Value versus Growth Real Estate Investment Strategy: Is the Win a Flash in the Pan?

By

Kwame Addae-Dapaah*

Prof Jim Webb**

Ho, Kim Hin/David*

&

Tan, Yan Fen*

*Department of Real Estate, National University of Singapore.

** Cleveland State University, Ohio.

Correspondence to:

Kwame Addae-Dapaah

Department of Real Estate

School of Design & Environment

National University of Singapore

4 Architecture Drive

Singapore 117566

Telephone: ++ 65 6874 3417 Fax: ++ 65 6774 8684

E-mail: rstka@nus.edu.sg

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Abstract

The superiority of the contrarian investment strategy, though well attested in the finance literature, is being questioned in some quarters on the pretext that the gap between the performance of value and growth investment narrows over time. If this is proven to be true, it would imply that value real estate investment may not be advisable given that real estate is a medium to long term investment. This paper uses empirical real estate investment return data from 1985Q1 to 2005Q3 for US, and some Asia Pacific cities to ascertain whether the superiority of "value" over "growth" real estate investment is a "flash" in the pan, i.e. unsustainable. The office, industrial and retail property investments are examined. In addition to confirming the relative superiority of "value" over "growth" property investment, the results show that office and industrial property investments exhibit return reversal. This implies that the "win" is sustainable. Although the returns from retail property investment display inertia, the results of stochastic dominance test validate the relative superiority of "value" over "growth" property investment for all the three sectors. This implies that fund managers who traditionally have been favoring prime (i.e. growth) property investment may have to reconsider their investment strategy if they want to maximize their return.

Keywords: contrarian investment strategy, value-growth spread, value properties, growth properties, stochastic dominance, mean reversion.

Introduction

The choice of an investment strategy is an important step in the decision-making process of fund managers and large institutional investors. In view of this, growth stock investment strategy and value stock investment strategy have received considerable attention in the finance literature. The growth stock investment strategy is frequently associated with investments in "glamour" stocks that have relatively high price-to-earnings ratios (i.e. high gross income multiplier in real estate terms). On the other hand, value stock investment strategy usually involves investing in "gloomy" stocks that characteristically have relatively low market prices in relation to earnings per share (EPS), cash flow per share, book value per share, or dividend per share (i.e. low gross income multiplier). They are often less popular stocks that have recently experienced low or negative growth rates in corporate earnings. Notwithstanding their relative unpopularity with investors, studies have shown that investments in value stocks, commonly known as contrarian investment strategy, have outperformed growth stocks in major markets (see for example, Fama and French [1993, 1995, 1996, 1998], Capual *et al.* [1993], Lakonishok *et al.* [1994], Haugen [1995], Arshanapali *et al.* [1998], Levis and Liodakis [2001], Badrinath and Omesh [2001] and Chan and Lakonishok [2004]).

However, Jones (1993) reports that the profitability of contrarian portfolios is a pre-WW II phenomenon that has since largely disappeared. Furthermore, Kryzanowski and Zhang (1992) find that the Canadian stock market exhibits significant price inertia, which negates the relative superiority of contrarian investments. These contrary findings have been refuted (see for example, Bauman and Miller [1997]).

In view of the overwhelming evidence in support of the superior performance of contrarian investment in the finance literature, there appears to be a prima facie case for expecting contrarian real estate investment to do likewise (Addae-Dapaah *et al.* (2002)). Growth stock is analogous to prime properties as both have relatively low earnings-to-price ratio (i.e. low initial yield) and investors in both investment media pin their hopes on a relatively high potential price or capital appreciation. Similarly, value stock that provides high income is comparable to high income-producing properties such as lower grade properties and properties in secondary locations. In relation to real property, the contrarian strategy implies that value properties with high running yield could outperform growth properties with low running yield. Thus, the objectives of the study are:

i) to ascertain the comparative advantage(s), in terms of performance, of contrarian real estate investment;
ii) to evaluate the relative riskiness of value properties and growth properties;
iii) to establish whether excessive extrapolation and expectational errors characterize growth and value strategies; and
iv) to ascertain the sustainability of the relative superiority (the "win") of contrarian real estate investment if such superiority is established.

In view of this, the next section provides a brief review of the finance literature on the contrarian investment strategy 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 which is followed by a post-model estimation. The last section deals with concluding remarks.

Literature Review

According to Dreman (1982) a contrarian investor is an investor who goes against the "grain". Thus, contrarian investment strategy simply refers to investment in securities which have lost favor with investors. It covers various investment strategies based on buying/selling stocks that are priced low/high relative to accounting measures of performance – earnings-to-price ratios (E/P), cash flow-to-price ratio (C/P) and book value-to-price ratio (B/P) – as well strategies based on low/high measures of earning per share (EPS) growth (Capual, 1993). In simple terms, the contrarian investment strategy refers to the value/growth stock paradigm.

While there is substantial empirical evidence supporting the efficient market hypothesis that security prices provide unbiased estimates of the underlying values, many still question its validity. Smidt (1968) argues that one potential source of market inefficiency is inappropriate market responses to information. The inappropriate responses to information implicit in Price-Earnings (P/E) ratios may be indicators of future investment performance of a security. Proponents of this price-ratio hypothesis claim that low P/E securities tend to outperform high P/E stocks (Williamson, 1970). Basu (1977), Jaffe *et al.* (1989), Fama and French (1992, 1998), Davis (1994), Lakonishok *et al.* (1994), Bauman *et al.* (1998), Badrinath and Omesh (2001) and Chan and Lakonishok (2004) show a positive relationship between earnings yield and equity returns. However, as a result of the noisy nature of earnings (i.e. the category of stocks with low E/P include also stocks that have temporarily depressed earnings), value strategies based on E/P give narrower spreads compared to other simple value strategies (Chan and Lakonishok [2004]). Furthermore, in view of the noise in reported earnings that results from Japanese accounting standards (i.e. distortions in the earnings induced by accelerated depreciation allowances), Chan *et al.* (1991) find no evidence of a strong positive earnings yield effect after controlling for the other fundamental variables.

Rosenberg *et al.* (1985) show that stocks with high Book Value relative to Market Value of equity (BV/MV) outperform the market. Further studies, e.g. Chan *et al.* (1991) and Fama and French (1992), confirm and extend these results. In view of the highly influential paper by Fama and French (1992), academics (e.g. Capaul *et al.,* 1993; Davis, 1994; Lakonishok *et al.,* 1994; La Porta *et al.,* 1997; Fama and French, 1998; Bauman *et al.,* 1998 and 2001; Chan *et al.,* 2000; and Chan and Lakonishok, 2004) have shifted their attention to the ratio of BV/MV as one of the leading explanatory variables for the cross-section of average stock returns.

Although BV/MV has gained much credence as an indicator of value-growth orientation, it is by no means an ideal measure (Chan and Lakonishok (2004)). BV/MV is not a 'clean' variable uniquely associated with economically interpretable characteristics of the firm (Lakonishok *et al.* (1994)). Many different factors are reflected in this ratio. For a example, low BV/MV may describe a company with several intangible assets that are not reflected in accounting book value. A low BV/MV can also describe a company with attractive growth opportunities that do not enter the computation of book value but do enter the market price. A stock whose risk is low and future cash flows are discounted at a low rate would have a low BV/MV as well. Finally, a low BV/MV may be reminiscent of an overvalued glamour stock.

The shortcomings of accounting earnings have motivated a number of researchers to explore the relationship between cash flow yields and stock returns. High Cash Flow to Price (CF/P) stocks are identified as value stocks because their prices are low per dollar of cash flow, or the growth rate of their cash flows is expected to be low. Chan *et al.* (1991), Davis (1994), Lakonishok *et al.* (1994), Bauman *et al.* (1998), Fama and French (1998), and Chan and Lakonishok (2004) show that a high ratio of CF/P predicts higher returns. This is consistent with the idea that measuring the market's expectations of future growth more directly gives rise to better value strategies (La Porta (1996)).

Fama and French (1998) and Bauman *et al.* (1998) use the ratio of Dividends to Price (D/P) as a proxy for the market's expectations of future growth. Firms with higher ratios have lower expected growth and are considered to be value stocks. They show that the performance of the value stocks based on dividend yields is quantitatively similar to the performance based on the prior categorizations (i.e. P/E, BV/MV and CF/P). Finally, instead of using expectations of future growth to operationalize the notions of glamour and value, Davis (1994) and Lakonishok *et al.* (1994) use past growth to classify stocks. Davis (1994) and Lakonishok *et al.* (1994) measure past growth by Growth in Sales (GS) to conclude that the spread in abnormal returns is sizeable.

To the extent that the different valuation indicators of value-growth orientation are not highly correlated, a strategy based on information from several valuation measures may enhance portfolio performance. Lakonishok *et al.* (1994) explore sophiscated two-dimensional versions of simple value strategies. According to the two-way classification, value stocks are defined as those that have shown poor growth in sales, earnings and cash flow in the past, and are expected by the market to continue growing slowly. Expected performance is measured by multiples of price to current earnings and cash flow. La Porta *et al.* (1997) form portfolios on the basis of a two-way classification based on past GS and CF/P introduced by Lakonishok *et al.* (1994). Using robust regression methods, Chan and Lakonishok (2004) estimate cross-sectional models that predicted future yearly returns from beginning-year values of the BV/MV, CF/P, E/P and the sales to price ratio. The use of the multiple measures in the composite indicators boosts the performance of the value strategy (see Gregory *et al*. [2003]).

In contrast to the above findings, Jones (1993) reports that the profitability of contrarian portfolios is a pre-WW II phenomenon that has since largely disappeared. However, this has been refuted by later studies which include post-war data. Also, Kryzanowski and Zhang (1992) suggest that positive profits resulting from the use of the contrarian investment strategy are limited to the U.S. stock market. When applied to the Canadian stock market, the DeBondt and Thaler (1985) do not produce favorable results. Instead of finding significant price reversals, Kryzanowski and Zhang (1992) find that the Canadian stock market exhibits significant price continuation behavior, which does not support contrarian investments. This is also refuted by later studies that conclude mean-reversion tendency (see for example, Bauman and Miller [1997]).

In view of the accumulated weight of the evidence from past studies, the finance academic fraternity agrees that value investment strategies, on average, outperform growth investment strategies. The only polemical issue about the contrarian strategy is the rationale for its superior performance.

Rationale for Superior Performance of Contrarian Strategies

Competing explanations include risk premiums (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 (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 (Amihud and Mendelson, 1986) .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 (see also Chan, 1988; Ball and Kothari, 1989; Kothari and Shanken, 1992.). However, Lakonishok *et al.* (1994), MacKinley (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)).

The behavioural finance paradigm recognizes psychological influences on human decision-making in which experts (in this case, investors) tend to focus on, and overuse, predictors of limited validity (i.e., earnings trend in the recent past) in making forecasts (see Covel and Shumway, 2005). In view of systematic errors in investors' expectations and analysts' forecasts, it has been argued that a significant portion of value stocks' superior performance is attributable to earning surprises (see De Bondt and Thaler, 1985; Lakonishok *et al*., 1994; La Porta, 1996; Chan *et al*., 2000, 2003; Chan and Lakonishok, 2004; Charles *et al*., 2004). According to Dreman and Berry (1995) and Levis and

Liodakis (2001), positive and negative earnings surprises have an asymmetrical effect on the returns of value and growth stocks. Positive earning surprises have a disproportionately large positive impact on value stocks while negative surprises have a relatively benign effect on such stocks (see also Bauman and Miller, 1997).

Furthermore, analysts and institutional investors may have their own reasons for gravitating toward growth stocks. Analysts have self-interest in recommending successful stocks to generate trading commissions and more investment banking business. Moreover, growth stocks are typically in 'promising' industries, and are thus easier to promote in terms of analyst reports and media coverage (Bhushan, 1989; and Jegadeesh *et al.,* 2004). These considerations play into the career concerns of institutional money managers (Lakonishok *et al.*, 1994). Another important factor is that most investors have shorter time horizons than are required for value strategies to consistently pay off (De Long *et al.,* 1990; Shleifer and Vishny, 1990). In addition, institutional investors act in a fiduciary capacity. Pension fund trustees, in particular, are expected to behave as an "ordinary man of prudence". This implies that they must go with the crowd (i.e. opt for glamour stocks. The result of all these considerations is that value stocks/glamour stocks become under-priced/overpriced relative to their fundamentals. Due to the limits of arbitrage (Shleifer and Vishny (1997)), the mispricing patterns can persist over long periods of time.

A third hypothesis that has been postulated for the superiority of the contrarian strategy is that the reported cross-sectional return differences is an artifact of the research design and the database used to conduct the study (Black, 1993; Kothari *et al.*, 1995). Thus, the abnormal returns would be reduced or vanish if different methodology and data were used. Such researchers argue that the superior returns are the result of survivor biases in the selection of firms (Banz and Breen, 1986), look-ahead bias (Banz and Breen, 1986), and a collective data-snooping exercise by many researchers sifting through the same data (Lo and MacKinlay, 1990). Finally, the database is limited to a relatively short sample period (Davis, 1994). The data-snooping explanation has been controverted by Lakonishok *et al.* (1994), Davis (1994, 1996), Fama and French (1998), Bauman and Conover (1999), Bauman *et al*., (2001), and Chan and Lakonishok (2004) who used databases that are free of survivorship bias and/or fresh data that previously have not been used for such analysis to confirm the superior performance of value strategy.

Furthermore, two features of value investing distinguish it from other possible anomalies. According to Chan and Lakonishok (2004), many apparent violations of the efficient market hypothesis, such as day-of-the-week patterns in stock returns, lack a convincing logical basis and the anomalous pattern is merely a statistical fluke that has been uncovered through data mining. The value premium, however, can be tied to ingrained patterns of investor behavior or the incentives of professional investment managers.

In view of the analogy between value stock and high income producing property (henceforth called value property), the features of the contrarian investment strategy may apply to property investment. Therefore, it is hypothesized that:

a) value properties generate higher returns than growth properties;

b) value property investment is riskier than growth property investment;

c) investors naively extrapolate past performance into future expectations; and

d) the returns of value and growth properties are mean-reverting.

These hypotheses will be operationalized through statistical tests, and where possible, stochastic dominance test.

Data Sourcing and Management

A growth real estate investor prefers properties with a low initial yield to properties with high initial yield. The investor chooses to exchange immediate cash flows for higher future cash flows (in the form of potential capital appreciation and/or rental growth) that are worth more at the date of the purchase, depending on the investor's opportunity cost of capital. On the other hand, a value property investor prefers to receive a high initial yield rather than to wait for future income or uncertain capital growth. The paper uses the Jones Lang Lasalle Real Estate Intelligence Service-Asia (JLL REIS-Asia), the Property Council of New Zealand, the Property Council of Australia and NCREIF property databases to classify 73 office property sub-markets, 52 industrial property sub-markets and 48 retail property sub-markets into value/growth sub-markets on the bases of yields (see Appendix1), i.e. E/P ratio. The data for the office and industrial property markets are from 1985Q1 to 2005Q3 while the retail property market data are from 1992Q1 to 2005Q3.

The initial yields are measured in U.S. dollars. Decile portfolios are formed on the basis of the end-of-previous-quarter's initial yield. The top decile of the sample with the highest initial yield is classified as value property (V_p) portfolio while the bottom decile with the lowest initial yield is classified as growth property (G_p). Each decile is treated as a portfolio composed of equally weighted properties. The portfolios are reformulated only at the end of each holding period. This system of classification is consistent with the finance literature (see for example, Chan *et al.* [1991] and Bauman *et al.* [1998, 2001]).

The classification of the property sub-markets into V_p and G_p portfolios is followed by an examination of the relative performances of the portfolios. If there is evidence of a value premium in any of the sampled property sector markets, the underlying reasons behind the relative superiority of V_p will be discussed.

The Contrarian Strategy Model

The performances of both the value and growth properties for the office and industrial sectors are compared on a 5-year, 10-year, 15-year and entire holding-period (of up to 83 quarters) horizons while those for the retail sector are compared on 5-year, 10-year and entire holding-period (of up to 55 quarters). Medium and long term investment horizons are the focus of analyses as real estate investors usually invest long (Ball, 1998). Periodic (i.e. quarter-by-quarter) return measure is used in the evaluation of the relative superiority of the performance of V_p and G_p portfolios. The periodic returns are quantified as simple holding period returns. Thus, the simple holding period returns are calculated for each quarter and compounded to obtain the multi-year holding-period (e.g. 5-year investment horizon) returns as defined in equation (1).

$$r_t = [(1+r_1)(1+r_2)\ldots(1+r_m)] - 1 \text{ (Levy, 1999),} \quad (1)$$

where

$r_1, r_2 \ldots r_m$ = return for each quarter of the period *m*.

m = number of quarters for the holding period.

Compared to simply adding the returns for all quarters of a given period, equation (1) is more accurate (Sharpe *et al.,* 1998). The periodic quartile returns for each holding- period horizon are averaged across the full period of study to determine the time-weighted average return. Arithmetic mean is most widely used in forecasts of future expectations and in portfolio analysis (Geltner and Miller, 2001). Each value-growth spread (i.e. value premium) is then computed by subtracting the mean return on a G_p portfolio from that on the corresponding V_p portfolio.

The pooled-variance t test and separate-variance t test are then used to determine whether there is a significant difference between the means of the V_p and G_p portfolios. If the p-value is smaller than the conventional levels of significance (i.e. 0.05 and 0.10), the null hypothesis that the two means are equal will be rejected:

$$H_0 : \mu_{value} = \mu_{growth}$$

$$H_1 : \mu_{value} \neq \mu_{growth}$$

The next step is to determine whether any difference in returns is a function of variation in risk, using a more direct evaluation of the risk-based explanation that focuses on the performance of the value and growth properties in ‘bad’ states of the world. Traditional measures of risk such as standard deviation of returns, risk-to-return ratio (i.e. coefficient of variation – CV) and return-to-risk ratio will be utilized.

The Levene’s Test is used to test the equality of the variances for the value and growth properties:

$$H_0 : \sigma^2{}_{value} = \sigma^2{}_{growth}$$

$$H_1 : \sigma^2{}_{value} \neq \sigma^2{}_{growth}$$

Performance in ‘Bad’ States of the World

According to Lakonishok *et al.* (1994), value strategies would be fundamentally riskier than glamour strategies if:

i) they under-perform glamour strategies in some states of the world; and

ii) those are on average ‘bad’ states of the world, in which the marginal utility of wealth is high, making value strategies unattractive to risk-averse investors.

Periods of severe stock market declines are used as a proxy for ‘bad’ states of the world. This is because they generally correspond to periods when aggregate wealth is low and thus the utility of an extra dollar is high. The approach of examining property performance during down markets also corresponds to the notion of downside risk that has gained popularity in the investment community (Chan and Lakonishok, 2004). If the above tests confirm the superiority of value properties, stochastic dominance will be used to ascertain the optimality of the value property investment strategy.

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.

Stochastic Dominance Criteria

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*. Given that *F* and *G* are the cumulative distribution functions of two mutually exclusive risky options *X* and *Y*, *F* dominates *G* (*FDG*) by *FSD*, *SSD*, and *TSD*, denoted by FD_1G, FD_2G, and FD_3G, respectively, if and only if,

$$F(X) \leq G(X) \qquad \textit{for all X (FSD)} \qquad (2)$$

$$\int_{-\infty}^{x} [G(t) - F(t)]dt \geq 0 \qquad \textit{for all X (SSD)} \qquad (3)$$

$$\int_{-\infty}^{x}\int_{-\infty}^{\upsilon}[G(t)-F(t)]dt d\upsilon \geq 0 \qquad \textit{for all X, and}$$

$$E_F(X) \geq E_G(X)(TSD) \qquad (4)$$

The *FSD* (also referred to as the General Efficiency Criterion – Levy and Sarnat, 1972) assumes that all investors prefer more wealth to less regardless of their attitude towards risk. The *SSD* is based on the economic notion that investors are risk averse while 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 are related in the following way:

FSD: $F(X) \leq G(X) \forall X \Longleftrightarrow E_F U(X) \geq E_G U(X) \qquad \forall u \in U_1, \qquad (5)$

SSD: $\int_{-\infty}^{x} F(t)dt \geq \int_{-\infty}^{x} G(t)dt \, \forall X \Longleftrightarrow E_F U(X) \geq E_G U(X) \qquad \forall u \in U_2, \qquad (6)$

TSD: $\int_{-\infty}^{x}\int_{-\infty}^{\upsilon} F(t)dt d\upsilon \geq \int_{-\infty}^{x}\int_{-\infty}^{x} G(t)dt d\upsilon \, \forall X \Longleftrightarrow E_F U(X) \geq E_G U(X)$

$\forall u \in U_3$, and

$E_F(X) \geq E_G(X), \qquad (7)$

where U_i = utility function class (*i* =1, 2, 3)

U_1 includes all *u* with $u' \geq 0$;

U_2 includes all *u* with $u' \geq 0$ and $u'' \leq 0$; and

U_3 includes all *u* with $u' \geq 0$, $u'' \leq 0$ and $u''' \geq 0$.

In other words, a lower degree *SD* is embedded in a higher degree *SD*. The economic interpretation of the above 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.

Empirical Model Estimation – A Test of the Extrapolation Model

Following the evaluation of the risk characteristics of the V_p and G_p portfolios, the next task is to investigate the relationship between the past, the forecasted, and the actual future growth rates. This relationship is largely consistent with the predictions of the extrapolation model. The essence of extrapolation is that investors are excessively optimistic about growth properties and excessively pessimistic about value properties. A direct test of extrapolation (Lakonishok *et al.* (1994)), then, is to look directly at the actual future rental income and capital growth rates of value and growth properties, and compare them to:

a) past growth rates and
b) expected growth rates as implied by the initial yields.

If naïve extrapolation is established, the variance ratio test will be used to show that naïve extrapolation is a credible explanation to the relative superiority of the contrarian strategy.

Variance Ratio Test

The variance ratio, which measures the randomness of a return series, is calculated by dividing the variance of longer intervals' returns by the variance of shorter intervals' returns (for the same measurement period. The result is normalized to 1 by dividing it by the ratio of the longer to the shorter interval. The test assumes that if a return series follows a random walk, the variance of its *k*-differences should be *k* times the variance of its first difference (Poterba and Summers, 1988).

Assuming that y_t denotes a time series consisting of *T* observations, the variance ratio of the *k*-th difference is calculated as follows (see Lo and MacKinlay, 1988; Poterba and Summers, 1988; Belaire-Franch and Oppong, 2005):

$$VR(k) = \frac{\sigma^2(k)}{\sigma^2(1)}, \quad (8)$$

where

VR(k): is the variance ratio of the series *k*-th difference

$\sigma^2(k)$: is the unbiased estimator of 1/*k* of the variance of the series *k*-th difference

$\sigma^2(1)$: is the variance of the first–differenced return series

k: is the number of the days of the base observations interval, or the difference interval.

The estimator of the k-period difference, $\sigma^2(k)$, is computed as:

$$\sigma^2(k) = \frac{1}{T}\sum_{t=k}^{T}\left(y_t + \ldots + y_{t-k+1} - k\hat{\mu}\right) \quad (9)$$

where

$\hat{\mu} = \frac{1}{T}\sum_{t=1}^{T} y_t$; while the unbiased estimator of variance of the first difference, $\sigma^2(1)$, is:

$$\sigma^2(1) = \frac{1}{T}\sum_{t=1}^{T}(y_t - \hat{\mu}) \quad (10)$$

A variance ratio greater than 1 suggests that the shorter-interval returns trend within the duration of the longer interval (i.e. the return series is positively serially correlated). Conversely, a variance ratio less than 1 implies that the return series is negatively serially correlated (i.e. the shorter-interval returns are mean reverting within the duration of the longer interval.

Performance of the Contrarian Strategy

Exhibits 1 to 4 clearly demonstrate the superiority of the contrarian strategy in each of the holding periods under consideration. The value portfolio for each property sector outperformed the corresponding growth portfolio. The value industrial property portfolio, in particular, recorded 100% positive value-growth spread for all the investment formation horizons (Exhibits 1-4a). In other words, the value industrial property portfolio outperformed its growth counterpart in every holding period. The mean value/growth industrial portfolio returns for the 5, 10, 15 and more than 15 years holding periods are 163.59%/40.77%, 405.55%/107.46%, 1023.36%/187.18% and 1992.29%/258.69% respectively (Exhibit 5 – for full details see Appendices B-1, C-1, D-1 and E-1). This implies that an investor who adopted the contrarian strategy over the more than 15-year holding period would have earned, on average, 1733.6% more on each dollar invested than the one who invested in glamour industrial properties over the same period.

Exhibits 1-4

Similarly, the value retail property portfolio had spectacular performance by registering 100% value-growth spread for the 10 and more than 10 years holding periods (Exhibits 2 and 4a). Over the 5-year investment formation horizons, the value retail property portfolio outperformed its glamour counterpart in 35 of the 36 holding periods (Exhibit 1). The mean value/growth retail property portfolio returns for the 5, 10 and more than 10 years holding period are 201.54%/65.62%, 810.85%/143.7% and 980.84%/203.76% respectively (Exhibit 5 – for full details see Appendices B-2, C-2 and F).

Exhibit 5

Glamour office property portfolio did better than its industrial and retail counterparts. However, the better performance was nothing compared to the value office property portfolio. The value office property portfolio outperformed the growth office property portfolio in 39 out of the 61 five-year holding periods. In other words, the growth portfolio outperformed the value portfolio in 22 (out of the 61) investment formation periods between 1994Q1 and 1999Q2 (Exhibit 1 – for full details, see Appendix B-3). However, the superiority of the contrarian strategy is evident over the longer investment horizons (Exhibits 2-4). Over the 10-year investment horizon, the value office portfolio outperformed its growth counterpart in 36 0f the 41 formation periods (Exhibit 2; also Appendix C-3). Furthermore, the superior performance of the contrarian strategy is attested by the 100% positive value-growth spread for the 15 and more than 15 years formation periods (Exhibits 3 and 4; also Appendices D-3 and E-3). The mean return value/growth office property portfolio returns for 5, 10, 15 and more than 15 years holding period are 102.6%/35.29%, 275.12%/66.05%, 944.65%/96.26% and 1929.81%/125.75% respectively (Exhibit 5). Thus, a dollar invested in value office property portfolio over the entire investment horizon, would have earned, on average, 1804.06% more than a dollar invested in growth office property portfolio. It is worth noting that the differences between the mean returns for both portfolios (i.e. the value premium) are statistically significant at both the 0.01 and 0.05 levels (Exhibit 6a).

Exhibit 6a & 6b

The relative superiority of the value portfolios is confirmed by the results of stochastic dominance test presented in Exhibits 7-9

Exhibits 7-9

Exhibits 7-9 clearly demonstrates that $V_pD_1G_p$ for all the holding periods under consideration – i.e. the value portfolios are the most efficient (and therefore the optimal) choice. This implies that value portfolios stochastically dominate growth portfolios in the first, second and third order. In other words, the value portfolios statistically prognosticated a higher probability of success than the growth portfolios. For example, Exhibit 8c shows that there was a 60% and 0% probability that the 5-year holding period return for value and growth portfolios respectively was greater than or equal to 200%. Thus, value portfolio investment should have been preferable to both risk averters and risk lovers (Kjetsaa and Kieff, 2003; Levy and Sarnat, 1972).

Is the Superior Performance of Contrarian Strategy a Compensation for Higher Risk?

According to the traditional school of thought (see literature review), the superiority of the contrarian strategy is a compensation for higher systematic risk (i.e. higher return is a reward for higher risk). If the value strategy is fundamentally riskier, it should under-perform the growth strategy during undesirable/bad states of the world – i.e. times of severe market decline when the marginal utility of consumption is high (Lakonishok *et al*., 1994). This section is therefore aimed at ascertaining if there is any synchrony between "value" underperformance and "bad" state of the world. Furthermore, traditional measures of risk (i.e. standard deviation) and risk-adjusted performance indicator (i.e. coefficient of variation) are used to compare "value" and growth strategies.

Exhibits 1-4 show that the value strategy (industrial and retail sectors) virtually never under-performed the growth strategy in any holding period. It is the value office portfolio that underperformed "growth" between 1994Q1 and 1999Q2 (5-year holding period), and 1991Q1and 1992Q3 (10-year holding period). Apart from 1997-1999 (the period of South-East Asian economic crisis), the periods of "value" underperformance do not coincide with severe market declines. As far as the industrial and retail sectors are concerned, there is no underperformance of the value portfolios to be associated with severe market declines as defined by some pay-off relevant factor.

The performance of the value and growth properties in four states of the world (i.e. Worst, Next Worst, Next Best, and Best 20 quarters) based on Datastream Indices for the Pacific Basin Real Estate Stock Market from 1985Q1 to 2005Q3 (Exhibit 10) is presented in Exhibit 11. After matching the quarterly returns for the growth and value portfolios with the changes in the real estate stock market return, the mean value-growth spread in each state is reported together with the corresponding t-statistics for the test that the difference in returns is equal to zero (Exhibit 11), i.e.

$$H_o : \mu_{value} - \mu_{growth} = 0$$
$$H_o : \mu_{value} - \mu_{growth} \neq 0$$

Exhibits 10 & 11

Exhibit 11 shows that the value strategy did notably better than the growth strategy in all the 4 states of the world (industrial sector) except the best state of the world (office and retail sectors). However, these "value" underperformances are not statistically significant. The null hypothesis is rejected for all 4 states of the world (industrial sector), the "Worst" and "Next Worst" (office), and "Worst" and "Next Best" states of the world to conclude that there is statistical difference between the means of the two populations. It is evident from Exhibit 11 that the superior performance of the value strategy was skewed towards negative market return months rather than positive market return months. The evidence indicates that there are no significant traces of a conventional asset pricing equilibrium in which the higher returns on the value strategy are compensation for higher systematic risk.

The volatility of the portfolios' returns during the period of study is presented in Exhibit 5. The results show that value portfolios recorded higher standard deviation of returns than growth portfolios for all the holding periods and for the three property sectors. The results presented in Exhibit 6b indicate that the higher value portfolio standard deviations are significantly different, at the 0.01 level, from those of the growth properties. However, since the mean returns and variances of the two portfolios are different, the coefficient of variation (CV) is a more appropriate risk measure for comparison. The CVs in Exhibit 5 imply that the industrial and office sectors value portfolios were safer than the growth portfolios for all the holding periods except the more than 15-year holding period. Furthermore, the retail value portfolio was safer (based on CV) than its growth counterpart in only the 5-year holding periods – It was riskier than the retail growth portfolio in the remaining two holding periods (Exhibit 5). However, since value portfolios stochastically dominate growth portfolios in all the holding periods (exhibits 7-9), the latter is riskier than the former (Biswas, 1997). Hence, a risk model based on differences in standard deviation alone may not be a credible explanation for the superior performance of value properties.

Post-Model Estimation – A Test of the Extrapolation Model

The paper provides empirical evidence to verify whether excessive extrapolation and expectational errors characterize growth and value strategies. First, the study period is divided into two: past (pre-portfolio formation) and future (post-formation) performances (see Panels B and C respectively of Exhibits 12-14). Exhibits 12-14 present some descriptive characteristics of the growth and value portfolios with respect to their initial yields, past growth rates, and future growth rates. Panel A of Exhibits 12-14 reveals that the value portfolios had higher initial yields than growth portfolios. This is supposed to portend lower expected growth rates for value properties. Panel B shows that, using several measures of past growth, including rental income and capital value, the growth portfolio performance for each sector (in relation to rental income) and for the industrial and retail sectors (relative to capital value) grew faster than the value portfolios over the pre- portfolio formulation period. Panel C shows that over the subsequent post-formulation years, the relative growth of rental income and capital value for growth properties was generally quite below expectation.

Exhibit 12-14

Recall that the Gordon's formula (Gordon and Shapiro (1956)) can be rewritten as $k_p \left(\equiv \frac{I}{P} \right) = R_N - g_p = d$, where k_p is the initial yield for property, I is the current rental income, P is the market price, R_N is the required nominal return, and $\left(g_p - d \right)$ is the rental growth for actual, depreciating properties. These formulae literally imply that, holding discount rates constant, the differences in expected rental growth rates can be directly calculated from differences in initial yields. Since the assumptions behind these simple formulae are restrictive (e.g. constant growth rates, etc.), the paper does not calculate exact estimates of the differences in expected rental growth rates between value and growth portfolios. Instead, the paper seeks to ascertain whether the large differences in initial yields between value and growth properties can be justified by the differences in future rental growth rates.

Panel B of Exhibits 12-14 reveal that the average quarterly growth rate for rental income for the glamour portfolio was 20.43% compared to -1.47% (industrial), 14.36% compared to 0.56% (office) and 17.40% compared to -1.87% (retail) for the value portfolio over the pre-portfolio formation period.

Every dollar invested in the value portfolio in 1994Q2 (office), 1994Q3 (industrial) and 1997Q4 (retail) had a claim to 8.57, 5.16 and 12.22 cents of the then existing corresponding rental income while a dollar invested in the growth portfolio was a claim to 1.69, 2.05 and 1.75 cents of the rental income (Panel A of Exhibits 12-14). Ignoring any difference in required rates of return, the large differences in initial yields have to be justified by an expectation of higher rental growth rates for glamour than value portfolios over a period of time. Thus, the expected rental income for the growth portfolio must be higher than the value portfolio at some future date. Accordingly, investors would like to know the number of quarters it would take for the rental income per dollar invested in the growth portfolios (0.0169, 0.0205 and 0.0175) to equate the rental income of the value portfolio (0.0857, 0.0516 and 0.1222), assuming that the differences in past rental income growth rates would persist. It would take approximately 26 years (office), 6 years (industrial) and 21 years retail) for such equalization to occur (see Exhibit 15). Note that this equality is based on a flow basis, not on a present-value basis which would require an even longer time period over which glamour properties should experience superior growth.

Exhibit 15

Unfortunately, a comparison of Panels B and C (Exhibits 12-14) show that the relatively higher expected future growth (implied by the higher growth rate in the pre-formation period) in the glamour portfolios during the post-formation period was a far cry from reality. The actual post-formation rental growth rate for glamour portfolios plummeted by 58.49% from 14.36% to 5.96% (office), 91.39% from 20.43% to 1.76% (industrial), and 79.02% from 17.4% to 3.65% (retail) per quarter. Alternatively, the post-formation rental growth rate for the value portfolios increased by 8.93% from -0.56% to -0.51% (office), 197.28% from -1.47% to 1.43% (industrial) and 100.53% from -1.87% to 0.01%. These results are consistent with the extrapolation model. Contrarian/glamour investors were pleasantly/unpleasantly surprised by the post formation portfolio results. Rental is, however, a portion of portfolio performance. Capital value is an important portion of a portfolios performance and thus, must be analyzed in relation to the extrapolation model.

During the pre-formation period, the capital value growth rates for the glamour portfolios, -1.21% (industrial) and 2.6% (retail) were higher than those for value portfolios, -7.45% (industrial) and 0.21% (retail). The capital value growth rate for the office glamour portfolio (-2.14%), in contradistinction, is lower than office value portfolio (6.99%) during the pre-formation period (Exhibits 12-14). The results in Exhibits 12-14 reveal that while the capital value growth rate the glamour industrial portfolio increase by 108.26% from -1.21% to 0.10%, that for the value industrial portfolio increased by 165.5% from -7.45% to 4.88% per quarter during the post-formation period. Moreover, the capital value growth rate for the retail glamour portfolio declined by 12.69% from 2.6% to 2.27% while that for the value portfolio increased by 238.1% from 0.21% to 0.71% per quarter in the post-formation period. Once again, the results are consistent with the extrapolation model.

However, the results for the office portfolio are inconsistent with the extrapolation model. The capital value growth rate for the glamour office portfolio increased by 156.54% from -2.14% to 1.21% while that of the corresponding value portfolio declined by 134.48% from 6.99% to -2.41% per quarter. The pertinent question that needs to be addressed at this juncture is whether, given the post-formation performance of capital value growth rates for the industrial and office portfolios, the glamour portfolios can outperform the value portfolios at some time in the future. This is addressed via a mean reversion analysis.

Variance Ratio Test

The results of the variance ratio tests are presented in Exhibit 16. The returns for both glamour and value portfolios for the three property sectors display mean reversion at long horizons. However, the office glamour portfolio returns exhibit positive serial correlation over investment horizons of up to 10 years (40 quarters) while the office value portfolio display negative serial correlation virtually over all the holding periods. This explains why the office glamour portfolio outperformed its value counterpart in 22 of the 61 5-year holding periods (Exhibit 1) as well as 5 of the 41 10-year holding periods (Exhibit

2). On the average, however, the value strategy outperformed the glamour strategy over the 5 and 10-year holding periods when the glamour portfolio displayed return inertia.

Exhibit 16

As far as the industrial sector is concerned, both portfolios display mean reversion in all the holding periods under consideration. This is also true of the retail sector except that the retail value portfolio exhibit positive serial correlation for holding periods between 5 and 10 years. These results imply that the superior performance of the contrarian strategy is not a flash in the pan – It will persist in future years.

Conclusion

The paper set out to investigate the comparative advantage(s) of the value and growth investment strategies to ascertain the sustainability of the superior performance (if any) of the contrarian strategy. The results of the study indicate that value portfolios for all three property sectors out-performed (in both absolute, and in most cases, risk-adjusted bases) growth portfolios over all the holding periods under consideration. A dollar invested in the value portfolio over 10 years, on the average, earned 209.07% (office), 298.09% (industrial) and 647.15% (retail) more than a dollar invested in the corresponding growth portfolios. Similarly, a dollar invested in the value portfolio over the entire period of study earned, on average, 1804.06% (office), 1733.61% (industrial) and 771.08% (retail) more than a similar investment in the growth portfolio. The difference between the performances of the value and the growth portfolios are statistically significant at the 0.01 level. Thus, the null hypothesis that there is no difference between the mean returns for the two portfolios is rejected.

Furthermore, the superior performances of value portfolios occurred in almost all the four "states of the world". The superior performance is not a compensation for higher risk as measured by the coefficient of variation (CV) for investment horizons of up to 5 years (retail) and 15 years (office and industrial). These findings are consistent with the contrarian strategy in finance. It must be noted, however, that the superior performance of the contrarian strategy for investment horizons of more than 5 years (retail) and 15 years (office and industrial) could be a compensation for higher risk as measured by the CV. Notwithstanding this caveat, the relative superiority of the value portfolio for each sector and holding period is confirmed by stochastic dominance test, which indicates that the value strategy is the optimal choice for both risk averters and risk lovers. In addition, the variance ratio test reveals that returns for both value and growth property portfolios exhibit mean reversion at long horizons. This means that the superior performance of the contrarian strategy is sustainable. The above results are consistent with the finance literature.

This consistency cannot be attributed to data snooping as the studies in the finance literature are based on different data. The findings imply that high initial yield office, industrial and retail portfolios in the sample outperformed low yield counterparts during the period under investigation. If the results can be generalized in any way, one may safely conclude that property investors should seriously consider contrarian real estate investment if they want to improve the performance of their portfolios.

References

Arshanapali, B., D. Coggin, and J. Doukas (1998), "Multifactor Asset Pricing Analysis of International Value Investment", *Journal of Portfolio Management*, vol. 24 no. 4 (Summer), pp 10-23.

Al-Khazali, O. (2002), "Stochastic Dominance as a Decision Technique for Ranking Investments", *Academy for Economics and Economic Education*, vol 5 no. 1, pp 1-8.

Amihud, Y., and H. Mendelson (1986), "Asset Pricing and the Bid-Ask Spread", *Journal of Financial Economics*, vol. 17, pp 229-254.

Ball, R., and S. Kothari (1989), "Nonstationary Expected Returns", *Journal of Financial Economics*, vol. 25 no.1, pp 51-74.

Banz, R., and W. Breen (1986), "Sample-Dependent Results Using Accounting and Market Data: Some Evidence", *Journal of Finance*, vol. 41 no. 4, pp 779-793.

Barrett, G. F. and Donald, S. G. (2003), "Consistent Tests for Stochastic Dominance", *Econometrica*, vol 71 no.1, pp 71-104.

Bauman, S. and R. E. Miller (1997), "Investor Expectations and the Performance of Value Stocks versus Growth Stocks", *Journal of Portfolio Management*, (Spring), pp. 57-68.

Bauman, W., and C. Conover (1999), "Investor Overreaction in International Stock Markets", *Journal of Portfolio Management*, vol. 25 no. 4, pp 102-110.

Bauman, W., C. Conover and R. Miller (2001), "The Performance of Growth Stocks and Value Stocks in the Pacific Basin", *Review of Pacific Basin Financial Markets and Policies*, vol. 4 no. 2, pp 95-108.

Basu, S. (1977), "Investment Performance of Common Stocks in Relation to their Price-Earnings Ratio: A Test of the Efficient Market Hypothesis", *Journal of Finance*, vol. XXXII, no. 3, pp 6763-6782.

Bhushan, R. (1989), "Firm Characteristics and Analyst Following", *Journal of Accounting and Economics*, vol.11 no. 2/3, pp 255-274.

Biswas, T. (1997), *Decision Making Under Uncertainty*, London: Macmillan Press Ltd.

Black, Fischer (1993), "Beta and return", *Journal of Portfolio Management 20*, pp 8-18

Capaul, C., I. Rowley, and W. Sharpe (1993), "International Value and Growth Stock Returns", *Financial Analysts Journal*, vol. 49 no.1 (July/August), pp 27-36.

Chan, K.C. (1988), "On the Contrarian Investment Strategy", *Journal of Business*, vol. 61 no. 2 (April), pp 147-164

Chan, L., Y. Hamao and J. Lakonishok (1991), "Fundamentals and Stock Returns in Japan", *Journal of Finance*, vol. 46 no. 5, pp 1739-1764.

Chan, L., J. Karceski and J. Lakonishok (2000), "New Paradigm or Same Old Hype in Equity Investing?" *Financial Analysts Journal*, vol. 56 no. 4, pp 23-36.

Chan, L., J. Karceski and J. Lakonishok (2003), "The Level and Persistence of Growth Rates", *Journal of Finance*, vol. 58 no. 2, 643-684.

Chan, L., and J. Lakonishok (2004), "Value and Growth Investing: Review and Update", *Financial Analysts Journal*, vol. 60 no. 1, 71-86.

Chopra, N., J. Lakonishok and J. Ritter (1992), "Measuring Abnormal Performance: Do stocks overreact?" *Journal of Financial Economics*, vol. 31 no. 2, 235-268.

Daniel, K. and S. Titman (1996), "Evidence on the Characteristics of Cross Sectional Variation in Stock Returns", *Working Paper* (University of Chicago, Chicago, IL).

Davis, J. (1994), "The Cross-Section of Realized Returns: The Pre-COMPUSTAT Evidence", *Journal of Finance*, vol. 49 no. 5, 1579-1593.

Davis, J. (1996), "The Cross-Section of Stock Returns and Survivorship Bias: Evidence from Delisted Stocks", *Quarterly Review of Economics and Finance*, vol. 36 no. 3, pp 365-375.

De Bondt, W. and R. Thaler (1985), "Does the Stock Market Overreact?", *Journal of Finance*, vol. 40 no. 3, 793-805.

Dechow, P., and R. Sloan (1997), "Returns to Contrarian Investment Strategies: Tests of Naïve Expectations Hypothesis", *Journal of Financial Economics*, vol. 43 no.1 (January), pp 3-27

De Long, B., A. Shleifer, L. Summers and R. Waldmann (1990), "Noise Trader Risk in Financial Markets", *Journal of Political Economy*, vol. 98 no. 4, pp 703-738.

Dreman, David (1982), *The New Contrarian Investment Strategy*, New York: Random House

Dreman D. and M. Berry (1995), "Overreaction, Underreaction and the Low-P/E Effect", *Financial Analysts Journal*, vol. 51 no. 4 (July/ August), pp 21-30

Fama, E F and K R French (1992), "The Cross-Section of Expected Stock Returns," *Journal of Foinance*, vol. 47, pp 427-65

Fama E.F. and K.R. French (1993), "Common Risk Factors in the Returns on Stocks and Bonds", *Journal of Financial Economics*, vol. 33 no.1 (February), pp 3-56.

Fama E.F. and K.R. French (1995), "Size and Book-to-Market Factors in Earnings and Returns", *Journal of Finance*, vol. 50 no.1 (March), pp 131-155

Fama E.F. and K.R. French (1996), “Multifactor Explanations of Asset Pricing Anomalies”, *Journal of Finance*, vol. 51 no. 1 (March), pp 55-84.

Fama E.F. and K.R. French (1998), “Value versus Growth: The International Evidence”, *Journal of Finance*, vol. 53 no.6 (December), pp 1975-1999.

Foster, F. Douglas, Tom Smith, and Robert E. Whaley (1997), “Assessing goodness of fit of asset pricing models: The distribution of the maximal R^2”, *Journal of Finance 52*, pp 591-607.

Geltner, D. and N. Miller (2001), *Commercial Real Estate Analysis and Investments*. NJ: Prentice Hall.

Graham, B. and D.L. Dodd (1934), *Security Analysis* (New York: McGraw-Hill Book Company, Inc.).

Hadar, J. and W. R. Russel, Rules for Ordering Uncertain Prospects, *American Economic Review,* 1969, 59, 25-34.

Hanoch, G. and H. Levy, The Efficiency Analysis of Choices Involving Risk, *The Review of Economic Studies,* 1969, 36:3, 335-346.

Haugen, R.A. (1995), *The New Finance: The Case Against Efficient Markets,* New Jersey: Prentice Hall.

Jaffe, J., D.B. Keim, and R. Westerfield (1989), “Earning Yields, Market Values, and Stock Returns”, Journal of Finance, vol. 44, pp 135-148

Jegadeesh, N., J. Kim, S. Krische and C. Lee (2004), “Analyzing the Analysts: When Do Recommendations Add Value?” *Journal of Finance,* vol. 59 no. 3, pp 1083-1124.

Kjetsaa, R. and M. Kieff, Stochastic Dominance Analysis of Mutual Fund Performance. *American Business Review,* 2003, 21:1, 1-8.

Kothari, S.P., J. Shanken, and R.G. Sloan (1995), “Another Look at the Cross-Section of Expected Stock Returns”, *Journal of Finance,* vol. 50, pp 185-224

La Porta, R. (1996), “Expectations and the Cross-Section of Stock Returns”, *Journal of Finan*ce, vol. 51 no. 5 (December), pp 1715-1742

La Porta, R., J. Lakonishok, A. Shleifer, and R. Vishny (1997), “Good news for Value Stocks: Further Evidence on Market Efficiency”, *Journal of Finance,* vol. 52 no. 2 (June), pp 859-874

Lakonishok J., A. Shleifer, and R. Vishny (1994), “Contrarian Investment, Extrapolation and Risk, *Journal of Finance,* vol. 49 no. 5 (December), pp 1541-1578.

Levis, M. and M. Liodakis (2001), “Contrarian Strategies and Investor Expectations”, *Financial Analysts Journal,* vol 57 no. 2, pp 43-56.

Levy, H., Stochastic Dominance and Expected Utility: Survey and Analysis. *Management Science*, 1992, 38:4, 555-593.

Levy, H. and M. Sarnat, *Investment and Portfolio Analysis*, New York: Wiley and Sons, 1972.

Rothschild, D. and J. E. Stiglitz, Increasing Risk I: A Definition *Journal of Economic Theory,* 1970, 2, 225-243.

Lo, A.W., and A.C. MacKinlay (1990), "Data-Snooping Biases in Tests of Financial Asset Pricing Models", Review of Financial Studies, vol. 3, pp 431-468

MacKinlay, A. Craig, (1995), "Multifactor models do not explain deviations from the CAPM, *Journal of Financial Economics 38,* pp 3-28

Parr, J., S. Green and C. Behnck (1989), "What People Want, Why They Move, and What Happens After They Move: A Summary of Research in Retirement Housing", *Journal of Housing for the Elderly,* vol. 5 no. 1 pp 7-33.

Rosenberg, B., K. Reid, and R. Lanstein (1985), "Persuasive Evidence of Market Inefficiency", *Journal of Portfolio Management*, vol.11, pp 9-17.

Sharpe, W., G. Alexander, G. and J. Bailey (1998), *Investments* (6th ed.,). NJ: Prentice

Shleifer, A. and R. Vishny (1990), "The New Theory of the Firm: Equilibrium Short Horizons of Investors and Firms", *AEA Papers and Proceedings*, vol. 80 no. 2, pp 148-153.

Shleifer, A. and R. Vishny (1997), 'The Limits of Arbitrage", *Journal of Finance*, vol. 52 no. 1, pp 35-55.

Taylor, W. and J. Yoder, Load and No-Load Mutual Fund Dynamics During the 1987 Market Crash, *Journal of Economics and Finance,* 1999, 23, 155-165.

Whitmore, G. A., Third Degree Stochastic Dominance", *American Economic Review,* 1970, 60, 457-459.

Williamson, J. (1970), *Investments – New Analytic Techniques*. New York: Praeger.

Exhibit 1a: Composition of Decile Portfolios (1994 Q2 to 1999 Q2)

	94Q2-Q3	Q3-Q4	94Q4-95Q1	Q1-Q2	Q2-Q3	Q3-Q4	95Q4-96Q1	Q1-Q2	Q2-Q3	Q3-Q4	96Q4-97Q1	Q1-Q2	Q2-Q3	Q3-Q4	97Q4-98Q1	Q1-Q2	Q2-Q3	Q3-Q4	98Q4-99Q1	Q1-Q2
Auckland CBD	4	4	4	4	4	4	4	4	4	4	4	3	3	3	4	4	3	4	3	4
Auckland Non-CBD	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Bangkok CBD	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1
Beijing CBD																	1	2	2	2
HK Central	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
HK Wanchai	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	4	4	4	4
HK Tsimshatsui	3	3	3	3	4	4	4	4	4	3	3	4	4	3	3	3	3	3	3	3
HK East																				
Jakarta CBD	2	2	2	3	2	2	2	2	2	2	2	2	2	1	1	1	2	2	1	1
KLCC	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	1
KL DC	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Makati CBD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Seoul CBD																				
Seoul Yoido CBD																				
Seoul Gangnam CBD																				
Shanghai Puxi	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Shanghai Pudong									1	1	1	1	1	1	1	1	2	1	2	2
Raffles Place	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Shenton Way									4	4	4	4	4	4	4	4	4	4	4	4
Marina Bay																				
Tokyo CBD													3	4	4	4	4	3	4	3

Source: Authors' Computations

Exhibit 1b: Composition of Decile Portfolios (1999 Q2 to 2004 Q2)

	99Q2-99Q3	Q3-Q4	99Q4-00Q1	Q1-Q2	Q2-Q3	Q3-Q4	00Q4-01Q1	Q1-Q2	Q2-Q3	Q3-Q4	01Q4-02Q1	Q1-Q2	Q2-Q3	Q3-Q4	02Q4-03Q1	Q1-Q2	Q2-Q3	Q3-Q4	03Q4-04Q1	Q1-Q2
Auckland CBD	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Auckland Non-CBD	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Bangkok CBD	1	2	2	2	1	1	2	2	2	2	2	1	1	1	2	1	1	1	1	1
Beijing CBD	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	1	2	2	2	2
HK Central	3	3	3	3	3	3	2	2	3	3	3	3	3	4	3	4	4	4	3	3
HK Wanchai	3	4	4	4	4	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4
HK Tsimshatsui	2	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
HK East	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3
Jakarta CBD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1
KLCC	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
KL DC	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Makati CBD	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Seoul CBD		1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	2	2
Seoul Yoido CBD		1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1
Seoul Gangnam CBD		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Shanghai Puxi	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2
Shanghai Pudong	2	3	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1	1
Raffles Place	4	4	4	4	3	4	4	4	4	4	4	3	3	3	3	3	3	3	4	3
Shenton Way	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	4
Marina Bay						3	3	3	3	3	3	4	4	3	4	3	3	3	4	4
Tokyo CBD	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3

Source: Authors' Computations

Exhibit 2: Median Rental-to-Price Ratio

	Quartiles			
	1	2	3	4
Time Period	Value			Growth
94Q1 to 94Q2	10.13%	9.04%	5.40%	4.23%
94Q2 to 94Q3	10.20%	8.88%	5.25%	4.27%
94Q3 to 94Q4	10.21%	8.68%	5.12%	4.31%
94Q4 to 95Q1	10.27%	8.53%	5.01%	4.24%
95Q1 to 95Q2	9.80%	8.46%	4.80%	4.17%
95Q2 to 95Q3	9.96%	8.27%	4.84%	4.20%
95Q3 to 95Q4	10.08%	8.08%	4.87%	4.22%
95Q4 to 96Q1	10.24%	7.86%	5.00%	3.97%
96Q1 to 96Q2	11.61%	7.65%	5.13%	3.94%
96Q2 to 96Q3	11.01%	7.59%	4.95%	3.90%
96Q3 to 96Q4	10.37%	7.46%	4.74%	3.93%
96Q4 to 97Q1	9.75%	7.46%	4.26%	3.78%
97Q1 to 97Q2	9.34%	7.39%	4.17%	3.51%
97Q2 to 97Q3	9.48%	7.35%	4.24%	3.60%
97Q3 to 97Q4	9.65%	7.33%	4.56%	3.64%
97Q4 to 98Q1	9.83%	7.04%	4.46%	3.54%
98Q1 to 98Q2	10.37%	7.52%	4.61%	3.58%
98Q2 to 98Q3	9.66%	7.50%	4.73%	3.64%
98Q3 to 98Q4	9.10%	7.54%	4.78%	3.72%
98Q4 to 99Q1	9.26%	6.90%	4.73%	3.81%
99Q1 to 99Q2	10.05%	6.51%	5.20%	4.00%
99Q2 to 99Q3	10.41%	6.56%	5.86%	4.14%
99Q3 to 99Q4	10.73%	6.40%	5.42%	4.03%
99Q4 to 00Q1	11.88%	6.34%	4.87%	3.91%
00Q1 to 00Q2	13.69%	7.32%	5.28%	4.02%
00Q2 to 00Q3	13.05%	7.47%	5.58%	4.17%
00Q3 to 00Q4	12.44%	7.66%	5.66%	4.32%
00Q4 to 01Q1	11.54%	8.28%	5.71%	4.47%
01Q1 to 01Q2	11.01%	8.18%	5.70%	4.40%
01Q2 to 01Q3	10.03%	7.69%	5.72%	4.36%
01Q3 to 01Q4	10.04%	7.75%	5.66%	4.30%
01Q4 to 02Q1	9.57%	8.19%	5.43%	4.03%
02Q1 to 02Q2	9.26%	8.41%	5.53%	3.91%
02Q2 to 02Q3	9.28%	8.41%	5.39%	4.06%
02Q3 to 02Q4	9.45%	8.25%	5.35%	3.90%
02Q4 to 03Q1	8.85%	7.86%	5.44%	3.92%
03Q1 to 03Q2	9.04%	7.78%	5.17%	3.93%
03Q2 to 03Q3	8.98%	8.01%	4.71%	3.68%
03Q3 to 03Q4	8.96%	8.20%	5.33%	3.93%
03Q4 to 04Q1	8.69%	7.86%	5.32%	4.07%
First-quarter 1994 to First-quarter 2004:				
Mean	10.69%	7.67%	5.21%	3.76%
Minimum	7.42%	5.48%	3.98%	1.86%
Median	9.88%	7.66%	5.11%	3.97%
Maximum	22.32%	9.42%	7.13%	5.11%

Source: Authors' Computations

Exhibit 3: Returns for Quartile Portfolios (1-quarter Holding-Period)

Time Period	Initial Yield Quartiles 1 Value	2	3	4 Growth	Spread between 1 & 4
94Q2 - 94Q3	17.98%	9.55%	10.52%	9.37%	8.62%
94Q3 - 94Q4	17.64%	9.29%	10.26%	9.02%	8.62%
94Q4 - 95Q1	17.41%	9.15%	10.02%	7.94%	9.47%
95Q1 - 95Q2	13.10%	7.03%	0.49%	5.80%	7.30%
95Q2 - 95Q3	12.80%	8.51%	1.32%	3.87%	8.93%
95Q3 - 95Q4	12.52%	8.46%	1.51%	4.03%	8.49%
95Q4 - 96Q1	12.19%	8.39%	0.89%	3.50%	8.70%
96Q1 - 96Q2	11.81%	6.80%	14.09%	7.55%	4.26%
96Q2 - 96Q3	11.31%	6.73%	12.79%	7.37%	3.95%
96Q3 - 96Q4	10.77%	6.58%	10.62%	8.01%	2.75%
96Q4 - 97Q1	10.25%	6.46%	9.95%	7.86%	2.39%
97Q1 - 97Q2	3.11%	2.36%	3.50%	-0.39%	3.50%
97Q2 - 97Q3	5.50%	-2.66%	2.66%	-0.49%	5.99%
97Q3 - 97Q4	5.93%	-5.73%	2.48%	-0.62%	6.55%
97Q4 - 98Q1	5.46%	-8.69%	0.83%	0.63%	4.83%
98Q1 - 98Q2	3.32%	5.16%	-5.00%	-1.30%	4.62%
98Q2 - 98Q3	5.14%	-0.39%	-2.75%	-6.17%	11.30%
98Q3 - 98Q4	7.11%	-1.37%	-4.00%	-8.15%	15.26%
98Q4 - 99Q1	0.46%	2.17%	-5.86%	-9.65%	10.12%
99Q1 - 99Q2	9.49%	4.22%	6.31%	4.25%	5.23%
99Q2 - 99Q3	9.18%	1.99%	6.54%	3.63%	5.55%
99Q3 - 99Q4	5.57%	5.37%	4.65%	4.30%	1.27%
99Q4 - 00Q1	11.58%	6.12%	3.85%	4.09%	7.50%
00Q1 - 00Q2	14.39%	10.61%	5.33%	2.88%	11.51%
00Q2 - 00Q3	19.66%	8.86%	5.73%	2.73%	16.93%
00Q3 - 00Q4	14.78%	8.14%	6.90%	3.18%	11.60%
00Q4 - 01Q1	14.65%	6.12%	7.29%	3.32%	11.32%
01Q1 - 01Q2	11.83%	6.18%	3.77%	-0.30%	12.13%
01Q2 - 01Q3	12.15%	5.09%	4.74%	-0.16%	12.31%
01Q3 - 01Q4	18.03%	7.59%	2.06%	0.46%	17.58%
01Q4 - 02Q1	7.25%	7.98%	0.24%	0.21%	7.03%
02Q1 - 02Q2	10.10%	8.28%	3.80%	0.85%	9.25%
02Q2 - 02Q3	13.51%	8.43%	2.72%	2.18%	11.33%
02Q3 - 02Q4	17.22%	7.57%	0.85%	-0.21%	17.43%
02Q4 - 03Q1	5.98%	8.31%	2.71%	1.35%	4.63%
03Q1 - 03Q2	11.05%	8.35%	3.65%	0.14%	10.91%
03Q2 - 03Q3	11.02%	7.23%	0.03%	-4.31%	15.33%
03Q3 - 03Q4	14.63%	9.15%	4.36%	4.46%	10.17%
03Q4 - 04Q1	7.76%	6.67%	9.01%	6.95%	0.81%
04Q1 - 04Q2	13.90%	10.16%	21.92%	8.40%	5.50%

Quarter Performance for Portfolios in the Period 94Q2 to 04Q2:

Arithmetic Mean Return	10.94%	5.76%	4.52%	2.41%	8.52%
Mean Volatility	4.62%	4.29%	5.39%	4.48%	4.36%

Source: Authors' Computations

Exhibit 4: Returns for Quartile Portfolios (3-year Holding-Period)

Time Period	Initial Yield Quartiles 1 Value	2	3	4 Growth	Spread between 1 & 4
94Q2 - 97Q2	309.06%	139.56%	104.67%	121.85%	187.21%
94Q3 - 97Q3	246.04%	123.22%	83.78%	110.43%	135.61%
94Q4 - 97Q4	187.34%	107.60%	65.47%	99.69%	87.65%
95Q1 - 98Q1	131.40%	80.49%	60.75%	90.70%	40.70%
95Q2 - 98Q2	122.39%	74.88%	66.41%	53.18%	69.21%
95Q3 - 98Q3	113.34%	57.18%	55.31%	40.17%	73.17%
95Q4 - 98Q4	104.36%	39.13%	41.54%	25.68%	78.69%
96Q1 - 99Q1	95.31%	20.26%	26.87%	11.14%	84.17%
96Q2 - 99Q2	97.72%	23.25%	19.18%	-0.27%	97.99%
96Q3 - 99Q3	87.25%	26.12%	12.95%	-4.40%	91.65%
96Q4 - 99Q4	77.44%	28.79%	7.31%	-8.36%	85.80%
97Q1 - 00Q1	68.16%	31.38%	28.21%	-26.78%	94.94%
97Q2 - 00Q2	81.27%	29.33%	35.49%	-22.67%	103.94%
97Q3 - 00Q3	69.47%	55.28%	17.74%	-2.71%	72.19%
97Q4 - 00Q4	67.74%	72.51%	8.93%	12.25%	55.49%
98Q1 - 01Q1	66.46%	100.90%	13.90%	15.33%	51.13%
98Q2 - 01Q2	103.27%	77.53%	27.73%	12.84%	90.43%
98Q3 - 01Q3	84.74%	111.82%	47.20%	9.87%	74.87%
98Q4 - 01Q4	104.47%	114.89%	44.91%	28.07%	76.40%
99Q1 - 02Q1	134.21%	112.75%	68.01%	30.31%	103.89%
99Q2 - 02Q2	133.09%	119.53%	78.70%	21.75%	111.34%
99Q3 - 02Q3	280.07%	145.96%	78.46%	26.09%	253.97%
99Q4 - 02Q4	319.09%	142.27%	80.25%	20.71%	298.38%
00Q1 - 03Q1	295.97%	143.36%	81.64%	17.55%	278.42%
00Q2 - 03Q2	319.80%	109.76%	83.91%	16.04%	303.76%
00Q3 - 03Q3	292.67%	97.43%	63.90%	14.40%	278.27%
00Q4 - 03Q4	287.24%	88.91%	69.30%	15.80%	271.44%
01Q1 - 04Q1	254.47%	98.17%	71.67%	18.10%	236.37%
01Q2 - 04Q2	258.10%	141.31%	81.79%	24.41%	233.68%

Quarter Performance for Portfolios in the Period 94Q2 to 04Q2:

Arithmetic Mean Return	165.24%	86.67%	52.62%	26.59%	138.65%
Mean Volatility	93.88%	41.37%	27.81%	36.42%	87.12%

Source: Authors' Computations

Exhibit 5: Returns for Quartile Portfolios (5-year Holding-Period)

Time Period	Initial Yield Quartiles				Spread between 1 & 4
	1 Value	2	3	4 Growth	
94Q2 - 99Q2	445.21%	138.18%	30.80%	145.28%	299.93%
94Q3 - 99Q3	389.81%	137.46%	26.75%	130.82%	258.99%
94Q4 - 99Q4	339.59%	136.48%	22.62%	117.04%	222.55%
95Q1 - 00Q1	293.56%	115.15%	29.92%	105.61%	187.95%
95Q2 - 00Q2	268.45%	133.13%	76.77%	46.52%	221.93%
95Q3 - 00Q3	242.26%	131.17%	82.91%	50.09%	192.18%
95Q4 - 00Q4	209.90%	129.00%	89.69%	50.53%	159.37%
96Q1 - 01Q1	184.79%	127.10%	98.67%	51.02%	133.77%
96Q2 - 01Q2	186.64%	127.66%	78.65%	30.18%	156.46%
96Q3 - 01Q3	171.95%	128.63%	70.02%	17.61%	154.34%
96Q4 - 01Q4	167.95%	129.89%	57.44%	7.92%	160.03%
97Q1 - 02Q1	163.70%	130.33%	61.92%	-9.49%	173.20%
97Q2 - 02Q2	193.52%	127.19%	63.20%	-6.73%	200.25%
97Q3 - 02Q3	191.43%	167.40%	47.56%	6.36%	185.07%
97Q4 - 02Q4	196.85%	201.60%	29.38%	18.32%	178.53%
98Q1 - 03Q1	205.17%	258.15%	29.32%	20.38%	184.79%
98Q2 - 03Q2	283.25%	226.23%	48.27%	14.44%	268.81%
98Q3 - 03Q3	255.19%	291.14%	56.88%	13.35%	241.84%
98Q4 - 03Q4	307.76%	292.00%	63.85%	34.13%	273.63%
99Q1 - 04Q1	373.71%	287.46%	97.79%	52.72%	320.98%
99Q2 - 04Q2	383.11%	320.23%	146.84%	52.41%	330.70%

Quarter Performance for Portfolios in the Period 94Q2 to 04Q2:

Arithmetic Mean Return	259.71%	177.88%	62.35%	45.17%	214.54%
Mean Volatility	85.17%	69.88%	30.79%	44.36%	57.92%

Source: Authors' Computations

Exhibit 6: Returns for Quartile Portfolios (Entire Holding-Period)

Time Period	Initial Yield Quartiles				Spread between 1 & 4
	1 Value	2	3	4 Growth	
94Q2 - 04Q2	2117.48%	956.51%	258.35%	274.12%	1843.36%
94Q3 - 04Q2	1779.51%	864.43%	224.24%	242.08%	1537.43%
94Q4 - 04Q2	1497.66%	782.46%	194.08%	213.78%	1283.88%
95Q1 - 04Q2	1260.77%	492.04%	275.80%	190.70%	1070.08%
95Q2 - 04Q2	1103.14%	644.82%	199.32%	159.70%	943.44%
95Q3 - 04Q2	966.66%	586.42%	195.41%	150.02%	816.63%
95Q4 - 04Q2	847.97%	532.88%	191.02%	140.35%	707.62%
96Q1 - 04Q2	744.94%	483.87%	188.46%	132.23%	612.70%
96Q2 - 04Q2	707.78%	446.70%	152.84%	85.31%	622.46%
96Q3 - 04Q2	625.68%	412.20%	173.47%	48.27%	577.41%
96Q4 - 04Q2	555.15%	380.60%	147.21%	37.27%	517.88%
97Q1 - 04Q2	494.23%	351.45%	110.07%	33.10%	461.13%
97Q2 - 04Q2	434.44%	389.05%	106.75%	33.63%	400.82%
97Q3 - 04Q2	408.10%	400.93%	106.70%	32.57%	375.53%
97Q4 - 04Q2	379.64%	431.40%	87.50%	42.00%	337.64%
98Q1 - 04Q2	354.79%	481.95%	85.96%	41.10%	313.69%
98Q2 - 04Q2	466.08%	344.71%	99.66%	41.69%	424.39%
98Q3 - 04Q2	392.97%	386.25%	123.28%	38.52%	354.45%
98Q4 - 04Q2	402.30%	353.40%	115.04%	63.47%	338.83%
99Q1 - 04Q2	428.94%	318.86%	145.60%	67.98%	360.96%
Quarter Performance for Portfolios in the Period 94Q2 to 04Q2:					
Arithmetic Mean Return	798.41%	502.05%	159.04%	103.39%	695.02%
Mean Volatility	510.25%	180.08%	55.94%	78.41%	434.91%

Source: Authors' Computations

Exhibit 7: Tests for Equality of Means

Holding Period	Value-Growth Spread	t test	Test statisic t	p-value	95% Confidence Interval
Quarterly	8.52%	Pooled-variance	8.38	0.000	(0.0650 , 0.1055)
		Separate-variance	8.38	0.000	(0.0650 , 0.1055)
3 Years	138.65%	Pooled-variance	7.41	0.000	(1.0119 , 1.7611)
		Separate-variance	7.41	0.000	(1.0072 , 1.7657)
5 Years	214.54%	Pooled-variance	10.24	0.000	(1.7218 , 2.5689)
		Separate-variance	10.24	0.000	(1.7174 , 2.5734)
Entire Period	695.02%	Pooled-variance	6.15	0.000	(3.1336 , 6.1332)
		Separate-variance	6.15	0.000	(3.1108 , 6.1560)

Source: Authors' Computations

Exhibit 10a: Four States of the World

Period	Classification	Period	Classification	Period	Classification	Period	Classification
94Q2 - 94Q3	NW10	96Q4 - 97Q1	NB10	99Q2 - 99Q3	NW10	01Q4 - 02Q1	NB10
94Q3 - 94Q4	NB10	97Q1 - 97Q2	NW10	99Q3 - 99Q4	W10	02Q1 - 02Q2	NB10
94Q4 - 95Q1	W10	97Q2 - 97Q3	B10	99Q4 - 00Q1	B10	02Q2 - 02Q3	W10
95Q1 - 95Q2	B10	97Q3 - 97Q4	W10	00Q1 - 00Q2	W10	02Q3 - 02Q4	NW10
95Q2 - 95Q3	NB10	97Q4 - 98Q1	W10	00Q2 - 00Q3	NB10	02Q4 - 03Q1	NW10
95Q3 - 95Q4	NW10	98Q1 - 98Q2	B10	00Q3 - 00Q4	NW10	03Q1 - 03Q2	W10
95Q4 - 96Q1	B10	98Q2 - 98Q3	W10	00Q4 - 01Q1	NB10	03Q2 - 03Q3	B10
96Q1 - 96Q2	NB10	98Q3 - 98Q4	B10	01Q1 - 01Q2	W10	03Q3 - 03Q4	B10
96Q2 - 96Q3	NW10	98Q4 - 99Q1	NB10	01Q2 - 01Q3	NW10	03Q4 - 04Q1	B10
96Q3 - 96Q4	NB10	99Q1 - 99Q2	B10	01Q3 - 01Q4	W10	04Q1 - 04Q2	NW10

Source: Author's Computations

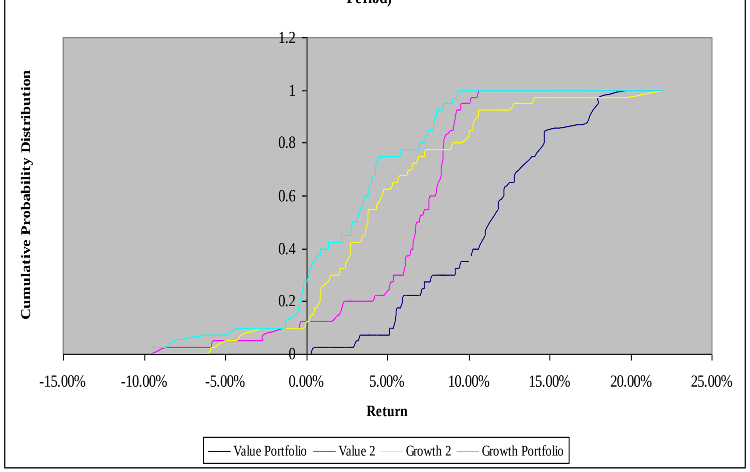


Exhibit 8a: Stochastic Dominance of Contrarian Real Estate Investment (Quarterly Holding Period)

Exhibit 8a: Stochastic Dominance Analysis of Contrarian Real Estate Investment (3-Year Holding Period)

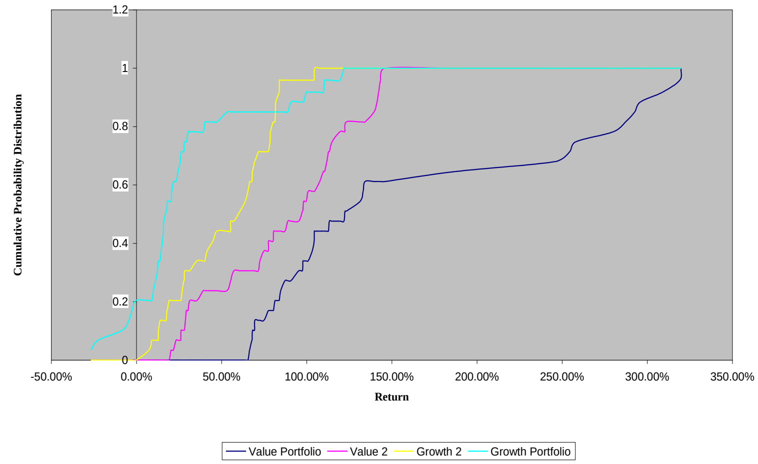


Exhibit 8c: Stochastic Dominance Analysis of Contrarian Real Estate Investment (5-Year Holding Period)

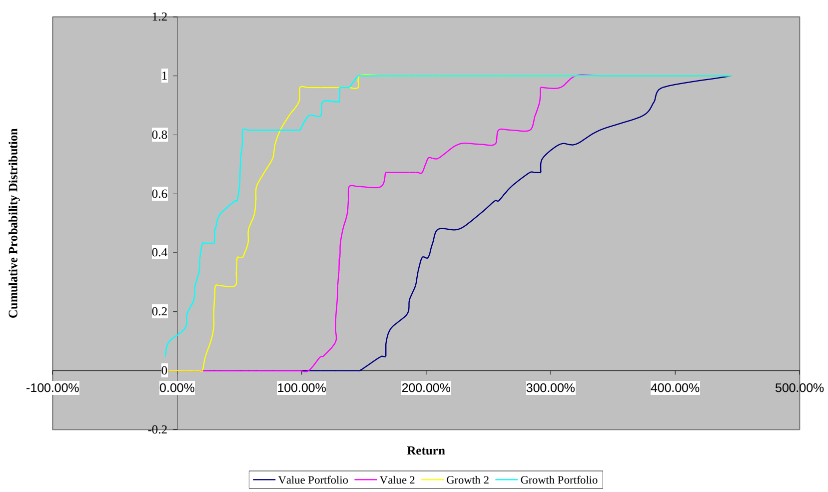
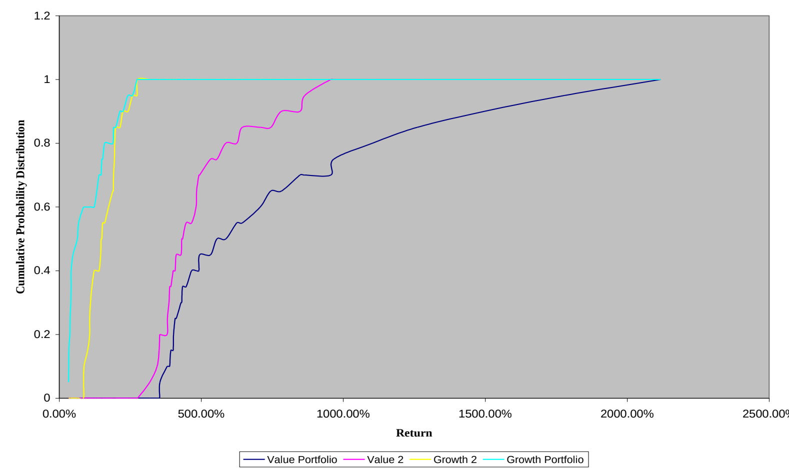
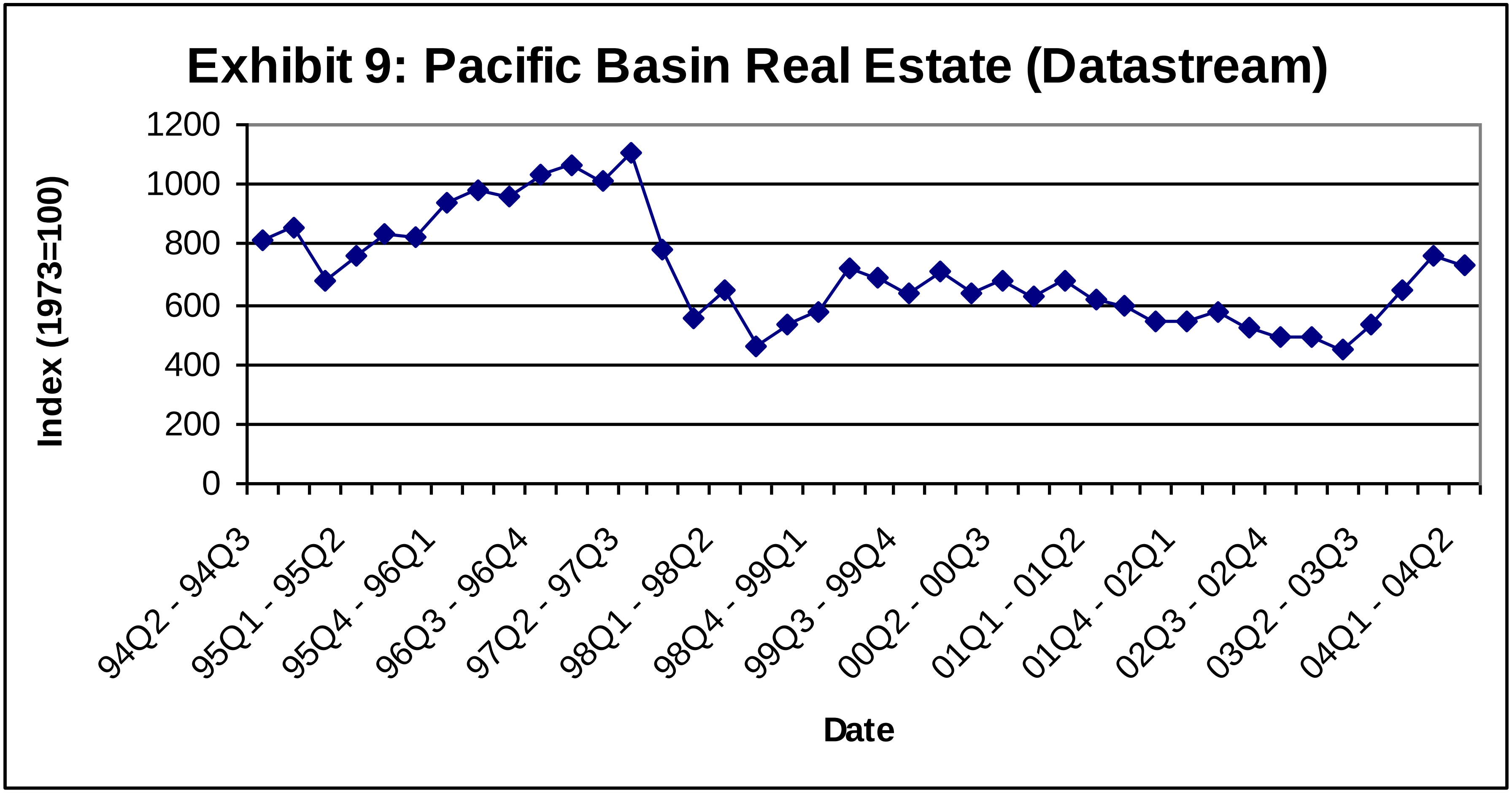


Exhibit 8d:Stochastic Dominance Analysis of Contrarian Real Estate Investment (>=5-Year Holding Period)



Source: Authors



Source: Authors

Exhibit 10b: Performance of Portfolios in Best and Worst Times

				Tests for Equality of Means		
	Value	**Growth**	**Spread**	**t test**	**Test statistic t**	**p-value**
Worst 10 quarters	10.83%	1.14%	9.69%	Pooled-variance	4.92	0.000
				Separate-variance	4.92	0.000
Next Worst 10 Quarters	11.81%	3.66%	8.16%	Pooled-variance	4.34	0.000
				Separate-variance	4.34	0.001
Next Best 10 Quarters	11.54%	3.38%	8.16%	Pooled-variance	3.34	0.004
				Separate-variance	3.34	0.004
Best 10 Quarters	9.57%	1.48%	8.09%	Pooled-variance	4.23	0.001
				Separate-variance	4.23	0.001

Source: Authors' Computations

Exhibit 11: Test for Equality of Variances

Holding Period	**Test statistics**	**p-value**	**95% Bonferroni confidence intervals**		**Decision**	
			Value	**Growth**	**α = 0.05**	**α = 0.01**
Quarterly	0.12	0.732	(0.0368 , 0.0616)	(0.0357 , 0.0597)	Do not reject	Do not reject
3 Years	15.33	0.000	(0.7217 , 1.3298)	(0.2800 , 0.5158)	Reject	Reject
5 Years	8.46	0.006	(0.6283 , 1.3022)	(0.3272 , 0.6781)	Reject	Reject
Entire Period	21.76	0.000	(3.7598 , 6.2919)	(0.5298 , 0.8865)	Reject	Reject

Source: Authors' Computations

Exhibit 12: Coefficient of Variation

Holding Period	**Quartile Portfolio**	**Standard deviation**	**Mean Return**	**Coefficient of Variation**	**Return to Risk**
Quarterly	**Value**	4.62%	10.94%	0.42	2.37
	Growth	4.48%	2.41%	1.86	0.54
3 Years	**Value**	93.88%	165.24%	0.57	1.76
	Growth	36.42%	26.59%	1.37	0.73
5 Years	**Value**	85.17%	259.71%	0.33	3.05
	Growth	44.36%	45.17%	0.98	1.02
Entire Period	**Value**	510.25%	798.41%	0.64	1.56
	Growth	78.41%	103.39%	0.76	1.32

Source: Authors' Computations

Exhibit 13: Initial Yields, Past Performance, and Future Performance of Value and Glamour Properties

Panel A: Initial Yields

			Value	**Growth**
1999	**Q1-Q2**	**Initial Yield**	0.1005	0.0400
1999	**Q2-Q3**	**Portfolio Composition**	Bangkok CBD	Auckland CBD
			Jakarta CBD	Raffles Place
			KLCC	Shenton Way
			Makati CBD	Tokyo CBD

Panel B: Past Performance

		Value		Growth	
		Capital Growth	Rental Growth	Capital Growth	Rental Growth
1994	Q3	2.49%	1.29%	6.60%	9.65%
	Q4	2.26%	0.79%	6.33%	8.37%
1995	Q1	2.14%	0.68%	5.13%	7.66%
	Q2	0.00%	1.03%	2.41%	5.30%
	Q3	-0.05%	1.28%	2.85%	5.38%
	Q4	-0.03%	0.89%	3.30%	5.04%
1996	Q1	-0.07%	0.98%	2.90%	4.59%
	Q2	-0.42%	-0.72%	2.74%	2.27%
	Q3	-0.47%	-0.78%	2.62%	2.46%
	Q4	-0.56%	-1.19%	2.51%	2.38%
1997	Q1	-0.61%	-0.91%	2.66%	2.35%
	Q2	-7.88%	-6.58%	-2.39%	-3.39%
	Q3	-8.92%	-7.12%	-2.58%	-3.64%
	Q4	-10.38%	-8.32%	-2.77%	-3.98%
1998	Q1	-12.58%	-9.88%	-2.91%	-4.20%
	Q2	-5.34%	-4.35%	-4.84%	-2.41%
	Q3	-6.17%	-5.19%	-5.87%	-2.74%
	Q4	-7.21%	-5.30%	-7.06%	-3.10%
1999	Q1	-8.95%	-6.44%	-8.10%	-3.39%
	Q2	-0.43%	-2.87%	-0.11%	0.26%
Geometric Average Growth Rate		-3.27%	-2.70%	0.08%	1.35%

Source: Authors' Computations

Exhibit 13: Fundamental Variables, Past Performance, and Future Performance of Value and Glamour Properties

Panel C: Future Performance

		Value		Growth	
		Capital Growth	Rental Growth	Capital Growth	Rental Growth
1999	Q3	-0.47%	-2.93%	-0.33%	0.33%
	Q4	-0.58%	-3.11%	-0.56%	0.18%
2000	Q1	-0.62%	-3.71%	-0.66%	0.07%
	Q2	-1.52%	-1.55%	-1.48%	6.03%
	Q3	-2.67%	-3.05%	-1.36%	5.57%
	Q4	-4.25%	-5.93%	-1.24%	5.20%
2001	Q1	-3.39%	-4.07%	-0.71%	4.81%
	Q2	-2.28%	-1.93%	-4.75%	-2.28%
	Q3	-2.64%	-4.41%	-4.69%	-2.45%
	Q4	0.39%	-0.06%	-4.98%	-2.95%
2002	Q1	-0.82%	-0.48%	-5.40%	-3.28%
	Q2	0.40%	-1.20%	-2.78%	-1.26%
	Q3	1.00%	-1.04%	-1.16%	-0.90%
	Q4	-1.97%	-2.53%	-2.79%	-2.33%
2003	Q1	0.53%	0.10%	-1.64%	-1.17%
	Q2	0.54%	-0.36%	-3.39%	-3.32%
	Q3	2.38%	1.64%	-4.29%	-5.47%
	Q4	2.72%	1.89%	1.07%	-0.75%
2004	Q1	1.69%	0.48%	1.96%	1.71%
	Q2	3.50%	2.40%	2.02%	2.02%
Geometric Average Growth Rate		-0.42%	-1.52%	-1.88%	-0.06%

Source: Authors' Computations

Exhibit 14: Growth of Rental Income Per Dollar (2nd Quarter 1999 = Year 0)

Year	Growth Portfolio	Value Portfolio	Year	Growth Portfolio	Value Portfolio
0	0.0400	0.1005	**13**	0.0476	0.0704
1	0.0405	0.0978	**14**	0.0483	0.0685
2	0.0411	0.0951	**15**	0.0489	0.0667
3	0.0416	0.0926	**16**	0.0496	0.0649
4	0.0422	0.0901	**17**	0.0502	0.0631
5	0.0428	0.0876	**18**	0.0509	0.0614
6	0.0434	0.0853	**19**	0.0516	0.0597
7	0.0439	0.0830	**20**	0.0523	0.0581
8	0.0445	0.0807	**21**	0.0530	0.0566
9	0.0451	0.0786	**22**	0.0537	0.0550
10	0.0457	0.0764	**23**	0.0545	0.0536
11	0.0464	0.0744			
12	0.0470	0.0724			

Source: Authors' Computations