An Examination of the Distribution Characteristics of the Australian Listed Property Trusts, Property Returns and Financial Assets

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By

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A u s t r a l i a

Abstract

The Modern Portfolio Theory (MPT) has been extensively used for measuring performance and making allocations to both direct and indirect real estate in mixed-asset portfolios (Roulac, 1976; Miles and McCue, 1982; Pagliari and Webb, 1984; Chan, Hendershott and Sanders, 1990; Mueller and Ziering, 1992; Mei and Lee, 1994; Liang, Myer and Webb, 1996; Schuck and Brown, 1997; and others).

MPT, based on the assumption that the rates of return are normally distributed, requires only two properties of return distribution, the mean and variance, for accurately describing the distribution of rates of return on assets (Markowitz, 1952; Tobin 1958; Sharpe 1966).

The distribution of returns to direct real estate has been found to be non-normal; it resembles the characteristics of skewness and kurtosis distribution; Myer and Webb, 1993, 1994; King and Young, 1994; Mei and Lee, 1994; Young and Graff, 1995; Newell, 1998).

This study expands the return distribution analysis literature by examining return distribution characteristics of the thirteen largest Listed Property Trusts (LPTs), the LPT index, four LPT sector specific indices, the PCA direct property index and eight financial asset indices. Both nominal and real quarterly, semiannual and annual returns, over the sample period from 1980-1998 are examined.

Consistent with the previous studies, this study findings evidence of significant skewness and kurtosis for quarterly returns, and reduction in both skewness and kurtosis with the increased holding period to semiannual and annual. Over these holding periods, LPT series show no evidence of non-normality.

Introduction

The Markowitz approach to investment portfolio construction assumes that rates of return to investments are independent, follow normal distribution and are constant over time. The theory is formally recognized as the Modern Portfolio Theory (MPT).

Recognizing the importance of the critical assumption of normal distribution, Fama (1965), Sharpe (1970), Fama and Miller (1972) and others carried out numerous studies that critically analyzed the distribution characteristics of returns to financial assets. The results are mixed. Some show evidence of normal distribution and some cast doubt on the validity of the assumption of normal distribution. Thus, it could be concluded that the validity of using MPT for making investment decisions in financial assets is neither totally rejected nor totally accepted.

Miles and McCue (1984), Hartzell, Hekman and Miles (1986) were the first to examine the distribution characteristics of real estate returns. They found evidence of skewness and kurtosis in the returns, concluding that returns to real estate may be non-normal.

Myer and Webb (1993 and 1994) undertook a more direct and rigorous examination of the distribution characteristics of real estate, equity REITs (real estate investment trusts) and financial assets. They examined NCREIF/FRC overall index at the aggregate level, four regional indices and four property type indices to proxy returns to real estate. For REITs they examined the overall REIT index and five individual REITs. To proxy returns to stocks, they examined S&P 500 index, a value weighted index, an equally weighted index and several individual closed-end funds. Both nominal and real, quarterly, semiannual and annual returns over the period from 1978-1990 were examined.

At quarterly intervals they found all real estate nominal return series non-normal, exhibiting significant excess kurtosis and to a lesser extent, skewness. Whilst only two financial asset return series showed excess kurtosis. When the return holding periods were extended to semiannual and annual levels, excess kurtosis for most of the series reduced; however the reduction was less for the real estate series compared to financial asset series,

particularly for semiannual data. However, the level of skewness did not reduce with increased holding period.

Myer and Webb, in order to increase normality, adjust the time series for inflation and autocorrelation. They found these series exhibit only slightly less non-normality than do the corresponding nominal series. In general they found financial asset series more normal than the real estate series.

Young and Graff (1995) also demonstrate non-normality in real estate return series. They suggest that if MPT is to be used for making real estate allocation decisions, property specific risks have to be accounted for in addition to overall market risk. However Mei and Lee (1994) suggest that real estate investment performance can be measured using the mean-variance framework as used for measuring financial asset performance.

Utilizing PCA (Property Council of Australia) individual property annual valuation returns, Newell (1998) examines the return distributional characteristic for approximately 2040 office and 750 retail properties over a ten-year period between 1985-1994. The presence of significant skewness and kurtosis is reported for both sets of return series over 80 percent of the study period. In general Newell's finding of non-normality in Australian property returns is consistent with the findings of the equivalent U.S. studies.

This study expands the return distribution analysis literature as follows. It examines the return distribution characteristics of the thirteen largest Listed Property Trusts (LPTs), the LPT index, a direct property index and seven financial asset indices, including the gold and the 10-year bond indices. The analysis is carried out using both nominal and real rates of return for quarterly, semiannual and annual periods, over the sample period from 1980–1998 (19 years).

The remainder of the paper is in three sections. The first discusses the data. The next discusses the methodology and the following the results. The last offers the conclusion and direction for further research.

Data

The overall study period is divided into three sub-periods, 1980–1998, 1985–1998 and 1992–1998. The reason for doing this was to get as much data as possible for analysis. From 1992-1998 data is available for the thirteen LPTs, five LPT indices, a property index, and eight financial asset indices. The thirteen LPTs are–General Property Trust (GPT), Schroders (SCH), Westfield Trust (WFT), Stockland Trust Group (SGP), National Mutual Property Trust (NMP), Capital Property Trust (CPL), Colonial First State Retail Property Trust (CMF), Advance Property Fund (APF), BT Property Trust (BTP), Armstrong Jones Office Fund (AJO), Armstrong Jones Retail Fund (AJR), Centro Property Limited (CEP), and Capcount Property Trust (CPY). These LPTs are indirect property investment vehicles similar to the U.S. REITs; which in turn are similar to the listed closed-end funds.

The five LPT indices are–the overall LPT Index, SBC Warburg Leaders, Diversified, Retail and Commercial Property Indices. The eight financial asset indices include All Ordinaries (the overall index), 50 Leaders, Retail, Building Materials, Bank and Finance, Small Ordinaries, Gold and 10 year Government Bonds. All, but the property index, are transaction based publicly available data from the Australian Stock Exchange (ASX). The property index is the valuation-based index produced by the PCA.

For the ASX series monthly data was available, which were compounded to calculate 28 quarterly returns over the 7-year period from 1992-1998. To test for the effect of longer holding periods on the results, the quarterly data was further compounded to compute 14 semiannual and 7 annual returns.

As can be seen that for the semiannual and annual returns the sample size becomes very small for effective examination of the distributional characteristics of the returns. For this reason the sample period was extended to 1985 and 1980. However, as the sample periods were extended, the number of LPT return series reduced. From 1985-1998 data was available for 7 LPTs (GPT, SCH, WFT, SGP, NMP, CPL and CMP) and for 2 (GPT and SCH) from 1980-1998.

For the available data from 1980-1998 and from 1985-1998, 76 and 56 quarterly, 38 and 28 semiannual and 19 and 14 annual returns are analyzed over the 19 and 14-year periods respectively.

To investigate the effect of inflation on the distributional characteristics of the returns, for all the above nominal returns the corresponding real returns are calculated. The actual rates of inflation, used for calculating real returns, were computed from publicly available National Government CPI index. For the purpose of this study all the return time series are price series, not the total return series.

Based on the theory of compromise, the sample set from 1985-1998 is perhaps the best representative of the true results for the population of this study.

Methodology

From historical data, a holding period rate of return to investment assets can be calculated by this formula:

$r = (P_1 - P_0) / P_0$ (price returns) $r = [(P_1 - P_0) + I] / P_0$ (total return)

Where: r = holding rate of return
P_1 = price at time period 1
P_0 = price at time period 0
I = income generated during the holding period

For time series data with several holding periods, rates of return for all the holding periods can be calculated using the above formula.

For normally distributed time series data, only two parameters, the mean (μ) and the standard deviation (σ) are required to fully describe the return distribution characteristics. The mean, median and mode are exactly same value locating the centre of the distribution whilst the standard deviation measures the spread of the values about the mean. The lower

values to the left of the mean and the higher values to the right of the mean are evenly spread. As such a normal distribution is a bell-shaped symmetrical distribution about the mean and the deviation (or spread) on either side of the mean is exactly same (mirror image).

The mean of historical return series data can be calculated with the following formula:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} r_i$$

Where: 8 is the sample mean

n is the number of observations

r_i is the holding period rate of return

The mean is simply the average of all the rates of return over the holding period.

The standard deviation of historical return series data can be calculated with the following formula:

$$\sigma_x = \frac{1}{n}\sum_{i=1}^{n}[x_i - \bar{x}]^2$$

Where: σ^2 is the variance and taking the square root of it results in the σ

However, if the return distribution is not normally distributed, two additional parameters, the skewness and kurtosis are required to fully characterize the distribution. These two parameters are indicators of normality. They can be calculated by taking third and forth deviations from the mean respectively. As such these are parameters are also described as the third and fourth moments of the distribution, the mean and standard deviation being the first and second moments respectively.

The skewness can be calculated by taking the cube root of the mean as follows:

$$\frac{S = \frac{1}{n}\sum_{i=1}^{n}[r_i - \bar{r}]^3}{\sigma^3}$$

Where: S denotes skewness

Skewness measures the degree of symmetry about the mean. A normal distribution, which is perfectly symmetric, has a zero value for skewness. A positive skewness is an indication of the clustering of lower values to the left of the mean, thus having a long tail in the direction of higher values to the right of the mean. A negative skewness is an indication of the clustering of higher values to the right of the mean, thus having a long tail in the direction of lower values to the left of the mean.

The kurtosis can be calculated by taking the fourth root of the mean as follows:

$$\frac{K = \frac{1}{n}\sum_{i=1}^{n}[r_i - \bar{r}]^4}{\sigma^4}$$

Where: K denotes kurtosis

The kurtosis measures the degree of peakedness of the distribution. A normal distribution has a kurtosis value of three. A positive kurtosis has a value of greater than three and indicates a higher probability of observing extreme values than that expected for normal distribution. The distribution is described as leptokurtic and has thicker tail than that for normal distribution. A distribution with negative kurtosis is flatter than normal distribution curve and is described as platykurtic distribution.

After describing the relevant distribution characteristics of the data using the four measures mentioned above, the Jarque-Bera (JB) statistics tests are performed to directly test whether each of the return series is normally distributed. Under the null hypothesis of normality the JB statistics has a chi-squared critical value of 5.99, up to this level the null hypothesis is refuted. This critical value is estimated at the default 5% level of significance with two degrees of freedom.

JB statistics can be calculated by this formula:

$$JB = \frac{T-k}{6}\left[S^2 + \frac{(K-3)^2}{4} \right]$$

Where: T is the number of observations

K is zero as the series are ordinary

S is skewness

K is kurtosis

The E-views software product is used to perform all the above satirical tests.

Results

Table 1

The quarterly returns for all, except bank & finance index, show presence of significant excess kurtosis. This indicates that the returns are peaked around the mean with fat tails, a demonstration of leptokurtic distribution characteristics. All the series, except the gold index, show evidence of negative skewness as well, but to a lesser extent.

The overall trust index shows significant kurtosis, similar to the level that of the overall stock and the gold indices. The excess kurtosis for the individual trusts is less, similar to the level that of smaller financial asset indices. Based on the JB statistics, the null hypothesis of the normal distribution can be accepted for all, except the bank & finance index.

With the increased holding periods to semiannual and annual respectively, excess kurtosis tend to decrease for all the series. This finding is consistent with the finding of Myer and Webb (1994). The level of skewness reduces too, but to a lesser extent. Based on the JB statistics, the null hypothesis of normality can be rejected for all, except for the gold index for semiannual returns. However, part reduction in skewness and kurtosis in annual returns could be due to reduced number of observations (obs < 30).

Table 2

The data set increases from 9 to 17, as described in the data section above, for this study period from 1985-1998. The quarterly returns for the new individual trusts, which have come into the analysis, show significant levels of kurtosis, except for CPL. Surprisingly the gold index that showed significant skewness and kurtosis over the study from 1980 through 1998 now conforms to normal distribution characteristics.

The PCA index, which is the proxy for property returns, comes into the analysis at semiannual and annual return intervals. The series does not have fat tail indicating peakedness of returns about the mean, nor shows significant skewness as found by Newell (1998) at individual property level, and by Myer and Webb (1994), Young and Graff (1995) and Brown (1988) at index level. Two reasons can be given for this. One, the data problem as the observations less than 30 points; the sample size is 28 and 14 for semiannual and annual returns respectively. Two, the returns are capital value returns only, it is not total return as used in the previous studies. The investigation in this area has scope for future research.

The overall semiannual and annual results are not significantly different from that for 1980 -1998 study period shown in table 1.

Table 3

This table shows results of all the 26 data sets described in the data section above, from 1992-1998. Although the results are consistent with those shown in tables 1 and 2 above, given that the sample size is less than 30, the results may be insignificant statistically.

Table 4

This table shows results for quarterly, semiannual and annual real return from 1985-1998. The quarterly results do not change significantly. However, there is significant increase in kurtosis and skewness, but to a lesser extent, for both semiannual and annual real returns. Four individual trusts, both the trust indices and four financial asset indices, which showed insignificant levels of kurtosis for normal returns are now exhibiting excess kurtosis. The

financial asset series are also exhibiting excess negative skewness. However, the results for the property index are unchanged.

Therefore, it can be inferred that by removing the effect of inflation does not increase normality; rather increases kurtosis in the returns. One reason for this could be that when inflation is removed, inflationary induced increases are removed. Therefore, price changes are relatively small over time and interrupted by large lumpy increases occasionally. This produces the fat tail in the return series.

Conclusion

The quarterly LPT returns are generally non-normal. As the holding periods are increased to semiannual and annual intervals, level of normality is increased as well. However, attention must be paid to reduction in sample size with increasing holding periods. It is advisable that results for sample size smaller than 30 points must be analyzed further using histograms and probability plots to determine the degree of normality with more precision.

The normality assumptions of MPT are based on the principle of portfolio diversification. The assumption is that over a specified investment period, part of return to an investment comes from microeconomic factors specific to the investment (α) and part comes from macroeconomic factors generally related to the market (β). Diversification is process where investment specific risks of assets are reduced when combined in a portfolio. The idea is to mix assets with alternative specific risk characteristics. Therefore when some assets in a portfolio fall in value the other increase. In this way not only the risk is minimized to the market risk level but the variance in the risk can be maintained at a constant level over time.

As such further research can be carried out to investigate whether portfolio risk is normally distributed. The research will be a very worthy as most investors, particularly institutional investors, do not generally hold individual assets, rather hold investment portfolios.

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Table 1- Distribution of Nominal Returns between 1980 - 1998

SAMPLE	Quarterly (Mar 1980 – Dec 1998)					Semiannual (Jun 1980 – Dec 1998)					Annual (Dec 1980 – Dec 1998)				
Trusts	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**
GPT	1.15	7.21	-0.19	4.06	4.04	2.33	10.63	0.47	3.00	1.43	4.44	13.50	0.57	2.20	1.52
SCH	1.01	7.27	-0.52	*5.62	*25.26	1.89	9.02	0.00	2.94	0.00	3.78	12.89	0.08	2.73	0.07
Trust Index															
Total Index	1.53	6.48	*-0.61	*7.99	*83.57	3.02	8.78	0.46	3.96	2.81	6.06	12.57	0.89	3.11	2.55
Fin. Assets Indices															
All Ordinaries	2.79	10.04	*-1.03	*7.03	*65.01	5.49	13.81	-0.28	2.24	1.43	11.88	24.68	0.36	1.87	1.42
50 Leaders	2.81	10.31	*-0.81	*6.37	*44.41	5.49	13.95	-0.27	2.12	1.70	11.95	24.93	0.26	1.92	1.13
Retail	3.55	11.14	-0.52	4.95	*15.49	4.84	14.29	-0.05	2.14	1.16	16.31	31.89	0.35	2.26	0.83
Bldg. Material	2.51	10.63	*-0.92	*5.90	*37.39	7.29	17.51	0.39	3.12	0.99	10.55	25.24	0.46	2.20	1.19
Bank & Fin.	3.97	10.96	-0.03	3.23	0.18	7.91	14.86	0.06	2.64	0.22	17.34	26.62	-0.18	1.86	1.12
Others															
Gold Index	4.03	27.17	*1.70	*7.50	*100.85	9.85	50.03	*2.22	*8.38	77.42	15.12	57.26	1.27	3.73	5.56

* indicates significance at 5% level for Skewness , Kurtosis and JB statistics.

Table 2- Distribution of Nominal Returns between 1985 - 1998

SAMPLE	Quarterly (Mar 1985 – Dec 1998)					Semiannual (Jun 1985 – Dec 1998)					Annual (Dec 1985 – Dec 1998)				
Trusts	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**
GPT	0.88	7.01	-0.51	*4.52	*7.83	1.75	10.16	0.47	2.71	1.13	3.14	11.47	0.45	2.35	0.72
SCH	0.58	7.61	*-0.81	*5.06	*16.03	1.01	9.63	0.02	2.67	0.12	2.00	13.76	0.29	2.72	0.24
WFT	1.93	7.84	*-0.93	*5.33	*20.84	3.91	11.42	-0.61	2.83	1.78	8.11	18.48	0.15	1.69	0.15
SGP	1.89	7.78	*-1.12	*7.50	*59.09	3.74	10.63	-0.60	3.37	1.84	7.55	16.01	0.43	2.73	0.47
NMP	0.63	7.47	*-0.85	*5.76	*24.60	1.21	10.20	-0.41	2.37	1.26	2.34	14.02	-0.51	1.72	1.57
CPL	0.44	5.64	0.48	2.72	2.36	0.79	6.85	0.43	2.64	1.01	1.48	8.55	0.44	2.57	0.56
CMF	0.63	9.33	*-0.62	4.41	*8.31	1.10	12.63	0.38	2.38	1.13	1.94	16.08	-0.25	1.34	1.76
Trust Indices															
Total Index	1.15	6.07	*-1.58	*10.48	*153.91	2.22	7.91	-0.10	3.34	0.19	4.34	10.20	0.43	2.53	0.57
SBC Leaders	1.56	6.68	*-1.24	*6.93	*50.47	3.09	9.23	-0.35	2.62	0.76	6.14	12.62	-0.02	2.22	0.35
Prop. Index															
CPA	n/a	n/a	n/a	n/a	n/a	1.27	5.45	0.13	2.64	0.23	2.80	10.83	0.19	2.44	0.26
Fin. Assets Indices															
All Ordinaries	2.90	9.62	*-1.37	*9.50	*116.56	5.58	12.33	-0.42	2.63	0.99	11.76	20.87	0.16	1.93	0.72
50 Leaders	3.11	9.69	*-1.12	*8.95	*94.45	5.96	11.87	-0.35	2.36	1.05	12.53	19.84	0.04	1.93	0.66
Retail	3.37	11.45	-0.57	*5.55	*18.29	6.85	17.58	0.34	3.44	0.79	8.28	22.35	0.32	2.36	0.47
Bldg. Material	2.13	10.80	*-0.96	*6.65	*39.86	3.89	13.52	-0.01	2.45	0.34	15.31	30.89	-0.06	1.70	0.98
Bank & Fin.	3.85	11.43	-0.04	3.14	0.06	7.48	14.16	-0.26	2.37	0.78	16.64	26.81	-0.26	1.97	0.77
Others															
Gold Index	2.99	20.70	*0.75	*3.70	*6.45	6.28	33.89	1.56	*4.87	*15.54	14.60	57.72	1.47	4.29	6.03
10Year Bonds	1.07	4.73	0.06	3.73	1.31	2.20	7.27	-0.56	3.88	2.41	4.37	9.69	-1.12	4.05	3.61

* indicates significance at 5% level for Skewness , Kurtosis and JB statistics.

Table 3- Distribution of Nominal Returns between 1992 - 1998

SAMPLE	Quarterly (Mar 1992 – Dec 1998)					Semiannual (Jun 1992 – Dec 1998)					Annual (Dec 1992 – Dec 1998)				
Trusts	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**
GPT	1.09	5.99	-0.17	2.03	1.24	2.23	9.16	0.44	1.83	1.25	4.51	13.52	-0.11	1.78	0.44
SCH	0.84	6.31	0.21	2.90	0.21	1.63	8.36	-0.09	2.74	0.05	3.75	16.31	0.12	2.34	0.14
WFT	1.74	5.90	-0.30	2.33	0.95	3.56	9.15	-0.39	2.52	0.49	7.61	16.64	-0.35	1.60	0.71
SGP	1.59	5.63	-0.16	1.81	1.77	3.22	8.25	-0.70	2.70	1.21	6.54	12.20	-1.02	3.14	1.23
NMP	2.20	6.48	0.25	2.57	0.50	4.33	7.87	-0.25	1.92	0.82	8.51	7.88	-0.51	1.56	0.90
CPL	-0.26	4.72	0.31	2.42	0.83	-0.57	6.04	-0.37	1.64	1.40	-1.24	7.62	0.05	1.81	0.41
CMF	1.08	7.71	-0.09	2.98	0.04	2.16	11.06	0.10	1.44	1.42	4.26	15.39	-0.43	1.40	0.96
APF	1.29	6.51	0.02	2.22	0.70	2.57	9.28	0.35	1.59	1.45	5.20	14.08	0.73	2.26	0.78
BTP	1.24	4.42	-0.06	2.11	0.95	2.48	6.08	-0.09	2.20	0.38	5.10	9.63	-1.19	3.05	1.65
AJO	1.64	16.06	-0.43	4.45	3.33	2.91	22.38	-0.06	4.70	1.70	7.89	38.04	-0.27	2.32	0.21
AJR	1.38	5.72	-0.10	2.09	1.01	2.66	6.70	0.02	1.97	0.61	5.46	10.88	0.29	1.38	0.85
CEP	0.37	5.61	0.18	2.36	0.63	0.64	6.41	0.15	1.89	0.76	1.51	11.85	-0.08	1.77	0.44
CPY	0.89	6.30	-0.84	5.32	9.57	1.65	7.33	-0.40	2.35	0.61	3.07	7.84	-0.55	1.92	0.70
Trust Indices															
Total Index	1.08	3.65	0.16	1.99	1.31	2.21	5.98	-0.03	1.47	1.36	4.60	10.41	-0.21	2.15	0.26
SBC Leaders	1.47	5.17	-0.27	1.93	1.65	3.00	8.11	-0.34	2.17	0.67	6.35	14.26	-0.47	2.02	0.54
SBC Diversified	1.28	4.47	-0.10	1.80	1.70	2.60	6.79	0.05	1.44	1.42	5.37	11.35	-0.21	2.11	0.28
SBC Retail	1.41	4.97	-0.22	2.25	0.87	2.90	7.93	-0.45	2.24	0.81	6.22	14.75	-0.36	1.66	0.67
SBC Comm.	0.97	3.98	0.28	2.27	0.99	1.92	5.31	-0.19	1.60	1.21	3.70	4.45	-0.33	1.71	0.61
Prop. Index															
CPA															
Fin. Assets Indices															
All Ordinaries	1.98	5.93	-0.12	2.38	0.49	4.02	9.00	0.68	2.90	1.10	8.55	16.85	0.70	2.55	0.63
50 Leaders	2.01	5.98	0.02	2.84	0.03	4.05	8.69	0.71	3.10	1.19	8.46	14.95	0.31	2.07	0.36
Retail	1.88	7.14	0.36	2.55	0.85	3.88	11.22	0.13	3.73	0.36	8.51	21.29	0.30	2.26	0.26
Bldg. Material	-0.12	8.60	-1.62	6.59	27.50	-0.38	11.90	0.02	3.07	0.00	-0.66	17.81	-0.14	1.77	0.46
Bank & Fin.	3.95	8.46	-0.27	2.13	1.22	8.18	13.65	-0.19	1.52	1.35	18.06	26.99	-0.18	1.58	0.62
Small Ords.	1.80	6.94	-0.35	2.75	0.66	3.78	11.98	0.65	2.27	1.31	8.55	24.84	1.16	2.79	1.59
Others															
Gold Index	1.03	17.62	1.16	4.55	9.15	3.49	35.02	1.92	6.11	14.33	11.40	70.38	1.64	3.96	3.42
10 Year Bonds															

Table 4- Distribution of Real Returns between 1985 – 1998

SAMPLE	Quarterly (Mar 1985 – Dec 1998)					Semiannual (Jun 1985 – Dec 1998)					Annual (Dec 1985 – Dec 1998)				
Trusts	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**	**Mean**	**St Dev**	**Skew**	**Kurt**	**JB Stats**
GPT	-0.19	7.10	-0.54	*4.60	*8.85	0.10	7.90	-0.86	*5.47	*10.64	-1.22	8.37	-1.84	5.58	11.88
SCH	-0.48	7.64	*-0.88	*5.43	*21.10	-2.36	8.37	-1.13	*5.31	*12.23	-3.09	9.45	-1.77	5.13	10.05
WFT	0.86	7.94	*-1.00	*5.44	*23.33	1.51	9.37	-1.23	*5.61	*15.14	-0.03	11.13	-1.23	4.67	5.21
SGP	0.82	7.83	*-1.14	*7.81	*66.45	1.40	9.15	-1.41	*8.31	*42.33	0.53	11.72	-1.29	5.86	8.66
NMP	-0.43	7.55	*-0.86	*5.95	*24.43	-1.42	8.02	-1.49	*7.13	*30.39	-5.19	8.83	-1.61	5.32	9.23
CPL	-0.63	5.68	0.40	2.74	1.69	0.10	6.22	0.03	2.50	0.29	-2.98	4.64	-0.31	3.67	0.48
CMF	-0.44	9.49	*-0.68	*4.39	*8.88	-3.76	10.18	-0.67	4.04	3.37	-6.50	11.18	-0.85	3.63	1.93
Trust Indices															
Total Index	0.08	6.14	*-1.71	*10.90	*173.25	-0.26	7.29	*-2.0	*10.3	*82.84	-2.41	8.77	-2.13	7.23	21.09
SBC Leaders	0.49	6.75	*-1.29	*7.22	*57.39	0.49	7.74	*-1.7	*8.05	*43.51	-0.84	9.17	-1.96	6.66	16.84
Prop. Index															
CPA	n/a	n/a	n/a	n/a	n/a	-0.86	4.57	0.11	2.82	0.09	-1.53	8.88	0.20	2.51	0.23
Fin. Assets Indices															
All Ordinaries	1.83	9.57	*-1.54	*10.1	*139.81	0.33	10.49	*-2.4	*11.2	*108.79	-2.06	14.05	-1.68	5.89	11.54
50 Leaders	2.04	9.63	*-1.27	*9.50	*113.89	0.85	10.35	*-2.4	*11.1	*104.59	-1.66	13.63	-1.75	6.10	12.84
Retail	2.29	11.49	*-0.66	*5.74	*21.69	1.38	12.38	-1.3	*6.51	*23.22	0.26	15.29	-1.54	4.95	7.79
Bldg. Material	1.05	10.61	*-1.08	*7.01	*48.56	0.98	10.06	*-2.1	*11.0	*97.14	-0.04	13.81	-1.54	5.94	10.57
Bank & Fin.	2.78	11.48	-0.13	3.09	0.18	1.06	10.89	-0.8	3.45	3.41	-0.26	12.47	-0.96	3.05	2.17
Others															
Gold Index	1.91	20.58	*0.71	3.71	5.94	-2.56	19.42	0.61	4.56	4.59	-5.67	20.67	-0.14	2.27	0.35
10 Year Bonds	0.01	4.83	-0.04	3.10	0.04	0.03	7.69	-0.52	2.91	1.30	-0.02	10.85	-0.58	2.43	0.98

* indicates significance at 5% level for Skewness , Kurtosis and JB statistics.