AN EXAMINATION OF INSTITUTIONAL REAL ESTATE PERFORMANCE INDICES

by

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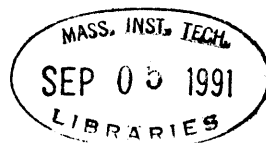
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ABSTRACT

This paper examines a number of issues regarding institutional
real estate performance indices. These indices are used by
investors in evaluating the performance of institutional real
estate holdings, and more specifically in evaluating fund
managers, setting   asset   allocations   and   determining
diversification policy. The Russell-NCREIF Index which is the
most widely referenced measure of institutional real estate
performance data is discussed in detail. Issues considered in
evaluating this index include the lack of an adjustment for
management fees, the manner in which capital expenses are
reported, and the issue as to whether an appraisal bias may
exist. A number of other indices are reviewed in less detail.

Additionally, current efforts to disaggregate the Russell-
NCREIF Index which involves separating the index so as to
provide market measures based on property type, geographic
location, and other property characteristics are reviewed. The
status of efforts by Russell-NCREIF to create indices for
leveraged properties and for hybrid debt investments is also
discussed. A discussion of the merit in indexing properties
based on lease structure and a proposed format for this index
follows. Lastly, conclusions on various aspects of the paper
are provided.

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For Daphne, my constant source of inspiration

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Chapter I: Introduction

Institutional investors, comprised primarily of pensions and profit sharing trusts, have in recent years been the most active source of capital in most major real estate markets. In spite of the current precarious state of many real estate markets, it appears that institutional investors will remain the primary source of capital for future real estate development. Institutional investors oversee the largest pool of capital within the United States available for long term financing commitments. These funds currently total $2.3 trillion [9] and represent a significant portion of the total capital within the United States. Unlike European countries where some institutional investors have allocated twenty to thirty percent of their capital to direct real estate holdings, direct real estate investments comprise a much smaller share of the assets of United States institutional investors, roughly four to five percent [15].

Direct net institutional investment (as contrasted to investment in the form of mortgages) in real estate peaked in 1987 at $14.5 billion and has since declined to a level of $11.0 billion in the most recent calendar year [32]. Although institutional investors and others are carefully assessing their views on real estate given the erosion that has occurred in property values, their role as the primary source of long term capital available within the United States and the continuing growth in this pool of

capital make it likely that they will remain a critical source of
capital for future real estate development and investment.

Because these institutions hold funds belonging to employees
of both public and private entities earmarked for future
retirements and other needs, the manner in which these funds are
invested is closely scrutinized. Indices provide one of the few
tools available to discern past performance and project future
performance, and thus are heavily relied upon. These indices are
thought to be of value in assessing the performance of real estate
funds, determining optimal allocations for investment portfolios,
and comparing real estate to other investments [13].

Unlike indices for other asset classes most real estate
indices are appraisal-based as opposed to transaction-based. This
distinction as well as the limited number of properties comprising
most real estate indices results in a number of issues, perhaps
shortcomings, that need be carefully considered in reviewing these
indices.

This paper addresses a number of these issues primarily with
regard to the Russell-NCREIF Index which is the most widely
referenced measure of institutional real estate performance data.
The Russell-NCREIF Index is a joint effort of the National Council
of Real Estate Investment Fiduciaries ("NCREIF") and the Frank
Russell Company that was formed in 1982. Returns for previous

years were collected initially and published dating back to 1978.
The index at its outset was comprised of fourteen investment
managers and included 234 properties. Participation since this
time has increased significantly and, at present, the index
includes roughly 1,500 properties held by fifty-six investment
managers and two pensions [26]. The Russell-NCREIF Index was the
first real estate index developed within the United States and as
a result there have been a number of obstacles to overcome.
Perhaps the most significant initial obstacle was simply persuading
an adequate number of money managers who for the most part had not
typically shared investment information to participate in the
index. More recent issues have included the need for periodic
corrections to previously stated returns to correct for incomplete
or inaccurate data collection and a refinement in property
definitions for warehouse and R&D/office properties made in 1988
due to inconsistencies in how members were defining these property
types.

While these issues might be termed developmental in nature and
seem to have been successfully addressed, there remain a number of
widely held concerns with the index. These concerns relate
primarily to the appraisal-based nature of the index and as such
may not be fully resolvable unless the index were to become
transaction-based. These issues include the following: the
exclusion of an estimate of management fees from the index, the
effect of capital improvement costs on total returns, the extent

to which appraised values fairly reflect current values of properties included in the index, and lastly, the index representing a collection of properties that may not be a suitable reference for many specific investment pools. Each of these items is discussed in detail. The appraisal issue is considered to be most significant and accordingly is reviewed most fully. Because the Russell-NCREIF Index is the most widely recognized real estate index, these issues are primarily reviewed with regard to this index. Several alternative real estate indices are discussed in less detail including Institutional Property Consultants' Benchmark, the Liquidity Fund National Real Estate Index, and the Real Estate Fund Return Descriptions published by Rogers, Casey & Associates. Those issues addressed above also pertain to these indices in varying degrees. These indices are discussed in Chapter II.

Data from the Russell-NCREIF Index is currently broken down by property type and geographic region. This process is termed disaggregation and exists so as to provide performance measures and market indicators based on specific property types or geographic areas. Efforts have also been made to disaggregate the index more fully such as by property type in a given area. These efforts however have been slowed by member concerns as to the confidentiality of property data and debate on the manner in which this data should be disseminated. The status of these efforts and

the complications accompanying the disaggregation of the index are discussed in Chapter III.

In addition to the index for unleveraged properties, two other Russell-NCREIF indices under development for a number of years may be published shortly. These indices are based on financial structure and include an index for properties having leverage in excess of five percent and an index of hybrid mortgage performance. Due to difficulties in accumulating data for a sufficient number of properties to support these indices as well as complications in data collection and in agreeing on how these indices should be calculated, the development period for these indices has been lengthy. In spite of the recent interest in resolving remaining difficulties and having the indices published, the value of these indices is unclear.

With respect to the leveraged properties index, given the wide variation in financing costs and the extent of leverage on properties, the index at an aggregate level would be of limited use. To be of practical use data would need to be disaggregated not simply by financing costs and leverage, but also based on property type and location. Given the limited size of the data base, this appears simply infeasible. Thus, the value of the index at a disaggregated level also appears marginal. Similarly, the hybrid debt index is comprised of properties where the participation component can take nearly an innumerable number of

forms. Even if this index were disaggregated fully such that proposed hybrid debt investments could be looked at relative to hybrid debt sub-indices having similar characteristics, the unique nature of any given hybrid debt investment brings to question what value the index will provide. These issues and a discussion of the merit of indices based on financial structure irrespective of these complications is included in Chapter IV.

A discussion of lease structure and the merit in tracking this property characteristic is provided in Chapter V. "Lease structure" as referenced here, encompasses lease durations and the creditworthiness of tenants. These issues are generally seen as fundamental considerations in evaluating real estate. In essence, an index reflecting lease structure involves identifying properties based on the portion of property value represented by existing leases and by that portion represented by residual interests, i.e. value not attributable to existing leases. While several articles have been written on this topic from a financing perspective, the possibility of disaggregating an index in this manner appears not to have been considered. This approach would supplement existing methods of disaggregating property data. An index reflecting lease structure would allow researchers to draw inferences from a more homogenous, appropriately grouped set of assets.

Chapter II: The Russell-NCREIF Index and Other Real Estate Indices

Russell-NCREIF Index

The principal issues to consider in evaluating the Russell-NCREIF Index include the following: the need for an adjustment to the index to reflect the cost of management fees, the effect of capital improvement costs on returns, the extent to which appraised values fairly reflect the current value of properties comprising the index particularly in light of the recent precipitous decline in property values and lastly, the index representing a collection of properties that may not be an appropriate reference for specific investment pools or for institutional real estate holdings collectively. Each of these items is examined in detail below.

Estimated Average Management Fees

Estimates of management fees have been derived based on a survey of forty-two open- and closed-end pooled funds representing $29.3 billion in assets and investing in all property types included in the Russell-NCREIF Index [27]. Determining a precise average for asset management fees is difficult in that some managers charge a fixed fee based on assets under management while others base fees on a sliding scale. Additionally, fees for cash reserves vary considerably as do disposition and incentive fees. Nevertheless, the brunt of the compensation provided to managers is based on a fee tied to net asset value and an approximation of asset management fees can be derived from this figure.

Based on twenty-four surveyed closed-end funds, management fees ranged from 1.0% to 1.25% of net asset value. Additionally, several funds had disposition or incentive fees tied to achieving certain targeted returns. For open-end funds, roughly one-half of the funds included in the survey based management fees on a sliding scale with typical fees ranging from .80% to 1.2%. Fees for those funds charging fixed asset management fees typically ranged from 1.0% to 1.2%. Only two of the eighteen open-end funds charged disposition or incentive fees.

Based on this data, a conservative estimate of management fees is 1.0% to 1.1% on net asset value. For purposes of this discussion, a figure of 1.0% is used. Results compiled by Evaluation Associates indicate median returns for the five year period ending December, 1990 for closed-end, open-end, and all equity funds as follows: 6.7%, 5.3%, and 6.6% [27]. Assuming management fees of 1.0% on net asset value, the adjustment required to reflect the cost of management fees would reduce the above returns by 15% to 19% (i.e., restated returns would be 5.7%, 4.3% and 5.6%). Clearly, the magnitude of these fees is such that an adjustment to the index may be appropriate before drawing inferences on real estate performance.

It should be noted that these fees are considerably higher than prevailing stock and bond management fees. Stocks, for

example, have asset management fees in the range of thirty to seventy-five basis points with fifty basis points representing an average fee level. Fees for managing fixed income pools generally are in the range of twenty-five basis points. Trading costs while not quantified in this discussion[1], are also significantly higher for real estate assets than for stocks and bonds. Real estate transaction costs are in the range of 150 to 300 basis points. Stock transaction costs for institutional traders are often as low as one cent per share; bond trading costs are comparable.

The Effect of Capital Improvement Costs on Total Returns

The effect of capital improvement costs on total property returns should be considered in evaluating Russell-NCREIF Index returns. Because only income and capital appreciation/depreciation components are provided by the index, the level of capital improvement costs is not easily discernable. The index is comprised of unleveraged properties. Thus, cash flow is equal to income less capital improvements.[2] While determining a precise average for capital improvement costs would require access to a representative sample of property data of Russell-NCREIF participants, an estimate for these costs has been derived based on data provided for twenty properties by fiduciaries participating

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[1] Average transaction costs are difficult to determine in that most open- and closed-end funds have not been in existence long enough to gauge typical holding periods.

[2] For purposes of this discussion, management fees, capital reserve accounts, etc. are not considered in cash flow.

in the Index [22]. These properties are geographically dispersed and include all property types.[3]

Setting aside one of the twenty properties with an unusually high level of capital expenditures (60% of appraised value), the average level of capital expenditures relative to annual income for the remaining properties was 16.9% over the period 1986-1990.[4] While it is difficult to generalize on the extent to which these capital improvements increased the appraised value of properties, clearly this level of capital expenditures indicates a significant level of reinvestment in properties.

There is also some concern that capital expenditures may have increased relative to past years. With an oversupply of space continuing in many markets and property owners often willing to incur higher initial costs to entice tenants, some portion of these costs generally are in the form of capital outlays and may not be recoverable. The current recession also exacerbates this problem in that the higher turnover of space due to defaults may result in property owners incurring tenant buildout costs more frequently than typical.

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[3] The geographic and property type distribution for these properties is as follows: West-9, East-4, South-5, Midwest-2; Office-7, Industrial-5, Retail-5, Apartment-1, Hotel-2

[4] Range of capital expenditures to appraised values was .9% to 37.1%. 14 of the 20 properties surveyed had capital expenditures in the range of 5% to 30%.

Discussion of Potential Appraisal Bias - Literature Summary

Unlike indices for other asset classes, most real estate indices including the Russell-NCREIF Index are appraisal-based indices. This distinction stems from the relatively infrequent nature of institutional real estate transactions and the resulting need to estimate values based on appraisals. The accuracy of appraisal-based indices has been a source of continuing concern and a topic of considerable research. Conventional wisdom has been that while appraisals may result in a "smoothing" of price volatility, a bias does not exist at the individual appraisal level. Accordingly, the focus of most research in this area has centered on whether a bias may exist at the index level assuming unbiased appraisals of market value.

An article written by Michael Gilberto [13] spurred considerable interest on this topic. This paper asserted that rate of return computations based on market value appraisals at the index level were generally biased. In instances where the appraisal errors were serially independent over time, this appraisal bias was shown to be positive. This research addressed bias in the holding period return only and left open the question as to the character and significance of this bias over time. A subsequent paper by David Geltner [12] considered this bias from the perspective of the arithmetic mean of a time-series of appraisal-based returns. This analysis concluded that bias based on holding period returns was minor assuming unbiased appraisals

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if portfolio values changed by a large fraction during the holding period. Further, the holding period return bias was determined to be in most instances of opposite sign to the pure arithmetic mean return bias and often of similar magnitude such that the two sources of bias would often largely offset one another. Thus, if appraised values of properties represented unbiased estimates of market values, holding period returns were found to be fairly accurate measures of performance from one period to the next.

George Gau and Ko Wang in a subsequent article on this topic [11] looked more closely at the direction and magnitude of holding period returns. This research concluded that the direction of the bias was determined by market trends in appraised values of portfolio properties and the resulting sign of the correlation of the holding period return. Using appraisal data from commingled real estate funds, this bias was found to be very modest in annual period returns. While each of these papers addressed bias at the index level assuming unbiased appraisals, several recent articles have examined the accuracy of underlying appraisals.

One such article based on returns from the Russell-NCREIF Index examined the relationship between income and appraised values. William Wheaton and Raymond Torto [37] in this paper addressed the relationship between income and the aggregate value for Russell-NCREIF office properties as well as the issue of what expectation of future income best reconciled Russell-NCREIF

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appraised values with expectations of income growth based on modern theory of asset valuation. The value of office properties was found to move essentially as a constant multiple of current income from 1978-1988, in spite of wide fluctuations over the period in cost of capital and inflation. It was determined that current property income was capitalized at between 7.0 and 8.3 percent over this period resulting in a price-earnings multiple between 12.0 and 14.3 with movement of this multiple somewhat dependent on inflation levels. Given the wide shifts in cost of capital and in inflation, this relatively constant p/e multiple appeared to be at odds with current asset valuation theory.

An effort was made to reconcile modern asset valuation theory with the Russell-NCREIF data by assuming that the appraisal process used a particular set of expectations about future rental income growth. These expectations, however, were found to vary significantly from actual income growth over most of the period. Assuming an appraisal discount rate of the long term bond rate plus 3%, the income growth anticipated by appraisers was determined and contrasted with the actual income growth from the index.[5] Expected income growth was 3% in 1978 and rose to 10% in 1982 and then fell gradually to 5% from 1983-1988. In contrast, actual rental inflation peaked at a level of 12% in 1979 and then, with one exception, fell sharply into the negative range over the period

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[5] The three percent adjustment to the long term bond rate is an estimate made by Wheaton-Torto of the risk premium for real estate used by investors for the period 1978 to 1988

1983-1988. Thus, if appraisals were based on a true market opportunity cost, past expectations of future income growth were shown to be consistently and systematically wrong.

This divergence between actual and anticipated income growth is reflected in the disparity between discounted values and Russell-NCREIF index values as shown in Table and Exhibit I. Discounted values are determined based on actual income growth through 1988 and projected income growth in later years estimated by a regression using forecast rental growth and forecast economy wide inflation as inputs.[6] The discounted values show considerably more variation than index values (i.e., appraised values) and a decidedly different long term trend. The volatility in discounted values stems from shifts in the cost of capital, and the growth of rental income.

Table I
Russell-NCREIF Index Values/
Discounted Values for Office Properties

Year	Discounted Value	Russell-NCREIF Index Value
1978	1.60	1.00
1979	2.30	1.10
1980	1.40	1.25
1981	0.80	1.45
1982	0.70	1.48
1983	0.85	1.50
1984	0.65	1.53
1985	1.20	1.55
1986	0.75	1.50
1987	0.70	1.48
1988	0.65	1.40

While this research was based on earnings growth derived from historical performance and discount rates reflecting a constant

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[6] The discount rate used is the 3% premium over the long term bond rate referenced previously.

Exhibit I

Discounted Values/Russell—NCREIF Index
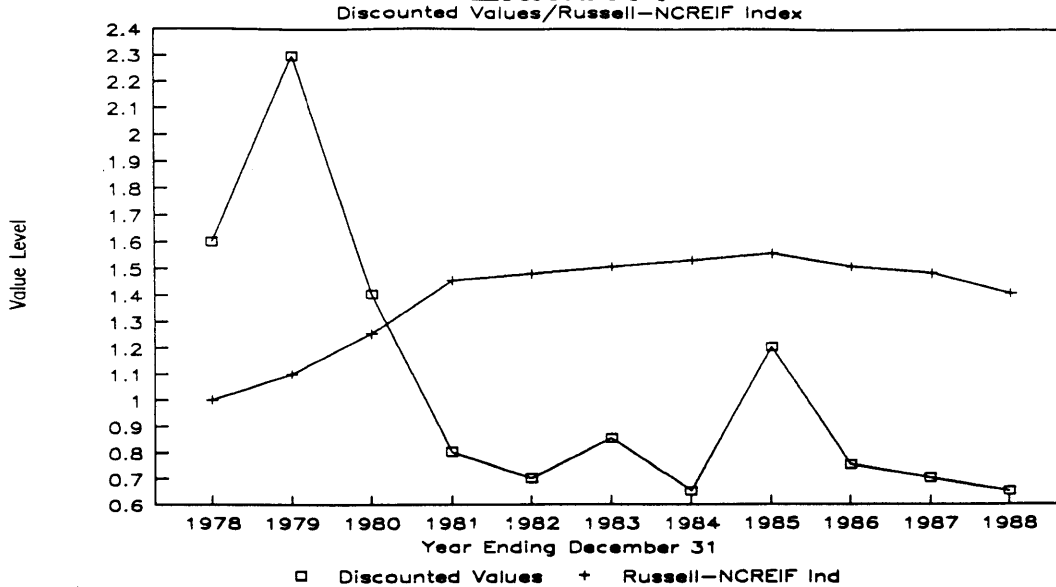
Source: Wheaton—Torto [37]

risk premium to long term bonds, a subsequent paper by Robert Frank
of Alex Brown [10] provided an estimate of appraisal bias using
external estimates of discount rates and earnings growth. In this
paper, investor internal rate of return requirements were based on
surveys provided by Real Estate Research Corporation. Earnings
growth and appreciation were projected at 0% and 2% for 1991 and
1992 respectively, and 5% thereafter. A discounted value was then
derived for the index in the following manner: 1983 was used as a
reference year with returns for subsequent years determined based
on actual or projected income growth and appreciation; a five
year holding period was assumed with year-five terminal value based
on year-six income capitalized at a yield of 100 basis points

higher than the initial yield;[7]
these figures were then discounted
based on Real Estate Research
Corporation's expected IRRs for
institutional investors. Results
based on these discounted cash
flows relative to actual Russell-
NCREIF Index values are shown in
Table and Exhibit II. Throughout
the projection, Russell-NCRIEF Index values exceed RERC IRR values
with the disparity as of 1990 at 19%. This analysis, in having
offered a specific estimate of the appraisal bias, is perhaps the
most pointed research to date on this topic.

Table II
Russell-NCREIF Index Values/
RERC Internal Rate of Return Values

Year	Russell-NCREIF Index Value	RERC IRR Value
1983	100	96
1984	108	105
1985	124	109
1986	137	112
1987	154	124
1988	163	136
1989	171	138
1990	184	154

Exhibit II
RERC IRR Values/Russell—NCREIF Index

Year Ending March 31
□ Russell—NCREIF Ind   + RERC IRR Values
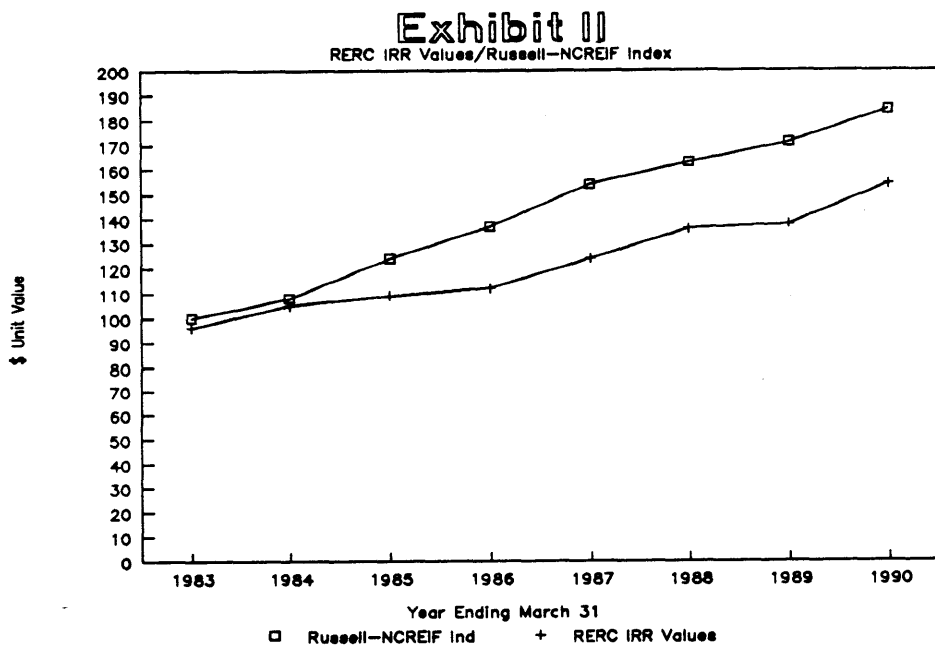
Source: Alex Brown [10]

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[7] This higher terminal yield was used to reflect real
depreciation, actual capital expenditures for tenant improvements,
etc.

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Evaluation of Potential Appraisal Bias

The manner in which appraisal bias is addressed here draws in part on the Wheaton-Torto [37] and Alex Brown [10] research on this issue. An implied value for the Russell-NCREIF Index is determined based on a discounted cash flow analysis. This discounted value is based on existing income, a projection of future income and a discounting of these cash flows to derive a net present value. Two separate sets of discount rates are used: a series provided by Real Estate Research Corporation based on surveys of investor yield requirements, and discount rates derived from capitalization rates provided by the American Council of Life Insurers based on surveys of mortgage commitments made on commercial properties. These discounted values are then contrasted with actual index values.

Analysis

1. Historical returns for both income and appreciation of the Russell-NCREIF Index are used for one-year periods ending March 30 between 1984 and 1991. For future years, an estimated earnings growth rate is estimated. Specific earnings growth rates are used from 1992 through 1995; a constant earnings growth rate is assumed thereafter.[8]

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[8] This earnings growth rate is derived based on Real Estate Research Corporation investor surveys. Most respondents indicate they anticipate no growth in earnings for the next two to three years and gradual earnings growth thereafter. Earnings growth assumptions used to determine discounted values are no growth for 1992 and 1993, three percent for 1994, four percent for 1995 and five percent thereafter.

2. 1984 has been used as a reference year and assigned a value of $100.00. Index values are adjusted each year by adding the capital appreciation/depreciation component to arrive at a new value for the subsequent year.

3. Internal rates of return are used to discount a constant stream of future earnings.[9] Two sources are used for internal rates of return: RERC's annual investor survey of desired/required internal rates of return, and a survey by the American Council of Life Insurers of capitalization rates for commercial properties from which IRRs have been derived.[10] Discounted values are determined by applying these IRRs to actual and projected incomes as shown in Table and Exhibit III.

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[9] For discounting purposes, a terminal value or a constant stream of earnings may be used interchangeably assuming that the terminal value accurately reflects the value of future earnings.

[10] Using the Gordon growth model ($P=D(i-g)$ where P=price, D=dividends, i=market yield and g=growth rate) and Cushman Wakefield surveys for anticipated growth rates over the survey period, internal rates of return may be inferred from surveyed capitalization rates.

Table III
Discounted Values / Actual Russell-NCREIF Index Values

Year Ending March 30	Index Value	Yield	Income	Year to Year % Change in Income	Appr	Capital Appr.
1984	$100.00	7.48%	$7.48	-6.33%	6.91%	$6.91
1985	$106.91	7.38%	$7.89	5.48%	4.24%	$4.53
1986	$111.44	7.54%	$8.40	6.50%	2.03%	$2.26
1987	$113.71	7.18%	$8.16	-2.84%	-0.92%	($1.05)
1988	$112.66	6.99%	$7.87	-3.54%	-1.48%	($1.67)
1989	$110.99	7.00%	$7.77	-1.34%	-0.06%	($0.07)
1990	$110.93	6.59%	$7.31	-5.91%	-1.12%	($1.24)
1991	$109.68	6.70%	$7.35	0.53%	-6.34%	($6.95)
1992E			$7.35	0.00%		
1993E			$7.35	0.00%		
1994E			$7.57	3.00%		
1995E			$7.87	4.00%		

Year Ending March 30	RERC IRR	Disc Value	Index Value	Difference		ACLI IRR	Disc Value	Index Value	Difference
1984	14.31%	$61.18	$100.00	63.44%	|	15.80%	$53.87	$100.00	85.63%
1985	14.06%	$63.96	$106.91	67.15%	|	14.70%	$60.27	$106.91	77.40%
1986	13.80%	$66.77	$111.44	66.90%	|	13.50%	$68.87	$111.44	61.81%
1987	12.60%	$77.33	$113.71	47.04%	|	12.40%	$79.26	$113.71	43.46%
1988	11.60%	$90.17	$112.66	24.94%	|	12.50%	$79.90	$112.66	40.99%
1989	11.42%	$95.27	$110.99	16.51%	|	12.40%	$83.08	$110.99	33.59%
1990	11.10%	$103.43	$110.93	7.25%	|	12.10%	$89.15	$110.93	24.43%
1991	11.60%	$99.54	$109.68	10.18%	|	11.80%	$96.65	$109.68	13.48%

Exhibit III
Discounted Values/Russell—NCREIF Index

□ Russell—NCREIF Ind   + RERC Disc. Values   ◇ ACLI Disc. Values

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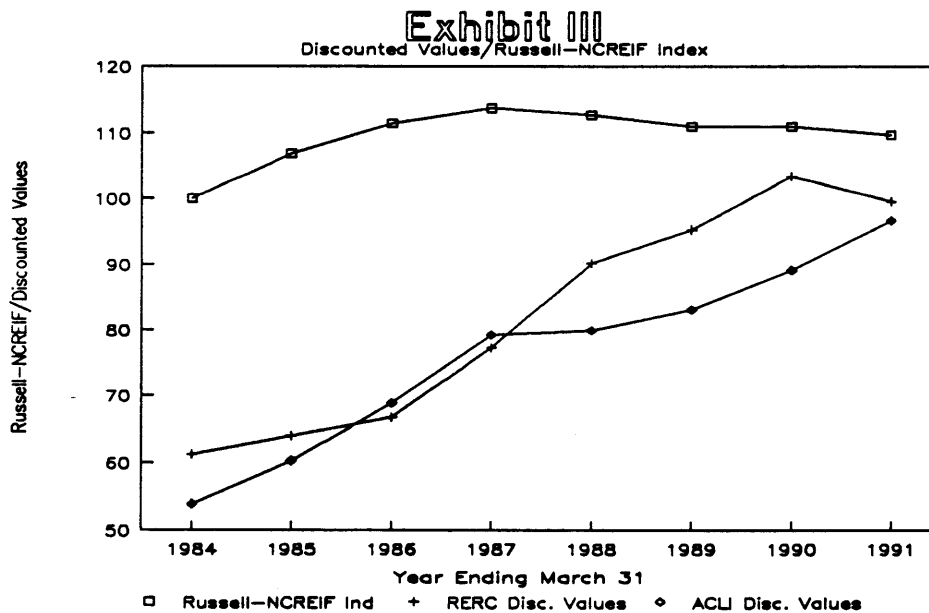
Table and Exhibit III show significant disparities between Russell-NCREIF Index Values and the RERC and ACLI discounted values. These disparities over the period shown largely result from actual Russell-NCREIF income growth falling well beneath anticipated income growth, i.e., discounted values reflect discounting of income that actually occurred as well as projected future income (as discussed on pages 18-20, Wheaton-Torto [37]). The current disparity however, reflects only widely differing expectations of future income growth.

Based on earnings growth assumptions detailed above, RERC and ACLI discount rates suggest the Russell-NCREIF Index is presently overvalued by ten and thirteen percent respectively. In fact, most available investor surveys[11] indicate comparable return requirements to the RERC and ACLI surveys suggesting overvaluation of the Index by a similar magnitude. This analysis, while indicating a significant overvaluation of the Russell-NCREIF Index shows a lesser overvaluation than the Alex Brown or the Wheaton-Torto analyses (Wheaton-Torto paper was limited to office properties and showed an overvaluation of the index of roughly one hundred percent as of 1988).

Based on the Russell-NCREIF Index values and discounted values, price-earnings ratios are implied for the index. These p/e

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[11] Referenced surveys include the Cushman Wakefield Real Estate Outlook, Peter F. Korpacz & Associates Real Estate Investor Survey and the Coldwell Banker Investment Property Sales Summary.

ratios are derived, of course, by dividing the index or discounted values for given years by earnings. Table and Exhibit IV show p/e ratios from 1984 to 1990 for the Russell-NCREIF Index and derived p/e ratios based on RERC[12] and ACLI discounted values.

Table IV
Russell-NCREIF Price-Earnings Ratios/
RERC and ACLI Price-Earnings Ratios

Year	Russell-NCREIF	RERC	ACLI
1984	13.40	9.70	8.80
1985	13.50	10.00	9.30
1986	13.30	9.80	10.20
1987	13.90	10.70	10.90
1988	14.30	12.00	10.80
1989	14.30	12.30	11.00
1990	15.20	12.70	11.30
1991	15.00	11.40	11.00

Exhibit IV
Russell—NCREIF/RERC and ACLI P/E Ratios

□ Russell—NCREIF Ind   +   RERC P/E ratios   ◇   ACLI P/E ratios

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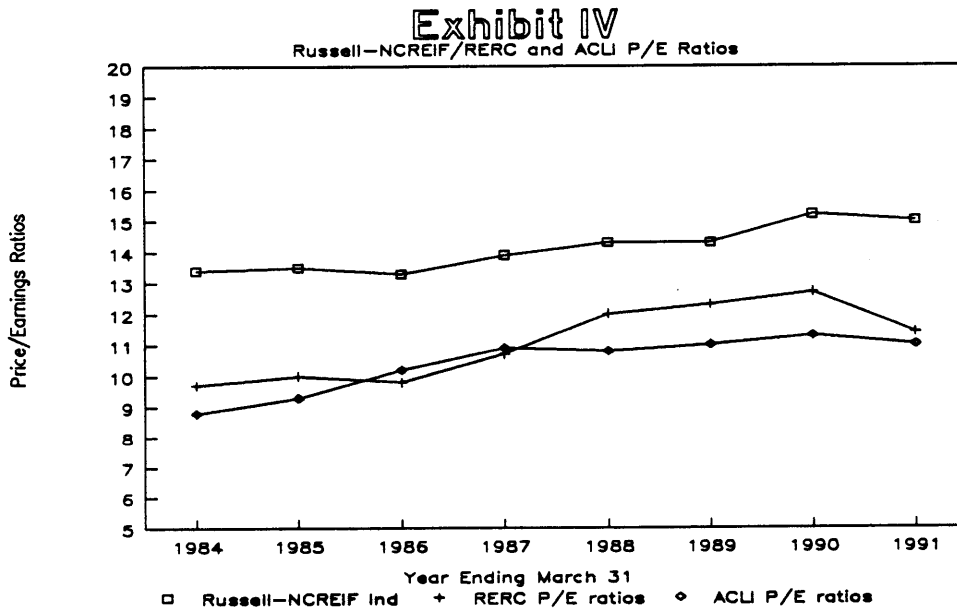
12 Using the Gordon growth model and market surveys for anticipated growth rates (see Footnote #9), capitalization rates any be derived from internal rates of return.

Given the significant oversupply of space that exists in most markets, some contend a chronic oversupply, most forecasts anticipate a further decline or at a minimum, a stagnation in lease rates. In view of these forecasts, a significant decline in the p/e levels would be expected. A substantial decline has occurred in the RERC p/e levels during 1991 while ACLI p/e levels fell more modestly. Russell-NCREIF p/e ratios, however, have remained relatively constant over the past two years. This suggests that appraised values of properties comprising the Russell-NCREIF Index have not responded as one would expect given investors' lowered expectations of both income growth and property residual values.[13]

As noted previously, the relatively constant p/e multiple of the Russell-NCREIF Index also appears to be at odds with current asset valuation theory. Given the wide shifts in costs of capital and in inflation during this period, a greater movement in the p/e ratios should have occurred. In contrast, the Standard & Poors

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[13] While changes in the composition of the Russell-NCREIF Index could potentially explain this lack of movement in the p/e ratio (e.g. a greater emphasis on property types having lower initial yields which would tend to increase p/e levels), this does not appear to be the case. An analysis of those changes that have occurred in the composition of the index over the period 1988-1991 indicates that less than one percent of the change in p/e is attributable to changes in index composition. The primary change that has occurred is an increased emphasis on retail properties and a lesser emphasis on office properties. Each of these property types have similar cash yields, i.e., similar p/e ratios. Those changes that occurred between 1986 and 1988 have the effect of depressing the p/e ratio by roughly 4.4%. These changes entailed an increased emphasis on apartment, R&D office and warehouse property types. Each have higher earnings yields than office and retail property types thus depressing the collective p/e ratio for the index.

Industrial Index experienced a movement in price-earnings from seven to twenty-three over this period. While a less dramatic shift in p/e ratios would be expected for real estate assets given that a portion of property value is comprised of fixed leases, it seems likely that the RERC and ACLI p/e ratios more accurately reflect the extent of price movements during this period.

Lastly, it should be noted that a p/e multiple of fifteen generally occurs when significant growth in earnings and in residual values are expected. Prevailing views as to likely growth in earnings and residual values are fundamentally changed relative to the late 1980's and one would expect this to be reflected by a downward movement in the collective price-earnings multiple for the index.

Composition of Russell-NCREIF Index

The composition of the Russell-NCREIF Index is important with respect to the inferences that researchers seek to draw from the index. While the index is generally viewed as fairly representing the composition of holdings of pension and profit sharing trusts at any given time, the composition of the index is continually changing to reflect the investment preferences of participants in the index. Thus, the index reflects performance for a continually changing and to date, expanding pool of assets. Given that the index does not isolate specific assets for either a cumulative index or for sub-indices based on property types and location,

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inferences on past performance or likely future performance may need to be qualified accordingly.

A further issue with regard to the composition of the Russell-NCREIF Index concerns the similarity of those properties comprising the index to the national property stock collectively. A recent Salomon Bros. survey of property stock using data for construction permits issued between 1967 and 1989 as a proxy for the composition of the property stock indicated a very different composition than that reflected in the Russell-NCREIF Index [6]. The Salomon Bros. survey indicated a composition for the national property stock as follows: 30% office, 11% industrial, 18% retail, 35% apartment and 6% other. In contrast, properties comprising the Russell-NCREIF Index vary significantly: 16% warehouse, 26% retail, 36% office, 11% apartment and 11% R&D/office. The most notable differences between the Russell-NCREIF Index and the Salomon Bros. survey involves office and apartment properties. Institutional holdings of apartment properties in particular appear to be modest possibly due to the lack of available investment vehicles for institutional investors in this area. These differences may be significant in that some research on the Russell-NCREIF Index has drawn inferences relating to the overall national property stock that may need to be qualified based on the index possibly not accurately reflecting the property stock collectively [24].

Summary Comments on Russell-NCREIF Index

Each of the issues raised in this discussion has been considered by various academics and others and a diversity of opinion exists as to the significance of each. The widespread recognition and use of the Russell-NCREIF Index stems from the breadth of properties included in the index, the greater longevity of the index relative to other real estate indices and Russell-NCREIF's success in resolving various developmental issues relating to the index. However, while the success of the index largely results from NCREIF members's ability to provide a uniquely broad scope of property data, the index is also subject to criticism by virtue of its sponsorship by NCREIF whose members, some feel, may not be disinterested when reporting their own performance.[14]

Table V shows total returns by income and capital appreciation for the Russell-NCREIF Index. These returns are

Table V

Russell-NCREIF Index

Annual Performance
Years Ending December 31

Period	Total	Income	Capital
Dec-78	15.6%	8.8%	6.8%
Dec-79	20.0%	9.0%	11.1%
Dec-80	17.5%	8.4%	9.1%
Dec-81	16.3%	8.1%	8.2%
Dec-82	9.4%	7.9%	1.5%
Dec-83	13.3%	7.8%	5.6%
Dec-84	13.1%	7.7%	5.4%
Dec-85	9.9%	7.5%	2.4%
Dec-86	7.0%	7.2%	-0.2%
Dec-87	5.4%	7.0%	-1.6%
Dec-88	7.0%	7.0%	-0.1%
Dec-89	5.8%	6.7%	-0.9%
Dec-90	1.5%	6.7%	-5.2%
Mean	10.9%	7.7%	3.2%
Std Dev	5.5%	0.8%	4.8%
Coef Var	50.7	9.8	149.6

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[14] This criticism is not easily quantified. The principal area of concern is valuations which are typically handled by outside appraisers, but in some instances are also handled internally. This process, some feel, is not sufficiently independent of fiduciaries' influence.

Exhibit V
Comparison of Real Estate Perf. Indices

Annual Performance in Percent

Year Ending December 31

□ Russell—NCREIF Ind   + IPC Net Returns   ◇ Liquidity Fund

△ Rogers & Casey Pens
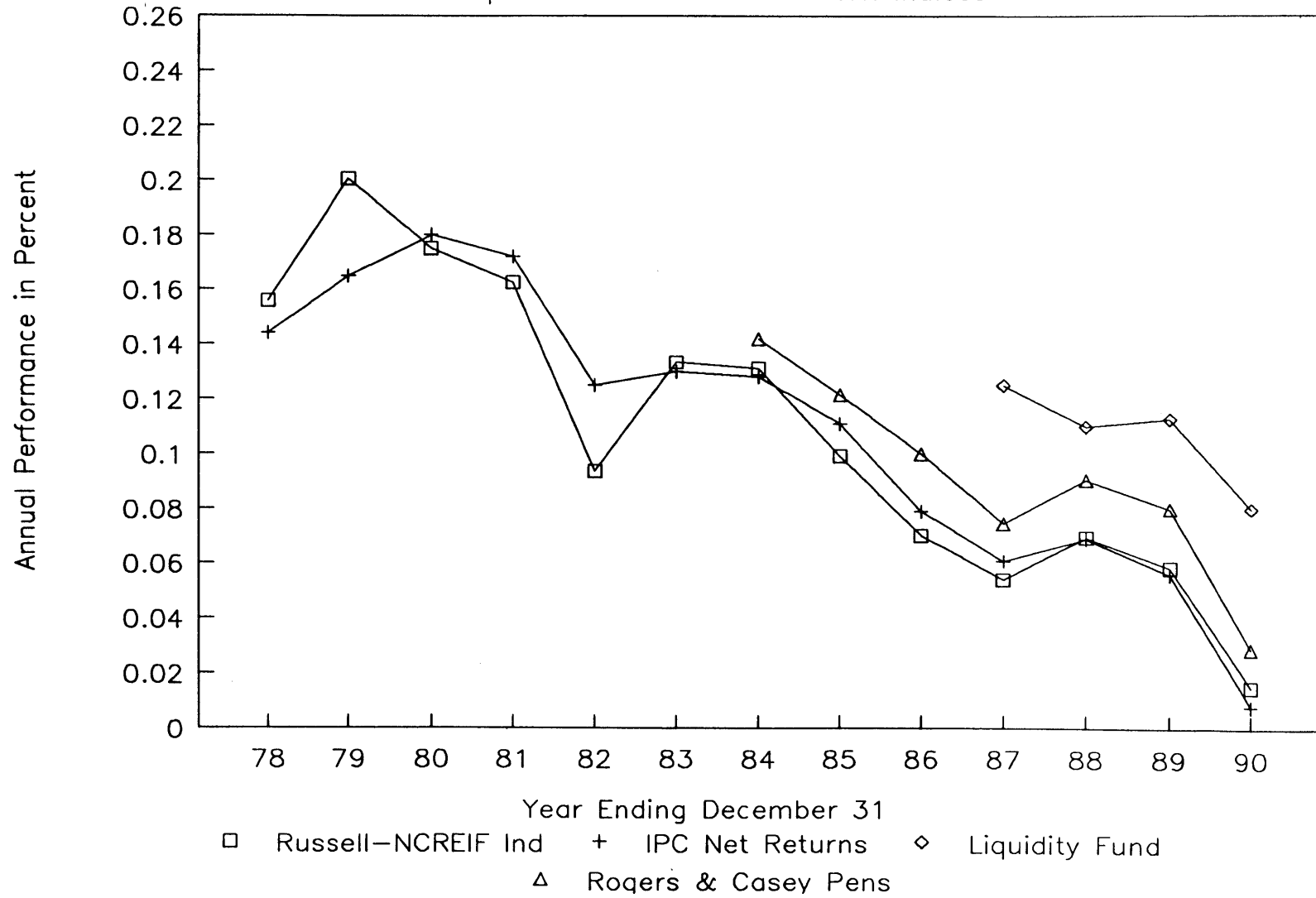
shown graphically for each of the indices reviewed in Exhibit V
[26].

Institutional Property Consultants' Benchmark

Although funds comprising Institutional Property Consultants'
Benchmark are similar and in many instances identical to those
included in the Russell-NCREIF Index, a direct comparison of the
two indices is inappropriate for several reasons. The Russell-
NCREIF Index is a publicly available index often referenced as a
barometer for the performance of institutional real estate
holdings. In contrast, the IPC Benchmark, while patterned after
the Russell-NCREIF Index, is a proprietary index which includes
2,700 of the 5,600 properties for which IPC holds information. IPC
controls the manner in which the benchmark is used and specific
benchmarks are created for use in evaluating given diversification
strategies or evaluating performance of specific property types.
While stock analysts have long used various market indices as well
as specific and specialized sub-indices, the availability of
specialized real estate indices and sub-indices is comparatively
quite limited. Thus, IPC's use of various benchmarks is notable.
Table VI provides returns for the IPC Benchmark on both a gross
and net of fees basis.

Several of the issues discussed in critiquing the Russell-
NCREIF Index can be considered in reviewing the IPC Benchmark. The
inclusion of management fees in the IPC Benchmark (returns are

Table VI

IPC Index				IPC Index			
Gross Annual Performance Years Ending December 31				Net Annual Performance Years Ending December 31			
Period	Total	Income	Capital	Period	Total	Income	Capital
Dec-78	16.5%	9.1%	7.4%	Dec-78	14.4%	0.7%	7.4%
Dec-79	18.1%	9.6%	8.5%	Dec-79	16.5%	0.8%	8.5%
Dec-80	20.3%	10.9%	9.4%	Dec-80	18.0%	8.6%	9.6%
Dec-81	19.3%	10.9%	8.4%	Dec-81	17.2%	8.8%	8.4%
Dec-82	13.9%	10.1%	3.8%	Dec-82	12.5%	8.7%	3.8%
Dec-83	14.4%	9.3%	5.1%	Dec-83	13.0%	7.9%	5.1%
Dec-84	13.9%	9.6%	4.3%	Dec-84	12.8%	8.4%	4.3%
Dec-85	12.3%	8.8%	3.6%	Dec-85	11.1%	7.5%	3.6%
Dec-86	8.9%	7.7%	1.2%	Dec-86	7.9%	6.7%	1.2%
Dec-87	7.1%	7.2%	0.1%	Dec-87	6.1%	6.2%	-0.1%
Dec-88	7.9%	6.7%	1.2%	Dec-88	6.9%	5.7%	1.2%
Dec-89	6.5%	6.5%	0.1%	Dec-89	5.6%	5.5%	0.1%
Dec-90	1.7%	6.2%	-4.5%	Dec-90	0.8%	5.3%	-4.5%
Mean	12.4%	8.7%	3.7%	Mean	11.0%	6.2%	3.7%
Std Dev	5.6%	1.6%	4.1%	Std Dev	5.2%	2.7%	4.1%
Coef Var	45.4	18.9	109.0	Coef Var	47.2	43.9	110.0

shown on a gross and net of fees basis) represents a notable
difference between the two indices. This distinction stems from
IPC's consulting relationships with plan sponsors and their
resulting access to fee information. Advisory firms on the other
hand, which comprise the majority of the Russell-NCREIF Index
participants, have opted to provide gross returns rather than net
returns for the Russell-NCREIF Index. Given the substantial fees
which accompany investments shown in the Russell-NCREIF Index,
there would seem to be a marked need for a publicly available index
providing returns net of fees. Like the Russell-NCREIF Index, the
IPC Benchmark relies on property specific valuations provided by
advisory and asset management firms. Although IPC collects

information on individual properties allowing the portfolio composition of each fund to be verified independently of managers, this does not address the issue of valuations for specific properties. [20]

Liquidity Fund Index

The Liquidity Fund National Real Estate Index differs from the two indices discussed thus far. This index is patterned after transaction-based stock indices and provides market values and capitalization rates.[15] Fifty-one markets are covered by the index with national averages based on the actual stock of each property type as indicated by market stock data provided by F.W. Dodge [6].

Table VII

Liquidity Fund Index

Annual Performance
Years Ending December 31

Period	Total	Income	Capital
Dec-87	12.5%	8.7%	3.8%
Dec-88	11.0%	8.6%	2.4%
Dec-89	11.3%	8.6%	2.7%
Dec-90	8.0%	8.8%	-0.8%
Mean	10.7%	8.7%	2.0%
Std Dev	1.9%	0.1%	2.0%
Coef Var	17.9	1.1	97.6

This index was created more recently than the Russell-NCREIF or IPC indices[16] and is based on transaction data contributed by various brokerage, advisory and investment firms. Standard & Poors

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[15] Other indices provide current income as opposed to pro-forma capitalization rates.

[16] Index was created in 1987 although returns prior to this time are provided based on transaction data and on market value and property return, estimates.

is a sponsor of the index and assists in the collection of transaction data. Index values are determined by adjusting transaction data or value and return estimates for prototype properties so as to meet pre-specified property "norms". The intent of this normalization process is to insure that the index reflects comparable quality property transactions.

In part, an intent of this index is to circumvent those issues or biases inherent in appraisal-based indices. However, the large number of markets tracked by this index result in a need to supplement reported transactions with estimated values and capitalization rates based on prototype properties. Thus, while appraisals per se are not used in this index, there are a number of instances where estimates or adjustments are required in deriving index values [22].

Rogers, Casey & Associates Open- and Closed-End Fund Performance Evaluation Report

Rogers, Casey publish the Pension & Investment Performance Evaluation Report (PIPER) providing fund returns for both open-end and closed-end funds over a ten year period. This report is dissimilar to the real estate indices discussed above. The report represents a compilation of returns for thirty open-end and sixty-three closed-end funds and is not intended as an index reflecting real estate performance. Notably, the median returns shown in this summary over the most recent five year period for both open-end and

closed-end funds were 8.8% which exceeded by two to three percent returns for the Russell-NCREIF and IPC Indices. This disparity stems primarily from the use of leverage by funds covered by this report resulting in higher returns. Fund returns are shown in Exhibit VIII [30].

Summary Comments

  Clearly, there are a number of marked distinctions amongst the indices reviewed. The widespread recognition of the Russell-NCREIF Index primarily results from the extensive property data provided by NCREIF members and the comparatively long twelve year history of the index. The breadth of the index which currently includes 1,500 properties and participation of many of the most active investment managers distinguishes this index from other indices. However, the appraisal-based nature of the index gives rise to a number of issues including a potential bias in valuations that should be recognized by those relying on this index.

  The Institutional Property Consultants Benchmark is comprised of roughly fifty percent of the 5,400 properties for which IPC holds property data. The composition of the benchmark is similar

Table VIII

Rogers & Casey Pensions & Investment
Performance Evaluation Report

Annual Performance
Years Ending December 31

Period	Total	Income	Capital
Dec-84	14.2%		
Dec-85	12.2%		
Dec-86	10.0%		
Dec-87	7.5%		
Dec-88	9.1%		
Dec-89	8.0%		
Dec-90	2.9%		
Mean	9.1%		
Std Dev	3.6%		
Coef Var	39.7		

Note: Income and Capital information not provided

to the Russell-NCREIF Index. This benchmark is one of a number of benchmarks used by IPC to evaluate given funds or investment strategies. IPC's inclusion of management fees represents a notable distinction between the IPC and Russell-NCREIF Indices.

The Liquidity Fund Index differs from the Russell-NCREIF and the IPC Indices. The index is patterned as a transaction-based index rather than a set data base of properties. The index provides pro forma capitalization rates and market values based on reported transactions and surveys of prototype properties. The index is weighted to reflect the actual market stock of properties. As discussed previously (see page 30), this results in a heavier emphasis on apartment investments than that reflected in the Russell-NCREIF or IPC indices. Given the relatively strong performance of apartment properties in recent years, this index shows higher returns than other indices reviewed.

The Rogers and Casey Performance Evaluation Report reflects returns for groups of open- and closed-end funds. The returns shown for these funds exceed returns for the Russell-NCREIF and IPC indices (see Exhibit V) due to perhaps the use of leverage by these funds and resulting higher returns. Because this index provides data at the fund level, rather than the property level, these benchmarks can not be disaggregated to study particular sectors of the property market [15].

Chapter III: Current Efforts to Disaggregate the Russell-NCREIF Index

The disaggregation process for the Russell-NCREIF Index entails segmenting data based on specific attributes. This process exists so as to provide performance measures and market indicators based on specific property types and/or geographic areas. While fairly extensive data is gathered for each property in the index, returns are currently published for sub-indices based only on property type and geographic region. The issue as to how best to disaggregate the index has been frequently debated since the index was formed. One view on this issue is that fully utilizing the index entails allowing the index to be disaggregated as fully as possible or simply as researchers see fit.

A number of issues, however, must be resolved in determining how the index is disaggregated. The index currently consists of roughly 1,500 properties. Those sub-indices that are created must include a sufficient number of properties such that statistically significant research can be conducted. A related issue concerns the proprietary nature of the index. Understandably, NCREIF members want to insure that the confidential nature of property specific data is maintained irrespective of the disaggregation effort.

Property Type and Property Location Disaggregation Efforts

Published Russell-NCREIF Index Detail includes returns based on property type, region and division. Returns based on property type are shown in Table IX and Exhibit VI. Regional returns are shown in Table X and Exhibit VII. Returns are separated into income and capital appreciation/depreciation components. Returns amongst different property types and geographic regions, as one would expect, vary significantly.

The disaggregation proposal under consideration involves allowing members and researchers to request information from the data base by designating property type(s) and/or geographic region(s). To insure confidentiality, guidelines on the manner in which data is presented and on the minimum number of properties within each cell have been established. Data would be presented in an aggregate format to insure confidentiality of property specific information. The issue concerning a minimum number of properties within data cells[17] is complicated by a desire on the part of some members to only release data in sufficient quantities to insure that statistically valid inferences can be drawn from material released. Research on this issue by David Hartzell and

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[17] Data cells refer to the number of properties encompassed when data is disaggregated or segmented in a given manner.

Table IX

Russell-NCREIF Property Type Indices

Office
Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	23.5%	8.9%	13.7%
Mar-80	26.8%	8.2%	17.6%
Mar-81	17.9%	7.3%	10.1%
Mar-82	20.1%	7.5%	11.9%
Mar-83	8.1%	7.7%	0.4%
Mar-84	14.1%	6.8%	7.0%
Mar-85	10.7%	6.9%	3.6%
Mar-86	8.8%	7.4%	1.3%
Mar-87	3.5%	6.8%	-3.2%
Mar-88	0.2%	6.5%	-6.1%
Mar-89	3.8%	6.5%	-2.6%
Mar-90	2.5%	6.1%	-3.4%
Mar-91	-4.4%	6.3%	-10.1%

Retail
Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	10.5%	8.4%	2.1%
Mar-80	12.4%	8.9%	3.2%
Mar-81	11.8%	8.4%	3.3%
Mar-82	11.1%	8.3%	2.7%
Mar-83	7.9%	9.0%	-1.0%
Mar-84	16.3%	8.8%	7.1%
Mar-85	15.0%	8.1%	6.5%
Mar-86	11.2%	7.6%	3.5%
Mar-87	11.3%	7.3%	3.8%
Mar-88	11.8%	6.9%	4.7%
Mar-89	13.6%	7.0%	6.2%
Mar-90	9.7%	6.4%	3.2%
Mar-91	5.2%	6.4%	-1.2%

R&D Office
Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	13.3%	9.2%	3.8%
Mar-80	14.7%	9.2%	5.2%
Mar-81	20.9%	9.0%	11.2%
Mar-82	20.6%	8.3%	11.7%
Mar-83	12.6%	8.3%	4.1%
Mar-84	22.1%	8.2%	13.1%
Mar-85	13.7%	8.1%	5.3%
Mar-86	8.9%	7.9%	0.9%
Mar-87	7.7%	7.7%	-0.3%
Mar-88	7.1%	7.4%	-2.3%
Mar-89	5.1%	7.5%	-2.3%
Mar-90	4.3%	7.3%	-2.9%
Mar-91	-1.0%	7.6%	-8.2%

Warehouse
Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	14.2%	8.0%	5.8%
Mar-80	21.3%	8.7%	11.9%
Mar-81	15.2%	8.6%	6.3%
Mar-82	14.3%	8.1%	5.9%
Mar-83	8.4%	8.0%	0.4%
Mar-84	11.6%	7.6%	3.9%
Mar-85	11.9%	7.9%	3.8%
Mar-86	12.6%	8.1%	4.3%
Mar-87	8.7%	7.8%	0.8%
Mar-88	11.9%	8.0%	3.7%
Mar-89	9.6%	7.7%	1.8%
Mar-90	9.3%	7.2%	1.9%
Mar-91	1.5%	7.1%	-5.3%

Apartments
Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-89	7.0%	7.0%	0.0%
Mar-90	6.0%	6.9%	-0.9%
Mar-91	- 4.7%	7.4%	-2.6%

Exhibit VI
Russell—NCREIF Property Indices
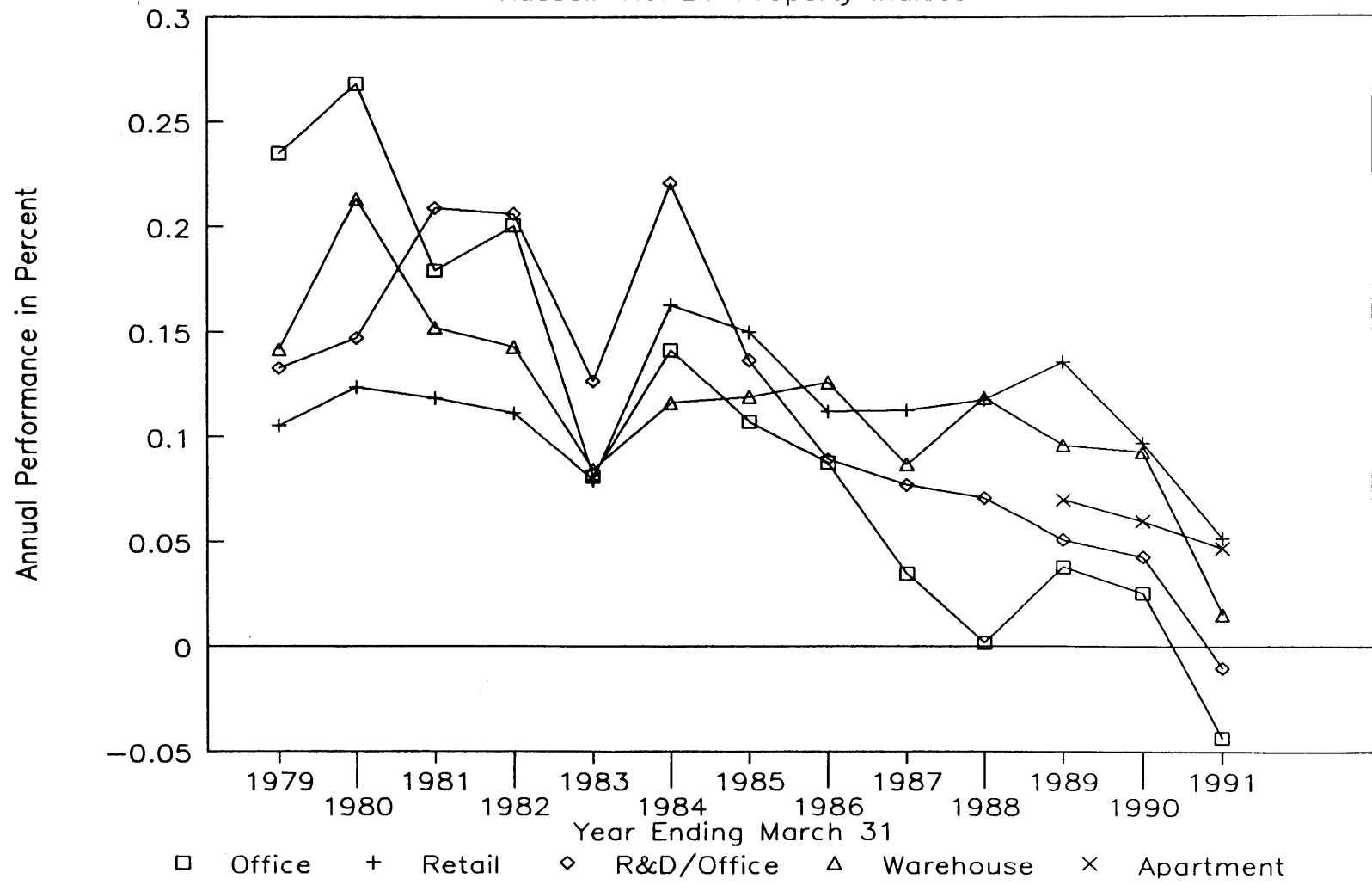
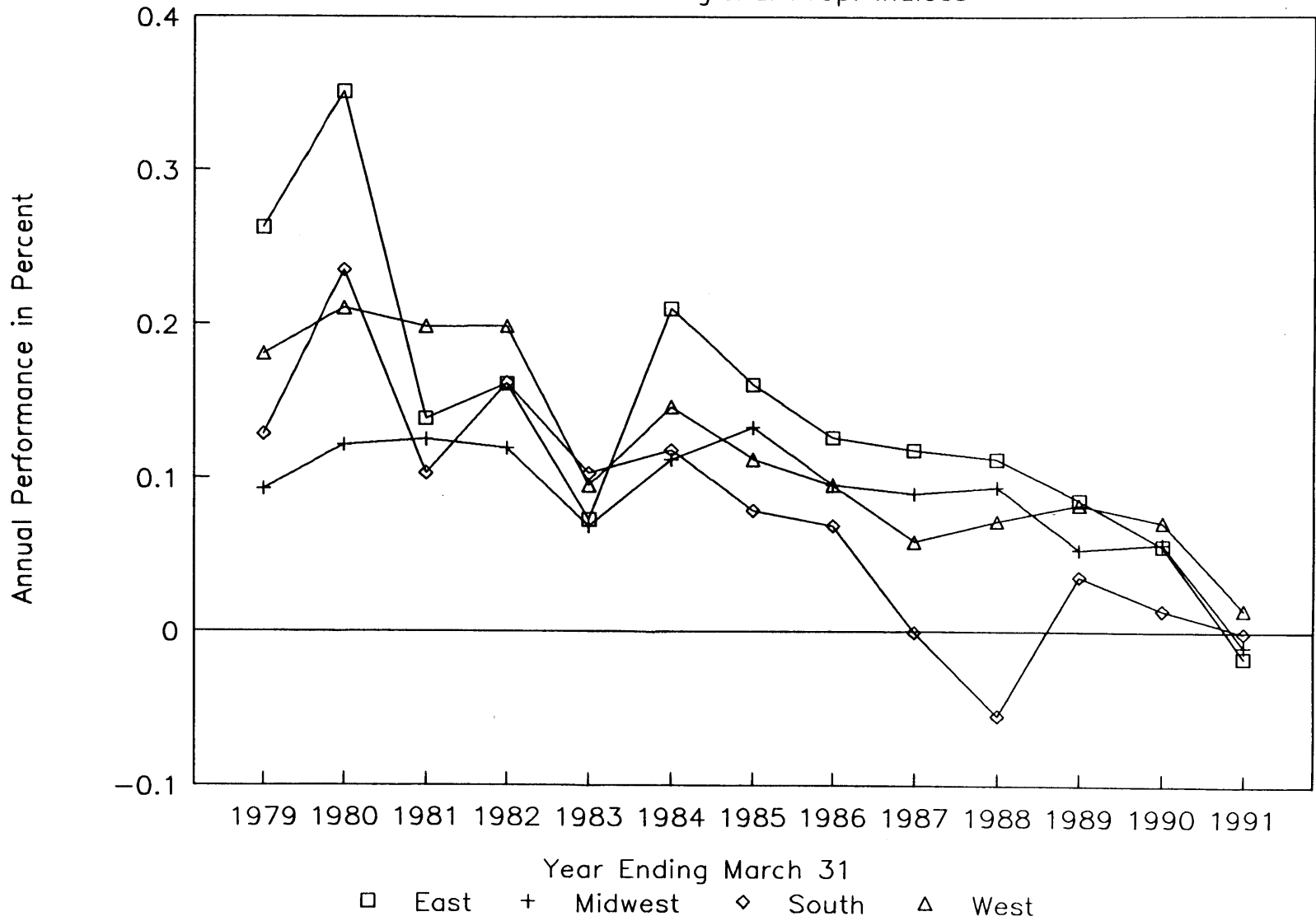Source: Russell—NCREIF Property Indices,
Index Detail, March 1991

Table X

Russell-NCREIF Regional Property Indices

East

Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	26.3%	10.6%	14.5%
Mar-80	35.1%	10.1%	23.3%
Mar-81	13.8%	7.9%	5.7%
Mar-82	16.1%	7.8%	7.9%
Mar-83	7.3%	8.1%	-0.8%
Mar-84	21.0%	7.5%	12.8%
Mar-85	16.1%	7.0%	8.7%
Mar-86	12.6%	7.5%	4.8%
Mar-87	11.8%	7.6%	4.0%
Mar-88	11.2%	7.1%	3.9%
Mar-89	8.5%	7.5%	1.0%
Mar-90	5.6%	6.9%	-1.2%
Mar-91	-1.7%	6.9%	-8.2%

Midwest

Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	9.3%	7.6%	1.6%
Mar-80	12.1%	8.6%	3.3%
Mar-81	12.5%	8.6%	3.7%
Mar-82	11.9%	8.3%	3.5%
Mar-83	6.9%	8.0%	-1.1%
Mar-84	11.2%	7.6%	3.4%
Mar-85	13.3%	8.0%	5.0%
Mar-86	9.6%	8.4%	1.1%
Mar-87	9.0%	7.7%	1.2%
Mar-88	9.4%	7.7%	1.6%
Mar-89	5.4%	7.0%	-1.6%
Mar-90	5.7%	6.9%	-1.1%
Mar-91	-0.9%	6.9%	-7.5%

South

Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	12.8%	8.4%	4.2%
Mar-80	23.5%	8.6%	14.0%
Mar-81	10.3%	8.7%	1.5%
Mar-82	16.2%	8.6%	7.1%
Mar-83	10.3%	8.0%	2.1%
Mar-84	11.8%	7.4%	4.1%
Mar-85	7.9%	7.1%	0.7%
Mar-86	6.9%	7.2%	-0.3%
Mar-87	-0.1%	6.5%	-6.3%
Mar-88	-5.5%	6.5%	-11.4%
Mar-89	3.6%	6.7%	-3.0%
Mar-90	1.4%	6.3%	-4.7%
Mar-91	-0.1%	6.6%	-6.4%

West

Annual Performance
Years Ending March 31

Period	Total	Income	Capital
Mar-79	18.07%	8.53%	8.98%
Mar-80	21.04%	8.46%	11.85%
Mar-81	19.82%	8.15%	11.00%
Mar-82	19.86%	7.60%	11.61%
Mar-83	9.49%	7.99%	1.42%
Mar-84	14.60%	7.52%	6.70%
Mar-85	11.20%	7.53%	3.48%
Mar-86	9.52%	7.39%	2.02%
Mar-87	5.85%	7.13%	-1.21%
Mar-88	7.18%	6.97%	0.20%
Mar-89	8.26%	6.87%	1.32%
Mar-90	7.14%	6.47%	0.65%
Mar-91	1.45%	6.54%	-4.85%

Exhibit VII
Russell–NCREIF Regional Prop. Indices

Source: Russell–NCREIF Property Indices,
Index Detail, March 1991

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C.F. Sirmans [19] concluded that the minimum number of properties needed to insure statistical significance is thirty[18].

Currently, only 54 of the 218 metropolitan statistical areas (MSAs) meet this requirement. If disaggregation based on specific property type(s) or geographical region(s) was desired still fewer areas would contain a sufficient number of properties to insure statistical significance. Thus, a decision must be made on whether to impose a guideline insuring that only statistically valid property data is released or to simply allow individual firms to assess the validity of property data as they see fit.

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[18] Statistical significance, in this paper, is based on a ninety-five percent level of certainty.

Chapter IV: Russell-NCREIF Leveraged and Hybrid Mortgage Indices

Although published data for the Russell-NCREIF Index currently includes only all-equity investments, data for properties having other financial structures has been collected for a number of years. Since 1983, an effort to compile data for leveraged properties has been underway. This index however, has yet to be published due to difficulties in establishing guidelines for data collection as well as some confusion in valuation and appraisal guidelines. These issues appear close to being resolved and May, 1992 has been set as a target date for publication of this index.

The hybrid mortgage index was created by NCREIF in the second quarter of 1987. Hybrid mortgages are defined as first or second mortgages on properties which allow the investor to participate in operations or sale proceeds. The index in 1987 was comprised of roughly 200 mortgages. HMI Index returns were reported for several quarters, with graphs comparing the performance of the index to stock and bond indices. Following initial publication of this index, the research committee of Russell-NCREIF expressed concerns that the index formula being used was not appropriate, or that the right information was not being collected. Publication of this index was then halted. Since then, review of the hybrid mortgage instrument has been undertaken by an academic group and is currently under consideration.

The potential application and thus the value of these indices however, appears limited at best. With each of these indices, a wide variation exists in its composition. In the instance of the leveraged properties index, properties having leverage ranging from five to one hundred percent will be included. Financing costs for these properties reflect the wide range of previous and presumably future interest rate levels. Thus, due to the broad spectrum of properties encompassed in this index, meaningful inferences could not be drawn from the index at an aggregate level. The index would need to be disaggregated to a level such that the sub-indices would consist of properties having similar financing costs and debt levels. However, given the limited size of the leveraged property index, it is doubtful whether the index is broad enough so as to provide statistically significant sub-indices.

More importantly, even if statistically valid sub-indices could be created, financial structure is simply not an attribute that merits creation of an index. A tenet of corporate finance is the Modigliani-Miller theorem on capital structure. This theorem shows that a firm's value is independent of its financial structure. One of the conditions of this analysis is that the tax system must be neutral with respect to the treatment of debt and equity. While this condition is not met by corporations under our system of taxation, pensions and profit sharing trusts are, of course, non-tax paying entities. This theory then suggests that

real estate values for institutional investors are independent of financial structure.

In looking at the stock market where indices exist in nearly every shape and form, indices based simply on financial structure do not exist except those recognizing financial structure indirectly such as large and small capitalization stock indices. Indices exist so as to allow measurement of past performance and inferences on likely future performance of assets. Financial structure in and of itself is not relevant in projecting future performance of assets. Indices should be based on characteristics directly affecting the performance of an asset class. Debt is external to assets and is not a suitable basis for a real estate index.[19] The value in this index may lie in the ease with which it could be folded into the unleveraged properties index.

The proposed hybrid debt index appears to be similarly flawed. This index will consist of properties having wide variations in their participation provisions. Participation may be through operating proceeds or sale proceeds and could be structured in any number of different ways. This results in an aggregate level index that would seem to have little discernable value to investors hoping to make inferences on specific hybrid debt investments.

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[19] While there may be instances where debt levels are meaningful, i.e. bankruptcy, excessive debt resulting in market perception problems, etc. these represent extremes and are not critical with respect to the appropriateness of using debt for indexing properties.

If this index could be disaggregated so as to provide sub-indices for properties having similar hybrid debt characteristics,[20] the index would show returns for the debt and participation components of these investments either separately or cumulatively. The participation component is what distinguishes this index from debt-based indices and merits review. The nature of hybrid debt investments is such that they may be used to avoid tax liabilities in transactions closely similar to outright sales and also used in straight financings where the participation component is not a substantive part of the transaction. The character of a hybrid debt instrument typically is not discernable simply by reviewing its basic terms. Thus, grouping these instruments in an index or in sub-indices and generalizing as to their behavior would be misleading. This index, however, can not simply be folded into the unleveraged properties index.

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[20] This appears improbable given the extraordinary number of forms which hybrid debt might take and the need for a minimum number of properties, perhaps thirty based on research done by Hartzell and Sirmans [19], so as to draw statistically valid inferences.

Chapter V: Proposal to Disaggregate Indices Based on Lease Structure

While lease structure has been considered in various previous studies on the performance of real estate [17], it is not tracked separately in the Russell-NCREIF Index or in other indices reviewed. Lease structure is a fundamental characteristic of real estate assets and may merit consideration as a basis or one of several bases in organizing an index. To illustrate this issue, consider a property in a given market leased on a long term basis to a credit tenant, and a second property with similar physical characteristics and a similar location brought to the market on a speculative basis. Clearly the nature of these assets differs dramatically. One will have performance similar to a fixed income instrument. The second's performance may reflect current market conditions. A real estate index that fails to address this issue ignores a fundamental characteristic of real estate assets. While the lease structure of most properties falls somewhere between the two extremes provided above, the proposal offered here would provide a framework for quantifying the leasing structure of properties and classifying properties on this basis.

Finance Related Research Regarding Lease Structure

Several papers written on this topic from a financing perspective may be instructive as to the manner in which real estate indices could be constructed on this basis (see for example

Booth, Cashdan and Graff [1] or Cashdan and Graff [3]). Much of this research has been done with the thought that separating property ownership into debt and equity like components would broaden the appeal of commercial real estate to institutional and individual investors and reduce traditional real estate financing costs. The framework that has been considered involves viewing property ownership as a combination of debt and equity. The term "debt" as used in this context is distinct from mortgage debt and is used with reference to a value for existing leases in a property. Debt would be priced by bond valuation techniques. "Equity," as referenced here, is viewed as the right to re-lease space after existing leases expire and would be priced based on techniques used to value stocks. These terms are analogous to those used in the securities market. Fixed income obligations or preferred instruments are seen as debt while residual claims are viewed as equity.

To clarify this delineation between debt and equity, consider the example of a completed, but not yet leased single tenant industrial building. The value of this property is, of course, a function of the property's occupancy rights, irrespective of past construction costs. At the point a lease is signed for the property (assuming the lease provides for operating cost escalations to be incurred by the tenant), the income from the property is defined for a given period. Thus, the value of the property at this point consists of a fixed income stream (possibly

including escalations) in addition to the value of occupancy rights upon completion of a lease term. The fixed income stream from the property can be viewed as a bond-like instrument.

An owner's interest in this property also includes the value of future occupancy rights. The value of this interest will rise and fall depending on supply and demand for industrial space, the market's valuation of the property specifically, and anticipated inflation for the remainder of the lease. A tenant's creditworthiness will not affect the value of this interest. This portion of an owner's interest has been termed real asset residual equity (RARE) and is similar to equity.

Articles written on this topic [2,3] refer to the debt component of properties as lease obligation bonds (LOBs). LOBs are financial instruments designed to give holders payments or a specified share of payments from leases for a given property. LOB cash flows resemble those of long term mortgages in that principal is repaid over the term of the note, rather than being paid in a lump sum at maturity. LOB debt has a similar legal status to general obligation debt except in the event of default. In instances of default, a note holder has a claim on occupancy rights to the leased space unlike general obligation debt where note holders have no specific claim on assets.

Real Asset Residual Equity (RARE) is that part of property ownership not represented by existing leases. In the instance of partially occupied properties, RAREs could also represent current occupancy rights for vacant space. RAREs then provide no current income and have volatility relating to the length of existing leases in a property due to greater uncertainty accompanying more distant lease expirations.

While much of the effort in financing literature relating to LOBs and RAREs has been motivated by a desire to broaden the appeal of property ownership to institutional and individual investors, the dramatically differing performance of LOBs and RAREs relative to inflation and stock and bond indices underlies these efforts. LOBs and RAREs are relatively new concepts and data for their respective performances does not exist. However, returns for each can be modeled by looking at aggregate real estate returns and then separating these returns into LOB and RARE components. Total real estate returns are estimated here based on the Russell-NCREIF Index. An initial estimate of the relative value of LOBs and RAREs is derived by determining the value attributable to existing leases relative to total property value. This produces a weighting of 38% LOBs and 62% RAREs[21]. LOB returns represent returns on existing

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[21] Although LOB and RARE weightings may vary over time, a constant relationship is assumed for illustration purposes. Relative LOB value is determined based on a discounted cash flow analysis and the relationship between the value for existing leases and total property values. These percentages are determined based on average lease duration, market lease rate and expense estimates, and estimated IRRs. Each of these inputs are based on market surveys or data provided by RERC.

leases and can be modeled based on a bond index having a comparable duration and credit quality. An index that is seen as approximating the duration and credit quality of leases in institutionally held properties is the Shearson Lehman Intermediate Government/Corporate Bond Index. RARE returns represent the difference between LOB returns and total returns. These returns are shown between 1975 and 1990 in Table XI and in Exhibit VIII [2].
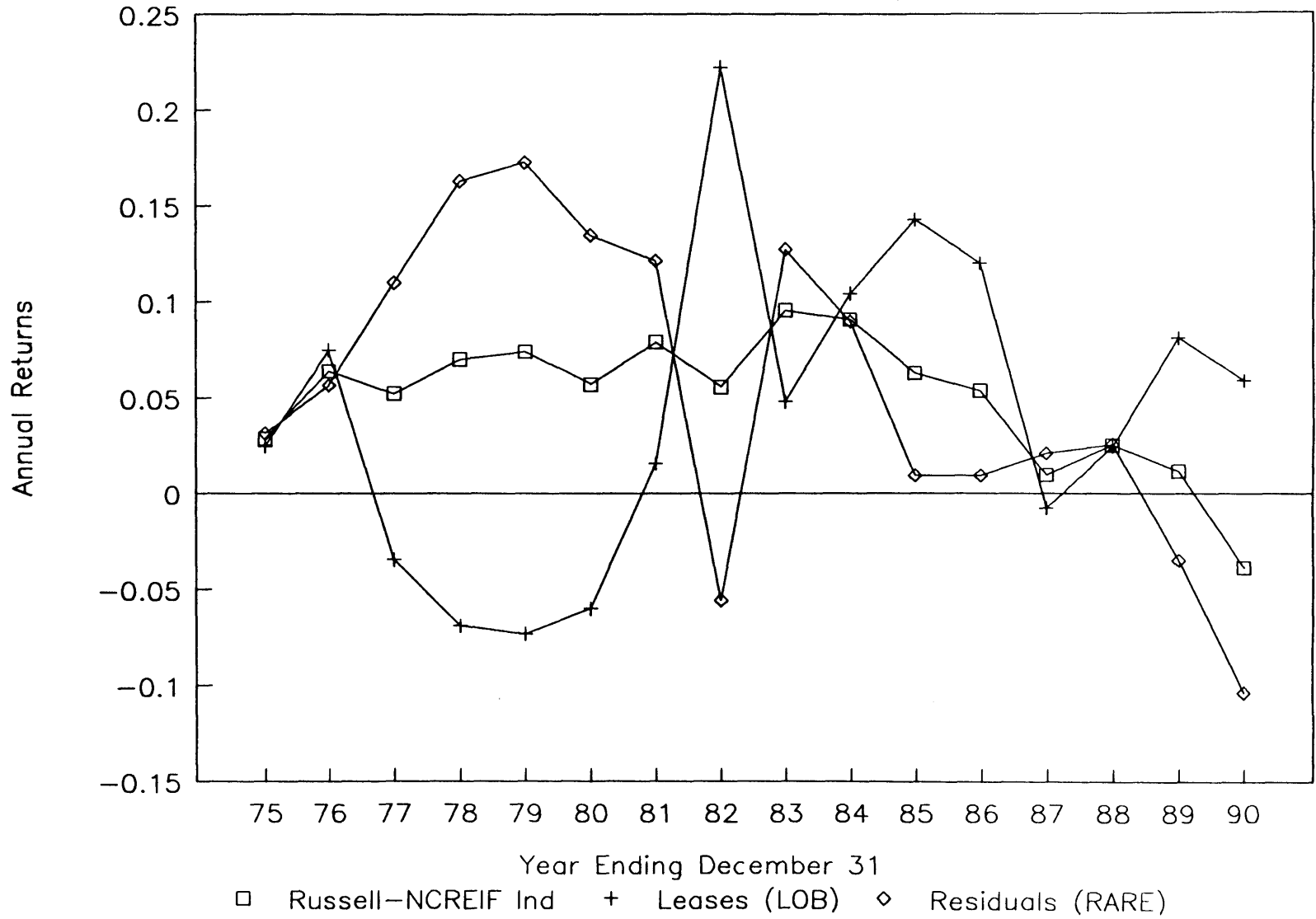
Clearly, the performance of LOBs and RAREs has differed significantly over time. LOBs and RAREs appear to have responded differently to periods of heavy inflation (1978 to 1981) and to strong or weak real estate markets. In considering the creation of a real estate index addressing the lease structure of properties, it should be recognized that an issue arising with regard to financing properties on this basis is the difficulty in clearly separating LOB and RARE components. Often, leases may include renewal options, expansion rights or other provisions that complicate the separation of LOB and RARE components. Similarly, properties may provide opportunities for further development or to otherwise increase property value that may not be easily quantifiable. However, while these issues may pose problems in financing properties due to a need for uniformity in LOB and RARE instruments, these issues are more easily addressed in indexing properties on this basis. It should be recognized that with

Table XI

Annual Returns for Real Estate, Existing Leases, Residuals	Year	Inflation	Russell-NCREIF Real Estate Returns	Leases (LOB)	Residuals (RARE)
Nominal Returns	1975	7.0%	9.9%	9.5%	10.2%
	1976	4.8%	11.2%	12.3%	10.5%
	1977	6.8%	12.0%	3.3%	17.8%
	1978	9.0%	16.0%	2.1%	25.3%
	1979	13.3%	20.7%	6.0%	30.6%
	1980	12.4%	18.1%	6.4%	25.9%
	1981	8.9%	16.9%	10.5%	21.1%
	1982	3.9%	9.4%	26.1%	-1.7%
	1983	3.8%	13.4%	8.6%	16.5%
	1984	4.0%	13.0%	14.4%	12.7%
	1985	3.8%	10.1%	18.1%	4.7%
	1986	1.1%	6.5%	13.1%	2.1%
	1987	4.4%	5.4%	3.7%	6.5%
	1988	4.4%	6.9%	6.9%	7.0%
	1989	4.6%	5.8%	12.7%	1.2%
	1990	4.1%	0.2%	10.0%	-6.3%

	Year		Russell-NCREIF Real Estate Returns	Leases (LOB)	Residuals (RARE)
Real Returns	1975		2.9%	2.5%	3.2%
	1976		6.4%	7.5%	5.6%
	1977		5.2%	-3.5%	11.0%
	1978		7.0%	-6.9%	16.3%
	1979		7.4%	-7.3%	17.2%
	1980		5.7%	-6.0%	13.5%
	1981		7.9%	1.6%	12.1%
	1982		5.6%	22.2%	-5.6%
	1983		9.6%	4.8%	12.7%
	1984		9.1%	10.4%	9.0%
	1985		6.3%	14.3%	0.9%
	1986		5.4%	12.0%	0.9%
	1987		1.0%	-0.8%	2.1%
	1988		2.5%	2.5%	2.6%
	1989		1.2%	8.1%	-3.5%
	1990		-3.9%	5.9%	-10.4%

Exhibit VIII
Ann. Returns: Real Estate, Leases, Res.

Annual Returns

Year Ending December 31

□ Russell–NCREIF Ind   +   Leases (LOB)   ◇ Residuals (RARE)

Source: Cashdan [2]

institutionally held properties lease structure generally dictates property values (i.e. institutional properties will typically be at their highest and best use and their value will be a function of their lease structure). Thus, even in instances where it is difficult to separate a property into LOB and RARE components, an index reflecting lease structure need only order properties in a defined manner depending upon whether their lease structure resembles a fixed income instrument, a speculative instrument having no current source of income, or falls somewhere between the two [3].

Framework for Addressing Lease Structure Within an Index

A proposed framework for constructing a real estate index on this basis is as follows. Property lease structure would be determined based on average lease duration, and the creditworthiness of existing tenants. In some instances, below market lease options would also be considered. Lastly, the relationship between value attributable to a property's lease structure and total property value would be recognized.[22] Each of these items would be clearly defined. Based on these criteria, a number between 1 to 10 would be assigned to each property. A "1" would be assigned to properties having either no leases in place or to properties with leases in immediate likelihood of default. A "5" would be assigned to properties having average lease

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[22] This criterion would be included to recognize instances where properties have leases that do not necessarily establish the property's value, e.g. a property in the path of development.

durations and average lease credit quality based on a benchmark created for this purpose. A "10" could be assigned to properties having long term high credit leases, (in instances where lease structure did not fully establish property value, the assigned number would be adjusted downward).

This scale could be used to ascertain the portion of a property's value represented by existing leases and that part represented by residual value. Lease structure could then be looked at in conjunction with property characteristics currently considered in indexing properties or disaggregating data. The importance of property type and property location would be dependent upon property lease structure, i.e. the number assigned to properties as outlined above. For example, the location and type of properties having long-term leases to high credit tenants are often of relatively little importance.[23] In contrast, for properties with forthcoming lease expirations specific property attributes may be quite relevant.

The merit in categorizing indices in this manner is evidenced to some extent by a number of commercial real estate firms having

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[23] To illustrate this, consider the example of a property acquired with a fixed 15 year lease based on an initial return on total cost of 9%, 3% fixed annual escalations, an overall IRR of 11%, and a terminal value also based on 9% relative to income. Even if this property sells for a 25% premium to the above terminal value, initial property value increases only by 6% (a 50% premium equates to a 12% increase in initial value), i.e. the terminal value and the nature of the property collectively in year 16 have little impact of the property's initial value.

already separated net leased properties from other property types in market surveys.[24] Based on the proposal detailed below, net leased properties would be categorized and viewed distinctly which appears not to have been done with those indices discussed.

Summary Comments regarding Lease Structure

In assessing the value of this proposal, the principal uses of an index must be considered. These include assessing the performance of real estate assets, evaluating fund managers, determining asset allocations, and setting diversification policy. With reference to each of these items, including properties in a single index having widely varying lease structures lessens the quality of the inferences that can be drawn from the index. Often, real estate indices are used to make judgements on likely future performance based on historical performance. In looking at asset classes and making such judgements, a certain level of homogeneity should exist [17]. By not recognizing lease structure, significant shifts that might occur in this variable and affect historical performance and inferences on future performance are simply ignored.

The following broad characterization of institutional investment since 1974 perhaps demonstrates the nature of these shifts in lease structure. Institutional real estate investment

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[24] Market surveys published by Cushman & Wakefield and Coldwell Banker address net leased properties separately.

might be viewed as having occurred in three different stages: a period following the initial passage of ERISA in 1974 marked by a conservative and cautious orientation amongst investors, a period during the mid to late 1980's characterized by rapid economic expansion and considerable optimism collectively towards income producing real estate, and a period from the late 1980's to the present marked by an awareness of many of the excesses of the previous period, a pronounced credit crunch and an undercurrent of caution. Based on this scenario, one could surmise that in the first and last of these stages, investors have acted conservatively and have tended towards properties having minimal leasing risk. The mid to late 1980's may have been characterized by a more aggressive pattern of investment and a greater willingness to accept leasing risk. If this represents a fair characterization of real estate investment patterns, evaluating real estate returns without recognizing the extent of changes in leasing structure may detract from the validity of research based on existing indices.

Even if one rejects the above post-ERISA characterization of real estate markets, a role of some sort for market psychology seems clear. As is the case with the stock market where run-ups in prices and sell offs are common place, clearly there are periods of greater and lesser optimism in real estate markets. Lease structure would seem to be a principal item that would vary as confidence in real estate markets builds and wanes. An index that

encompasses the manner in which lease structure varies may represent an improvement over indices currently available.

Chapter VI: Conclusions

Real estate indices, in large part due to their appraisal-based nature pose a number of problems to those seeking to evaluate previous performance or project future performance by reviewing these indices. These problems may not be fully resolvable unless these indices were to become transaction-based. Because this change appears unlikely any time soon, these issues are perhaps most effectively addressed by simply recognizing and quantifying each as best possible.

Perhaps the most substantive of those issues raised concerns the potential appraisal bias of the Russell-NCREIF Index and to varying extents other indices reviewed. While this bias is not easily quantified given the difficulty in determining an appropriate rate to use in discounting future earnings, it does appear that a bias of some magnitude exists almost regardless of the discount rate chosen. Unless the index were to become transaction-based, this problem may simply be intractable. The nature and complexity of those properties held by institutions and the manner in which they are held defy easy solutions such as attempts to standardize the valuation process.

Based on a limited survey of institutionally held properties, capital improvement expenditures appear to be a significant and continuing cost. In light of the excess supply of space present

in many markets and resulting higher costs to attract and retain tenants, capital improvement costs should be carefully considered in assessing returns based on available real estate indices. Management fees (i.e. asset management, advisory and others fees at this level), which substantially affect real estate returns are typically not reflected in real estate indices and should also be considered to properly evaluate real estate returns.

The evaluation of existing and proposed real estate indices should not simply address whether an index fairly represents a market basket for a given type or types of properties. The evaluation should also address the merit of an index in terms of its shedding light on the underlying attributes of assets comprising the index and the value of the index for use in projecting future performance. In this context, indices based on items such as financial structure have little value given the lack of insight offered by the index to specific investments. Indices should be based on tangible property characteristics directly affecting property performance. Characteristics such as property type, location and lease structure represent suitable items for use in creating and broadening real estate indices.

The number and variety of real estate indices available within the U.K. offer a frame of reference for indices available in the United States. Perhaps due to institutional investors in Britain having invested larger percentages of their assets over longer

periods of time in real estate, a broader variety of real estate indices are in use [15]. U.K. property indices include a number of broad based market indices similar to the Russell-NCREIF Index though smaller in size. Additionally, indices are in use which track specific properties or property prototypes so as to provide "national" samples. Lastly, a number of performance measurement services showing returns for groupings of commingled funds and direct investments are available. The number and breadth of property indices available within the U.K. arguably better serve U.K. investors than indices available to U.S. investors and may be worth considering as existing indices within the States are further developed and additional indices are created.

A number of issues discussed in this paper are unique to real estate indices and complicate the setting of investment goals. Nevertheless, the need for well grounded approaches to managing portfolios necessitates a continued reliance on real estate indices. To the extent that those issues and biases discussed in this paper are seen as valid, adjustments to asset allocations, diversification policies and approaches used in applying modern portfolio theory are needed.

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