Are Size and Value Premiums Significant in Listed Property Trust Returns?

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Abstract

This paper attempts to examine the effects of size and value attributes in risk premiums on Listed Property Trusts (LPTs). In order to ascertain the significance of the effects, the effects of the same two factors on stocks are also analysed and compared. The examination is carried out by analyzing monthly risk premiums on six LPT and six stock indices. The twelve indices are the LPT and the stock market indices, five size-value/growth LPT and five, matched, size-value/growth stock indices. The five LPT style indices are constructed for the first time; the equivalent stock indices are the ASX/Russell indices. The study period is from July 92 - June 00, 96 observations are analysed.

The results indicate that size and value premiums are significant in both LPT and stock risk premiums. However, the difference is that size premium is more profound in LPTs whilst value premium in stocks. Consequently, the coefficients of time series regression on SML (small minus large) factor mimicking size premiums in LPTs and VMG (value minus growth) factor mimicking value premiums in stocks, together with the market beta, are found significant in explaining risk premiums on LPTs and stocks respectively. Furthermore, it is found that value premiums in common stocks are also significant in explaining risk premiums on LPTs.

Introduction

Assuming that investors hold mean-variance efficient (MVE) portfolios, Sharpe (1964) and Lintner (1965) developed the Capital Asset Pricing Model (CAPM) and showed investors that individual asset returns are a positive linear function of their market betas (market sensitivity). An asset's market sensitivity equalises percentage changes in the returns on an asset relative to percentage changes in the returns on the market. According to the CAPM the market risk is the only source of risk that matters in the pricing of assets.

Banz (1981) was perhaps the first to provide evidence of firm size (share price times number of shares outstanding) effect in stock returns. Banz (1981) concluded that on average smaller firms outperformed larger firms, and the CAPM was misspecified which estimated low betas for the smaller firms. Reinganum (1982) supported the existence of small firm effect in stock returns by showing evidence that returns on smaller firms exceeded returns on larger firms by as much as 30% per annum.

Basu (1983) discovered that higher returns to smaller firms were simultaneously accompanied by higher risks. He shows evidence that the size effect virtually disappear when returns were controlled for differences in risk. Keim (1983) further diminished the sole reason of firm size for higher returns by showing evidence that nearly 50% of the higher returns on smaller firms were in the month of January. Keim's January evidence is further supported by Chang and Pinegar (1988) who show evidence that stock returns were not significantly higher than returns on T-Bill's either than in the months of January and July.

Fama and French (FF) (1992) using a multivariate model tested the robustness of the size effect. The other variables included were market beta, earnings-price-ratio, leverage, and book equity to market equity (BE/ME) ratio. They found that size and BE/ME capture most of the cross-section of the average stock returns. FF then tested the joint effect of BE/ME and firm size on the stock returns. They found that on average the larger the BE/ME ratio the larger the return, in all of the ten size deciles that they had formed. Furthermore, they found inverse relation between firm size and return, ie, the smaller the firms size the larger the return.

FF (1993) identified three stock and two bond market factors as common risk factors in the returns on stocks and bonds. The stock market factors include the overall market factor, plus two additional factors mimicking risks related to size and BE/ME ratios respectively. These factors are identified as SMB (small minus big) and HML (high minus low). The two bond market factors relate to bond maturity and default risks. FF concluded that the two markets are integrated and there is some overlap between the return generating processes.

FF (1996) use the three factor stock market model and examine returns on various portfolios. The portfolios include their own 25 size-BE/ME portfolios developed in FF (1995), 10 portfolios based on BE/ME, earnings/price, cashflow/price, and past five-year sales ranked developed by Lakonishok, Shleifer and Vishny (1994) and 10 portfolios formed on short-term (11 months) and 10 on long-term (up to 5 years) of past returns developed by DeBondt and Thaler (1985) and Jagadeesh and Titman (1993) respectively.

FF (1996) presents evidence and concludes that their three-factor model captures most of the average-return anomalies of the CAPM.

Annin and Falaschetti (1999) show evidence that small capitalisation stocks underperformed large capitalisation stocks between 1990-1998. Gustafson and Miller (1999) show evidence that the largest stocks outperformed the smallest for four straight years between 1995-1998 and reconfirm the finding of Annin and Falaschetti (1999).

The recent finding of large firm effect led the authors to believe that small firm effect is seasonal. To confirm their conjecture Annin and Falaschetti (1999) calculated serial correlation for large and small stocks for the period 1926-1996. They report a serial correlation of 0.00 and 0.36 in the risk premiums of the large and small firms respectively, and suggest that size effect has a tendency to move in cycles.

Colwell and Park (1990) tested for seasonality in REIT returns and found on average REIT returns are higher in January than in any other month. However, abnormal January returns disappear for both large equity and mortgage REITs. This finding led Liu and Mei (1992) to examine seasonality-size effect in REITs. They found the January effect accounted for only 5% of access return and 95% was related to size. This finding is not consistent with the evidence of the January effect in the stock market found by Keim (1983) and Chang and Pinegar (1988). The REIT finding is also in contrary to the latest finding of Ibbotson (1998) that show evidence that small stock returns are seasonal; evidence suggest that virtually all of the small stock effect is related to high January returns.

McIntosh, Liang and Tompkins (1991) directly tested for size effect and found that smaller REITs provided greater returns without greater risk. This finding is also not consistent with the finding of Basu (1983) who found smaller firm higher returns were related to higher risk.

Peterson and Hsieh (1997) examine REIT pricing and performance using the FF five factor model. They hypothesise that since REITs are traded on the stock exchanges, the factors which influence the stock returns possibly also influence, to greater or lesser extent, returns on REIT shares. Their results indicate that risk premiums on EREITs are significantly related to risk premiums on a market portfolio of stocks, as well as to the returns on mimicking portfolios for size and BE/ME factors in common stocks. Additionally they found that MREIT risk premiums are related to the three stock market and two bond market factors.

Lockwood and Rodriguez (1999) found evidence of significant large firm effect during 1987-1992, followed by a significant small firm effect during 1993-1997 for REIT shares. This finding seems to be a reversal of the small/large firm effect for common stocks found by Annin and Falaschetti (1999) and Gustafson and Miller (1999).

This study examines the significance of size and value premiums in LPT risk premiums by comparing with the size and value premiums present in stock risk premiums. Shares of firms with high BE/ME and low BE/ME are defined as value and growth shares respectively (detailed in data section). LPTs are similar investment vehicles to EREITs that invest money, largely obtained through the sale of their shares to investors, in various types of real estate. LPTs are required by law to pay out 95% of their earnings in dividends and hold at least about 75% of their investments in real estate, in order to be tax exempt at the company level.

The monthly risk premiums (returns in excess of 90 Day Bank Bill rates) on twelve indices are subjected to various analyses in order to examine the significance of size and value effects. The twelve indices are the LPT and the stock market indices and five size-value/growth LPT and five size-value/growth stock indices. The five specialised size-value/growth LPT indices are constructed for the first time. The five specialised stock indices are the Russell/ASX (Australian Stock Exchange) size-value/growth indices. The study period is from July 1992 - June 2000, ie, 96 observations are analysed. The excess returns analysed are inclusive of cash dividends paid. Excess returns and risk premiums are used interchangeably.

Firstly, the overall performance is examined by using all of the three performance measures, namely Sharpe, Treynor and Jensen. Then, monthly risk premiums on the twelve indices are subjected to time series regression analyses to examine their sensitivity against the movement of the risk premiums on the market index (CAPM Analysis), and the market index, plus the following four factors in a five-factor model: (i) the risk premium on the market index (R_M-R_F), (ii) the size premium on LPTs (difference in returns between small and large (SML)), (iii) the value premium on LPTs (difference in returns between value and growth (VMG)), (IV) the size premium on stocks (SML) and (v) the value premium on stocks (VMG). The coefficients on the four factors are defined below to differentiate between LPT and stock factors.

The remainder of the paper is structured as follows. The section following discusses the data, in particular the methodology used in constructing the size-value/growth indices for LPTs. The next conducts the analyses and discusses the results. The last concludes.

Data

The LPT Index is a value-weighted index which accounts for approximately 95% of the Australian LPT market. It currently comprises 48 trusts, ranging in market capitalisation from AUD 94 million to AUD 4.5 billion, with an average of AUD 618 million. The total LPT market capitalisation is approximately AUD 30 billion, and accounts for approximately 6% of the ASX.

The five value-weighted size-value/growth indices are constructed as follows. At the end of June of each year between (June 92-June 99) the trusts within the LPT index were sorted into two size groups, small and large, based on their respective market capitalisation of the time. Monthly share prices were multiplied by the number of shares outstanding to calculate the monthly market capitalisation. The data is from WDR, Australia.

The size breaks were delineated at percentile breaks of 33% and 66%. In dollar values, this allowed trusts with equity market value of less than $250 million (ie, below 33%) to be classified as small, and those over $800 million (ie, over 66%) as large. Note that the size ranges are not continuous and the categories represent trusts with distinctly different size characteristics. The trusts within the range $ 250 to $800 million (ie, between 33% and 66%) could be classified as medium, however are not included in the analyses for this study. The percentile breaks were calculated by taking the averages of all the trusts within the market index over a year period (ie, July-June).

Next the trusts were sorted, independently, into two BE/ME groups. Each month, starting June 1992, the book values were calculated from the Independent Property Trust Monthly Reports and divided by the monthly market capitalisation to calculate the equivalent monthly BE/ME ratios.

The BE/ME ratios range from lows of 0.4346 to highs of 1.8396, with a mean and median of 0.9886 and 0.9945 respectively. At the lowest BE/ME ratio the trusts were trading at 2.3 times their book value. The share price was $2.60 and BE per share was $1.13, which could be interpreted as the trusts trading at a premium of 130.09% [($2.60/$1.13)-1*100)]. Premium trading (low book value) is a typical character of growth stocks; investors buy these stocks at a high price-to-earnings ratio (low yield) in anticipation of future growth in capital values.

At the highest BE/ME ratio the trusts were trading at 0.5435 times their book value. The share price was $1.06 and BE per share was $1.95, which could be interpreted as the trusts trading at a discount of 45.64% [($1.06/$1.95)-1*100)]. Discount trading (high book value) is a typical character of value stocks; investors buy these stocks at low-price-earnings ratio (high yield) to take advantage of high returns. Typically, value investors are considered as yield investors.

At the book-to-market ratio of one (1.00), the book value is exactly equal to the market value, and the stocks are considered to be trading at equilibrium price, relative to their book value. Ideally, this ratio level was chosen as the breakpoint to divide the LPT universe into value and growth groups.

The four LPT size-value/growth indices, respectively small value LPTs (SVLPTs), small growth LPTs (SGLPTs), large value LPTs (LVLPTs) and large growth (LGLPTs), representing all small value, all small growth, all large value and all large growth LPTs, were formed at the intersections of two size and two value/growth groups. The small LPT index (SLPTs), which comprises all small LPTs was constructed by combing the SVLPTs and SGLPTs. The LPT index represents all LPTs (ALPTs).

Following the categorisation monthly rates of return for each trust within each index were calculated as follows:

$$R_T = [(P_T - P_{T-1}) + D_T] / P_{T-1} \qquad (1)$$

Where: R_T is the return at period ($_T$), P_T is the price at time ($_T$), P_{T-1} is price at period ($_{T-1}$), and D_T is dividend at period ($_T$).

The monthly individual returns were weighted by their respective market capitalisation and summed to calculate the monthly value-weighted returns on each index. A value of 1000 was assigned as the base value for all the indices for the month of June 1992, and following monthly index values were calculated as follows:

$$[(1+R_T) * IV_{T-1})] \qquad (2)$$

Where R_T is the monthly return at time $_T$, IV_{T-1} is the index vale at time $_{T-1}$.

The stock market indices were obtained from the Frank Russell Company, Australia. The indices include the All Ordinaries, Small Ordinaries, ASX/Russell Small Value, ASX/Russell Small Growth, ASX/Russell Value 100 and ASX/Russell Growth 100, representing all stocks (ASTKs), all small stocks (SSTKs), all small value stocks (SVSTKs), all small growth stocks (SGSTKs), all large value stocks (LVSTKs) and all large growth stocks (LGSTKs) respectively.

The All Ordinaries index is the Australian Stock Market Index (equivalent to the S&P 500), which currently comprises 250 stocks with a total market capitalisation of approximately 578 AUD billion. This is almost 95% of all the ordinary shares listed on the ASX.

The All Ordinaries Index is divided into the ASX 100 (comprising the 100 largest companies by the market capitalisation) and the ASX Small Ordinaries (comprising the remaining 150 companies). The ASX 100 accounts for approximately 85% (current market-cap appro. AUD 490) and Small Ordinaries remaining 15% (current market-cap appro. AUD 87) of the All Ordinaries Index.

The ASX/Russell growth and value style indices are created within each capitalisation segment. The ASX/Russell Value 100 and Growth 100 aggregate to the ASX 100 Index and ASX/Russell Small Value and Growth aggregate to the ASX Small Ordinaries Index. Weightings in the growth and value indices are determined by analysing each stock's price to net total asset value (P/NTA) relative to the market weighted median P/NTA using a non-linear weighting scheme.

The scheme yields value and growth probabilities between 1.00 and 0.00 for each stock. Stocks with a probability of 1.00 for value or a probability of 1.00 for growth are placed entirely in the value or growth index. Stocks with a probability of less than 1.00 for value or for growth are placed in both indices proportionately to their probabilities. For example, stocks with a probability of 0.60 for value will have 0.40 for growth, and would have 60% of their returns assigned to value and remaining 40% to growth. According to this scheme roughly 70% of all stocks within the All Ordinaries Index are classified as either value or growth and only 30% have some portion in both.

The small/large LPT/stock indices compare as follows: The average size of small LPT/stock and large LPT/stock are AUD 192,608,988/128,273,871 and 1,942,353,892/2,241,197,006 respectively. In percentage, the average small LPTs are approximately 30% large than the average small stocks, while the average large LPTs are approximately 15% smaller than the average large stocks. The biggest disparity between the LPT/stock size indices is in the maximum size category; the largest LPT market capitalisation is AUD 4,545,352,278, while stock is AUD 26,358,345,000. However, given that the average size in the indices is not substantially different, which will have the largest influence on returns, the bias in the size difference would be minimised.

Furthermore, it is considered that investors seeking to invest in small/large LPTs/stocks should categorically select them as defined by the individual market. Given that LPTs are generally smaller, thus on the basis of size per se, qualify as small stocks, however, should not be considered per se as small stocks. Because the economic characteristics of large LPTs, which in size may be considered as small stocks, are quite different from that of small stocks. FF (1992b/93) and Chan and Chen (1991) discuss the difference in economics characteristics between small and large stocks in detail.

Analyses and Results

Performance Analysis

In Table 1 the risk-adjusted performances of the twelve indices are analysed using Sharpe ratio, Treynor index and Jensen's alpha.

The Sharpe ratio was calculated as follows:

$$S = \frac{R_I - R_F}{\delta_I} \qquad (3)$$

Where: S = the Sharpe ratio, R_I = mean monthly returns on each index, R_F = risk free rate of return and δ_I = standard deviation of monthly returns

The Treynor index was calculated as follows:

$$T = \frac{R_I - R_F}{\beta_I} \qquad (4)$$

Where : T = the Treynor index, R_I = mean monthly returns on each index, R_F = risk free rate of return and β_I = beta of each index aginst the market index

The Jensen's alpha was calculated as follows:

$$R_I - R_F = \alpha + \beta_I (R_M - R_F) + \varepsilon_I \tag{5}$$

Where : R_I = *return* on the index, R_F = risk free rate, α = Jensen's alpha as the measure of performance, β_I = *beta* of the index, R_M = return on the market index, ε = error term

Based on all three performance measures the SLPT index is found to outperform all other LPT and stock indices. In the case of the Jensen measure, it can be said that SLPT outperforms the market index by the largest margin than any other index. The SVLPT index is ranked second, again by all the three measures. Then in the third and forth positions as per Sharpe ratio are the value stocks, both large and small, as per Treynor index are small growth LPTs and all LPTs and as per Jensen's alpha are the large value stocks and small growth LPTs. The growth stocks, both large and small are ranked second last and last by all the three measures. The LPTs outperforms stocks in almost all size and value\growth categories.

The size effect is more significant in LPT returns, whilst value effect is more significant in stock returns. The small value and growth LPTs outperform large value and growth LPTs. Whilst, small and large value stocks outperform small and large growth stocks. One possible reason for this could be attributed to the different methods used for calculating book values for LPTs and stocks.

In the case of the LPTs, the values of the underlying properties make up the major component of the book values. As the properties within the trusts are re-valued, at least once in every two years, these book values are up dated accordingly. Consequently, the book values of LPTs, unlike the book values of common listed companies, are not purely based on the historical cost of the assets. Historical cost accounting causes book value changes to lag market value changes, hence causes larger variation in book-to-market ratios.

Beaver and Ryan (1993) show evidence that the lag between book-to-market values range from three to six years. The regularly up dated book values in the case of the LPTs, perhaps eliminates this lag, if not, definitely reduces it substantially. Thus, the difference in performance between growth and value LPTs formed on the basis of regularly up-dated book-to-market ratios ought to be less significant relative to stocks based on pure historical cost values.

The significance of alphas and betas in the Treynor and Jensen performance measures are further analysed with the R-squares values and test statistics in the next section.

The CAPM Analysis

The CAPM theory states that ex-ante returns on assets with larger betas should be higher than those associated with smaller betas. In theory the CAPM is quite logical in that sense that assets with higher risks ought to produce higher returns to appropriately compensate the risk averse investors.

Because ex-ante return and risk are not observable, empirical tests on the CAPM are performed with ex-post data. Using the ex-post data, Roll (1977), FF (1992) and others have shown evidence that the CAPM fails the test of empiricism. However, the validity of these evidences are criticised for using ex-post data, when the CAPM is explicitly designed as an ex-ante model, and data snooping. See for example Black (1993), Malkiel and Xu (1997).

The ex-post model of the CAPM can be expressed as follows:

$$R_I - R_F = \boldsymbol{b}_I (R_M - R_F) + \boldsymbol{e}_I \qquad (6)$$

Where : R_I = *return* on the index, R_F = risk free rate, performanc e, $\boldsymbol{b}_I$ = *beta* of the index, R_M = return on the market index, $\boldsymbol{e}$ = ramdom error term

The time series regression takes the form of equation 5. The alpha and random error term are eliminated in the CAPM equation as they are expected to be zero. However, in the regression analyses the alpha is usually estimated to test the reliability of the beta as the sole risk estimator. The null hypothesis is alpha = 0.

The analyses of alphas and the betas in table 1 are extended in table 2 and figure 1. Table 2 shows the actual annual mean returns, actual annual excess mean returns, annual returns as per the CAPM and the alpha and beta coefficients for the eleven indices. The all stocks index is used as the market index. The coefficients and the CAPM returns are estimated by regressing monthly excess returns on the indices against monthly excess returns on the market index.

The results show that all excess mean returns are positive. This is an indication that investors are risk averse and only take extra risk for extra return. The testable implication of the CAPM, the null the $(R_M\text{-}R_F) > 0$ is not rejected.

All the beta coefficients are significant at 5% significance level, which indicates that the market factor is significant in explaining risk premiums on the indices. The null hypothesis that beta = 0 is not rejected. However, the alternative hypothesis, in this case, that alpha is = 0 also cannot be rejected at 10% level for SLPTs, SVLPTs, SGSTKs LVSTKs and LGSTKs.

Furthermore, as indicated by the adjusted R^2 values, the model at the best explains only 37% of the total variation in risk premiums on the LPT indices. And it is found further misspecified in explaining variations in risk premiums on small LPT indices. The model only manages to explain approximately 19% of the variations in risk premiums on SLPTs and 25% on SLVPTs and SGLPTs respectively. The market factor estimates low risk premiums on these indices by as much 5.09, 3.85 and 2.58% per annum respectively.

Overall, the single factor market model is considered inappropriate in explaining returns on LPT indices, particularly small LPT indices.

The market factor explains additional 30% and 50% of the variation in risk premiums on small and large stock indices respectively. However, it still does not fully explain the variations in risk premiums on value and growth stock indices. The market factor under/over estimates risk premiums on SVSTKs, LVSTKs and SGSTKs, LGSTKs by as much as 2.22, 2.95 and -3.47, -3.48% per annum respectively. The alpha coefficients on these indices are significant at 10% level, and the null that alpha = 0 is rejected.

Figure 1 shows the positions of the indices in relation to the security market line. The dotted lines along the security market line indicate the significance of alpha values at 10% level. The alphas of the indices, which are outside the dotted lines, are considered to be significantly different from zero. The indices found in this region are small (2) and small value (3) LPTs and small growth (9), large value (10) and large growth (11) stocks. The small growth LPT index (4) is on the boarder, whilst the small value stock index (8) is barely inside.

Therefore, it is suggested that the market factor over values small LPTs and over/undervalues value/growth stocks. In other words, the market factor is not able to capture size related excess returns on LPTs and value/growth related excess/under returns on stocks. The market factor seems to capture limited variations caused by value/growth and size premiums in LPT and stock returns respectively. However it's unable to fully reflect the variations related to size and value/growth premiums in LPT and stock returns, which are found significant at 10% level.

The five-factor model is estimated in Table 3. The ex-ante form of the model can be expressed as follows:

$$E(R_I) - R_F = b_I (E(R_M) - R_F \} + s_{I(1)} E(SML) + v_{I(1)} E(VMG) + s_{I(2)} E(SML) + v_{I(2)} E(VMG)$$

$Where: E(R_M) - R_F$, $E(SML)$, $E(VMG)$, $E(SML)$ and $E(VMG)$ are expected premiums on the market, size factor in LPTs, value factor in LPTs, size factor in stocks and value factor in stocks; $b_I, s_{I(1)}, v_{I(1)}, s_{I(2)}, v_{I(2)}$, are the slpes in the time series regression for each factor respective ly.

The time series regression takes this form,

$$R_I - R_F = a + b_I + s_{I(1)}(SML) + v_{I(1)}(VMG) + s_{I(2)}(SML) + v_{I(2)}(VMG) + e_I \quad (8)$$

In the five-factor model the alpha values for all the indices are indistinguishable from zero. Particularly, the alphas for SLPT, SVLPT, SGSTK, LVSTK and LGSTK, which were significant at 10% level in the single factor model, are now insignificant. The null hypothesis that alpha = 0 is not rejected at 10, 5 or 1% levels. All betas are significantly distinguishable from zero. The beta coefficients have improved by at least 10% for SLPTs, SVLPTs and SGLPTs; the explanation ability of the model has improved by 20% for small LPTs and by 25% for all LPTs.

The improved market betas in the five-factor model estimates average annual risk premiums on these indices at 2.82% (beta * average market risk premium), ie .37 * 7.63* per annum. Note that the beta is same for all three indices. The market beta in the CAPM estimated the annual average risk premiums on SLPTs, SVLPTs and SGLPTs at 1.98, 2.21 and 2.21% respectively. Given that the realised risk premiums on these indices were 7.08, 6.07,and 4.79, the CAPM underestimated annual average risk premiums on these indices by 5.09, 3.85 and 2.58% respectively (see table 3).

The size premium in LPTs, measured by SML and value premiums in stocks, measured by VML are significant at the 5% level in the returns on SLPTs. The coefficients on SML and VML add approximately 1% and 2% to the average risk premiums o n SLPTs. The improved market beta combined with SML and VML coefficients estimate annual average risk premium on LPTs at 5.82% and reduce the unexplained CAPM risk premium of 5.09% substantially to 1.26% (7.08%-5.82%). In the case of SVLPTs and SGLPTs almost all of the CAPM unexplained risk premiums are eliminated. The value premiums on common stock returns is also significant in large LPT and all value stock returns, and improved upon the CAPM explanation of the returns on these indices.

The finding of Peterson and Hsieh (1997) that value premiums are important in REIT pricing is replicated in this study for LPTs. They found that BE/ME factor adds 1.2% per annum to the average risk premiums estimated by the CAPM for REITs. In this study it

is found that value premiums add almost 2% per annum in excess of the CAPM estimated risk premiums on small LPTs. However, the value premiums in LPTs do not add much to the risk premiums, although are positively significant in value and negatively in growth LPT and stock indices. Note that value premium was not found significant in the LPT performance (see discussion on performance analyses above). The finding of positive/negative relationship of value premiums with value/growth stocks is consistent with the f indings in several studies undertaken by FF, and provide further support for the distress firm hypothesis of FF (1996) and Chan and Chen (1991).

The small size effect in stocks, although found significant at 5% level in returns on all indices, does not imply any additional risk premiums on any of the indices because the average of the SML factor in stock returns is zero (0.00%). The coefficients on the SML factor in LPTs have significant positive slopes for SLPTS, SVSTKs and negative for ALPTs, large LPTs and growth stocks. This finding of negative and positive slopes of weak firm returns and strong firm returns on VMG and SML respectively, is also consistent with the findings in several studies undertaken by FF and others.

Conclusion

The literature on firm size effect per se in returns, found by Liu and Mei (1992), Lockwood and Rodriguez (1999) for REITs and Banz (1981), Reinganum (1982), Basu (1983), FF (1992/93/95/96), Chan and Chen (1991) and others for stocks is further extended. The small LPTs followed by small values LPTs were ranked first and second by all the three performance measures. The value stocks, both small and large, were placed third and fourth. The value premium is more profound in stock returns, whilst size in LPT returns.

The finding by Banz (1981) and Ibbotson, Kaplan and Peterson (1997) that the CAPM is misspecified in estimating risk premiums on small stocks, because it estimates low betas for small firms, is extended. The study finds that market betas for small firms are low relative to their realised risk premiums, and the CAPM is unable to estimate approximately 5% of the realised annual risk premiums. Further more, the study finds evidence that the market betas on small firms are improved by almost 10% in a five-factor model, and the improved betas reduce the CAPM unexplained risk premiums by almost 2% per annum. Additionally, the SML factor mimicking size premiums in LPT returns and VMG factor mimicking value premiums stock returns further reduce the unexplained CAPM risk premiums by 3%, and thus the five factor model is able to capture almost all the realised risk premiums on small LPTs and value stocks.

The original finding by Peterson and Hsieh (1997) that value premiums in common stock returns is important in explaining risk premiums on REITs is replicated in this study for LPTs.

References

1. Annin, M. and Falaschetti, D. 1999, “Is there still a size premium?” Ibbotson Associates, Chicago, Illinois.

2. Banz, R. W. 1981, “The relationship between return and market value *Journal of Financial Economics*, vol. 9, pp. 3-18.

3. Basu, S. 1983, “The relationship between earnings’ yield, market value and return for NYSE common *Journal of Financial Economics*, vol. 12, pp. 129-156.

4. Berk, Jonathan B., 1995, "A Critique of Size-Related Anomalies", *Review of Financial Studies 8*, pp: 275-286.

5. Bhandari, L C., 1988, "Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence", *Journal of Finance* Vol: 43, pp: 507-528.

6. Black, Fisher, 1993, "Beta and Return", *Journal of Portfolio Management*, Fall, 8-18.

7. Chan, K C., and N. Chen, 1991, Structural and Return Characteristics of Small and Large Firms", *Journal of Finance,* vol 46, pp: 1467-1484.

8. Cheney, J.M. and Moses, E.A. 1992, *Fundamentals of Investments,* West Publishing Company, Los Angeles, United States of America.

9. Colwell, P E., and H Y., Park, 1990, "Seasonality and Size Effects: The Case Real Estate Related Investment", Journal of Real Estate Finance and Economics, vol 3: pp: 251-259.

10. DeBondt, Werner F. M., and Thaler, Richard H., 1985, "Does the Stock Market overreact"? *Journal of Finance,* 40, 793-805.

11. Chang C Eric., and Michael J Pinegar, 1988, "A Fundamental Study of the Seasonal Risk-Return Relationship: A note, *Journal of Finance,* vol: 53, pp: 1035-1039.

12. Fama, E.F.and French, K.R. 1992, “The cross-section of expected returns”, *The Journal of Finance*, vol.47, no. 2, pp. 427-465.

13. Fama, E.F.and French, K.R. 1996, “Multifactor explanations of asset pricing anomalies”, *The Journal of Finance*, vol. 51, no. 1, pp. 55-84.

14. Gustafson, K.E. and Miller, J.D. 1999, “Where has the small-stock premium gone?”, *The Journal of Investing*, Fall 1999, pp. 45-53.

15. Harrington, D.R. 1987, *Modern Portfolio Theory, The Capital Asset Pricing Model & Arbitrage Pricing Theory: A User’s Guide,* 2nd edn, Prentice-Hall Inc., New Jersey, United States of America.

16. Ibbotson Associates 1998, *1998 Yearbook: market results for 1926-1997,* Ibbotson Associates, Chicago, Illinois.

17. Keim, D.B. 1983,”Size-related anomalies and stock return seasonality: Further Empirical Evidence”, *Journal of Financial Economics*, vol. 12, pp. 13-32.

18. Lakonishok, Josef, Andre Sheilfer, and Robert W. Vishny, 1994, "Contrarian investment, extrapolation, and risk, *Journal of Finance,* vol 49, 1541-1578.

19. Liu, C H., and Mei, J., (1992a), "The Preditability of Returns on Equity REITs and Rheir Co-Movement with Other Assets", *Journal of Real Estate Finance and Economics,* vol:3-3, pp: 261-282

20. Lockwood L., and Rodriguez, 1999, "Size and Value Effects for REITs", ARES Meeting, Tempa, Florida, unpublished.

21. Peterson, J.D. and Hsieh, C. 1997, “Do common risk factors in the returns on stocks and bonds explain *Real Estate Economics*, vol. 25, no. 2, pp. 321-345.

22. Reinganum, M.R. 1981, “Misspecification of capital asset pricing: Empirical Anomalies based on Earnings’ Yields and Market values”, *Journal of Financial Economics*, vol. 9, pp. 19-46.

23. Reinganum, M.R. 1982, “A direct test of Roll’s conjecture on the firm size effect”, *The Journal of Finance,* vol. 37, no.1, pp. 27-35.

24. Roll, R. 1981, “A possible explanation of the small firm effect”, *The Journal of Finance*, vol. 36, no. 4, pp. 879-888.

25. Rowland, P.J. 1997, *Property Investments and their Financing*, 2nd edn, LBC Information Services, North Ryde, NSW, Australia.

26. Sharpe, W.F. and Alexander, G.J. 1990, *Investments*, 4th edn, Prentice-Hall International, Englewood Cliffs, NJ, USA.

27. Sharpe, W.F., Alexander, G.J & Jeffrey, V.B. 1999, *Investments*, 6th edn, Prentice-Hall International, Englewood Cliffs, NJ, USA.

28. Strong, R.A. 2000, *Portfolio Construction, Management & Protection*, 2nd edn, South Western College Publishing, Ohio, USA.

29. Willard, M., Liang, Y., and Tompkins, D L., "An Examination of the Small-Firm Effect within the REIT Industry", Journal of Real Estate Research, vol; 11, pp: 9-17.

Table 1

The mean, Sharpe, Treynor and Jensen measures of monthly excess returns on six LPT, six stock indices are shown below. The alpha and beta coefficients for the Treynor and Jensen measures were calculated by regressing the monthly excess returns on the indices against the monthly excess returns on the market index. The all stocks index was used as the market index. The R^2 values and the test statistics of the regressions are shown in table 3.

Performance by Sharpe Measure				Performance by Treynor Measure				Performance by Jensen Measure			
Indices	Mean	Stdev	S/Ratio	Indices	Mean	Beta	T/Index	Indices	Mean	b(Rm-Rf)	J/Alpha
SLPTs	0.57%	2.28%	0.250	SLPTs	0.57%	0.26	0.022	SLPTs	0.57%	0.16%	0.41%
SVLPTs	0.49%	2.29%	0.215	SVLPTs	0.49%	0.29	0.017	SVLPTs	0.49%	0.18%	0.32%
LVSTKs	0.83%	4.04%	0.205	SGLPTs	0.39%	0.29	0.013	LVSTKs	0.83%	0.60%	0.23%
SVSTKs	0.69%	4.00%	0.173	ALPTs	0.45%	0.49	0.009	SGLPTs	0.39%	0.18%	0.21%
SGLPTs	0.39%	2.27%	0.172	LVLPTs	0.36%	0.39	0.009	SVSTKs	0.69%	0.52%	0.18%
SSTKs	0.62%	4.01%	0.155	LVSTKs	0.83%	0.98	0.008	ALPTs	0.45%	0.30%	0.15%
ASTKs	0.61%	3.95%	0.154	SVSTKs	0.69%	0.84	0.008	LVLPTs	0.36%	0.24%	0.11%
ALPTs	0.45%	3.14%	0.144	SSTKs	0.62%	0.85	0.007	SSTKs	0.62%	0.52%	0.10%
LVLPTs	0.36%	2.74%	0.130	LGLPTs	0.25%	0.40	0.006	LGLPTs	0.25%	0.25%	0.01%
LGLPTs	0.25%	2.87%	0.089	ASTKs	0.61%	1.00	0.006	ASTKs	0.61%	0.61%	0.00%
LGSTKs	0.38%	4.36%	0.086	LGSTKs	0.38%	1.06	0.004	LGSTKs	0.38%	0.65%	-0.28%
SGSTKs	0.27%	4.41%	0.060	SGSTKs	0.27%	0.88	0.003	SGSTKs	0.27%	0.54%	-0.28%

Note: All monthly excess returns on the indices are in excess of monthly returns on the 90 Day Bank Bill

<u>Table 2</u>

The actual realised annual excess returns on the LPT and stock indices are compared with the estimated annual excess returns by the CAPM. The 2-tailed test statistics are used to determine the significance of the coefficients; the significant coefficients are marked by astricts.

	Indices	Beta	t-stats.	Mean (%) pa	Excess Mean	CAPM Rtns	Misspec (%) pa	t-stats.	Adjust. R2
1	ALPTs	0.49	6.98**	11.97%	5.57%	3.74%	1.84%	0.56	0.37
2	SLPTs	0.26	4.48**	13.55%	7.08%	1.98%	5.09%	1.83*	0.19
3	SVLPTs	0.29	5.15**	12.49%	6.07%	2.21%	3.85%	1.95*	0.25
4	SGLPTs	0.29	5.27**	11.14%	4.79%	2.21%	2.58%	0.98	0.25
5	LVLPTs	0.39	6.28**	10.68%	4.36%	2.97%	1.38%	0.45	0.32
6	LGLPTs	0.40	5.91**	9.35%	3.10%	3.05%	0.05%	0.04	0.30
7	SSTKs	0.85	13.71**	14.26%	7.75%	6.48%	1.26%	0.42	0.70
8	SVSTKs	0.84	13.56**	15.19%	8.63%	6.41%	2.22%	0.71	0.69
9	SGSTKs	0.88	11.80**	17.09%	3.24%	6.71%	-3.47%	(1.93)*	0.63
10	LVSTKs	0.98	30.52**	9.51%	10.43%	7.47%	2.95%	1.78*	0.92
11	LGSTKs	1.06	32.13**	10.94%	4.61%	8.08%	-3.48%	(2.10)*	0.93
12	MARKET	1.00		14.13%	7.63%	7.63%	0.00%	0.00	
	RF	0.00		6.08%					

* and ** indicate significance of the co-efficients at 10 and 5% levels

<u>Figure 1</u>

Shown below are the position of indices in relation to the security market line. The diamonds represent an index; the numbers identify them, which are allocated to each in the table above. The alpha coefficients of the indices, which are located outside the dotted lines, are distinguishable from zero at 10% significance level.

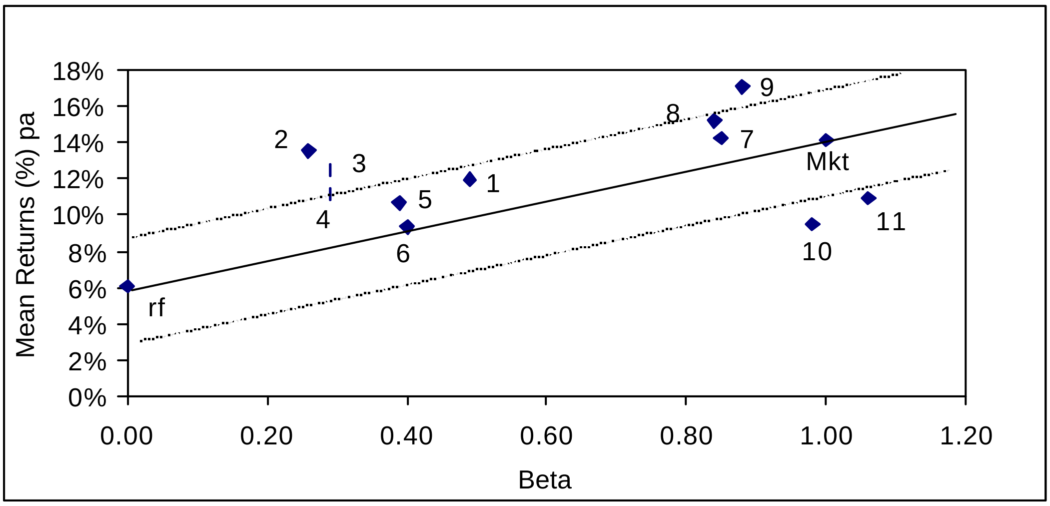

Table 3

Regressions of excess LPT and stock returns on the Market Index excess returns and the mimicking returns for the size premium (SML) and value premium (VMG) in LPT returns, as well as in stock returns: July 1992 to June 1999. The SML $_{(1)}$, VMG $_{(1)}$, SML $_{(2)}$ and VMG $_{(2)}$ represent returns on indices mimicking size and value factors in LPT and stock returns respectively. The test statistics used to determine the significance of the coefficients are shown in parentheses.

$$R_I - R_F = a_I + b_I (R_m - R_F) + s_{I\,(1)} (SML) + h_{I\,(1)} (VMG) + s_{I\,(2)} (SML) + h_{I\,(2)} (VMG) + e_I$$

$R_I - R_F$	a_I	b_I	$s_{I\,(1)}$	$v_{I\,(1)}$	$s_{I\,(2)}$	$v_{I\,(2)}$	$AdjR^2$	e_I	DW
	0.17	0.45	-0.98	-0.09	-0.27	0.41			
(R_{ALPT} - R_F)	(0.77)	(7.58)**	(-5.56)**	(-0.40)	(-3.18)**	(3.19)**	0.66	0.01	2.07
	0.16	0.37	0.49	-0.06	0.24	0.35			
(R_{SLPT} - R_F)	(0.74)	(6.45)**	(2.82)**	(-0.30)	(3.00)**	(2.77)**	0.38	0.01	2.22
	0.08	0.37	0.14	0.34	0.27	0.37			
(R_{SVLPT} - R_F)	(0.40)	(6.79)**	(0.85)	(1.70)*	(3.41)**	(3.09)**	0.45	0.01	2.08
	0.08	0.37	0.14	-0.65	0.27	0.37			
(R_{SGLPT} - R_F)	(0.41)	(6.79)**	(0.85)	(-3.25)**	(3.41)**	(3.09)**	0.45	0.01	2.08
	0.08	0.37	-0.86	0.34	0.27	0.37			
(R_{LVLPT} - R_F)	(0.40)	(6.79)**	(-5.27)**	(1.70)*	(3.41)**	(3.09)**	0.62	0.01	2.09
	0.08	0.37	-0.86	-0.65	0.27	0.37			
(R_{LGLPT} - R_F)	(0.41)	(6.79)**	(-5.27)**	(-3.25)**	(3.41)**	(3.09)**	0.65	0.01	2.09
	0.03	0.99	0.01	0.02	0.85	0.19			
(R_{SSKT} - R_F)	(0.85)	(94.61)**	(0.17)	(0.38)	(56.32)**	(8.05)**	0.99	0.00	2.28
	-0.06	1.00	0.12	-0.04	0.79	0.49			
(R_{SVSTK} - R_F)	(-0.83)	(54.15)**	(2.08)**	-0.56)	(29.27)**	(11.94)**	0.97	0.01	1.92
	-0.01	1.00	-0.13	0.03	0.99	-0.45			
(R_{SGSTK} - R_F)	(-0.13)	(46.49)**	(-1.98)*	(0.37)	(32.01)**	(-9.55)**	0.97	0.01	1.88
	-0.02	1.00	-0.13	0.03	-0.00	0.55			
(R_{LVSTK} - R_F)	(-0.13)	(46.49)**	(-1.98)*	(0.37)	(-0.08)	(11.48)**	0.97	0.01	1.87
	-0.01	1.00	0.12	-0.04	-0.21	-0.51			
(R_{LGSTK} - R_F)	(-0.83)	(54.15)**	(2.08)**	(-0.56)	(-7.84)**	(-12.32)**	.98	0.01	1.92

* and **denote significance of the (t) statistics at 10 and 5% levels respectively.