

Analyzing Real Estate Portfolio Returns: More than Alpha and Beta...There's Gamma

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Executive Summary

Traditionally, core real estate, as exemplified by the NCREIF National Property Index, represents the “beta” or market return to institutional real estate. Enhancing the beta with “alpha,” in the traditional securities market sense, requires superior insight into asset allocation, asset selection, and market timing—activities whose success, based on historical data from the public securities markets, can be ephemeral and not particularly powerful. Leveraging the assets, which has become increasingly popular in the search for higher returns, also leverages the risk—in effect steepening the market return line.

An increasing proportion of new money allocated to institutional real estate managers today is targeted for higher-return potential in employing value-added or opportunistic strategies. To the extent such out-performance can be attributed to superior insight or talent on the part of management, this can properly be attributed to “alpha.” But, what about all the other garden-variety activities employed in real estate? By virtue of being able to *take control of the asset*—something not possible in publicly-traded securities, managers routinely invest additional capital and/or effort in refurbishing, re-tenanting, redeveloping, creatively financing, or simply changing some or all of the management team. In this paper, we collectively label such “control” activities as real estate’s “gamma.” The portfolio return equation then becomes: $R = \text{Beta} + \text{Alpha} + \text{Gamma}$.

By analyzing the 11-year experience with an actual portfolio, this paper will show how gamma can be much more powerful than alpha in enhancing the beta of real estate, with only a marginal increase in volatility risk, if certain diversification practices are followed. Gamma can better explain why previously mislabeled “alpha” can be so

positive and persistent in real estate studies. It is possible, even, that the concept of “gamma” will satisfy skeptics and motivate institutions to increase their allocation to real estate. Somehow, NPI returns alone, with their desirable attributes of low correlation and standard deviation, are not compelling enough to offset investors’ concerns about the illiquidity and unfamiliarity of private market real estate. The enhanced return/risk trade-off offered by the “gamma” of real estate could well increase comfort levels and move allocations higher.

In summary, it may make much more sense for institutional investors to *create* core properties than to *acquire* them.

On Improving the Credibility of Real Estate Finance and Theory

Much of the publishing activity of the recent decade or so has been aimed at improving the stature and credibility of real estate as a mainstream asset class. In so doing, there have been many papers seeking to explain real estate in the language and practices of the public securities realm. This has indeed been helpful. Cap rates are increasingly understood to be simply the inverse of the P/E ratio. NCREIF is achieving status as a provider of useful benchmarks, repeat-sale indices, and data ranging from property level details to pooled fund performance. Recent work (e.g., Pagliari 2004) has helped to explain the relationship between private market and public REIT returns. As real estate investment sophistication improves, so does its credibility with institutional and private investors.

Still, as illustrated by the lack of real estate education in the CFA program, there remain nagging doubts about how much is to be believed. The lumpiness of property investments and the non-normal distribution of returns lead to difficulties in deriving statistically reliable performance attribution analyses. Further doubts are raised when so many investment managers claim large and persistent “alphas” versus their benchmark. Even in the highly sophisticated UK real estate industry, Lee and Stevenson (2002) found that “on average, real estate funds delivered significant risk-adjusted performance” over the period studied. This kind of result reaffirms doubts about the credibility of the asset class. Abundant and persistent alpha does not exist in public securities portfolios. In the world of public securities, “alpha” is traditionally conceived as the excess return generated by managers solely from asset selection and market timing. Because the sum of all managers’ alphas is zero (in concert all their actions *define* the benchmark index), it is the rare manager that persists year after year in deriving significant positive alphas.

After reading the Winograd (2004) treatise on alphas and betas, Conner and Liang (2003) about value-added activities, and Falzon et al (2002) about the much wider spread between top and bottom quartile manager performance in private market investing than in public, the thought emerged: perhaps real estate (and, indeed, venture capital) investment theory needs another Greek letter.

Proposing an Improvement in the Portfolio Return Equation for Real Estate

The conventional portfolio return equation in modern portfolio theory has been simply:

$$\text{Portfolio return} = \text{beta (market return)} + \text{alpha (manager selection and timing contribution)}$$

However, there is *one very important difference between private market investing and public securities investing*: private market investing usually involves *taking control of the asset*. In public securities, the best one can do is to cast very small minority votes for board seats and resolutions. In real estate, the investor can take total control of the asset: hire and fire management and vendors; develop budgets; change the physical structure; change the tenant profile; change the financing package; etc. This ability to *control* can lead to a *change in intrinsic value*. In public securities, all one can do is to *evaluate* the value changes being undertaken by the in-place management, all of which is public knowledge. Investment performance then is based on one's ability to perform superior evaluations. One of the earliest acknowledgments of this major difference between private and public investing is in Stoesser and Hess (2000) wherein they distinguish between "production value-added" and "investment value-added."

In real estate, the investor can buy an ordinary property at full market price (no alpha), but still produce superior returns by improving the value of the asset. To date, in standard attribution analyses, such value improvements have all been lumped in with "alpha." To really understand the performance of a real estate portfolio, we need another Greek letter, and this paper proposes the use of the next one in sequence: the "gamma." Thus, the portfolio return equation becomes:

$$\text{Portfolio return} = \text{beta (market return)} + \text{alpha (selection, timing)} + \text{gamma (value-added)}$$

Such value-added activities (resulting from the ability to control the asset) can have such a dominant impact, that Kaiser (2005) found that "style boxes" in real estate were classified more by the activities engaged in than by the assets that were purchased (as is the case with public securities "style" definitions).

An alternative approach to determining the property level returns was offered by Geltner (2003), in which he offered analytic procedures for evaluating three components of a property's IRR-based return: the initial yield; the cash flow change; and the yield change. However, this approach was somewhat cumbersome and subjective, requiring anecdotal evidence from the asset managers to make some distinctions. A further complication in an IRR-based approach is that alpha and gamma activities are largely indistinguishable.

In order to focus this discussion and the analysis that follows, it is proposed that the activities of real estate investment managers can be classified into three groups—beta, alpha, and gamma—as shown in Exhibit 1.

Exhibit 1

Classification of Actions Available to Real Estate Investment Advisors

	<u>“Beta” Acts</u>	<u>“Alpha” Acts</u>	<u>“Gamma” Acts</u>
Portfolio Level	Implement client benchmark Focus on adequate diversification Add leverage to portfolio.	Deviations from benchmark. Targeted over/under weights. Vary targets over the cycle Vary leverage over the cycle. Timing of cash vs. property.	Creative application of leverage strategies.
Property Level	Buy core at market. Long-term hold strategy.	Seek information advantage. Seek mis-pricing opportunities. Local cycle-timing strategies. Active high-bidder sales strategy.	Develop relationships to encourage owners to sell/joint venture “off market” Acquire properties with high vacancy risk. Property Control Activities: -Control management/leasing team. -Add developer partner to team. -Re-tenanting strategies -Refurbishment strategies. -Redevelopment or new development strategies

Other observers, especially Conner and Liang (2003) have usefully categorized the “gamma” acts into three categories of “value-added” activities: physical; financial; and operational. Most observers, such as Stoesser and Hess (2000) then conclude that these activities typically have their greatest impact in the “wealth creation” phases of the property life cycle—development and re-development. On further thinking, however, it becomes apparent that such activities pervade the world of real estate, and are embedded in “beta” numbers (the NCREIF Index) and in “alpha” performance attribution, not just in the world of closed-end value-added and opportunistic funds. Exhibit 2 offers one possible classification of gamma activities by their relative importance in contributing to the performance numbers in the NCREIF Index vs. the usually higher-return numbers in the non-NCREIF-reporting property funds.¹

“Gamma” acts conventionally reported in NCREIF:

“Beta” acts

Maintain property’s relative market status by:

- Maintain management team
- Routine re-leasing

- Routine maintenance

“Alpha” acts

Improve property’s relative market status by:

- Change of management team.
- Re-tenanting strategies.

- Rehabilitation to maintain competitiveness with new properties.

“Gamma” acts usually included in Value- Added or Opportunistic (Non-NPI property)

Substantially alter property’s relative market value by:

- Adding developer partner to management team
- Re-tenanting strategies with substantial vacancy risk
- Increase size and/or change utility of space by redevelopment or new development.

• Operational Phase •

• Development and •

Re-development Phase

Obviously, control activities do fall along a continuum from ordinary and necessary activities to major re-development. Although the NCREIF Index is thought of as the “market return” line, it indeed does depend on the cumulative impact of all managers’ activities in managing, leasing, and maintaining their properties. A slightly more talented and/or hard-working manager then could easily create the appearance of some “alpha” performance simply by making the properties perform to a higher level than the market on average, through superior management, re-tenanting, rehabilitation, etc. while never going so far as to remove the property from NCREIF-qualifying status (i.e., generally remaining close to fully-leased).

A Real-world Analysis of Beta, Alpha, and Gamma

To illustrate the application and possible utility of this proposed “gamma” theory let us now consider the facts of a real property portfolio. To be useful for this purpose, the portfolio should: a) contain a range of properties from core to value-added to opportunistic (all phases of the property life cycle); and b) provide the availability of sufficient property level data for the analysis. The portfolio selected, while not particularly large, does indeed encompass the full range of gamma activities. Further, it offers a long enough time horizon (11 years) to produce potentially significant results, thereby reducing the problems highlighted in Young and Grieg (1993) and Young and Annis, (2002).

The study portfolio is the major part of an open-end fund (quarterly share purchase and redemption), with the lesser portions in cash and publicly-traded REITs excluded from this analysis. The fund has pursued a consistent strategy of “value-added” acquisitions, as well as a fairly long-term hold policy in order to preserve its REIT status. Properties include the four major property types, with a national geographic coverage. The portfolio was begun in 1990, but did not reach a reasonable minimum level of diversification until it held 10 properties in 1994. Thus, the study period runs from 1994 through 2004. Exhibit 3 contains some summary statistics.

Exhibit 3

Summary Statistics of Study Portfolio

<u>Year</u>	<u>NPI Portfolio</u>		<u>No. of Properties</u>	<u>Market Value Props. (Millions)</u>	<u>Loan-to-Value</u>	
	<u>Return</u>	<u>Return</u>			<u>Sold</u>	<u>Percentage</u>
1994	6.38	15.62%	10	\$118	0	28%
1995	7.53	15.89	12	158	0	31
1996	10.30	15.14	13	168	1	29
1997	13.91	16.26	14	191	1	32
1998	16.24	21.67	17	223	0	24
1999	11.36	11.04	33	316	1	33
2000	12.24	12.48	35	396	1	31
2001	7.28	11.54	35	411	2	31
2002	6.77	7.47	36	442	1	35
2003	9.00	8.41	37	461	2	39
2004	14.50	19.04	38	618	2	35
Annual	10.45%	13.98%				
Std. Dev.	3.42%	4.33%				

Over this period, the mix of property types varied widely, with retail beginning at 29% of the portfolio, but only averaging 4-8% in the recent 5 years. Offices ranged a bit lower than NPI levels, varying between 16% and 28% in no particular pattern. Industrial started at 13%, rose to 47% in 1999, and gradually declined to 27% by the end. Apartments ranged from 20-40% in no particular pattern.

A naïve conclusion from these statistics would be that the study portfolio used its 30%+/- leverage to outperform the NPI, and also endured a bit higher volatility because of the leverage. The story proves to be more interesting than that.

Methodology and Preliminary Conclusions – Beta and Alpha

One of the issues in this kind of analysis involves reconciling the timing and frequency of property appraisals. Seasonality effects can destroy the reliability of quarterly attribution analyses, as in Graff (1998). In the NPI, some properties are appraised quarterly, others only yearly, with a distinct fourth quarter seasonality. Recent statistics continue to show this trend, with 35-42% of NPI properties (by market value) reappraised in quarters one through three, and 53% appraised in the fourth quarter. On average, properties are appraised about 1.7 times per year. The study portfolio pursued a policy of appraising approximately one-quarter of the portfolio in each quarter, with each property valued in the same quarter each year. Properties in development were carried at accumulated investment cost until sufficient lease up had occurred to substantiate an appraisal, usually within two years of initial acquisition. As a consequence, in order to reduce the seasonality effect, this study considers only annual returns.

Step 1: Evaluating the leverage effect on Beta. In order to fairly compare the un-levered NPI with the study portfolio, the NPI returns were levered by the annual LTV ratio for the study portfolio. NCREIF provides a set of cash flow-based statistics on its website in addition to its traditional accounting-based returns, in which income is defined as NOI income and the difference between that figure and the total return represents the appreciation return. The cash flow statistics subtract the reinvested capital from NOI, to arrive at true distributable income to the investor. The difference between this and the total return is called the *capital return* (or, appreciation). This study levered this capital return by the LTV ratio, and added it back to the cash flow return, to get a total levered return for the NPI. The cash flow return was not levered, with the simplifying assumption that the debt cost approximated the cash flow, which began in the mid-6% range in the early years, declining to 5.2% by 2004. The result was a levered NPI annual return of 12.14%, with a standard deviation of 4.61%. Thus, nearly half of the return difference (169 bps.) between the study portfolio and the NPI can be accounted for by the use of leverage. There is a comparable rise in volatility risk. But, what about the other 184 bps difference in return?

Step 2: Evaluating the property type and geographic selection effect on Alpha. At this step, further complications are introduced, by having to deal with small sample sizes of statistics in addition to the seasonality problems. In this step, a re-weighted NPI return series was derived from annual NPI returns from each MSA for the specific property type

in the study portfolio and weighting them by the study portfolio weights. MSA/property returns were included for only the whole years that a study portfolio property was held. In a few early years, there were fewer than four NPI properties (the minimum to meet NCREIF masking criteria) so proxies were created. For example, Maryland office substituted for suburban Baltimore returns in 1994-96, Chicago/Milwaukee retail substituted for Milwaukee neighborhood retail for the whole period, and North Carolina apartments represented Raleigh apartments for 1994-95. Nonetheless, we believe the results to represent a viable approximation in the search for alpha. The “re-weighted” NPI produced an un-levered annual return of 10.79% over the 11 years, indicating a possible “alpha” of 34 bps from choosing an above average mix of MSA/property-type sectors over this period. This may not be statistically significant.

However, that is not to say that the managers of the study portfolio intentionally focused their acquisition policies on a search for out-performing property types or MSA’s. Rather, acquisitions were selected as offering the best return/risk trade-off at the time from among the various opportunities that presented themselves. In other words, “deal selection” was the driving force, not some sort of “top down” view that these sectors were the best. (It is true, though, that the *sale* strategy over this same period was at least partly driven by a top-down view as to which sectors represented the best cyclical sale opportunities.)

Finally this particular mix of sectors did produce a lower volatility, with a 2.23% standard deviation. Though this lower risk (along with the 34 bps of selection alpha) could very well simply be fortuitous, it could also be the result of conscientiously diversifying the MSA mix via the sophisticated economic driver methods of Mueller and Ziering (1992) and the geographic clustering methods of Ziering and Hess (1995). The study portfolio’s diversification policy and status at the end of 2004 is shown in Exhibit 4.

Exhibit 4

Study Portfolio Diversification by Economic Region as of December 31, 2004

<i>EMPLOYMENT CODES</i>	1 Traditional North American	2 Older Financial & Cultural	3 Energy	4 High Growth Lifestyle	5 New Age Hi-Tech	6 Regional Center - Distribution	7 Education/ Government
I. Diversified	6%			11%	6%	2%	
II. Farm							
III. Finance/Insurance Real Estate		7%			7%		
IV. Government					7%	16%	7%
V. Manufacturing	4%			2%			
VI. Military				7%			
VII. Mining			6%		8%		
VIII. Service				6%			
IX. Transportation							

It is quite conceivable that the study portfolio’s diversification policies did produce a superior risk control to that of the naïve NCREIF portfolio, thereby producing the reduced volatility.ⁱⁱ

From the levered Beta and the sector selection Alpha, then, we can isolate the unexplained portion of the total return, as shown in Exhibit 5.

Exhibit 5

Study Portfolio Beta, Alpha, and Unexplained

11-Year Summary Performance

	Annual Return	
“Real Portfolio”	13.98%	
NPI	10.45%	= 353 bps total difference
NPI Re-weighted to Real Portfolio		
MSA/Prop. Mix	10.79%	= + 34 bps MSA/Prop. sector mix “alpha”
NPI – Levered*	12.14%	= +169 bps in “beta”
Unexplained Difference	150 bps	

The unexplained difference of 150 bps is a fairly large figure, and must have some statistical significance as it is derived from a fairly large portfolio over a fairly long time period. We believe there is a reasonable explanation—the Gamma we postulated earlier.

Methodology and Preliminary Conclusions – Gamma

Throughout the 11 years, the study portfolio focused on “value-added” acquisitions which, at the time, involved two often-intertwined strategies: 1) taking advantage of what were perceived to be situational mis-pricing of properties (in its purest form, an “alpha” strategy); and, 2) acquiring properties where there were potential profits to be made from development or redevelopment. In reality, these two strategies were often combined in an acquisition. On average, about 18% of the portfolio was represented by such opportunities each year, with a range from 0% to 27%. Most of these projects required considerable commitment of capital and/or management effort to add the potential value to the property. Such “value-add” returns were typically recorded in the first one or two annual appraisals, after which the property became leased enough that it took on the characteristics of the “core” properties that comprise the NCREIF Index.

In this analysis, two property holding periods were defined: the heavy “value-added—or gamma—period, and the stabilized core period. And, again, only whole-year annual data were used (excluding partial years in which properties were either acquired or sold) for both the study properties and the corresponding NPI MSA/property sectors. (At this time, the data is only refined enough to consider the 10 years 1994-2003.) Over those ten years, there are 33 property-years in the value-added or “gamma” phase and 102 property-years in the core, or “beta” phase. Also, only unlevered returns were used, because it is impossible to know the leverage ratio applicable to each property when much of the financing is carried at the portfolio level. Finally, there was no weighting by market value, in order to see the average “beta” effect without the distortions introduced by large properties. (This simplification is not unreasonable since the vast preponderance of properties bunch in the \$15-30 million size range.) *The results were strikingly significant: “gamma” years outperformed their NPI sector benchmarks by over 800 bps, while “beta” or core property years outperformed by only 62 bps!*

From these statistics, it seems clear that most, if not all, of the unexplained 150 bps of portfolio out-performance came about as a result of the high gamma activities. (There were eight properties requiring ground-up development, with the portfolio assuming much of the development and all of the lease-up risk. Another dozen properties involved substantial re-development effort and vacancy risk of up to 100%).

Based on conventional wisdom and the facts of this study, it seems clear that taking on such high gamma activities represents a substantial move to the right on the risk curve, with roughly double or triple the volatility. The results are summarized in Exhibit 6.

Exhibit 6

Property Returns and Risks Segregated by Level of Gamma Activity

1994-03

	<u>Value-added or Opportunistic Property Years</u>	<u>Stabilized Core Property Years</u>
Number of whole years	33	102
Out-performance vs. NPI MSA/property sector	ave. +802 bps	ave. + 62 bps
Standard deviation	20.08	6.55
Median out-performance	+664 bps	+70 bps
Highest out-performance	+7294 bps	+1729 bps
Lowest under-performance	-2850 bps	-2044 bps
Modified standard deviation, (Excluding high and low extremes)	14.11	5.97

The data do indeed confirm the conventional view that taking on substantial development or leasing risk does represent the assumption of higher volatility

outcomes. What is curious is that the portfolio total return does not feel riskier to the investor. This is not because there was some fortuitous offsetting of good years with bad. In fact, the converse was true: the three worst property-years bunched in the slow-to-recover economy of 2003, a very difficult period to sign new leases. Instead, there appear to be two other diversification mechanisms at work: the dampening effect of the other “core” properties in the portfolio; combined with economic cluster differentiation.

In the case of the “core” properties, one cannot necessarily conclude that the 62 bps of superior performance are indeed superior, due to the small sample size and non-normal distribution problems noted in Young and Annis (2001). Or, if they do represent superior performance, how much is due to the selection effect of alpha (picking better properties) and how much is due to less notable gamma activity that creates value in excess of local market forces. The kind of analysis needed to separate the alpha from the gamma remains for future research.

Conclusions

From the analysis of a real portfolio containing a wide range of core to opportunistic properties it appears that one can, at least crudely, discern the relative contribution from beta, alpha, and gamma strategies. Of the three, alpha appears to be the smallest, which is consistent with many studies from the public securities arena. Beta can be a substantial contributor, particularly where significant leverage is involved. Yet, of them all, gamma may be the largest and, as yet largely unstudied, contributor to superior returns in private real estate investing.

By virtue of taking control of the asset, and implementing some combination of physical value-added, financial value-added, or operational value-added strategies, investors can achieve returns not normally found in public securities investing. Indeed, the “gamma” factor can serve to explain:

- The frequency and persistence with which many portfolios out-perform the NPI
- That at least a portion of the higher returns delivered by value-added and opportunistic closed-end funds is due to the on-going efforts of management, not just higher leverage or “cherry-picking” of opportunities.

Indeed, by understanding that there are value-creating activities occurring at the property level, real estate skeptics can come to understand that the beta and alpha parts of real estate do bear some similarity to those found in publicly-traded securities.

The presence of gamma also means that return attribution work can no longer assume simply that a “manager shows superior property *selection* skills when holding individual property investments that outperform the market,” Liang et al, 1999. There can be some causal activity that adds to a property’s otherwise market-related returns. Much of this activity is only known anecdotally, in stories, for example, about finding a way to

add two more shop spaces in the parking area of a strip mall, or about renovating rent controlled apartments at turnover de-control, etc. In fact, we don't know how much "gamma" is already included in NCREIF reported returns.

Parallels with Corporate Securities Investing

In the private market phases of corporate investing, the investor also can take control. In venture capital, the venture capitalist actively sits on the board of portfolio companies—hiring and firing management, restructuring the capital base, selling off component assets, seeking mergers, etc—tools which are not available to the arms-length public securities investor. And, in the world of venture capital, high returns are not uncommon, and are comparable to those produced by real estate opportunity funds.

In LBO's (leveraged buy-outs) or other forms of taking a company private, there often is a substantial "control premium" to be paid in order to acquire enough securities to obtain full control of the underlying company. The acquiring investor then goes on to restructure, to change management, etc. to add value beyond the cost of the control premium. The value of the gamma that can be produced by controlling a corporate asset and working to change its value appears to be substantial indeed.

Implications for Future Research and Industry Practice

For those in industry or academia who see the potential of analyzing property returns for their gamma component, there is a rich potential for future work.

- What is the risk/reward ratio for typical development and redevelopment phases of a property life cycle—how much gamma is there in these high returns, in addition to the underlying market trend forces, and at what risk, or volatility of outcomes?
- Is there a base level gamma in the NCREIF return data that really is just part of the beta—a "required minimum" activity to maintain a property's competitiveness in the local marketplace and thereby earn the local market rate of return?
- How much more obvious gamma might there be in the NCREIF Index data?
- What is the potential impact of gamma on real estate's role in the asset allocation process for mixed asset portfolios?

- What does the understanding of gamma imply for future versions of “style boxes” in real estate investment management? (How much gamma can be tolerated and still allow a fund to be classified as “core-plus”?)
- How much gamma is needed to offset the risk of buying core at today’s low cap rates? Should investors build core rather than buy core?
- How can the concept of gamma help improve the credibility of real estate among institutional investors? Can it really explain some of the “un-believability” of real estate risk and return?

There could indeed be much to discover about the proposed new equation:

$$\text{Private market returns} = \text{Beta} + \text{Alpha} + \text{Gamma.}$$

ⁱ In order for properties to qualify for inclusion in the NCREIF Index, they must be “institutional grade”, held in a fiduciary environment, and be generally fully leased. This means that such properties are generally in the “operating asset stage” as defined by Conner and Liang (2003), not in the development and lease-up or the redevelopment and repositioning stages where there would likely be some period of substantial vacancy. In fact, NCREIF-qualified properties that enter into a period of substantial redevelopment are often dropped from the index until such time as they are once again substantially leased.

ⁱⁱ Another contributor to the low volatility number is the fact that the study portfolio held development projects at accumulated cost until the first appraisal, which could be a period as long as 2 years. However, in removing these zero return years from the model, it appears that the standard deviation would rise less than 10 bps.

References

Conner, P. and Y. Liang, The Expanding Frontier of Institutional Real Estate, *Real Estate Finance*, October 2003, 20:3, 2-10..

Falzon, R., M. Halle, and R. McLemore, Private Equity Investing in US Real Estate Companies, *Prudential Real Estate Investors white paper*, November 2002.

Geltner, D., IRR-Based Property-Level Performance Attribution, *The Journal of Portfolio Management*, Special Real Estate Issue, 138-151, September 2003.

Graff, R. The Impact of Seasonality on Investment Statistics Derived from Quarterly Returns, *Journal of Real Estate Portfolio Management*, 1998, 4:1, 1-16.

Graff, R. and M. Young, Real Estate Return Correlations: Real-World Limitations on Relationships Inferred from NCREIF Data, *Journal of Real Estate Finance and Economics*, 1996, 13:121-142.

Kaiser, R., Investment Styles and Style Boxes in Equity Real Estate: Can the Emerging Model Succeed in Classifying Real Estate Alternatives?, *Journal of Real Estate Portfolio Management*, January-April 2005, 11:1, 5-18.

Lee, S. and S. Stevenson, A Meta Analysis of Real Estate Fund Performance, *Paper presented at the AREs annual meeting in Naples, FL*, 2002.

Liang, Y., R. Hess, D. Bradford and W. McIntosh, Return Attribution for Commercial Real Estate Investment Management, *Journal of Real Estate Portfolio Management*, 1999, 5:1, 23-30.

Mueller, G. and B. Ziering, Real Estate Portfolio diversification Using Economic Diversification, *Journal of Real Estate Research*, 7:4, 375-86, Fall 1992.

Myer, F.C.N. and J.R.Webb, Statistical Properties of Returns: Financial Assets Versus Commercial Real Estate, *Journal of Real Estate Finance and Economics*, 8, 267-82.

Stoesser, J. and R. Hess, Differentiating Higher Return Strategies in Property Markets, *Prudential Real Estate Investors white paper*, August 2000.

Young, M. and S. Annis, Performance Attribution: Pure Theory Meets Messy Reality, *Journal of Real Estate Research*, 23:1, Jan-April 2002, 3-28.

W. Greig, Drums Along the Efficient Frontier, *Real Estate Review*, Winter 1993.

Webb, J.R. and F.C.N. Myer, Management Style and Asset Allocation in Real Estate Portfolios, *Journal of Real Estate Portfolio Management*, 2:2, 119-25, 1996.

Winograd, B., Alpha and Beta – Translated from the Greek, *Prudential Investment Management white paper*, October 2004.

Ziering, B. and R. Hess, A Further Note on Economic vs. Geographic Diversification, *Real Estate Finance*, 1995.

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