

## When and Why Real Estate Could Be a Surrogate for Bonds: A Dynamic Asset Allocation View

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At a recent weekly investment briefing at our firm, the bond portfolio manager smilingly announced, “the 2-year Treasury is now trading at a 1.3% yield, the lowest since Truman was President!” What the bond manager did *not* mention was that for the *two decades* following Truman’s presidency, long-term Treasury bonds returned an average of less than 2% per annum! Indeed, all mixed-asset investors have come to see it as only natural that there be a continued decline in interest rates, and, therefore, a continuation of the very satisfactory returns they have enjoyed in *their* twenty-year career to date. *No one seems to be alarmed enough to seriously ask the question: should bonds continue to play a major role in my portfolio?* During this painful bear market in stocks, now three years old, investors are simply glad to have an asset that doesn’t go down. Yet, how much return remains at these interest rates? Is anybody looking forward, or are they all still driving in their rear-view mirror? Are there prudent alternatives to bonds? These are among the questions this paper seeks to address.

### The History of U.S. Treasury Bond Returns

Bond returns are relatively quite understandable—you receive a fixed income yield plus or minus a change in principal value determined by the difference between beginning and ending market interest rates, should you sell the bond prior to maturity. Exhibit 1 summarizes the returns on long-term Treasury bond investments by decade, with most data from the commonly accepted Ibbotson database.<sup>1</sup> Annual statistics are found in the appendix.

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<sup>1</sup> Source: Ibbotson long-term Treasury return series. Prior to 1926, data based on NBER and BEA statistics for long term Treasury price change plus the annual interest yield for each year.

**Exhibit 1**  
Annual Total Returns, Long Term US Treasury Bonds

<u>Decade</u>	<u>Starting 10-year Bond Interest Rate</u>	<u>First Five Years</u>	<u>Second Five Years</u>	<u>Entire Decade</u>
1921-30	5.40%	9.16%	4.92%	7.02%
1931-40	3.30%	4.10%	5.02%	4.56%
1941-50	1.94%	3.90%	1.38%	2.63%
1951-60	2.40%	1.28%	1.16%	1.22%
1961-70	4.12%	2.63%	0.42%	1.52%
1971-80	6.53%	6.36%	2.50%	4.41%
1981-90	12.43%	17.12%	10.79%	13.91%
1991-2000	8.07%	12.72%	6.32%	9.47%
2001-02	5.11%	10.53% (Two years only)		

What is striking about these numbers is how low the total annual returns were from 1930 to 1980. Except for the very early thirties, interest rates were gradually rising for most of that half century. As a result, value erosion caused by those rising rates resulted in total annual returns consistently *less than the starting interest rate!* With today's 10-year bond yield at only 3.6%, might we run the risk of similar results? Exhibit 2 shows what returns might be starting with a 4% return on a 12-year bond, with various ending interest rates in five years.

**Exhibit 2**  
Annual Total Bond Returns for a 12-year Treasury  
Purchased at 4% Initial Yield

<u>Market Yield at Year Five</u>	<u>Total Annual Return</u>
2%	6.5%
3	5.2
4	4.0
5	2.8
6	1.6

Source: Bailard, Biehl & Kaiser

The prospects for bond returns anywhere close to what we have enjoyed for most of the past twenty years is almost nil—even if yields fall to 2%! Clever bond managers can potentially improve on these returns somewhat, by investing in lower credit issuers—corporations, CMBS, foreign governments—but the returns are unlikely to approach double digits without resorting to junk bond or private loan investments. The problem is the low interest rate environment--*the starting point matters*. For institutional investors, this could be a serious problem, with the fixed-income allocation typically targeted between 20% and 40% of the entire portfolio. What might be done to remedy this?

## Can Private Market “Core” Real Estate Be An Alternative to Bonds?

A number of papers have been written which decompose private market real estate returns into two components: one, a fixed income component per the leases on the property; and, two, a residual appreciation or inflation component reflecting the re-leasing of the property at future higher rents (Graff, 1992 and 1999). For any given property, these components can be precisely determined, and, potentially, even separately financed.

This paper will take the view that core real estate could perform an even stronger role as a fixed income substitute because of two distinguishing features of this asset:

- *Real estate cap rates historically have been remarkably stable*, with maybe a 300 basis point range from 7.5% to 10.5%, far less than the 1100 basis point range exhibited by bonds; and
- *Real estate cash distribution incomes historically have been remarkably reliable*, provided the portfolio is constructed with an objective of reliable income.

Prior to the past two decades’ extraordinary decline in interest rates, bond investments were included in a portfolio strategy primarily for stable and reliable income. Perhaps real estate can fill that traditional role, while improving on the total return.

### Real Estate Cap Rates: Remarkable Relative Stability

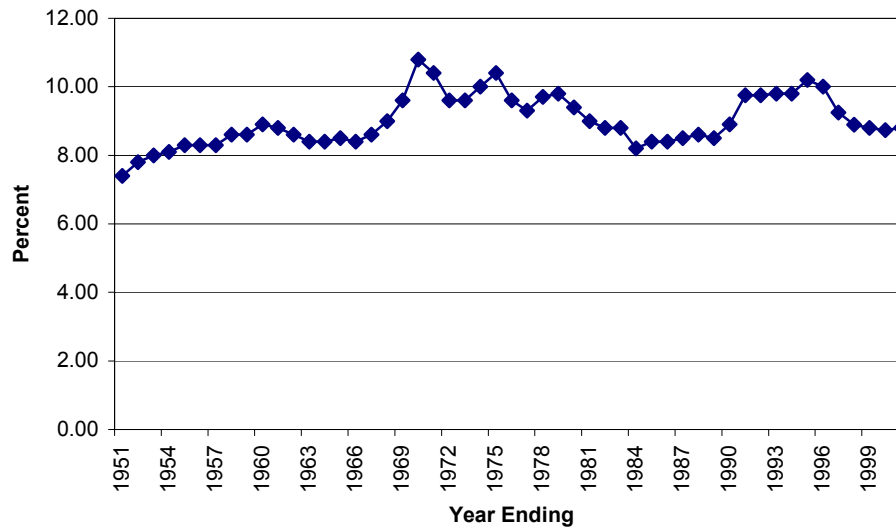
As we saw in Table 1 (and further detailed later in chart 2), bond interest rates have moved in a range of over 1000 basis points in the past half-century, in one large cycle. A similar 1000-basis point range is found for earnings yields<sup>2</sup> on common stocks, with two large cycles in the past fifty years (Kaiser 2003). Capitalization rates for real estate, however, have exhibited only about a 300-basis point range over its cycles since 1950, as shown in Exhibit 3.

#### Exhibit 3

Average Investment Property Cap Rates: 1951-2001

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<sup>2</sup> Earnings yield on common stocks is the inverse of the P/E ratio. A P/E of 20 times earnings is equal to a 5% earnings yield.



Source: Kaiser, Ron, "Using Capital Markets' Value Cycles in Allocating to Real Estate vs. Stocks or Bonds", *Journal of Real Estate Portfolio Management*, 5:1, 1999, and updated in a paper presented to the American Real Estate Society in April 2002 in Naples, FL.

The dampened volatility range of cap rates has major implications for valuation stability. Beginning and ending valuation levels have a dramatic influence on total return for bonds, as we saw earlier, and for common stocks, where changes in the P/E level can account for up to half of the total return impact over a 15 or 20-year P/E cycle (Kaiser 2003). In contrast, had a real estate investor been precisely unlucky enough to have invested at the low average purchase cap rate of 8.2% in 1984, and sold at the highs of 10.2% in 1995, it would have reduced a NCREIF annual return by only 200 basis points. Over the past 50 years of cap rate cycles, this appears to be about as large as the valuation effect gets: as summarized in Exhibit 4 this factor alone can add or subtract at most about 200 basis points to total return, assuming the investor gets the timing perfectly right or perfectly wrong.

#### Exhibit 4

##### Effect of Cap Rate Changes on Total Return

	<u>Estimated Cap Rate</u>	<u>Annual Valuation Effect</u>
1951	7.4%	--
1970	10.8%	-1.9%
1984	8.2%	+2.0%
1995	10.2%	-2.0%
2001	8.8%	+2.5%

Source: Bailard, Biehl & Kaiser

## What is Real Estate’s “Income” Return?

The nature of real estate returns has often confused people on two counts: one, NCREIF income returns are always greater than the cash distribution actually received by investors; and, two, appreciation returns have lagged inflation, thereby raising doubts about the asset's ability to offer an inflation hedge. The heart of the problem appears to lie in NCREIF’s insistence on reporting income returns based on Net Operating Income (NOI) rather than cash distributions, which is what is left from NOI after capital reinvestment in the property. (The reinvested capital meanwhile, in the NCREIF methodology, is added to the carrying value of the property.)

*A similar state of confusion would exist if the S&P 500 income returns were calculated based on the earnings yield rather than the dividend yield. This would have the effect of increasing the reported income return component (by adding retained earnings to the dividend to get total income), and reducing the reported appreciation component (by adding the capital reinvested in the business to the investors’ cost basis each year), though neither number would be related to anything observable by the investor (which, simply, is dividends and price change)!*

Let’s see what happens when we view real estate returns in the same manner as we do stock market returns—cash distribution to the investor plus change in price between what is paid for the building and what it is sold for. Cash distribution is equal to NOI income less cap ex. Over time, this is the number that the investors would have received, less any advisory fees not included in property transactions or operations.

The total return remains the same, but the appreciation return would be calculated from the original purchase price, not from an accumulating cap ex price. Exhibit 5 contains the results.

### Exhibit 5

25-Year History 1978-2002	NCREIF NOI Methodology	Alternative Cash Distribution Methodology
Income Return	8.05%	5.43%
Appreciation Return	<u>1.23%</u>	<u>3.77%</u>
Total Annual Return	9.36%	9.36%
Annual Inflation (CPI)	4.37%	4.37%

Source: NCREIF

Let’s look at the NCREIF-based appreciation another way. Assume we bought a building at the end of 1977 for \$10,000,000. At a 1.23% annual appreciation rate, that building would be worth \$13,580,000 today. Does that feel right? If we use the alternative cash income methodology, that building would have appreciated to \$25,200,000. *That* feels right. In

effect, the annual capital investment component of NOI is a necessary factor in maintaining a building's competitiveness with newly constructed buildings.

It also seems logical for the appreciation component to be close to the reported CPI inflation. We know that replacement construction costs tend to rise with inflation. Whenever rents rise faster than inflation, developers are encouraged to build because they can sell buildings for more than they cost. Then, when too many buildings are built, vacancies rise, rents fall, new construction becomes more costly than current market values, and development stops. When economic growth fills up enough space so rents begin to rise again, the cycle starts all over.

Thus, we can create a simple factor model to explain private real estate returns as follows:

	<u>Example</u>	
Purchase cap rate	9.0%	
Less reinvested capital	-2.6	(NCREIF historical average)
Plus inflation	4.0	
+/- cap rate change at sale	_____	?
Equals long term total return	10.4%	

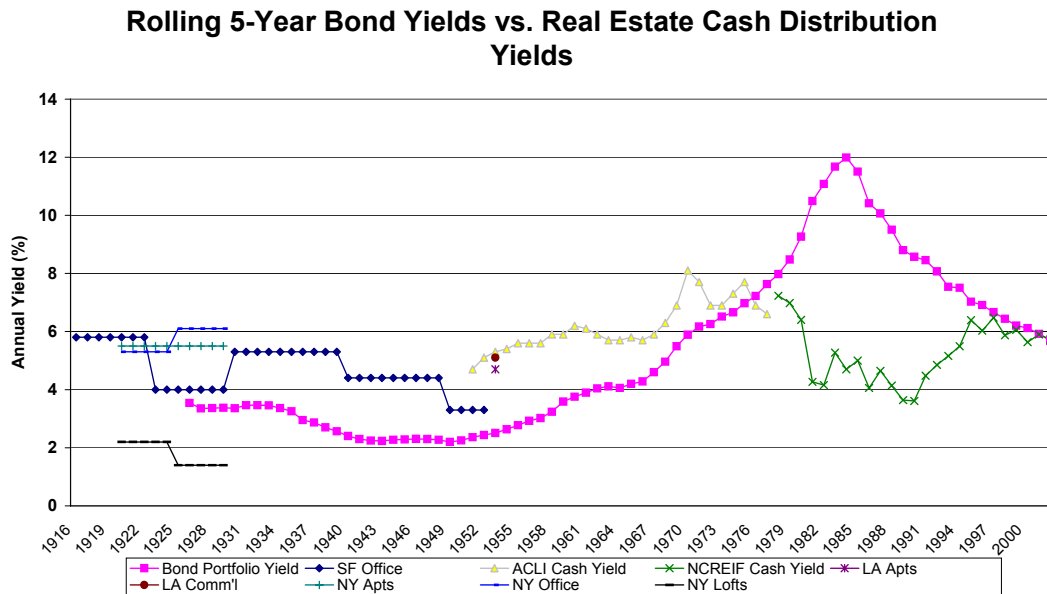
This approximates the finding that the national real estate return since 1937 has been 10% per year (Kaiser, 1997). However, NCREIF's historic total return is less than the 10.4% that one would expect from this model. This could be explained by a number of possible factors: 1) cap rates have actually averaged less than nine for NCREIF-type core properties; 2) properties have under-performed their pro forma cap rate assumptions; 3) transaction costs reduce returns; 4) appraisals tend to be conservative, so there is some residual as yet unreported appreciation returns; and/or 5) that the unusual boom/bust period of the 1980's to early 90's had a greater impact on NCREIF's relatively short 25-year history than would be the case if it were spread over the longer 60-year period that this cycle appears to exist (Kaiser 1997).

### **Bond Duration vs. Real Estate "Duration" and the Stability of Cash Flows**

For bonds, the duration can be precisely determined from its face yield, current price, and its remaining term to maturity, with "term" typically being the largest influencing factor. Real estate can similarly be factored, though for most properties the actual average lease term is not different from one property to another. Apartments are the shortest in term, usually having about 6-months remaining on the average lease in place. Industrial is generally more intermediate, and can have leases ranging from short terms (1-3 years for small users) to longer ones (5-10 years for large users.) Office leases typically run 5-10 years also, so the average remaining term for leases in place would be 3 to 7 years. Retail leases are similar to office, except for very large users where 20 year leases or longer are not uncommon. The conclusion is that average real estate lease duration is probably shorter than that for most intermediate-term or longer-term bond portfolios.

Are real estate incomes more volatile, therefore, than bonds? For any one property, or even small group of properties, the answer would be a resounding “Yes”. However, when one spreads this duration risk over a broadly diversified portfolio of properties—in this case the entire NCREIF portfolio—real estate begins to look like an infinite duration investment, with inflation-hedged income. Exhibit 6 shows the historic yield levels for bonds and real estate back to 1920. Over this period, real estate yields moved in the fairly narrow range typical of investment real estate. However, as we saw earlier, valuations rise with inflation, so a constant yield on a rising asset value translates into an inflation-hedged income stream (when viewed over a term long enough to smooth out the effects of shorter real estate cycles.)

### Exhibit 6



Over these eighty years, the general impression one gets is that real estate cash flows have been remarkably stable, running between 3.5% and 6% of current values for most of the time. Current values have also been remarkably stable as well, with negative price change exceeding income returns (resulting in negative total returns) in only two periods, from about 1929 to 1934 (Kaiser 1997) and from 1991 into 1993 (NCREIF data).

The earlier data from Los Angeles, New York, and San Francisco are derived from studies limited to one metro area. Case (1960) developed the Los Angeles data from 57 apartment properties and 37 commercial properties based on estimated values in 1953-4. The New York studies are from Grebler (1955) and represent 30-40 apartment buildings and 5 to 8 office buildings in two sub-periods of the 1920's. San Francisco data is from Wendt (1953) and represents the median cap rate over 5 sub-periods for 9 to 14 different properties in that period in which there were actual transactions, based on leases in place at the time of purchase or sale divided by that transaction price. In all cases, the data was represented as

being some version of “net income” with the treatment of “modernization expenses” or other potential capital costs being unclear. However, we have concluded that the authors’ definitions of cap rates are likely similar to our modern definition, so we have subtracted a 2.6% “cap ex” figure from the studies’ cap rates to estimate what a long-term cash distribution return would have been.

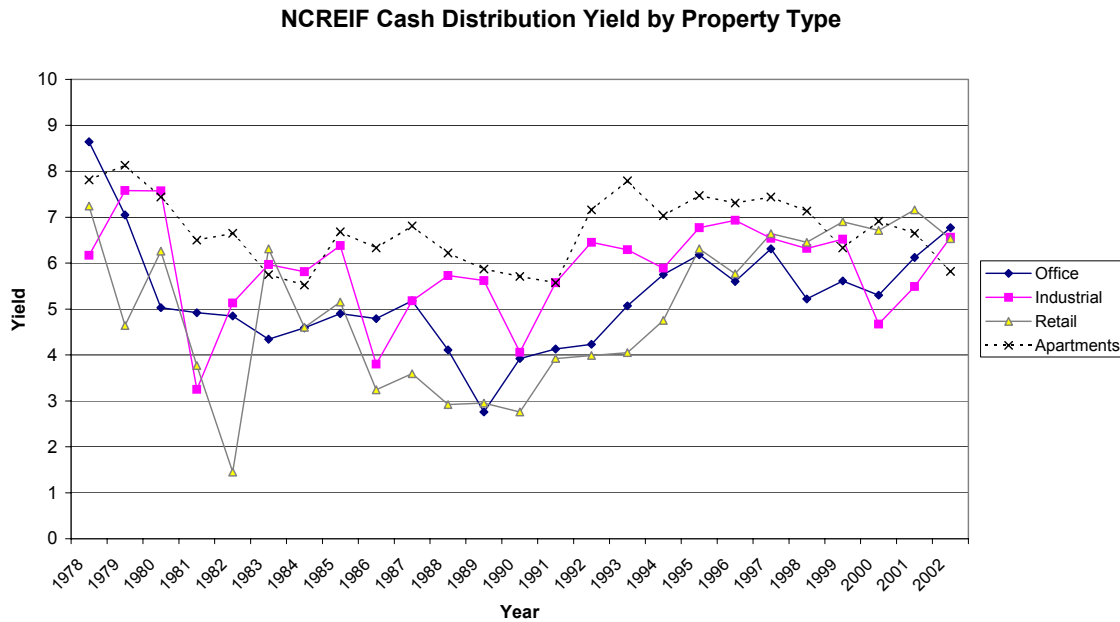
These small sample sizes and somewhat imprecise definitions of “net cash flow” result in data from the early studies that are therefore less reliable than the data directly from NCREIF or estimated from ACLI. Nonetheless, they are useful to indicate that the industry perception that cap rates have generally always run around 8-9%, more or less, is perhaps an historically persistent phenomenon. However, the limited data from the 1930’s and 1940’s indicates that cap rates trended more in the 6-8% range for some years—results that would not be inconsistent with the low interest rate environment that existed at the time. Nonetheless, our earlier conclusion that real estate cash yields have trended between 3.5% and 6% throughout the century appears to be reasonable.

Bond yields, with a more reliable database, have a similar long run average yield at 4.1%. However, they have also clearly moved through one long cycle over this period. They ran well above average, often above real estate yields, for the inflation-induced peak from about 1969 to 1997. This period of 28 years has been a long time – long enough to have dominated the thinking of most investment professionals still working today. Yet, prior to that period, yields ran remarkably low for an even longer 41 years, and are once again at below-average yield levels. What if we are indeed into another multi-decade period of low bond yields? Should they continue to dominate our thinking about the “norm portfolio” of two-thirds stocks and one-third bonds?

### **Income Reliability by Property Type**

Although useful data across property types is not generally available prior to the NCREIF database, that data does contain some useful insights for those 25 years, which, helpfully, include the boom-bust of the 1980’s to early 90’s. (Apartments do not figure into the data until beginning in 1981).

## Exhibit 7



Source: NCREIF

Statistically, the data show the following characteristics:

## Exhibit 8

	<u>Annual Compound Cash Distribution Return</u>	<u>Standard Deviation</u>
NCREIF Total Index	5.43%	1.09%
Office Index	5.25	1.19
Industrial Index	5.85	1.07
Retail Index	4.96	1.65
Apartment Index	6.72	0.75
Est. Market Index <sup>3</sup>	5.67	1.16

Although the NCREIF Index is heavily weighted toward office properties, especially in its early years, the over-all mix is only slightly below what one would expect from a market-weighted return. (It is also worth noting that the retail figures have a higher standard deviation partly because of the heavy weighting toward low-cap-rate regional malls in the early years and grocery-anchored strip centers in more recent years. This shows up in the

<sup>3</sup> Utilizing the estimated investable universe weights of Office at 29%, Industrial at 7%, Retail at 32%, and Apartments at 32% per Miles et al (1994).

data, where the average cash distribution yield in the NCREIF retail series is 4.18% through 1993 and 6.36% since then.)

## The Efficient Portfolio Approach: Bonds Are Disappearing From the Mix

Most asset allocation models that use the Markowitz “efficient frontier” approach (return, volatility risk, and covariance among asset classes) find that real estate often dominates the unconstrained models. To many observers, this means the model fails to adequately account for unique real estate risks, such as illiquidity, and therefore artificially increase the risk numbers, or, more commonly, they simply put an upper limit on the amount of real estate that will be tolerated in the final answer. Not surprisingly, the final answer for real estate is usually equal to the maximum limit amount—typically 10% of the portfolio.

Another common feature of such models is to begin with a commonly comparable data set, which is usually constrained historically by the fact that the NCREIF data only begins in 1978. Of course, as we saw in Exhibit 1, the period since 1978 very closely coincides with the years of highest returns for bonds. Exhibit 9 highlights the raw data for three basic asset classes, domestic stocks, bonds, and real estate, since 1978, but with correlation coefficients going back to 1926 for stocks and bonds.

### Exhibit 9

Asset Allocation Data 1978-2002  
Quarterly Returns, Risk, Correlation—Annualized

Asset Class	Annual Return	Volatility, or Standard Deviation	Correlation With		
			Stocks	Bonds	RE
LT Treasury Bonds	10.2%	12.4%	0.13		-0.13
S&P 500 Stocks	13.0	16.1		0.13	-0.03
NCREIF NPI	9.4	3.4	-0.03	-0.13	

Source: Bailard, Biehl & Kaiser

At this point, we are going to more closely approximate transaction market conditions by increasing the NCREIF volatility risk to 7.0%. This is based on the work by Miles et al (2000) which showed that the standard deviation for NCREIF data using only *sold* properties (thereby omitting the appraisal smoothing problem) was 1.2 times more volatile, and the data using only *repeat sales*, which therefore is a pure transaction index, was 1.8 times more volatile. We thus feel comfortable with our relatively conservative approach, which increases the volatility by a little over 2.0 times.

Over the period 1978-2002, the most efficient portfolio (Sharpe Ratio of 1.19) had a 10.1% return and held 22% bonds, 16% stocks, and 62% real estate. The median portfolio on the risk spectrum had a return of 11.7% and held 18% bonds, 60% stocks, and 22% real estate. At 80% along the risk spectrum, real estate finally begins to disappear from the mix: 12.5%

returns with 16% bonds, 83% stocks, and 1% real estate.<sup>4</sup> This makes sense: real estate offers the lowest return of the three.

*What happens if we utilize the longest time series data we have for each asset, thereby reducing the impact of the past 20 years of stock and bond bull market returns? In this case, we would still have the 9.4% for real estate, but, per the Ibbotson database, the bond returns would be 5.7% and the stock returns 10.7%. The volatility over this longer period produces a higher standard deviation for stocks (23.2%) and a lower one for bonds (8.5%). Exhibit 10 itemizes the differences. In all scenarios, we held the correlations the same.*

## Exhibit 10

Returns and Risks Used in Models in Each Time Period

	1978-2002		1926-2002	
	<u>Return</u>	<u>Standard Deviation</u>	<u>Return</u>	<u>Standard Deviation</u>
LT Treasury Bonds	10.2%	12.4%	5.7%	8.5%
S&P Stocks	13.0	16.1	10.7	23.2
Real Estate	9.4	7.0	9.4 or 8.0	7.0

The most efficient portfolio (Sharpe ratio 0.96) returned 8.7% and held 22% bonds, 7% stocks, and 71% real estate. More importantly, the median risk portfolio (return of 10.1%) held *no bonds* and 44% real estate, and the 80<sup>th</sup> percentile risk portfolio returned 10.5% with *no bonds* and 17% real estate. Real estate is replacing bonds in the traditional asset mix. There is no meaningful role for an asset that produces only a 5.7% return. (And, as we saw back in Exhibit 2, interest rates would have to drop nearly in half to achieve even those returns over the next five years.)

Yet, some would argue that the real estate returns of the NCREIF history have benefited from an unusually high level of inflation—four percent per year over that period. Since 1926, inflation has averaged only 2.5%. Thus, let us reduce the real estate return to 8% (notwithstanding the earlier study (Kaiser 1997) which suggested that 10% is a reasonable long term return expectation for real estate) and see what happens to our ideal model mixes. The most efficient portfolio is again a low risk one, with returns at 7.7% and a Sharpe ratio of 0.78, and holds 25% bonds, 8% stocks, and 67% real estate.<sup>5</sup> However, already at portfolio 2 of 10 on the risk spectrum, *bonds have entirely disappeared from the mix* while real estate maintains a more than a 10% allocation in all portfolios except those in the 90<sup>th</sup> percentile of risk or higher. Exhibit 11 summarizes some of the relevant data for lowest risk, median risk, and 80<sup>th</sup> percentile risk along the risk spectrum.

<sup>4</sup> Standard & Poors Micropal and Ibbotson Associates

<sup>5</sup> Standard & Poors Micropal and Ibbotson Associates

## Exhibit 11

### Asset Allocation Models at Various Historic Returns

Portfolio #	1978-2002 Returns			1926-2002 Returns: 10.7% for Stocks and 5.7% for Bonds and 9.4% Real Estate					
	<u>1</u>	<u>5</u>	<u>8</u>	<u>1</u>	<u>5</u>	<u>8</u>	8.0% Real Estate		
Return	9.9%	11.7%	12.5%	8.0%	10.1%	10.5%	7.2%	9.5%	10.2%
Risk	5.5	10.2	13.7	5.0	13.1	19.1	5.0	13.1	19.1
Sharpe Ratio	1.2	0.8	0.6	0.9	0.5	0.4	0.7	0.5	0.3
<u>Allocation</u>									
LT Treasury Bonds	23%	18%	16%	39%	0%	0%	39%	0%	0%
S&P Stocks	3	55	83	10	60	83	3	55	83
Real Estate	74	27	1	51	40	17	58	45	17

Source: Bailard, Biehl & Kaiser

What these data suggest is that bonds serve little or no role in mixed asset portfolios, except during periods of high and declining interest rates, which we have just had, and which is not repeatable from today's low levels.

### Inflation-indexed Bonds: An Alternative to Real Estate?

Earlier we argued that the income stream from a very large real estate portfolio could be compared to a long-duration inflation-hedged bond. If so, then one could begin to determine a market *risk premium* for real estate much as analysts do for common stocks. Currently, the 30-year US inflation-indexed Treasury bond yields 2.6%, with income and principal fully linked to US inflation, as measured by the CPI. NCREIF's average income return is 5.3%, also ultimately linked to domestic inflation (with considerable noise from shorter-term real estate cycle activity). The yield difference of 2.7% would therefore be a first approximation of the risk premium for real estate. This fairly small number again confirms real estate's relatively low-risk statistical status. (Common stocks have a calculated risk premium over fixed-rate government bonds of 5.0% since 1926, or 6.0% for the more modern period from 1946-1997.)

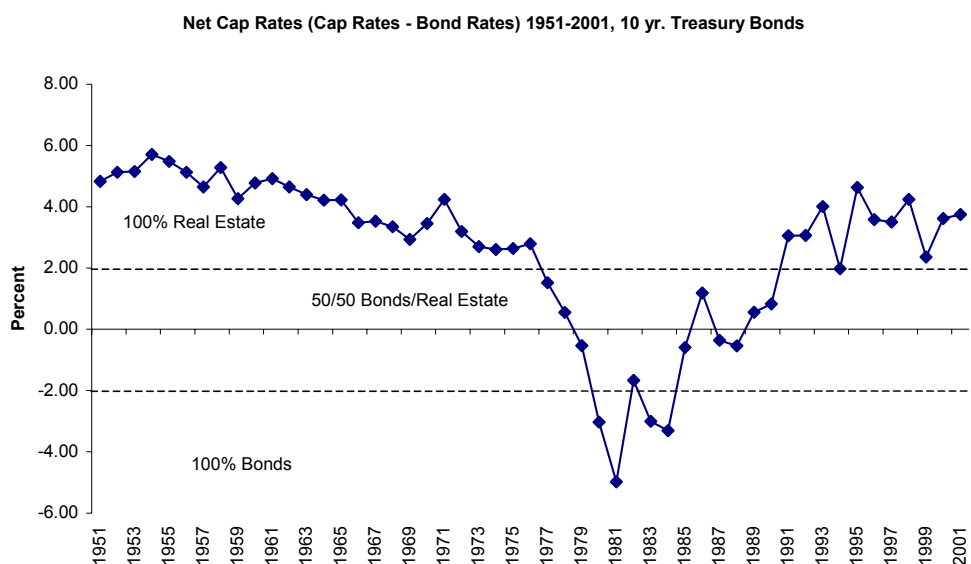
In this case, an investor considering using inflation-indexed bonds in place of real estate would have to decide that giving up an annual average of 2.7% extra return was a prudent trade-off. In these times of under-funded pension funds and spending-constrained endowment funds, one wonders whether such a loss of return would be worthwhile.

### Toward a Dynamic Asset Allocation Approach

A dynamic asset allocation between bonds and real estate has previously been proposed and explored in Kaiser (1999 and 2002). In that case, a model was proposed in which

bonds were to be held when bond yields were 200 basis points or more above real estate cap rates, and vice-versa when real estate yields were superior by that margin. In the middle ground, the two assets were held in equal amounts. A final refinement to this model, termed “realistic”, was the assumption that it would take three years to implement the asset allocation shift required, and that there would be a 3% transaction cost for selling real estate and a 1% buying cost. This simple decision chart, based on year-end values, is shown in Exhibit 12.

Exhibit 12



Source: (Kaiser 1999)

A summary of the results of this exercise is shown in Exhibit 13. Over the 51-year period, there is a definite reward to be earned from favoring the highest-yielding asset class.

Exhibit 13

Bonds vs. Real Estate vs. “Realistic” Switching Regime of Exhibit 7

<u>51 years: 1951-2001</u>	<u>100% Bonds</u>	<u>100% NCREIF</u>	<u>“Realistic” Regime</u>
Annual Returns	5.95%	9.9%	10.5%
Standard Deviation	10.7	5.1	6.7
Return/Std. Dev.	0.6	1.9	1.6

Source: (Kaiser 1999)

The success of this approach is that it captures bond returns only during the years when a peak in inflation has driven interest rates to unusual heights. It is further helped by the low liquidity of real estate and the 3-year averaging out of (or into) real estate and the 3-year averaging in for (or out of) bonds. Such delays serve to postpone the full commitment to bonds until closer to the peak in yields, for, as we saw in Exhibit 1, the

years prior to the peak were hurt by the price erosion caused by rising rates. These delays also serve to stay a while longer during the high-performing bond years when rates are in a steep decline.

## Beyond Volatility Risk: The Risk of Losing Money

*Downside Risk*, or the risk of losing money, is considered by many investors to be a more important measure of risk than the conventional financial definition of return volatility as used in efficient frontier models. On this basis, real estate proves even more superior, as shown in Kaiser (1997). Over the most recent *long cycle* of real estate, as defined in that paper, beginning in 1934 and ending in 1993 (end-of-trough to end-of-trough), real estate appeared to have had only 2 or 3 negative return years, with the worst being the -6% in 1991, while long-term bonds historically had 14 negative years, with the worst being the -9% of 1967. By this standard, a diversified real estate portfolio is lower risk than the conventional-wisdom, low-risk Treasury bonds.

## Considerations Involved in Replacing Bonds With Real Estate in the Asset Mix

For investors concerned with maximizing real estate's bond-like attributes, and minimizing its riskier real estate attributes, liquidity, strategy, property mix, geographic diversification, and minimum portfolio size should all be considered.

*Liquidity.* In order to preserve some of the flexibility associated with bond investing, only the more liquid forms of real estate should be employed. Open-end commingled funds, or open-end private REITs are probably the best alternatives. (Over shorter-term periods of, say, five years, the most liquid vehicle — publicly-traded REITs — behave more like stocks than real estate, with a 0.55 to 0.8 correlation with small-cap value stocks over any rolling five-year period since the inception of NAREIT per Kaiser (2002).) For the very largest investors, it would also be possible to invest in properties directly via a separate account approach.

*Strategy.* The lowest risk, most bond-like strategy would be to employ the *core approach* embodied in the definition for inclusion in the NCREIF Index. Reasonable investors might also consider seeking an additional perhaps 200 basis points in performance by employing a *core-plus* approach. In this, a *value-added* approach is used in the property acquisition phase, with the majority of properties in the portfolio held long enough for the majority of the portfolio to be held as “core” once the value-added process has been accomplished. Core-plus investing might also involve the prudent use of leverage, generally at less than 50% loan-to-value, and employed only when there is positive financial leverage (debt costs are lower than cap rates).

*Property-type Mix.* The cash yield volatility of each property type was highlighted earlier in Exhibits 5 and 6. Two types had the unfavorable combination of lower yields and higher volatility: offices and regional malls (the earlier portion of the retail data set). Thus, it would seem prudent for a bond-surrogate portfolio to emphasize apartments,

industrial, and strip retail over offices and malls. Nevertheless, the portfolio should be spread over at least several property types in order to diversify over the not completely correlated yield curves.

*Geographic/economic Location.* Metro area economic driver is another portfolio diversification factor to consider in reducing income volatility. In this case, mere geographic diversification by NCREIF regions may be inadequate. Studies by Mueller and Ziering (1992) and Mueller (1993) highlighted the importance of diversification by economic drivers as defined by the dominant SIC employment codes. Further, work by Ziering and Hess (1995) indicated that looking for clusters of different data could lead to even more powerful diversification over broadly defined metro groups such as “Traditional North American”, “New Age, High Tech”, etc.

A particularly important concern for investors concerned with income stability would be to reduce exposure to the more volatile markets. A first approximation would be to limit exposure to those markets with the widest historic vacancy range, such as: Tucson, Atlanta, or South Florida for apartments; Tucson or Houston for industrial property; Austin, Denver, Phoenix, Houston, South Florida for office buildings; and Houston, San Antonio and Dallas for retail properties. Essentially, these are markets with historically low barriers to new development.

*Number of Properties.* Finally, there is the question of how many total properties should a portfolio hold in order to significantly reduce the unsystematic risk (or idiosyncratic risk) of real estate. Young and Graff (1995) clearly delineated the problem of using conventional statistical approaches that rely upon normal curve distributions. They have pointed out how real estate return data have broader ranges (longer tails and lower central peaks) than normal, and that they are significantly skewed. Nonetheless, industry portfolio managers know that the portfolio impact of one or two substantially under-or-over-performing properties can be diminished by holding an increasingly large number of properties. In fact, based on Young and Graff’s work, it appears that 74 properties are required to reduce the asset specific risk that can be achieved by a 16 asset portfolio of normally distributed return assets, such as common stocks. In fact, this number of assets can easily be achieved by investing in one or two large open-end property funds.

## Conclusion

Most of today’s generation of investors remains favorably inclined toward maintaining a major role for bonds in mixed asset portfolios. And, why not? Bonds have been stellar performers for over 20 years. However, a longer view of history reveals that those two decades were an extraordinary anomaly. At no other time in the last century did bond yields begin at such double-digit heights. At today’s sub-4% Treasury yields, there are serious questions *as to whether bonds should play any role at all* in any but the *most* risk averse portfolio mixes. Private market real estate should be given serious consideration as a replacement vehicle for bonds, with its superior cash yields currently, its lower volatility of cash yield, and its nearly double potential total return from today’s starting levels. Bonds fare poorly in all of these comparisons. In this case, the math is simple and the

analysis requires little in the way of forecasting skill. Even rear-view-mirror investors can see that bonds will be a poor performer from today's interest rate starting point.

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