

# The Risk-Return Attributes of International Real Estate Equities

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**Abstract.** This paper examines the risk and return attributes of international real estate equities over the 1980–1988 time period. The empirical results indicate that international real estate equities offer higher returns as well as greater total and systematic risk than U.S.-based REITs. The results also indicate that international real estate equities are weakly positively correlated with the return on REITs. International real estate equities achieve higher values for both the Treynor and Jensen measures than either the S&P 500 Index or the World Equities Index. International real estate equities also outperform domestic real estate companies on a risk-adjusted basis. However, international real estate equities underperform the World Equities Index using the Sharpe Index which suggests that international real estate equities carry significant unsystematic risk.

## Introduction

In recent years, the investment characteristics of United States domestic real estate have been extensively analyzed in the real estate literature. For example, Miles and McCue [16] examined the unlevered rates of return on both real estate investment trusts (REITs) and commingled real estate funds (CREFs). A subsequent study by Ibbotson and Siegel [10], compared the returns on residential, farm, and business real estate with the returns on various types of other financial assets. In another study, Kuhle and Walther [15] compared the performance of REITs and common stocks over the 1973–1984 period. Finally, Sagalyn [19] examined the risk-return performance of two categories of U.S.-traded real estate equities—REITs and real estate companies (or RECs).

It should be instructive to study the investment characteristics of foreign real estate since Ibbotson, Siegel and Love [11] estimate that this category of assets comprised almost 37% of total world investable wealth (or \$10,200 billion) at the end of 1984. However, with the exception of Giliberto [5], there has been no detailed analysis of the risk and return attributes of foreign real estate investment. Giliberto analyzed the diversification benefits of international real estate stocks using the Salomon-Russell Global Equity Property Sector Index for the 1985–1989 time period. He found significant diversification benefits associated with combining U.S. real estate equities with foreign real estate equities. For the 1985–1989 time period, the correlation between North American real estate stocks and Japanese real estate stocks was 0.06. Over the

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same time period, the correlation between North American and European real estate equities excluding the United Kingdom was 0.20.

The purpose of this paper is to provide additional evidence regarding the risk-return attributes of international real estate securities. Since there is no consistent source of appraisal-based returns on international real estate, we employ the international real estate equities index developed by Capital International Perspectives (C.I.P.) as our proxy for the returns associated with international real estate investment. The Capital International Perspectives Real Estate Index differs somewhat from the Salomon-Russell Index used by Giliberto. First, the Salomon Russell Index includes data from 1985 on, whereas the C.I.P. Index used in this study has data from 1980 on. Second, the Salomon Russell Index includes companies from eleven different countries whereas the C.I.P. Index includes real estate equities from fourteen different countries.

Several empirical studies have demonstrated that the inclusion of real estate in mixed-asset portfolios provides more efficient portfolios than financial assets alone.<sup>1</sup> Furthermore, a number of studies have shown that internationally diversified common stock portfolios have substantially lower risk levels than purely domestic equity portfolios.<sup>2</sup> Therefore, this study examines the correlation between the returns on international real estate equities and various categories of financial assets. In particular, this paper will analyze the correlation between the returns on international real estate equities and (1) domestic REITs; (2) domestic real estate companies; (3) Capital International Perspectives World Equity Index; (4) the Standard and Poor's 500 Index; and (5) Ibbotson and Sinquefeld's Corporate and Government Bond Indices. This will enable us to evaluate the performance of international real estate equities as well as provide an estimate of the degree of diversification benefits attainable from the addition of international real estate to an investment portfolio. Kuhle and Walther [15] examined composite measures of risk-return performance, and found that U.S.-based REITs outperformed common stocks on a risk-adjusted basis over the 1977-1984 period. In order to provide international evidence on this issue, we also compute the Treynor, Sharpe and Jensen Indices for the international real estate index as well as the other categories of assets.

The results of our study indicate that international real estate equities achieved higher returns as well as higher levels of both systematic and total risk than U.S.-based REITs over the 1980-1988 time period. Furthermore, international real estate equities also achieved higher returns than U.S.-based real estate companies with comparable measures of both total and systematic risk. In addition, our results found that this asset category displayed a weak positive correlation with REITs. International real estate equities had higher values for both the Treynor and Jensen measures than either the S&P 500 Index or the World Equities Index. International real estate equities also outperformed domestic real estate companies for all three risk-adjusted performance measures. However, this asset category underperformed the World Equities Index when performance was measured using the Sharpe Index, which suggests that these securities have substantial non-market risk.

The remainder of the paper is organized as follows. Section two reviews the relevant literature regarding international asset diversification and diversification in real estate. Section three describes the research design and data analyzed. The results of our empirical analysis are presented in section four. Finally, section five presents a summary and the major conclusions.

## Literature Review

In recent years, research on mixed-asset portfolios containing both real estate and financial assets has received increased attention. Research by Webb and Rubens [26, 27]; Webb, Curcio and Rubens [25]; and Firstenberg, Ross and Zisler [3] has documented that (1) real estate should have a major weight in a mixed-asset portfolio and (2) the returns to real estate are negatively associated with financial assets. This conclusion holds true even when the time period is varied and when the variance on the real estate series is significantly increased while the returns are held constant. The results of these studies also indicate that the optimal allocation among categories of real estate, i.e., between farmland, residential real estate, and business real estate, varies over different time periods. This suggests that different categories of real estate are affected by different macroeconomic factors.

A number of authors have examined the gains associated with diversification in domestic real estate, either across geographical region or property type. To the extent that different categories of real estate are not subject to the same macroeconomic variables, diversification across geographic areas or property types will reduce the unsystematic risk of the real estate portfolio. Accordingly, diversification enables the investor to reduce the overall risk level of the real estate portfolio without sacrificing return.

Firstenberg, Ross and Zisler [3] find that different regions and property types are weakly correlated, and therefore, there are substantial gains associated with diversification. In addition, studies by Hartzell, Hekman and Miles [8] and Grissom, Kuhle and Walther [7] find that real estate diversification, especially across property types, is even more effective in reducing the variance than it is for stock portfolios. Furthermore, Sagalyn [19] finds that the systematic risk and risk-adjusted returns of REITs and real estate companies (composed of homebuilders and commercial/property investment/development companies) are quite different, especially during periods of low growth in real GNP.

Finance researchers have also examined the benefits associated with the international diversification of equity portfolios. Studies by Solnick [23] and Ibbotson, Carr and Robinson [9], among others, have shown that internationally diversified common stock portfolios have substantially lower risk levels than purely domestic portfolios with the same level of return. Thus, as the number of countries in which equity investments are made increases, the investor is able to attain a superior risk-return trade-off.

## Data and Research Design

Firstenberg, Ross and Zisler [3] have suggested that international diversification in real estate lowers risk according to the extent to which the economies of the areas are independent of each other. In this paper, we determine the degree to which international real estate diversification improves portfolio performance by calculating the relative performance measures for a domestic equities index, a world equities index, a world real estate index, a domestic real estate investment trust (REIT) index, a domestic real estate companies (REC) index; United States Treasury bills, a corporate bond index, and a government bond index. The Standard and Poor 500 Index, the Treasury bill series,

corporate bond index, and government bond index are courtesy of Ibbotson and Sinquefeld [12]. The other indices are the Capital International World Index and Real Estate Index and the National Association of Real Estate Investment Trusts Equity REIT Index. Finally, a domestic real estate companies index is computed by determining the market value weighted returns on real estate companies other than REITs included in the COMPUSTAT database.<sup>3</sup>

To measure the returns on international real estate, we use the international real estate industry index developed by Capital International Perspectives.<sup>4</sup> Capital International Perspectives calculates monthly security returns for approximately 1375 companies representing nineteen countries and comprising approximately 60% of the aggregate market value of the stocks listed on the nineteen stock exchanges covered.<sup>5</sup>

This data source also computes indices for thirty-eight industry groups, including real estate. Each industry index represents the value of a market weighted portfolio of stocks (using total shares outstanding). The industry indices are adjusted for foreign exchange fluctuations relative to the U.S. dollar, and therefore, permit the comparison of returns between international real estate equities and U.S.-based equity REITs.<sup>6</sup>

We calculate the total return for each index for each month during the study period from January 1980 through December 1988. The total return for the month,  $R_{(i,t)}$  is equal to the ending price,  $P_{(i,t)}$ , less the beginning price,  $P_{(i,t-1)}$  plus any distributions during the month,  $D_{(i,t)}$ , divided by the beginning price:

$$R_{(i,t)} = [P_{(i,t)} - P_{(i,t-1)} + D_{(i,t)}] / P_{(i,t-1)} \quad (1)$$

$$\text{for } i = 1, \dots, 6 \text{ and } t = 1, \dots, 108$$

After computing the monthly returns for each investment category, we also calculate the standard deviation for each investment category as well as the inter-investment correlations. The lower the inter-investment correlations, the greater the risk reduction benefits associated with diversification across geographical regions or asset categories. If international diversification in real estate is beneficial, we would expect a low correlation coefficient between U.S. real estate investment trusts and real estate companies and the Capital International Perspectives Real Estate Index. For each index, we also develop three risk-adjusted measures of portfolio performance—Treynor's Index, Sharpe's Index, and Jensen's Abnormal Performance Index.

Treynor's Index [24] for a portfolio,  $T_i$ , is computed as the difference between portfolio return,  $R_i$ , minus the risk-free rate,  $R_f$ , divided by the portfolio *beta*,  $B_i$ , a measure of systematic risk relative to the reference market index. In the analysis that follows, we utilize the world market index as the reference market index.

$$T_i = [R_i - R_f] / B_i \quad (2)$$

The Treynor measure implicitly assumes that portfolios are completely diversified so that systematic risk is the relevant measure of risk.

Sharpe's Index [20] for a portfolio,  $S_i$ , is computed as the difference between portfolio return,  $R_i$ , minus the risk-free rate,  $R_f$ , divided by the portfolio standard deviation,  $\sigma_i$ , a measure of total risk.

$$S_i = [R_i - R_f] / \sigma_i \quad (3)$$

Thus, Sharpe's Index represents the ratio of the excess return to total risk.

Jensen's Abnormal Performance Index [14] for a portfolio,  $\alpha_i$ , is the intercept coefficient in a regression between excess returns for the portfolio,  $[R_i - R_j]$ , and excess returns for the market index,  $[R_m - R_j]$ , i.e.:

$$[R_i - R_j] = \alpha_i + \beta_i [R_m - R_j] + \text{error}_i \quad (4)$$

Jensen's Abnormal Performance Index for a portfolio is a measure of relative performance based on the security market line. In contrast to the Sharpe and Treynor measures, Jensen's Abnormal Performance Index enables one to determine whether the abnormal returns are statistically significant.<sup>7</sup> A statistically significant positive value for  $\alpha$  can be viewed as evidence of superior risk-adjusted performance in comparison to the overall market, whereas a significant negative value is indicative of inferior performance.

The three composite measures of investment performance discussed above are not without problems. Roll [17] has argued that the theoretical market portfolio should contain all risky assets in the world economy. Therefore, the choice of inefficient benchmark indices may lead to ambiguous results regarding performance measurement.

## Empirical Results

Exhibit 1 provides summary statistics for each of the asset categories. Treasury bills have the lowest monthly average rate of return, 0.49%, the lowest standard deviation, 0.30% and the lowest  $\beta$ , 0.00%. The World Real Estate Index has the highest average monthly return, 1.94%, the highest standard deviation, 7.47%, and the second highest  $\beta$ , 1.17. However, since this index has been converted to a common numeraire currency, the dollar, the rate of return reflects both changes in the value of the underlying index and changes in the value of the dollar relative to the currencies reflected in the index. The REIT Index has a lower average monthly return than the international real estate equities index, 1.46%, but also has a lower total risk (an average standard deviation of 3.55%) and systematic risk (an average  $\beta$  of 0.48). Domestic real estate companies not only have a higher monthly return than domestic REITs (1.32%) but also higher levels of total risk and systematic risk. Thus, in general, the results appear to reflect a direct relationship between risk and return.

**Exhibit 1**  
**Summary Statistics for Each Index**  
**(January 1980–December 1988)**

Index	Average Monthly Return (%)	Standard Deviation of Return (%)	Beta
S%P	1.13	4.34	0.75
World	1.61	4.25	1.00
REITs	1.46	3.55	0.48
World Real Estate	1.94	7.47	1.17
Real Estate Companies	1.32	7.44	1.24
T-Bills	0.49	0.30	0.00
Corp. Bonds	1.07	2.78	0.14
Gvt. Bonds	1.02	3.14	0.19

Exhibit 2 contains the matrix of correlation coefficients between the indices. For mixed-asset portfolios to be beneficial, the different asset returns must not be perfectly positively correlated. The lower the inter-investment correlations, the more beneficial is the diversification across asset types. That is, the lower the inter-investment correlations, the greater the risk reduction of the portfolio. The correlation coefficient between the Capital International Real Estate Index and the REIT Index is 0.27. Similarly, the correlation coefficient between the World Real Estate Index and domestic real estate companies is 0.40. These correlation coefficients suggest that there are significant diversification benefits associated with investment in international real estate equities for a U.S. investor. Also, the correlation between the Capital International Real Estate and T-bill Index is negative and extremely large relative to the corporate and government bond indices. Clearly, the potential for international diversification to increase portfolio performance exists.

Exhibit 3 shows the relative performance measures for each index. The REIT Index provides the highest value for the Sharpe performance measure and the Jensen measure. Consistent with previous empirical research, we find that REITs outperform the market

**Exhibit 2**  
**Matrix of Correlation Coefficients**  
**(January 1980–December 1988)**

Index	Common Stock	World Index	Real Estate	REITs	Corp Bonds	Gvt Bonds	T-Bills	RE Comp.
Common Stock	1.00							
World Index	0.66	1.00						
Real Estate	0.11	0.63	1.00					
REITs	0.33	0.50	0.27	1.00				
Corp Bonds	0.47	0.30	0.03	0.25	1.00			
Gvt Bonds	0.50	0.37	0.12	0.20	0.92	1.00		
T-Bills	0.09	-0.01	-0.21	-0.00	0.26	0.21	1.00	
RE Comp.	0.53	0.67	0.40	0.57	0.34	0.35	0.03	1.00

**Exhibit 3**  
**Relative Performance Measures**  
**(January 1980–December 1988)**

Index	Sharpe's Index	Treynor's Index	Jensen's Measure
S&P	0.1481	0.8598	-0.1921
World	0.2627	1.1170	0.0000
REITs	0.2719	1.9962	0.4256
World Real Estate	0.1943	1.2353	0.1389
Real Estate Companies	0.1115	0.6673	-0.5592
T-Bills	0.0000	0.0000	0.0018
Corp. Bonds	0.2081	4.1791	0.4245
Gvt. Bonds	0.1681	2.7238	0.3110

proxy. Jensen's *alpha* measure for REITs is both positive and statistically significant ( $t=2.25$ ). The World Real Estate Index has higher values for both Treynor's measure and Jensen's Abnormal Performance Index than either equity index. In addition, the World Real Estate equities outperform domestic real estate companies for each of the three risk-adjusted performance measures. However, Jensen's *alpha* for the World Real Estate Index is not statistically significantly different from zero, ( $t=0.091$ ). Moreover, international real estate equities lag the World Equities Index when performance is measured using Sharpe's Index, possibly as a result of exchange rate movements.

The Spearman Rank-Order Correlation (*rho*)<sup>8</sup> for the Treynor and Jensen Indices is 0.83 and is statistically significant at the 0.00 level. The Spearman Rank-Order Correlation (*rho*) between the Sharpe Index and the Treynor Index is 0.2571 indicating a low degree of correlation. The Spearman Rank-Order Correlation (*rho*) between the Sharpe Index and the Jensen Measure of Abnormal Performance is 0.60 indicating a high degree of correlation.

## Conclusions

Previous empirical studies have documented the gains associated with real estate diversification according to geographical region and property type. Likewise, other studies have shown the risk reduction benefits associated with international diversification in common stock. The purpose of this study is to provide evidence regarding the risk-return characteristics of international real estate investments.

We find that international real estate equities offered higher returns as well as higher measures of both total and systematic risk than U.S. based-REITs over the period from January 1980 to December 1988. In addition, the empirical results indicate that international real estate equities are weakly positively correlated with the returns on REITs. Thus, the addition of international real estate should improve portfolio performance.

The results of this study also find that U.S.-based REITs generally achieved the highest values for each of the composite performance measures indicating that REITs outperformed the world market portfolio on a risk-adjusted basis. International real estate equities had higher values for both the Treynor and Jensen measures than either the S&P 500 Index or the World Equities Index. Furthermore, international real estate equities outperformed domestic real estate companies for each composite performance measure. However, Jensen's *alpha* for the World Real Estate Index was not statistically significant. Moreover, international real estate equities underperformed the World Equities Index when risk-adjusted performance was measured using the Sharpe Index which suggests that international real estate carries significant unsystematic risk.

International real estate is certainly not a homogeneous asset category. The lease terms, indexation provisions, and tenant obligations differ from country to country. Accordingly, a more detailed analysis of the international real estate index through a decomposition, country by country, would provide a worthwhile future research endeavor.

## Notes

<sup>1</sup>See, for example, Burns and Epley [1] and Webb and Rubens [26].

<sup>2</sup>See, for example, Solnick [23] and Jacquillat and Solnick [13].

<sup>3</sup>The real estate companies included in the study were those from S.I.C. codes 6510 (real estate operators/lessors), 6512 (operators–nonresidential buildings), 6513 (operators–apartment buildings), 6531 (real estate agents & managers), and 6552 (subdivision developers, ex-cemetery). Twenty-nine different firms were included at some point in time during the 1980–1988 sample period.

<sup>4</sup>Capital International Perspectives Real Estate Index, like the National Association of Real Estate Investment Trusts (NAREIT) Equity REIT Index, uses stock market-based values. As noted by Sirmans and Sirmans [22], market-based indices have different distributional properties than cost-based and appraisal-based indices used in other empirical studies.

<sup>5</sup>For a detailed discussion of the Capital International Perspectives Indices, see Nilly Sikorsky, The Origin and Construction of the Capital International Indices, *Columbia Journal of World Business* (Summer 1982), 24–41.

<sup>6</sup>The number of real estate firms and the countries of origin of the firms included in the Capital International Perspectives Real Estate Index have changed over time. Over the 1980–1988 time period, the international real estate index represented between 0.7% and 1.6% of the aggregate market value of the World Equities Index. The Index only included one U.S. firm, Coldwell Banker, for any portion of the 1980–1988 time period. The Index was recomputed to purge the effects of the inclusion of this company. The recomputation of the Index was done following the methodology prescribed by Capital International Perspectives.

<sup>7</sup>For a more complete discussion of the differences between the three measures of composite portfolio performance, see Francis [4], Ch. 28.

<sup>8</sup>The Spearman Rank-Order Correlation (*rho*) is used to measure the strength and direction of relationship between two ordinal (i.e., ranked) variables. In this case, each asset category is first ranked according to each of the three measures of risk-adjusted portfolio performance and then the degree of association between the alternative performance measures is computed. The Spearman rank correlation coefficient is given by:

$$r_s = 1 - \{ (6 \sum d_i^2) / [n(n^2 - 1)] \},$$

where:  $d_i = X_i - Y_i$  and the test-statistic for the Spearman rank correlation coefficient when  $n$  is large is:

$$z = r_s (n - 1)^{0.5}.$$

For further details on this measure, see Weirs [28].

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