard Deviation	0.047	0.033	0.030	0.032	0.031
Coefficient of Variation	3.521	2.440	2.038	2.393	1.627
Panel 7: 6-month holding period using price momentum criterion					
Mean	0.016	0.023	0.028	0.027	0.032
Standard Deviation	0.072	0.047	0.042	0.038	0.050
Coefficient of Variation	4.611	2.037	1.521	1.413	1.585
Panel 8: 1-year holding period using price momentum criterion					
Mean	0.036	0.046	0.056	0.060	0.064
Standard Deviation	0.099	0.067	0.061	0.054	0.077
Coefficient of Variation	2.764	1.462	1.086	0.893	1.206
Panel 9: 2-year holding period using price momentum criterion					
Mean	0.087	0.101	0.112	0.117	0.121
Standard Deviation	0.143	0.086	0.088	0.090	0.094
Coefficient of Variation	1.649	0.858	0.787	0.768	0.774
Panel 10: 3-year holding period using price momentum criterion					
Mean	0.156	0.159	0.168	0.170	0.013
Standard Deviation	0.150	0.105	0.101	0.108	0.112
Coefficient of Variation	0.960	0.661	0.602	0.602	0.634

Note:
[v] Value
[g] Growth

Table 6: Robustness to time varying risk

Panel 1: Market Risk (Beta): $Rp - Rf = \alpha p + \beta p (RM - Rf) + \varepsilon t$

	α	β	R^2
Portfolio using book-to-market ratio			
Cheap	0.0211 (0.786)	0.079 (0.583)	0.025
Expensive	-0.011 (-0.371)	0.242 (1.590)	0.163
Cheap-Expensive	0.032 (1.292)	-0.163 (-1.288)	0.113
Portfolio using six-month price momentum			
Loser	-0.024 (-0.658)	0.244 (1.336)	0.121
Winner	0.005 (0.197)	0.174 (1.238)	0.106
Winner-Loser	0.029 (1.408)	-0.069 (-0.661)	0.033

Panel 2: Fama and French Factor Loadings: $Rp - Rf = \alpha p + \beta p (RM - Rf) + sp\ SMB + hp\ HML + \varepsilon t$

	α	β	s	h	R^2
Portfolio using book-to-market ratio					
Cheap	-0.005 (-0.223)	0.122 (1.119)	0.004** (3.068)	0.002* (1.881)	0.578
Expensive	-0.05** (-2.260)	0.364*** (3.22)	0.003** (2.41)	0.004*** (3.31)	0.69
Cheap-Expensive	0.0453 (1.592)	-0.242 (-1.668)	0.0007 (0.433)	-0.001 (-1.164)	0.216
Portfolio using six-month price momentum					
Loser	-0.068** (-2.795)	0.358** (2.877)	0.005*** (3.323)	0.004*** (3.22)	0.724
Winner	-0.026 (-1.20)	0.252** (2.28)	0.004** (2.743)	0.003** (2.519)	0.63
Winner-Loser	0.042* (1.858)	-0.107 (-0.916)	-0.001 (-0.953)	-0.001 (-1.057)	0.198

Notes: Eqn. 1 is used to evaluate the parameters for the various investment strategies. Eqn. 2 and 3 are used to evaluate the differences of the top and bottom quintiles' returns to examine the contrarian and momentum approach. If the beta of the difference in returns is not found to be statistically significant, then the respective profit is not due to time-varying market risk. The t-statistic is computed and reported in the parentheses

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

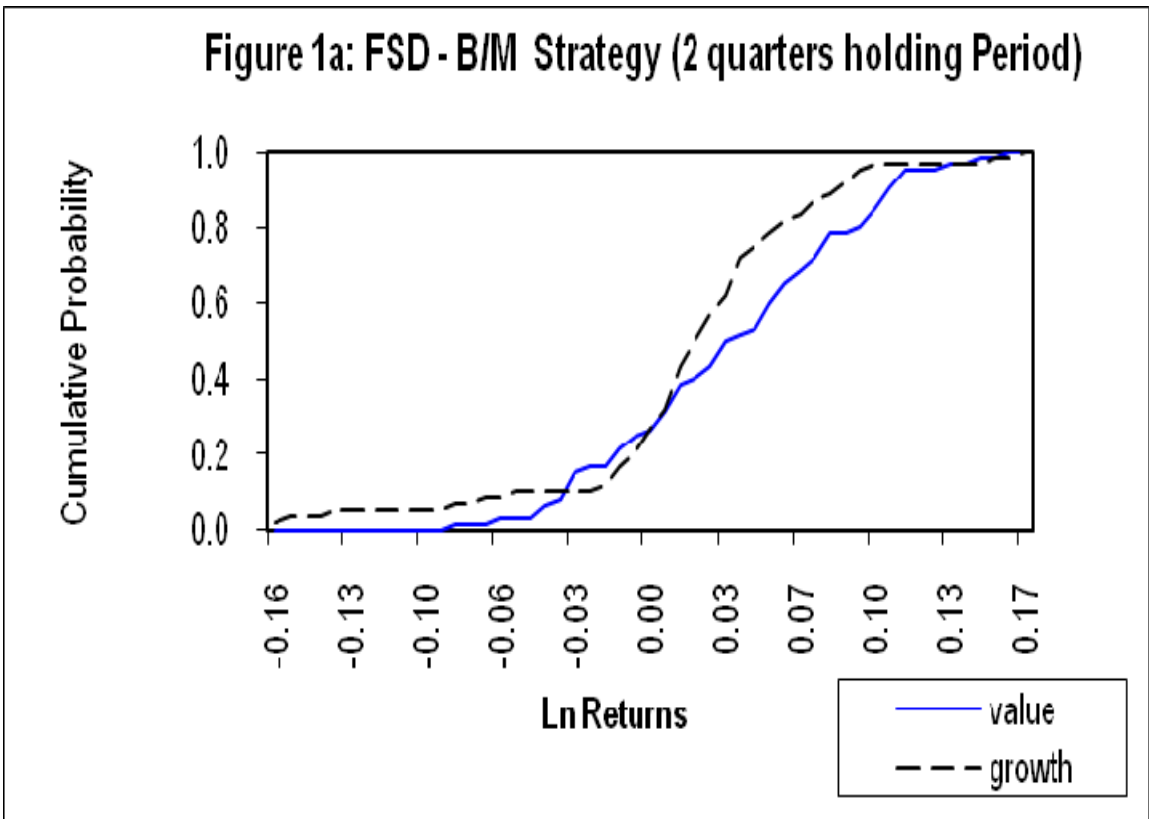
Figure 1a: FSD - B/M Strategy (2 quarters holding Period)
Cumulative Probability
1.0
0.8
0.6
0.4
0.2
0.0
-0.16
-0.13
-0.10
-0.06
-0.03
0.00
0.03
0.07
0.10
0.13
0.17
Ln Returns
value
growth

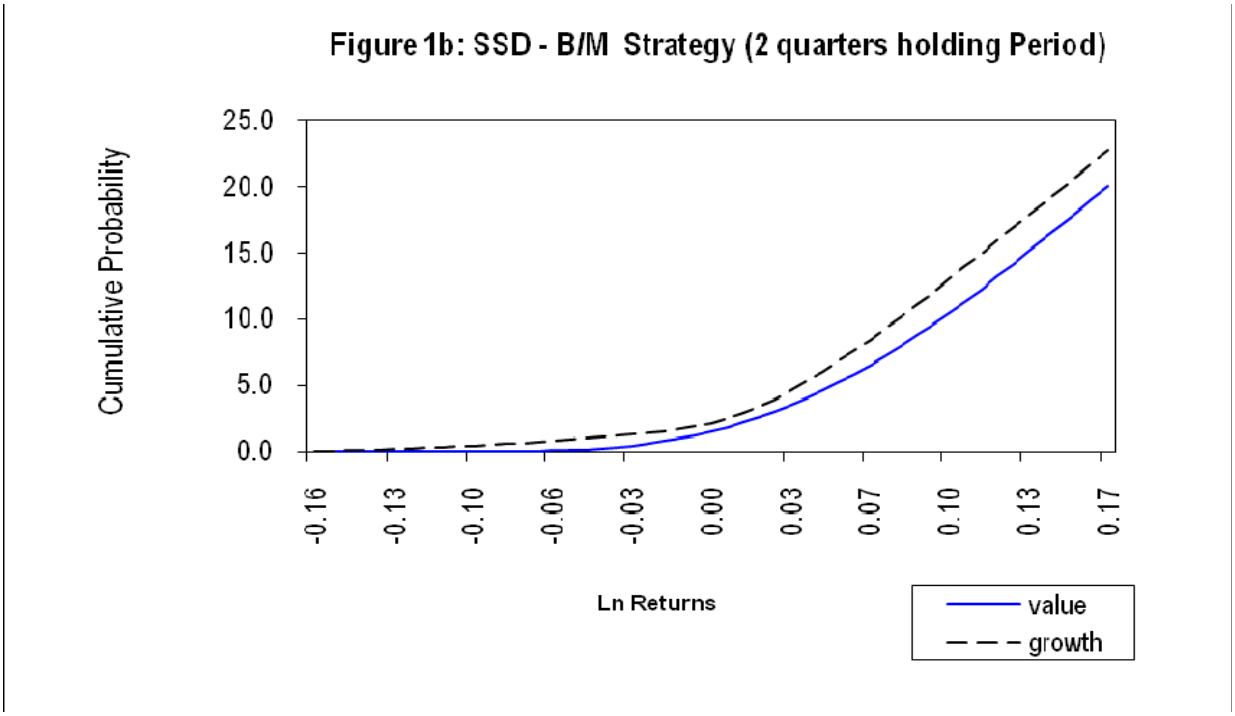
Figure 1b: SSD - B/M Strategy (2 quarters holding Period)
Cumulative Probability
25.0
20.0
15.0
10.0
5.0
0.0
-0.16
-0.13
-0.10
-0.06
-0.03
0.00
0.03
0.07
0.10
0.13
0.17
Ln Returns
value
growth

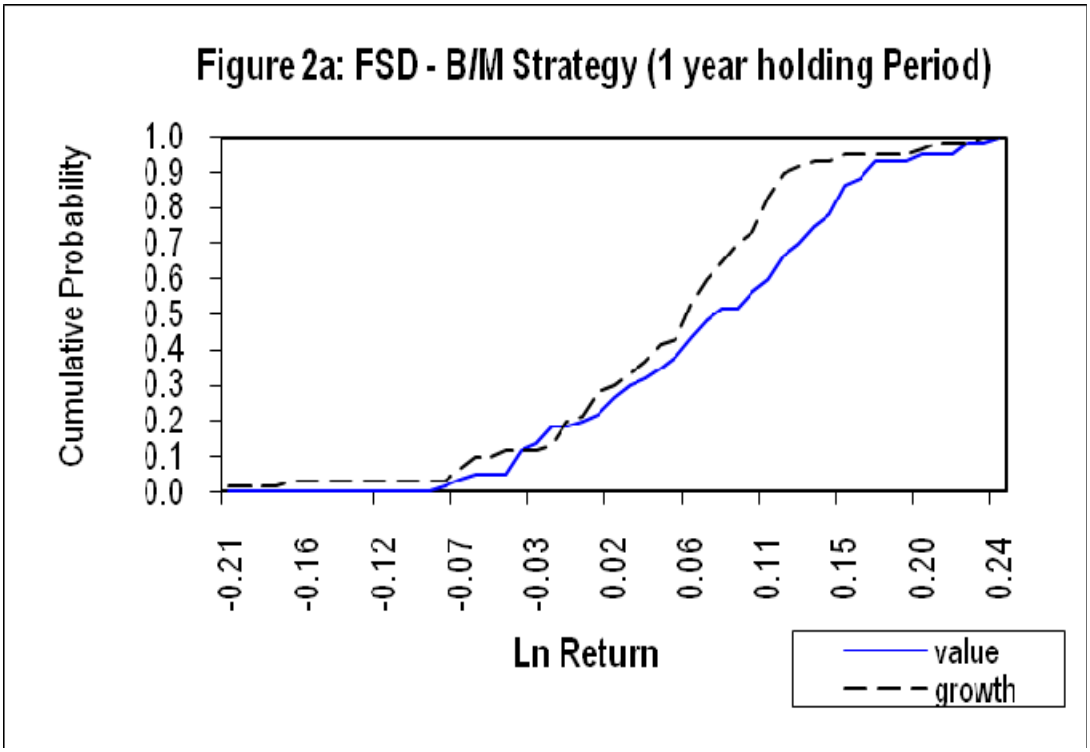
Figure 2a: FSD - B/M Strategy (1 year holding Period)
Cumulative Probability
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.21
-0.16
-0.12
-0.07
-0.03
0.02
0.06
0.11
0.15
0.20
0.24
Ln Return
value
growth

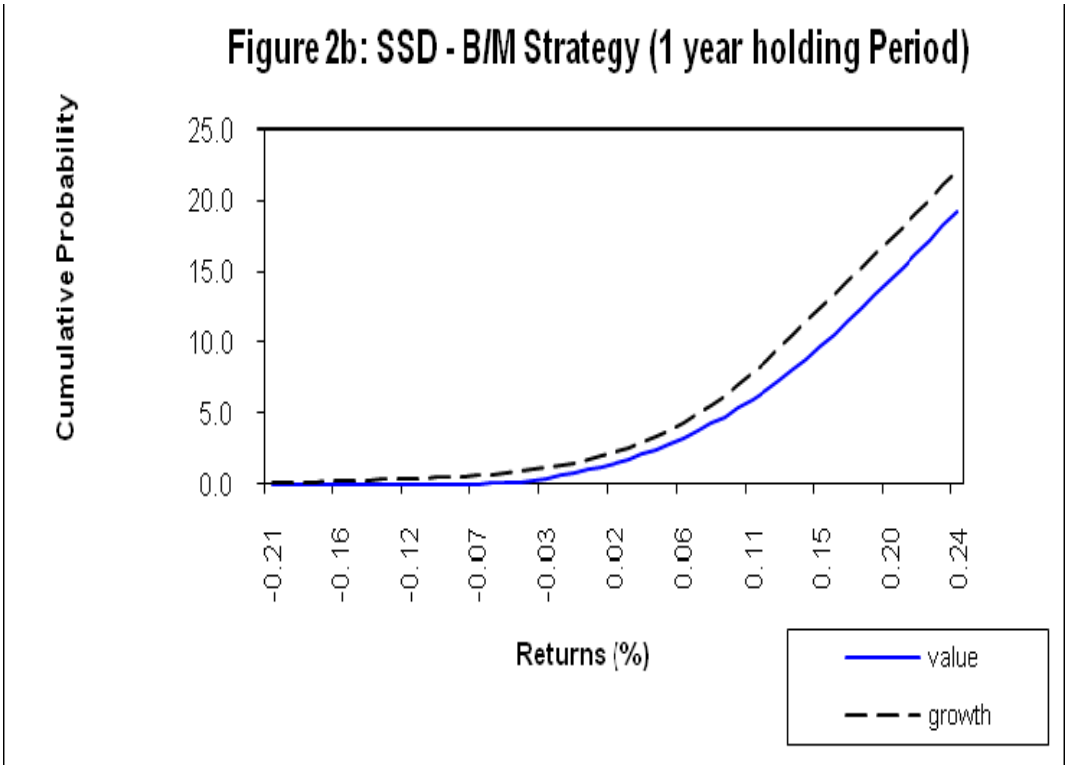
Figure 2b: SSD - B/M Strategy (1 year holding Period)
Cumulative Probability
25.0
20.0
15.0
10.0
5.0
0.0
-0.21
-0.16
-0.12
-0.07
-0.03
0.02
0.06
0.11
0.15
0.20
0.24
Returns (%)
value
growth

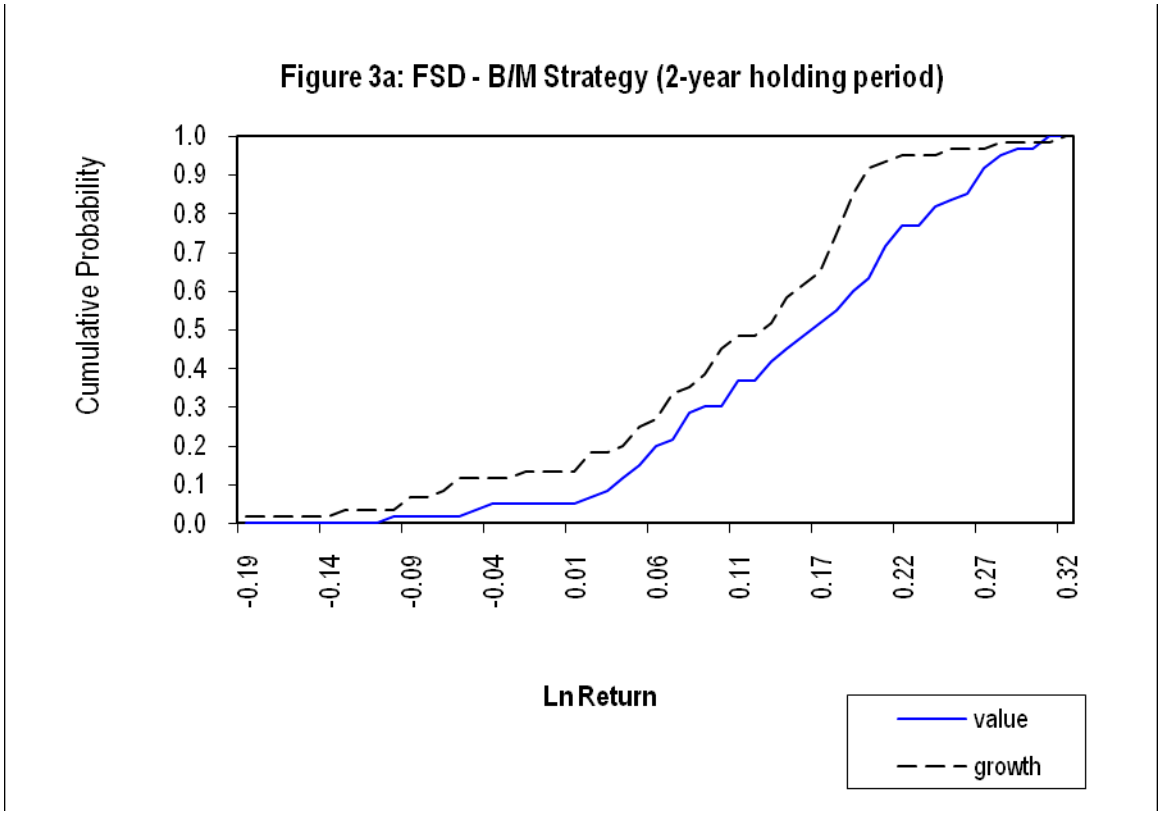
Figure 3a: FSD - B/M Strategy (2-year holding period)
Cumulative Probability
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.19
-0.14
-0.09
-0.04
0.01
0.06
0.11
0.17
0.22
0.27
0.32
Ln Return
value
growth

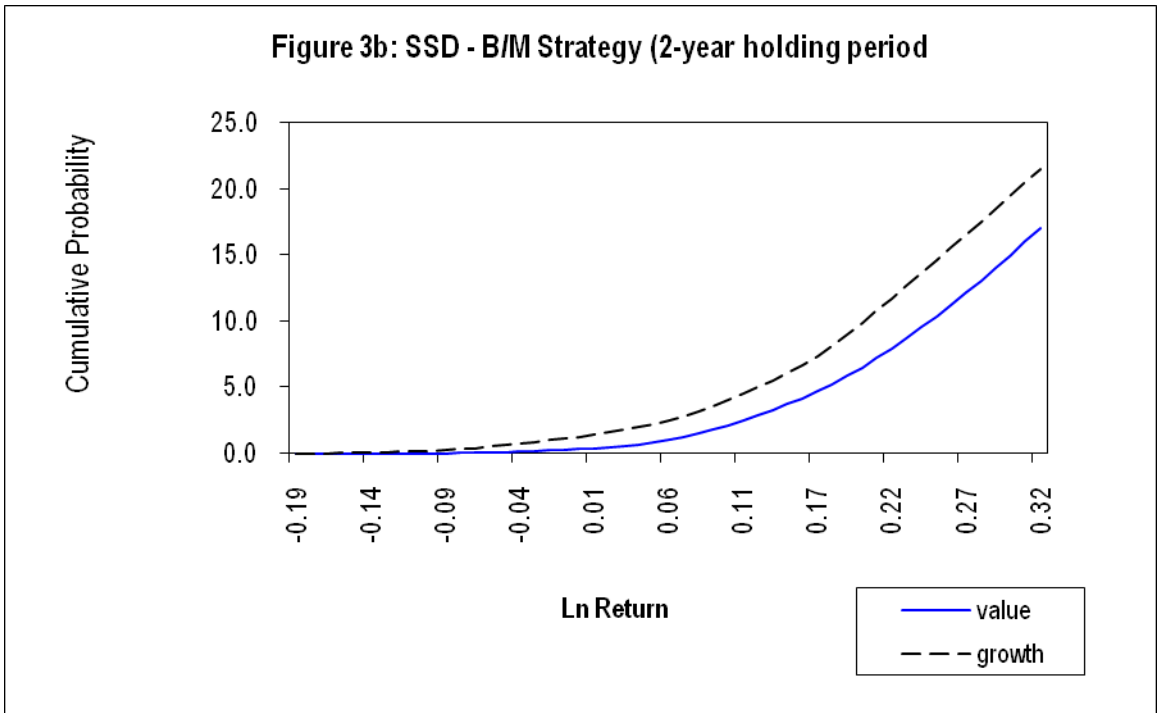
Figure 3b: SSD - B/M Strategy (2-year holding period
Cumulative Probability
25.0
20.0
15.0
10.0
5.0
0.0
-0.19
-0.14
-0.09
-0.04
0.01
0.06
0.11
0.17
0.22
0.27
0.32
Ln Return
value
growth

Figure 4: FSD - B/M Strategy (3-year holding period)

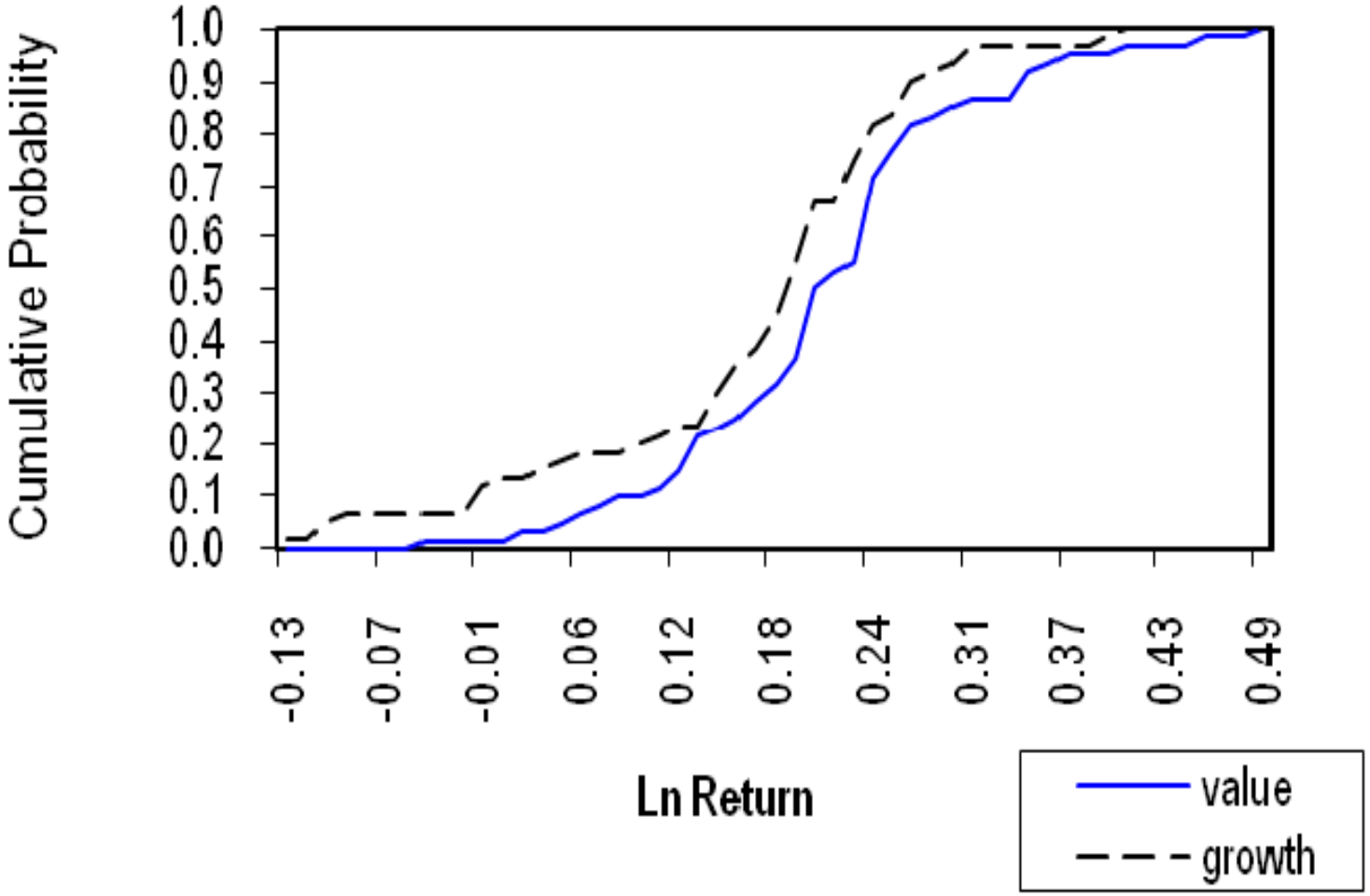

Figure 5a : FSD - Momentum Strategy (1 year holding period)

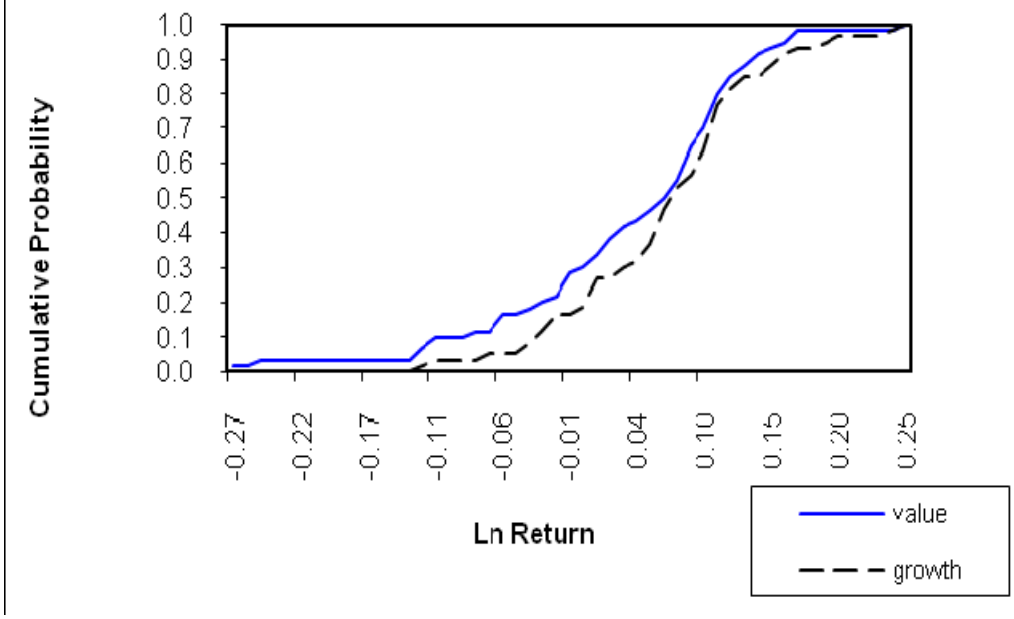

Figure 5b : FSD - Momentum Strategy (1 year holding period)