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**WORKING PAPER NO. 96-244**

**REITs: Stocks, Bonds or Real Estate?**

By  
**KENNETH T. ROSEN**

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# **REITs: Stocks, Bonds, or Real Estate?**

November 30, 1995

WORKING PAPER NO. 96-244

by

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## Executive Summary

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- The REIT IPO boom has created a publicly traded real estate sector with a market capitalization of over \$35 billion with control over \$70 billion in real estate.
- The REIT sector provides a new avenue for pension funds to invest in real estate and diversify their portfolios and obtain competitive returns.
- In at least two sectors, apartments and regional malls, REITs are dominant players in the market.
- Historically REITs have been looked at skeptically by institutional investors as they were correctly perceived to behave as small "cap" stocks.
- Many of the REITs created since 1992 hold institutional quality real estate in their portfolios. They represent fully integrated real estate operating companies that have developed, acquired, and managed real estate for several decades, and have a market capitalization greater than \$400 million.
- This research paper shows that institutional quality, large capitalization REITs behave as institutional quality real estate, and not as small cap stocks in the 1993-1995 period.
- The correlation of the overall Wilshire REIT index with the S&P 500 is .31, with the Russell 2000 is .43, and with a ten year Treasury Bond index is .51 over the 1993-1995 period.
- However, if we look only at an institutional quality large cap REIT index, the correlation with the S&P 500 is .08, with the Russell 2000 is .25, and with a ten year Treasury Bond index is .43 during the 1993-1995 period. Thus, the large number of new companies that have come public since 1992 have made the universe of REITs a good proxy for institutional quality real estate. REITs can no longer be viewed as behaving as small cap stocks.



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## Introduction

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The REIT IPO boom which began in November 1992 has produced a sector which includes over 100 companies with an overall market capitalization of over \$35 billion<sup>1</sup>. If we add in the leverage of these REITs as well as the value of the operating partnership units (the non-trading shares taken by the sponsors when the REIT was formed) the REITs today control over \$70 billion<sup>1</sup> of real estate. In at least two real estate sectors, apartments and regional malls, the REITs are dominant players in the markets.

Traditionally, institutional investors have looked to real estate investments to diversify their portfolio and provide competitive returns. The rapid growth of the REIT sector has provided a new avenue for pension fund real estate investment. However, the institutional community has looked at the REIT vehicle with some skepticism. Much of this skepticism relates to the widely held view that REITs behave as small cap stocks and not as real estate. This view comes from several academic studies<sup>2</sup> and consultant reports<sup>3</sup> which show a high correlation of REIT returns with various small cap stock return indices over the past ten years.

While this research correctly portrays the REIT market prior to 1993, it may not be a good predictor of the future risk/return performance of the many REITs that have come public since November 1992. It is our view that the REIT IPOs of 1993 and 1994 have produced a universe of companies that have very different investment characteristics than the earlier group of equity REITs. Many of the newly created REITs hold institutional quality real estate in their portfolios, represent fully integrated real estate operating companies that have developed, acquired, and managed real estate for several decades, and have a market capitalization of greater than \$400 million. The differences between the pre-1992 REITs and the post-1992 REITs require a new analysis to determine their investment characteristics. The purpose of this paper is to test the hypothesis that a subset of post-1992 REITs behave as institutional quality real estate and not as small cap stocks.

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<sup>1</sup> Wilshire REIT Index capitalization is over \$35 billion, AMB Rosen estimates that this represents over \$70 billion of real estate under control.

<sup>2</sup> Joseph Gyourko and Donald Keim, "What Does the Stock Market Tell Us About Real Estate Returns," *Journal of American Real Estate and Urban Economics Association*, 1992.

<sup>3</sup> "Public Real Estate Equity Securitization: A Strategic Analysis," PCA / Kenneth Leventhal & Co., December 1993. Prepared for California Public Employees' Retirement System.



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## Methodology

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The standard measures for examining the investment characteristics of REITs has been to look at returns, standard deviations of returns, and cross correlations of returns. Typical studies use the NAREIT equity index or the Wilshire equity REIT index as measures of REIT returns. They use the NCREIF index to capture returns in the private real estate market, the S&P 500 to capture overall stock market performance, the Russell 2000 to capture the "small cap" stock effect, and the performance of the 10-year Treasury Bond to capture bond market effects.

It is our view that the standard methodology has two major defects. The first concerns the simple fact that the REIT index from 1980 to 1992 represents a vastly different pool of stocks than the 1993 to 1995 REIT index. This produces a "temporal aggregation bias" which, while present in all indices, is especially severe in a sector whose capitalization has grown from \$6.7 billion in October 1992 to \$35.4 billion in September 1995. There are various ways to control for this bias by partitioning the data and/or using regression analysis to test for structural shifts in relationships. This paper will utilize these techniques as well as the standard methodologies and compare the results.

The second major defect in the standard methodology is that the NCREIF index is well known to have a major problem that makes it difficult to use as a measure of private market real estate performance. The "smoothing" involved in the appraisal process makes the standard deviation and the cross-correlation data unusable for cross asset comparison. In our view, the NCREIF index substantially lags behind actual market changes, so any attempt to compare the NCREIF and REIT indices must account for this "lagged and smoothed" data.

A second problem in comparing REIT and NCREIF indices is that the indices represent different types of real estate. The NCREIF index is heavily weighted in office properties, the poorest performing sector in real estate in the past decade, and underweighted in the excellent performing apartment sector. The Wilshire REIT index, on the other hand, is heavily weighted in apartments and underweighted in the office sector. The weighting by sector as of the end of 1994 is illustrated in Table 1. The office and industrial sector is 11% of the Wilshire REIT index and 47% of the NCREIF index. Apartments represent 30% of the REIT index and only 13% of the NCREIF index.

It is clear that any attempt to compare the aggregate indices is likely to result in poor results. This is true for comparisons of means, standard deviations, and cross-correlations. These indices represent far different property types, and so need to be disaggregated to provide meaningful results.

**Table 1**  
**Property Type Weightings**  
**Dec 31, 1994**

	<u>Wilshire REIT</u>	<u>NCREIF</u>
Local Retail	25%	11%
Regional Retail	13%	29%
Factory Outlet	4%	---
Apartments	30%	13%
Mfd. Housing	3%	---
Hotel	2%	---
Office	5%	35%
Industrial	6%	12%
Other	12%	---
Total	100%	100%

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## Standard Aggregate Results

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For comparison purposes, we first calculate the standard measures of performance for the following indices: (1) the Wilshire REIT index, (2) the NCREIF index, (3) the Standard and Poors 500, (4) the Russell 2000 stock index, (5) a 10 year Treasury Bond index, (6) the Dow Jones utility stock index. We calculate these annual performance measures for a three, five, and ten year horizon ending in June 1995. These results are shown in Table 2.

**Table 2**  
**Mean Return and Standard Deviation**  
**Period Ending June, 1995**

	<u>3-Yrs</u>		<u>5-Yrs</u>		<u>10-Yrs</u>	
	<u>Mean Return</u>	<u>Std. Dev.</u>	<u>Mean Return</u>	<u>Std. Dev.</u>	<u>Mean Return</u>	<u>Std. Dev.</u>
Wilshire REIT Index	11.95	13.33	8.25	11.32	6.38	10.24
NCREIF Total	2.84	4.27	0.26	4.97	4.43	5.54
S&P 500	13.68	10.06	12.36	8.18	15.28	11.91
Russell 2000	14.90	8.75	11.27	9.15	9.70	11.22
10-Yr T-Bond Index	12.77	14.75	14.09	11.97	13.81	13.24
Dow Jones Utility Index	7.12	21.35	7.21	17.14	10.65	15.66

## A. Private versus Public Real Estate Indices.

It is apparent that in all time horizons the public REIT index has far outpaced the private real estate index. This should not be surprising for several reasons. First, the Wilshire REIT index represents a pool of companies, not just a static pool of real estate assets. Even if the assets performed identically, REITs that are well managed operating companies would have numerous advantages in terms of total return. They can acquire and develop properties at accretive returns and thus increase stock price and total returns. They can leverage their investments and, so in a favorable interest rate and fundamental property investment environment, they will have superior equity returns. Leverage, of course, can work against an equity investor in an unfavorable interest rate and property market environment.

In terms of standard deviation of return, the comparison of the Wilshire REIT and the NCREIF indices is problematic because of the previously mentioned problems with the NCREIF index. We would hypothesize that the standard deviation of the Wilshire REIT index should be substantially higher than that of the NCREIF index because REITs are priced in a continuous process in the capital markets. We can elaborate on this concept by separating the income and capital appreciation components of the two indices. Table 3 shows the mean standard deviation of the income and capital appreciation of the Wilshire REIT and the NCREIF for the 1985-1994 period.

**Table 3**  
**Income and Capital Appreciation Components of Real Estate Indices**  
**Quarterly Data, Annualized**

Period Ending 2Q	Wilshire REIT Index				NCREIF Index			
	Income		Capital Appreciation		Income		Capital Appreciation	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1985-1986	7.90	0.26	6.69	11.63	7.49	0.08	2.84	1.80
1986-1987	7.09	0.46	4.26	7.25	7.28	0.04	-0.01	1.21
1987-1988	8.11	0.24	-5.90	18.59	7.17	0.33	1.62	0.70
1988-1989	7.88	0.47	-1.65	4.02	6.89	0.04	2.53	1.11
1989-1990	9.00	0.74	-17.21	6.42	6.51	0.04	0.34	0.62
1990-1991	9.57	1.25	-3.43	34.69	6.71	0.10	-6.89	1.96
1991-1992	7.85	0.69	-3.26	6.10	7.15	0.24	-13.05	4.91
1992-1993	6.90	0.39	24.36	21.24	7.86	0.16	-9.93	2.95
1993-1994	6.12	0.21	-2.31	12.95	8.45	0.13	-4.63	1.57
1994-1995	7.79	0.31	-5.21	6.89	9.00	0.10	-1.21	0.44

Note: The terminology and practice used in public and private indices is inconsistent. The income component of the public market is the dividend return, while income in the private market is property earnings, not investor dividends. The capital appreciation component of the public market is the securities price changes, while the capital appreciation component of the private market represents changes in appraised value.

This table shows that the standard deviation of the income component of both indices is quite low. The standard deviation of the capital appreciation component of the REIT index is much higher than that of NCREIF because of the continuous capital market pricing in the public market and the magnifying effect of leverage. However, it is our view that the variability of the NCREIF capital appreciation component is understated, because of the previously discussed smoothing process.

## **B. REITs versus Stocks and Bonds.**

In comparing mean returns of REITs with broad stock and bond indices, REITs have shown good returns in the three and five year time horizons. This is not surprising in that REITs are real estate companies, not static pools of assets. Not surprisingly, they behave like other public companies and attempt to enhance shareholder value by growth in earnings per share. REITs are "real estate...plus", that is, they start with a pool of assets that will show real estate return characteristics plus they have public companies' incentives to grow the pool of earnings assets.

As Table 2 shows, the standard deviation over a ten-year period of the REIT Index is comparable though somewhat lower than that of the S&P 500 and the Russell 2000 index, and lower than the utility stock index. The standard deviation of the Wilshire REIT Index is 10.2%; of the S&P 500, 11.9%; of the Russell 2000 Index, 11.2%; and of the Utility Stock Index, 15.7%.

## **C. Cross Correlations Between REITs and Other Investments**

A final standard measure of investment performance is the cross correlation of returns between assets. Tables 4 to 6 show the cross-correlations of returns for quarterly data for the three, five, and ten year periods.

**Table 4**  
**3-Year Correlation Matrix**  
**Quarterly Returns, 92 Q3 - 95 Q2**

	<u>Wilshire REIT</u>	<u>NCREIF Total</u>	<u>S&amp;P 500</u>	<u>Russell 2000</u>	<u>10-Yr T-Bond</u>	<u>DJ Utility Index</u>
Wilshire REIT	1.000					
NCREIF Total	-0.030	1.000				
S&P 500	0.127	0.089	1.000			
Russell 2000	0.197	-0.476	0.651	1.000		
10-Yr T-Bond Index	0.544	0.137	0.667	0.409	1.000	
Dow Jones Utility Index	0.493	0.028	0.716	0.548	0.833	1.000

**Table 5**  
**5-Year Correlation Matrix**  
**Quarterly Returns, 90 Q3 - 95 Q2**

	<u>Wilshire REIT</u>	<u>NCREIF Total</u>	<u>S&amp;P 500</u>	<u>Russell 2000</u>	<u>10-Yr T-Bond</u>	<u>DJ Utility Index</u>
Wilshire REIT	1.000					
NCREIF Total	-0.038	1.000				
S&P 500	0.614	-0.212	1.000			
Russell 2000	0.738	-0.184	0.820	1.000		
10-Yr T-Bond Index	0.339	-0.143	0.545	0.237	1.000	
Dow Jones Utility Index	0.387	-0.214	0.645	0.384	0.837	1.000

**Table 6**  
**10-Year Correlation Matrix**  
**Quarterly Returns, 85 Q3 - 95 Q2**

	<u>Wilshire REIT</u>	<u>NCREIF Total</u>	<u>S&amp;P 500</u>	<u>Russell 2000</u>	<u>10-Yr T-Bond</u>	<u>DJ Utility Index</u>
Wilshire REIT	1.000					
NCREIF Total	-0.077	1.000				
S&P 500	0.579	-0.015	1.000			
Russell 2000	0.728	-0.108	0.875	1.000		
10-Yr T-Bond Index	0.342	-0.005	0.298	0.200	1.000	
Dow Jones Utility Index	0.412	0.036	0.649	0.449	0.713	1.000

The cross-correlations show that there is no statistically significant correlation between the NCREIF and the REIT index over any of the time periods examined. This is not surprising given the earlier critique of the NCREIF index. This does not mean that REITs are not a proxy for real estate investment, it just means that they are not correlated with the NCREIF index. As shown earlier, the differential weighting of each index by property type and the "smoothed and lagged" and unlevered nature of the NCREIF index make it unlikely that the indices would be highly correlated. By disaggregating the NCREIF and the REIT indices, and appropriately lagging the REIT index, we can make a more statistically valid comparison of these investment indices. Table 7 shows the results of our regressions on these three subindices: apartments, offices, and regional malls. The dependent variable is the property type NCREIF sub-index. The independent variable is a polynomial distributed lag of the property type specific REIT index that we have constructed. These data show that the NCREIF and REIT indices are positively correlated when disaggregated and appropriately lagged. Our fitted data show that the R-square statistics are in the .33-.36 range and the betas are in the .31 to .36 range. These results suggest that the REIT indices are at least a partial leading indicator of NCREIF performance and are correlated with real estate indices.

**Table 7**  
**Regression Summary**  
**Polynomial Distributed Lag Model\***  
**REIT Sub-Indices vs. NCREIF Sub-Indices**

<u>AMB Rosen / Wilshire Sub-Index</u>	<u>Alpha</u>	<u>Summed Beta</u>	<u>Average t-Statistic</u>	<u>R-Squared</u>
Apartment	.659	.328	2.26	.333
Office	-.891	.359	2.60	.360
Regional Mall	.981	.314	2.91	.362

\* Distributed lags are from four to twelve quarters.

Turning to the non-real estate sector results, the correlation between the Wilshire REIT index and the S&P 500 is .58 over the ten year period, .61 over the five year period, and .13 over the three year period. The correlation between the Russell 2000 and the REIT index is .73 over the ten year period, .74 over the five year period, and .20 over the three year period. These results indicate that the REIT sector is performing less like the overall stock market and small cap stocks since 1992. This is consistent with our hypothesis that the new universe of REITs are behaving more like real estate and less like stocks.

A final set of correlations were done with a Treasury Bond index and a utility stock index. Given that REITs are often perceived as a yield vehicle, it is surprising that the correlations are only in the .34 to .54 range for all periods.

Another way of illustrating the apparent shift in correlations over time is to compile a monthly correlation table by year over time. Table 8 shows these results from 1985 to 1995. It is quite clear that the correlation between REITs and stocks has declined sharply in the 1993-1995 period. The recent correlations between REITs and bonds has risen somewhat, while there appear to be no correlations between REITs and utility stocks in 1994 and 1995.

**Table 8**  
**Correlations by Year**  
**(Monthly Returns)**

*Wilshire REIT Index vs.*

<u>Year</u>	<u>S&amp;P 500</u>	<u>DI Util</u>	<u>10-Yr TBond</u>	<u>Russell 2000</u>
1985	0.510	0.093	0.087	0.788
1986	0.777	0.768	0.317	0.681
1987	0.870	0.584	0.232	0.918
1988	0.651	0.376	0.658	0.774
1989	0.844	0.541	0.252	0.865
1990	0.722	0.086	0.633	0.843
1991	0.479	0.224	-0.167	0.714
1992	0.234	-0.085	0.328	0.789
1993	0.357	0.680	0.761	0.351
1994	0.327	0.086	0.434	0.546
1995*	0.263	-0.145	0.432	0.589
Total Period	0.611	0.349	0.346	0.731
1993-1995	0.292	0.311	0.510	0.444
1990-1995	0.478	0.232	0.403	0.670
1985-1989	0.783	0.497	0.300	0.831
Three Year Moving Averages				
1993-1995	0.316	0.207	0.542	0.495
1991-1993	0.357	0.273	0.307	0.618
1989-1991	0.682	0.284	0.239	0.807

\* 8 months of data in 1995 (through August).

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## Partitioning the REIT Universe: Disaggregate Results

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The standard aggregate results suggest that REITs in the last three years are behaving less like small cap stocks. In order to more adequately reflect the diverse nature of the REIT universe, we have partitioned the universe in several different ways. We use these data partitions to test standard measures of performance: mean return, standard deviation, and cross-correlations. We also use these data in our regression analyses (see Appendix B).

The three partitions that we use are as follows: (1) pre-November 1992 versus post-November 1992 REITs; (2) REITs with market capitalization of \$400 million or more; (3) institutional quality REITs with a fully-integrated real estate operating company with at least a five year history as a private company. We have also created a fourth partition which combines aspects of the previous four criteria: institutional quality REITs with over \$400 million in market capitalization.

These partitions in essence create subindices of REITs which may have very different investment characteristics than the aggregate index. The companies included in each subindex are shown in the Appendix. Each sub-index draws on the overall REIT universe and is market cap weighted. Healthcare REITs are excluded from our universe, and several large real estate operating companies are included in this index.

Table 9 shows the correlation matrix with other assets for four subindices of the Wilshire index. Looking first, at the pre- and post-1992 REITs, there does not appear to be a statistically significant difference in their cross correlations. The second sub-index is comprised only of large capitalization REITs (more than \$400 million equity market capitalization). This includes 27 companies shown in Appendix A. The cross-correlation between stocks and REITs drops substantially when just large cap REITs are included. The correlation with the S&P 500 drops from .31 to .17, and the correlation with the Russell 2000 drops from .43 to .31.

A third partition of the data looks only at institutional quality real estate companies that acquire, manage, and develop their own properties. Thirty-four companies are included in this index. Not surprisingly, the correlation with stocks is similar to that of the large cap index. The correlation with the S&P 500 drops from .31 to .10, and the correlation with the Russell 2000 drops from .43 to .33.

Finally, we created a combined index for institutional quality, large capitalization REITs. These are companies that have over \$400 million of equity market capitalization and are fully integrated operating companies that acquire, manage, and develop real estate properties. Twenty of the 27 large capitalization companies are included in this index. Manufactured housing, self-storage, hotel and healthcare companies are excluded from this index. It is this set of stocks which we feel are most representative of the investable universe that pension funds might appropriately consider as part of their real estate allocation. The cross-correlation between this subset of REITs and the S&P 500 falls to .08 versus .31 for the



overall REIT index. The cross-correlation with the Russell 2000 index falls to .25 versus .43 for the overall REIT index. Finally, the cross-correlation between this subindex and the ten-year T-Bond index falls to .43 from .51, and the cross correlation with the Dow Jones utility index falls from .29 to .21.

**Table 9**  
**Correlation Matrix for Partitioned Data**  
**Monthly Data, 1/93 - 8/95**

	AMB Rosen Indices*					Wilsh. REIT	S&P 500	Russell 2000	10-Yr T-Bond	DJ Utility Index
	Inst. Qual. Lrg. Cap Index	Instit. Quality Index	Large Cap Index	Post-92 REIT Index	Pre-92 REIT Index					
Inst. Qual. Lrg. Cap Index	1.00									
Inst. Quality Index	0.99	1.00								
Large Cap Index	0.98	0.98	1.00							
Post-92 REIT Index	0.75	0.77	0.83	1.00						
Pre-92 REIT Index	0.95	0.95	0.97	0.80	1.00					
Wilshire REIT Index	0.90	0.91	0.95	0.92	0.94	1.00				
S&P 500	0.08	0.10	0.17	0.23	0.24	0.31	1.00			
Russell 2000	0.25	0.34	0.31	0.40	0.36	0.43	0.75	1.00		
10-Yr T-Bond	0.43	0.47	0.47	0.44	0.52	0.51	0.44	0.45	1.00	
DJ Utility Index	0.21	0.22	0.25	0.17	0.30	0.29	0.56	0.31	0.43	1.00

\* These indices were created by AMB Rosen using the screens discussed in the text. The companies in each index are shown in Appendix A.

This set of stocks clearly has a set of characteristics that act substantially different than the overall REIT indices. Table 10 and Figure 1 show that this subset of stocks have had a total return that was nearly double the overall REIT index and a percentage standard deviation slightly higher than the REIT index. These companies are also concentrated only in institutional quality real estate: office, industrial, retail, and residential properties.

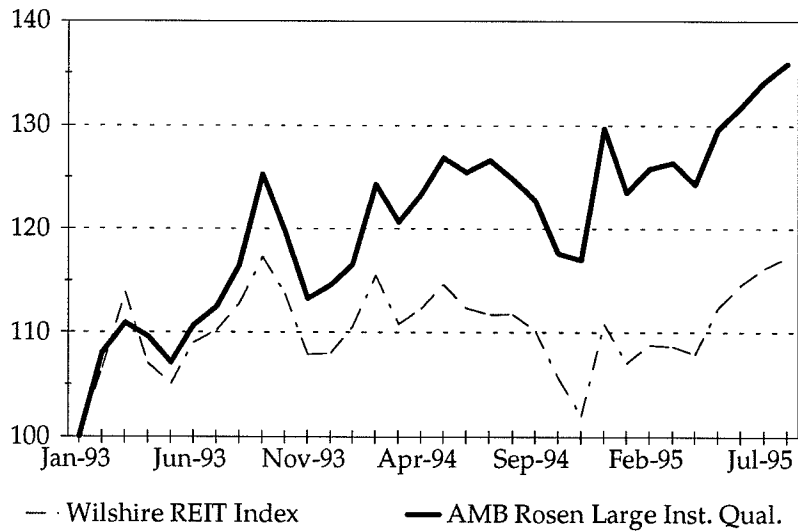
**Table 10**  
**Characteristics of REIT Indices**  
**1993-1995**

	AMB Rosen Instit. Qual. Large Cap. REITs	Wilshire REIT
Average Annual Total Return	13.5%	7.1%
Standard Deviation	13.1%	12.3%
Average Capitalization	\$ 755.8 MM	\$321.8 MM
Office/Industrial	21% *	11%
Regional Mall	28%	13%
Apartment	22%	25%
Other Retail	29%	16%

\* Includes REITs categorized as "Diversified" by Wilshire.

**Figure 1.**

**Cumulative Returns**  
**1993 - 1995**



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## Summary

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Our analysis shows that the conventional view that REITs are small cap stocks is no longer true. The large number of new companies that have come public since 1992 have substantially reduced the cross-correlation between small cap stocks and REITs. A disaggregate analysis shows that medium and large cap institutional quality REITs have a fairly low correlation with the stock market indices.

In summary, it is our view that many high quality REITs are real estate--"plus".

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## APPENDIX A

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**Table A1**  
**Pre-92 REIT Index Composition**

Ticker	Firm
BED	Bedford Property Investors
BPP	Burnham Pacific
BRE	BRE
BRI	Berkshire Realty
BTR	Bradley
CUZ	Cousins
DRE	Duke Realty
EGP	Eastgroup
FRT	Federal
FUR	First Union
HRE	HRE
IRT	IRT
KE	Koger Equities
KIM	Kimco
MGI	MGI
MRY	Merry Land & Inv.
NNN	Commercial Net Lease
NPR	New Plan
PCT	Prop. Capital Trust
PEI	Penn REIT
PRET	Price REIT
PTR	Security Capital Pacific
RCT	REIT of CA
ROUS	Rouse
SAR	Santa Anita
SEQ	Storage Equities
SIZ	Sizeler
UDR	United Dominion
VNO	Vornado Realty Trust
WIR	Western
WRE	Washington
WRI	Weingarten

**Table A2**  
**Post-92 REIT Index Composition**

Ticker	Firm	Ticker	Firm
ACH	Alexander Haagen	MAC	Macerich
AEC	Associated Estates	MCG	McArthur/Glen
AML	Amlis	MCT	Mark Centers Trust
AVN	Avalon	MDI	Mid America Rlty Invstrs
BCN	Beacon Properties	MHC	Manufactured Home
BFS	Saul Centers	MLS	Mills
BYA	Bay Apartment	OAS	Oasis
CBL	CBL	PAG	Pacific Gulf Properties
CCG	Chelsea GCA	PAO	Paragon
CEI	Crescent Realty	PPS	Post Properties
CLB	Columbus Realty Trust	PRME	Prime Retail
CLP	Colonial Properties Trust	RCI	ROC Communities
CNT	Center Point	REG	Regency
CPJ	Chateau	RFSI	RFS Hotel Investors
CPT	Camden	SCN	Security Capital Industrial
CRE	Carr Realty Corp.	SKT	Tanger Factory Outlet
CWN	Crown American	SMT	Summit
DDR	Developers Diversified	SPG	Simon
EJD	DeBartolo	SPK	Spieker
EQR	Equity Residential	SRW	Charles Smith
ESS	Essex	SUI	Sun Communities
EWR	Evans Withycombe	SWP	Southwest Props
FAC	Factory Stores of America	TCO	Taubman Centers
GBP	Gables	TCT	Town and Country
GGP	General Growth	TEE	National Golf
GRT	Glimcher	TRI	Tri Net Corporate Realty
HGI	Horizon	TUC	Tucker
HIW	Highwoods	URB	Urban
IAC	Irvine	WDN	Walden
JDN	JDN Realty	WKS	Weeks Corporation
JPR	JP Realty	WRP	Wellsford
KRT	Kranzco Realty	XEL	Excel Realty Trust
LRY	Liberty Property Trust		

**Table A3**  
**Large Cap. REIT Index Composition**

Ticker	Firm
AVN	Avalon
CEI	Crescent Realty
CUZ	Cousins
DDR	Developers Diversified
DRE	Duke Realty
EJD	DeBartolo
EQR	Equity Residential
FRT	Federal
GGP	General Growth
GRT	Glimcher
KIM	Kimco
LRY	Liberty Property Trust
MHC	Manufactured Home Communities
MRY	Merry Land & Inv.
NPR	New Plan
PPS	Post Properties
PTR	Security Capital Pacific
ROUS	Rouse
SCN	Security Capital Industrial
SEQ	Storage Equities
SPG	Simon
SPK	Spieker
TCO	Taubman Centers
UDR	United Dominion
VNO	Vornado Realty Trust
WRE	Washington
WRI	Weingarten

**Table A4**  
**Institutional Quality REIT Index Composition**

Ticker	Firm
AEC	Associated Estates
AVN	Avalon
BCN	Beacon Properties
CBL	CBL
CLP	Colonial Properties Trust
CPT	Camden
CUZ	Cousins
DDR	Developers Diversified
DRE	Duke Realty
EJD	DeBartolo
EWR	Evans Withycombe
FRT	Federal
GGP	General Growth
GRT	Glimcher
HIW	Highwoods
IAC	Irvine
JPR	JP Realty
KIM	Kimco
LRY	Liberty Property Trust
MAC	Macerich
MRY	Merry Land & Inv.
OAS	Oasis
PPS	Post Properties
PTR	Security Capital Pacific Trust
ROUS	Rouse
SCN	Security Capital Industrial
SMT	Summit
SPG	Simon
SPK	Spieker
TCO	Taubman Centers
URB	Urban
VNO	Vornado Realty Trust
WRI	Weingarten
WRP	Wellsford



**Table A5**  
**Large Cap Institutional Quality REIT Index**  
**Composition**

Ticker	Firm
AVN	Avalon
CUZ	Cousins
DDR	Developers Diversified
DRE	Duke Realty
EJD	DeBartolo
FRT	Federal
GGP	General Growth
GRT	Glimcher
KIM	Kimco
LRV	Liberty Property Trust
MRY	Merry Land & Inv.
PPS	Post Properties
PTR	Security Capital Pacific Trust
ROUS	Rouse
SCN	Security Capital Industrial
SPG	Simon
SPK	Spieker
TCO	Taubman Centers
VNO	Vornado Realty Trust
WRI	Weingarten

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## APPENDIX B

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**Table B1**  
**Regression Summary**  
**REIT Sub-Indices vs. Mkt Indices**

Sub-Index: <i>Pre-92 REITs</i>			
<u>Regression vs.</u>	<u>Alpha</u>	<u>Beta</u>	<u>R-Sq.</u>
SP500	0.526	0.339	0.023
Util	0.824	0.283	0.061
TBond	0.522	0.567	0.249
Russ2000	0.469	0.424	0.099
Wil REIT	0.359	0.917	0.884

**Table B2**  
**Regression Summary**  
**REIT Sub-Indices vs. Mkt Indices**

Sub-Index: <i>Post-92 REITs</i>			
<u>Regression vs.</u>	<u>Alpha</u>	<u>Beta</u>	<u>R-Sq.</u>
SP500	0.734	0.484	0.028
Util	1.193	0.259	0.008
TBond	0.853	0.616	0.143
Russ2000	0.604	0.654	0.133
Wil REIT	0.550	1.214	0.816

**Table B3**  
**Regression Summary**  
**REIT Sub-Indices vs. Mkt Indices**

Sub-Index: <i>Large Cap. REITs*</i>			
<u>Regression vs.</u>	<u>Alpha</u>	<u>Beta</u>	<u>R-Sq.</u>
SP500	0.803	0.258	-0.006
Util	1.023	0.247	0.028
TBond	0.722	0.552	0.197
Russ2000	0.652	0.431	0.084
Wil REIT	0.503	0.996	0.896

\*Over \$400 million market capitalization

**Table B4**  
**Regression Summary**  
**REIT Sub-Indices vs. Mkt Indices**

Sub-Index: <i>Institutional Quality REITs</i>			
<u>Regression vs.</u>	<u>Alpha</u>	<u>Beta</u>	<u>R-Sq.</u>
SP500	0.919	0.154	-0.025
Util	1.032	0.226	0.014
TBond	0.732	0.544	0.173
Russ2000	0.735	0.352	0.070
Wil REIT	0.507	0.998	0.826

**Table B5**  
**Regression Summary**  
**REIT Sub-Indices vs. Mkt Indices**

Sub-Index: <i>Large Cap. Institutional Quality REITs*</i>			
<u>Regression vs.</u>	<u>Alpha</u>	<u>Beta</u>	<u>R-Sq.</u>
SP500	0.929	0.126	-0.028
Util	1.016	0.214	0.011
TBond	0.735	0.510	0.156
Russ2000	0.749	0.319	0.028
Wil REIT	0.509	0.962	0.805

\*Over \$400 million market capitalization