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SPECIAL REAL ESTATE ISSUE

Income and Cap Rate Effects on Property Appreciation

Some guidance for future pricing trends.

Philip Conner and Youguo Liang

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The strong performance of real estate and other private market asset classes over the last few years has attracted considerable interest in alternative investments and in real estate in particular. As the last few years have demonstrated quite clearly, property and capital market forces drive real estate pricing and thus investment performance. Measuring the contribution of these two forces, however, is challenging.

This article examines the historical relationship between real estate property market forces, which drive property earnings, and capital market forces, which largely determine cap rates, to help investors better understand how the two forces have affected property values in the past and how changes in either might affect property values in the future.

INSTITUTIONAL REAL ESTATE MARKET

For purposes of our discussion, we define the U.S. institutional real estate market as the universe of properties that constitute the National Council of Real Estate Investment Fiduciaries (NCREIF) Property Index. The NCREIF Property Index, or NPI, consists of quarterly performance data for unlevered (i.e., equity-owned) investment-grade properties owned by or on behalf of tax-exempt institutions, such as pension funds, endowments, and foundations. To be included in the index, properties must be current income-producing assets from the major property types—apartments, industrial, office, retail, and hotel properties.

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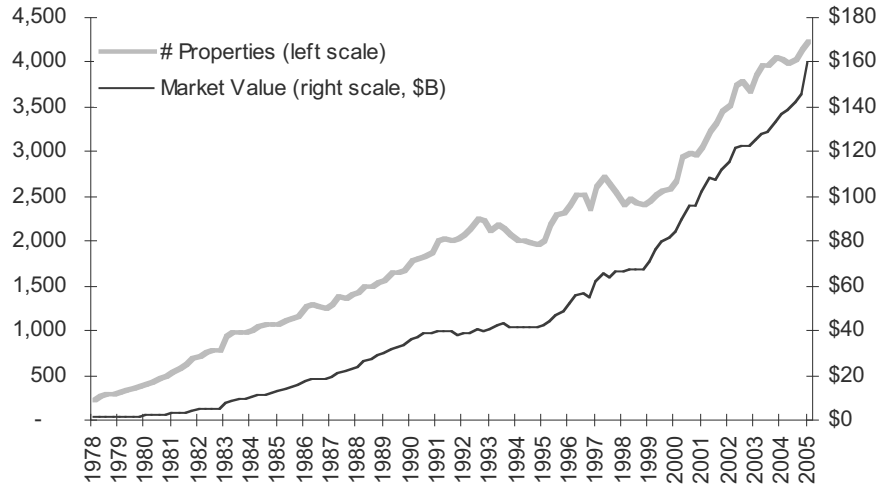
EXHIBIT 1

Size and Growth of NCREIF Property Index (NPI)



Source: National Council of Real Estate Investment Fiduciaries (NCREIF)

Exhibit 1 shows the growth of the NPI since its inception in fourth-quarter 1977 in terms of total number of properties and their aggregate market value.

As Exhibit 1 clearly shows, the NPI expands and contracts over time as data contributors buy and sell assets. Although the total size of the index fluctuates quarterly, the NPI has experienced only two prolonged periods of contraction, when the number of assets declined.

The first occurred in the early to mid-1990s when liquidity finally returned to the transaction market after the severe capital crunch that accompanied the early 1990s' property market downturn. As new capital sources, including public REITs and opportunity funds, stepped into the void left by traditional capital sources, many institutional investors exited the asset class or reduced their exposure partly because of concerns about liquidity.

The second period of contraction occurred a few years later, presumably as more investors decided to harvest the healthy gains from the market recovery at what seemed to be the peak of the property market cycle.

The rapid growth in the index since 2000-2001 illustrates the powerful influence of the capital markets in recent years. Despite a sharp rise in vacancy rates and falling rents in most markets and property sectors after the economy weakened in 2001, capital flowed to real estate as a safe haven from the volatile stock and bond markets.

At the end of first-quarter 2005, the index included more than 4,200 properties with an aggregate market value of approximately $159 billion. This marks a 58% increase in the total number of properties and an 89% increase in market value since the end of first-quarter 2000, when the index included fewer than 2,700 properties with an aggregate value of about $84 billion.

CAPITALIZATION RATES DEFINED

The earnings and cap rate data for the NPI provide insights into how property market and capital market forces have affected real estate pricing recently and over the longer term. Capitalization rates, or *cap rates,* are an important valuation metric in real estate. For those less familiar with the vernacular of the real estate business, a cap rate is analogous to the inverse of a price-earnings ratio for a stock in the public equities market.

That is, a cap rate is simply a ratio of a property's recurring earnings, or net operating income (NOI), to its price or market value:

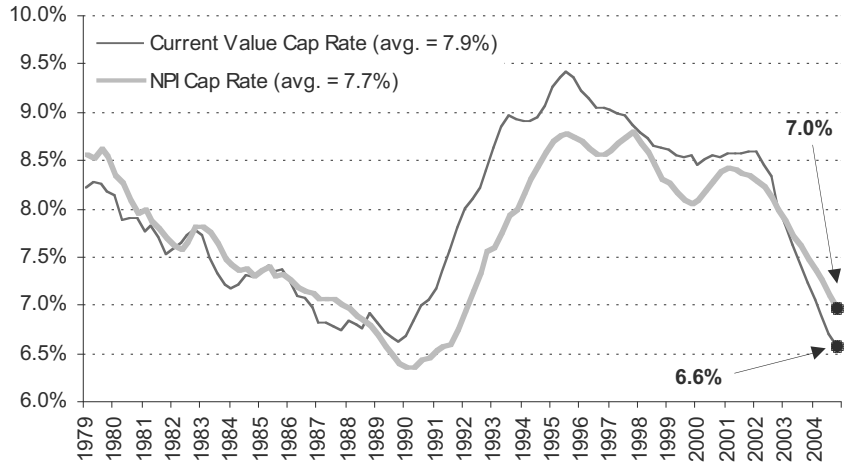
$$C = NOI/P \tag{1}$$

Recurring property earnings, or NOI, consist almost entirely of rent payments, which for most property types derive from long-term lease contracts. Like operating earnings in the corporate world, a property's NOI typically excludes extraordinary items. For example, capital expenditures for major property expenses, such as new mechanical systems or structural components, generally are not deducted from the NOI used to calculate a property's cap rate.

Due to limited transaction volumes in the private market where the actual properties trade, the asset price in the denominator of the cap rate equation frequently is based on an appraised value rather than on a transaction price. In the case of the NCREIF database, most of the reported property values in the index from which cap rates and the appreciation component of the returns are derived reflect appraised values. Additionally, although many properties in the index are appraised quarterly, NCREIF requires data contributors to update their appraisals only annually.

EXHIBIT 2

Historical Capitalization Rates



Note: Cap rates show four-quarter moving averages using data from two prior quarters, the "current" quarter and one "forward" quarter.

Sources: NCREIF; Prudential Real Estate Investors

From a data perspective, the use of appraised values in the NPI and the irregular timing of appraisals have two important consequences. First, because the appraisal process itself is inherently backward-looking, changes in the reported values for properties in the index tend to lag changes in the real estate property and/or capital markets. Second, the irregular timing of appraisals creates seasonality in the data, since more properties are appraised in the fourth quarter, producing a smoothing effect on the volatility of the quarterly NPI returns.

Exhibit 2 presents two series of cap rate data from the NCREIF database. The NPI cap rate reflects the implied cap rates for all properties in the index, whether or not their reported market values are based on current appraisals. The current value cap rate series, as the name implies, is a subset of the NPI data that uses only properties for which the reported market values reflect recent appraised values or transaction prices.

To correct for appraisal lag, both series show four-quarter moving averages using cap rates from the two previous quarters, the current quarter, and one forward quarter.[1] Although the patterns of the two series are similar, the current value cap rate series is slightly more volatile and tends to lead the NPI series as cap rate trends change. In the early 1990s, for example, the current value cap rate began to trend upward several quarters before the NPI cap rate responded to the liquidity crisis.

As more properties in the NPI are appraised quarterly, the difference between the two series has lessened. Historically, however, current value cap rates provide a more contemporaneous view of property value trends. Hence, unless otherwise noted, references to cap rates hereafter refer to current value cap rates.

Over the last 15 years, cap rates for investment-grade properties have averaged about 8.3%, or about 40 basis points higher than their longer-term average. As a point of reference, an 8.3% cap rate implies a price-earnings ratio of about 12× for real estate, which is considerably lower than the average P/E ratio for most stocks over the same period. Since 1990, the P/E ratio for the stocks in the S&P 500, according to operating earnings, has averaged about 20.5×.[2]

Real estate cap rates have also been much less volatile than earnings-price ratios (the inverse of a P/E ratio), as shown in Exhibit 3. While this characteristic highlights the relative stability of real estate cash flows compared with less predictable corporate earnings, appraisal smoothing accounts for at least some of the difference in the volatility of the two series.

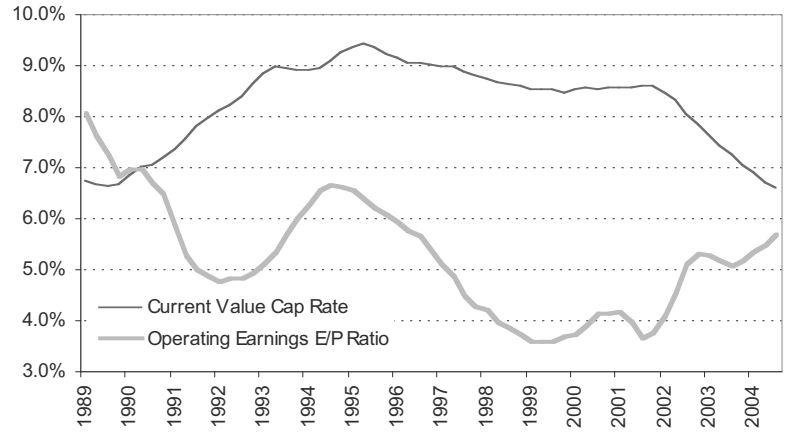
As Exhibit 3 shows, declining cap rates and the relatively weak equity markets have caused the two series to converge in recent years. At the end of first-quarter 2005, the current value cap rate for the NPI was just 6.3%, which implies a P/E ratio of about 15.9×. This compares with an estimated P/E ratio of about 16.8× for the S&P 500 as of the end of the first quarter.

Although cap rates provide an indication of a property's recurring earnings power, they do not necessarily provide a true picture of the cash yield that an investor can expect to receive from the property. The definition of the earnings used to calculate cap rates varies somewhat by property type. In some cases, the expenses that are excluded from NOI, which in the office, industrial, and retail sectors include leasing commissions and tenant improvements, can have a significant impact on cash flow.

To illustrate, consider the leasing costs (i.e., commissions and tenant improvements) for a ten-year office lease for 1 million square feet. Assuming a 5% leasing commission and an average lease rate of $50 per square foot, leasing commissions for the initial ten-year term would cost $25 million, or half of the tenant's total rent payments in the first

EXHIBIT 3

Current Value Cap Rates versus S&P 500 Earnings-Price Ratios

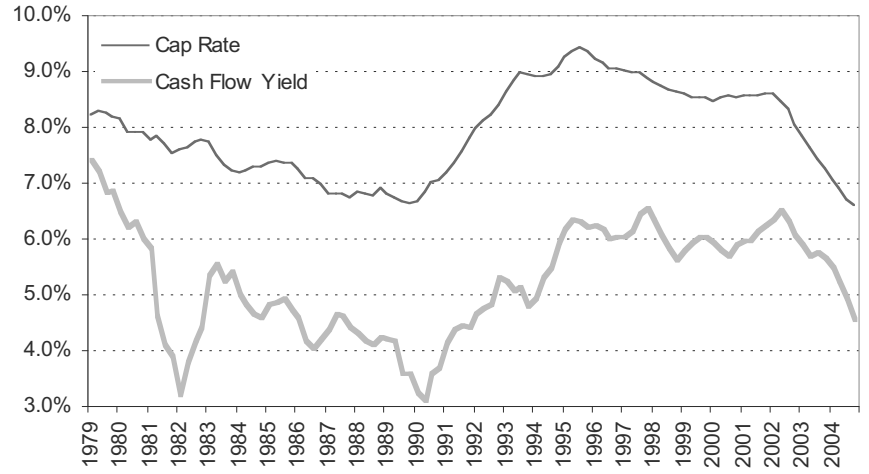


Note: Both series show four-quarter moving averages using data from two prior quarters, "current" quarter and one "forward" quarter.

Sources: NCREIF; Standard and Poor's; Prudential Real Estate Investors

EXHIBIT 4

Current Value Cap Rates versus Cash Flow Yields



Sources: NCREIF; Prudential Real Estate Investors

year. Tenant improvements, which typically account for about 25% or more of an office building's total cost, can easily add another $30 to $50 per square foot, bringing the total leasing costs to between $55 and $75 million. And, if the tenant renews or extends the lease, the landlord usually incurs additional costs for commissions on the renewal term and tenant improvements.

Exhibit 4 illustrates the dramatic effects that capital expenditures can have on cash flow yields. Logically, cash yields are much more volatile than cap rates, due to the lumpiness of capital expenditures generally. Since 1979, the average difference between the cap rates and cash yields shown in Exhibit 4 has been about 2.7 percentage points.

The distinction between the yield implied by the cap rate and the actual cash flow yield is important for two reasons. First, investors should be aware that cap rates are similar to earnings-to-price yields for stocks and interest yields for bonds, but they typically overstate actual cash flow yields. Second, because methodologies for calculating NOI differ by property type, the gap between cap rates and cash flow yields tends to be more pronounced for some property types than others.

For example, leasing costs generally are not treated as capital expenditures for apartments, unlike office, industrial, and retail properties. Instead, they are included in the operating expenses that are deducted from NOI. This practice helps explain why cap rates tend to be lower for apartments than for other property types. It also means that the gap between apartment cap rates and cash yields tends to be narrower. That is, apartment cap rates provide a better approximation of cash yields.

While the different methodologies for calculating NOI can cause cap rates to vary widely across property types and can make comparisons between different sectors less meaningful, investors typically consider both cash yields and cap rates when buying or selling assets. At the end of first-quarter 2005, apartment and retail properties had the lowest cap rates of the four major property types in the NPI, but their cash yields were higher than those for office and industrial.

This suggests investors will assign a higher multiple (or lower cap rate) to property earnings if they expect to

receive a greater share of the earnings in the form of cash flow. In the case of the retail sector, the higher cash yields reflect the relatively healthy property market fundamentals and pricing power that retail landlords wield today.

The distinction between cap rates and cash flow yields is particularly relevant today for investors in the office sector, which was hit especially hard by the downturn in the corporate economy in recent years. As our example of commissions and tenant improvements demonstrates, leasing costs for office properties can have a major impact on cash flows. Hence, as the office markets recover over the next few years, the gap between cap rates and cash flow yields may be wider than usual for office properties that currently suffer from higher vacancies and will require retenanting to achieve stabilized occupancies.

MATHEMATICAL DECOMPOSITION OF CAP RATE

Despite the idiosyncrasies of the earnings and value inputs used to calculate cap rates, the cap rate equation itself is quite simple. In its more practical form, the cap rate Equation (1) can be rearranged to solve for price:

$$P = NOI/C \tag{2}$$

While it's clear from Equation (2) that property NOI and cap rates together determine pricing, the drivers that determine the two variables differ. Property market forces—the supply of and demand for space—largely drive real estate earnings (NOI). Although tenant demand can change unexpectedly, as the sudden contraction in office demand in 2001-2002 demonstrated, new supply is relatively easy to measure and, over the longer term, to forecast.

Capital market forces, however, ultimately determine cap rates, and are far more unpredictable and complex. Like their analogue in the public equities market, P/E ratios, cap rates reflect a composite of many factors. For example, investor sentiment toward real estate investments or, more broadly, the relative attractiveness of value versus growth and earnings and valuation expectations for a particular asset can influence cap rates.

To further complicate matters, property and capital market forces are not always aligned. Intuitively, capital market forces should be most favorable toward real estate when property market fundamentals are healthiest and least favorable when supply and demand are not in balance—but this is not always the case. Indeed, capital market forces can easily overwhelm property market fundamentals, as they have during recent years, or amplify property market conditions, as they did during the early 1990s.

Ideally, investors would like to know how changes in property income and cap rates affect asset prices. Mathematically, this can be expressed as:

$$P_2/P_1 - 1 = (NOI_2/NOI_1)(C_1/C_2) - 1 \tag{3}$$

where $(P_2/P_1 - 1)$ equals the percentage change in price from period 1 to period 2, alternatively expressed as $\Delta P/P_1$. Similarly, percentage growth in NOI from period 1 to period 2 is noted as $\Delta NOI/NOI_1$. If we define $\Delta C = C_1 - C_2$, then $\Delta C/C_2$ can be interpreted as the percentage change in cap rate from period 2 to period 1, and Equation (3) can be rearranged as:

$$\Delta P/P_1 = (\Delta NOI/NOI_1 + 1)(\Delta C/C_2 + 1) - 1 \tag{4}$$

or:

$$\Delta P/P_1 = \Delta NOI/NOI_1 + \Delta C/C_2 + (\Delta NOI/NOI_1)(\Delta C/C_2) \tag{5}$$

As Equation (5) shows, the percentage change in price is the sum of three components: percentage growth in income, percentage change in cap rate, and the product of the two. The first component is the *income effect* on property appreciation, holding cap rates constant. The second component is the *cap rate effect* on property appreciation, assuming constant income.[3]

The third term is the *interaction effect*, or portion of the appreciation that cannot be allocated to the NOI or cap rate effects. In reality, NOI growth and cap rate change are likely related and cannot therefore be held constant. Fortunately, the interaction effect is negligible when the income and cap rate effects are small and the interval is relatively short.

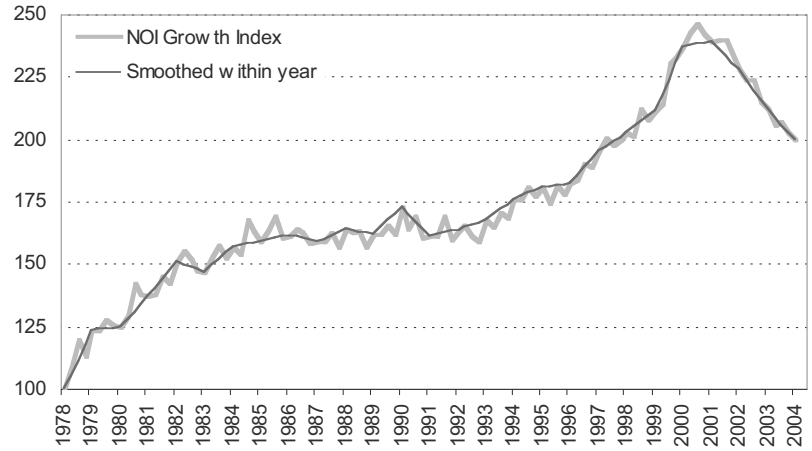
If we ignore the interaction effects, property appreciation can be decomposed into an income effect and a cap rate effect:

$$\Delta P/P_1 \cong \Delta NOI/NOI_1 + \Delta C/C_2 \tag{6}$$

DECOMPOSITION OF NCREIF CAP RATES

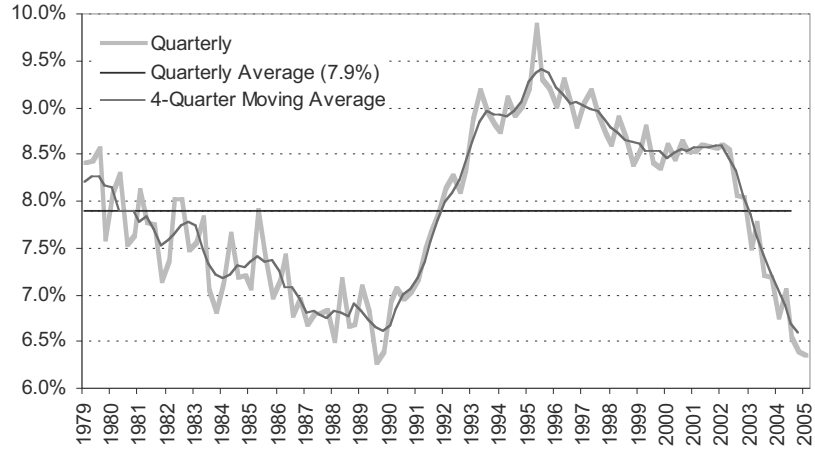
Although the equation for estimating the price effects of changing cap rates and NOI is imprecise because of the interaction between cap rates and earnings, decom-

EXHIBIT 5
Historical Same-Store Income Growth



Sources: NCREIF; Prudential Real Estate Investors

EXHIBIT 6
Historical Current Value Cap Rates



Sources: NCREIF; Prudential Real Estate Investors

posing historical NCREIF cap rates provides a way to isolate and quantify (approximately) the effects of capital and property market forces on property values. To test whether Equation (6) provides a reasonable approximation of price movements, we examine the historical NOI and cap rate data from the NPI to compare the implied appreciation, based on the model, and the NPI appreciation index.

Exhibit 5 presents the growth in same-store income for NCREIF properties indexed to fourth-quarter 1978. The more volatile series shows the actual quarterly changes in property income. To adjust for the seasonality of the data, the smoothed series assumes the average quarterly growth during each year is evenly distributed over the four quarters in that year.[4]

As Exhibit 5 shows, property income has grown considerably since fourth-quarter 1978. The index has nearly doubled since inception, growing at a compound annual rate of about 2.7%. Notably, property income has fallen about 20% from its peak level in 2001 due to rising vacancies and falling market rents.

The recent decline is unprecedented, in both size and length, in the history of the NPI. During the last market correction in the early 1990s, property income fell about 7.7% from peak (4Q90) to trough (3Q92), or less than half the recent decline.

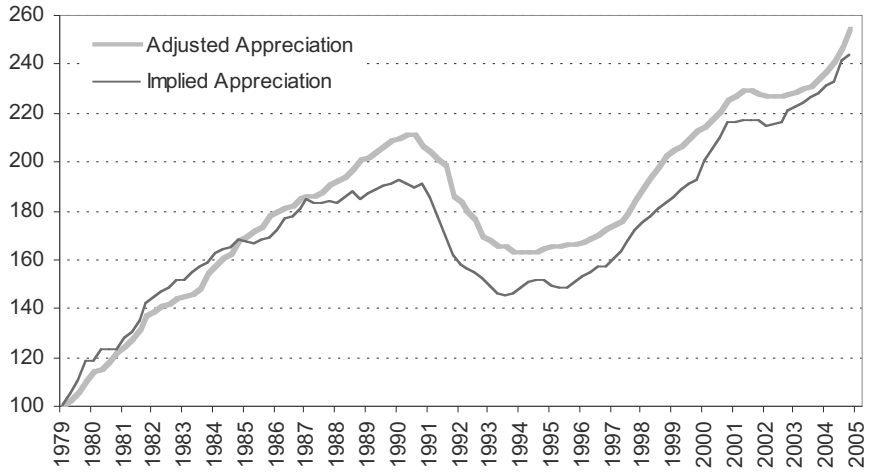
Exhibit 6 presents the historical NPI current value cap rate series. Clearly, cap rates have plunged since second-quarter 2002, falling well below the long-term average. At the end of first-quarter 2005, cap rates matched the previous record low of 6.3% in third-quarter 1989. The sharp decline in cap rates illustrates the strength of the real estate capital markets over the past few years.

This is different from the property market downturn in the early 1990s. Then cap rates rose sharply, as investors demanded higher returns. Recently, investors have accepted lower yields, despite the sharp deterioration in market conditions and property earnings.

Although declining property income explains some of the recent decline, powerful capital market forces—liquidity, low interest rates, and investors' thirst for stable cash yield—have continued to support asset values. Exhibit 7 shows the adjusted NPI appreciation, based on the NCREIF capital appreciation index, along with the implied appreciation based on the pricing effect model in Equation (6).[5]

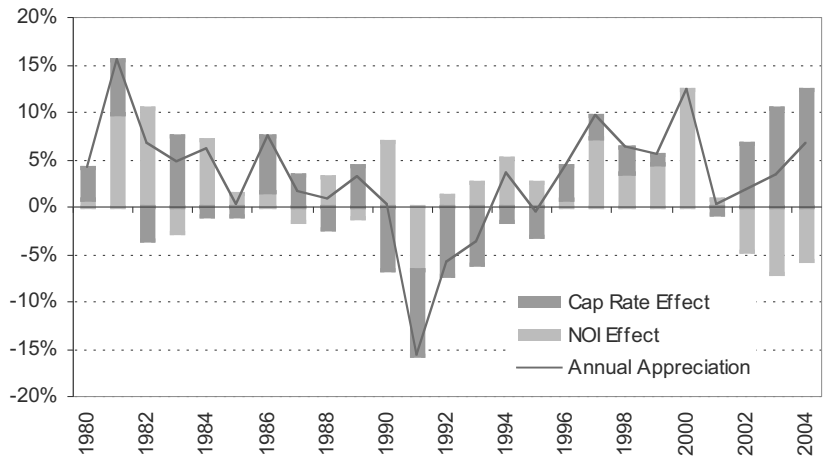
While the fit is not perfect, the model appears to approximate property appreciation closely enough that we can examine its component parts to better understand the interaction between capital and property market forces and

EXHIBIT 7
Historical NPI Appreciation versus Implied Appreciation



Sources: NCREIF; Prudential Real Estate Investors

EXHIBIT 8
Cap Rate and NOI Effects on Annual Appreciation



Sources: NCREIF; Prudential Real Estate Investors

their effects on real estate pricing. Exhibit 8 shows the annual implied appreciation of the NPI, decomposed into the NOI and cap rate effects. The property market downturns in the early 1990s and in the early 2000s are particularly interesting case studies for the dynamic interaction between property and capital market forces.

Capital market forces turned against real estate in 1990, about a year before the weak property markets began to affect property income. When property market forces became aligned with the weak capital markets in 1991, and NOI turned negative, property prices fell sharply, producing a 15.6% decline in property values.

Capital market forces remained a powerful negative factor in the real estate market from 1992 through 1995, despite the recovery in the property markets. It is not surprising that this period coincides, more or less, with one of the two periods of contraction in the NCREIF database.

Institutional capital continued to rotate out of the sector when liquidity finally returned to the market after the distressed conditions in the early part of the decade. Naturally, most sellers accepted discounted asset prices as the price for liquidity, which explains why the negative cap rate effect more than offset the positive NOI effect.

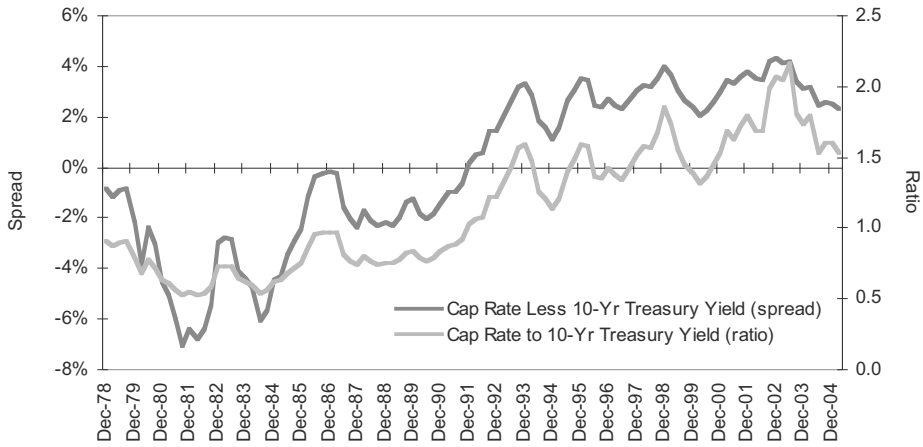
Capital market forces have also dominated property market forces in the most recent market downturn but with the opposite effect. Historically low interest rates and strong demand for stabilized income-producing assets have exerted tremendous downward pressure on cap rates, despite deterioration in the property markets. As a result, cap rate compression has completely overwhelmed the negative effects of falling property income.

Whether the strong capital flows in the face of deteriorating earnings reflect rational investor behavior or not is difficult to know for sure. Cap rate spreads to benchmark rates such as the ten-year Treasury bond yield, however, suggest that real estate pricing is at least as rational as pricing in the bond market. The cap rate spread and ratio to the ten-year Treasury yield have declined in recent years, but still remain above their long-term averages (*see Exhibit 9*).

Exhibit 10 shows the cumulative appreciation, decomposed into the NOI and cap rate effects, for the NPI and major property types during the last two property market downturns. It also includes the interaction effect, which increases over longer intervals and for large movements in NOI or cap rates.

EXHIBIT 9

Cap Rates and Treasury Yields



Sources: NCREIF; US Federal Reserve; Prudential Real Estate Investors

EXHIBIT 10

NCREIF Appreciation Decomposed – Two Market Downturns

1991 — 1993

	Cumulative Appreciation	*NOI Effect*	*Cap Rate Effect*	*Interaction Effect*
NPI	-23.5%	-3.2%	-21.0%	0.7%
Office	-32.7%	-5.8%	-28.6%	1.7%
Industrial	-25.4%	-8.4%	-18.6%	1.6%
Retail	-14.2%	1.3%	-15.3%	-0.2%
Apartment	-16.4%	4.6%	-20.1%	-0.9%

2002 — 2004

	Cumulative Appreciation	*NOI Effect*	*Cap Rate Effect*	*Interaction Effect*
NPI	12.4%	-16.4%	34.4%	-5.6%
Office	4.3%	-21.4%	32.6%	-7.0%
Industrial	7.0%	-17.5%	29.7%	-5.2%
Retail	28.7%	-2.5%	32.0%	-0.8%
Apartment	17.1%	-18.6%	43.8%	-8.1%

Sources: NCREIF; Prudential Real Estate Investors.

Unlike the early 1990s, when the liquidity crisis warranted a higher discount or cap rate, the ample liquidity in the most recent downturn has created a positive liquidity premium today. In every property sector, the cap rate effect has more than offset falling income to produce modest to healthy appreciation instead of the value losses associated with the early 1990s' market downturn.

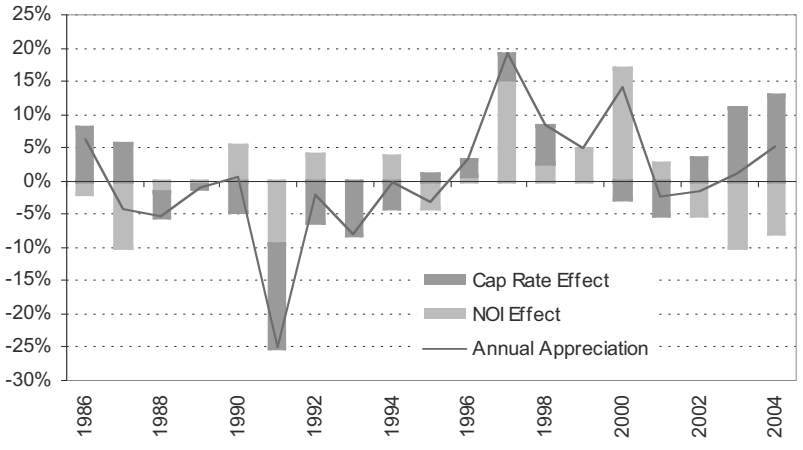
Although property values increased across all four major property types during the latest downturn (2002-2004), growth was not uniform. Exhibits 11 and 12 show the annual implied appreciation for the office and industrial sectors separated into NOI and cap rate effects. Both sectors suffered steep declines in property income during the severe corporate recession, but they still managed to produce modest annual appreciation of 1.4% and 2.2% per year, respectively. Unlike the early 1990s, when capital flowed out of real estate, strong capital market forces—the availability of cheap equity and debt capital and strong demand for assets—effectively prevented values from falling sharply, despite the sudden contraction in tenant demand.

Office values dipped in 2001 and 2002 as the economy struggled and job losses soared, but they have since recovered as investors look forward to the property market recovery and rising property income. Industrial values also declined slightly in 2003, thanks to a 9.6% decline in NOI. As in the office sector, increased competition among investors for a limited supply of assets pushed values higher last year.

Property appreciation in the consumer-driven retail sector far outpaced all other property types during the recent downturn. Retail property values increased at a robust 8.8% annual rate from 2002 to 2004 as strong consumer spending continued to support retailers and demand for retail space throughout the downturn in the corporate economy. Although NOI fell slightly in 2003 and 2004, the decline was modest compared with the office, industrial, and apartment sectors.

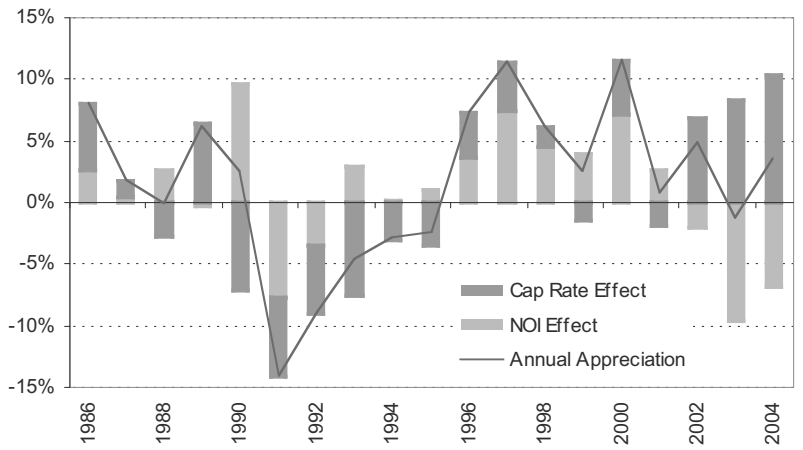
Capital market forces, which were particularly strong in the retail sector, caused cap rates to compress sharply from 2002 to 2004 (*see Exhibit 13*). At least some of the recent compression likely comes from investors correcting underweight allocations to retail. In 2001, at the start of the recent market downturn, retail cap rates were the highest among the major property types, in part because the promises that helped propel Internet stocks higher created concerns about future demand for retail space. Retail

EXHIBIT 11
Decomposition of Office Appreciation



Sources: NCREIF; Prudential Real Estate Investors

EXHIBIT 12
Decomposition of Industrial Appreciation



Sources: NCREIF; Prudential Real Estate Investors

appreciation should slow, therefore, from its recent pace as investors rebalance their portfolios and yields adjust to a new level.

Capital market forces were also strong in the apartment sector, where prices increased at a 5.4% annual rate despite very weak property market fundamentals. Heavy job losses and the booming housing market badly hurt tenant demand for apartments, causing vacancy rates to rise and market rents to fall. Yet investor demand for apartment properties caused cap rates to fall sharply (*see Exhibit 14).*

At least some of the recent demand for apartment properties (or any property that can be converted to residential use) stems from condo converters looking to take advantage of the housing market while interest rates remain low and enthusiasm for homeownership remains high. If rising interest rates cause the condo market to slow, apartment cap rates likely will increase. Property income, however, should begin to recover as the economy expands and job growth continues, particularly if rising interest rates and higher home prices make homeownership less affordable.

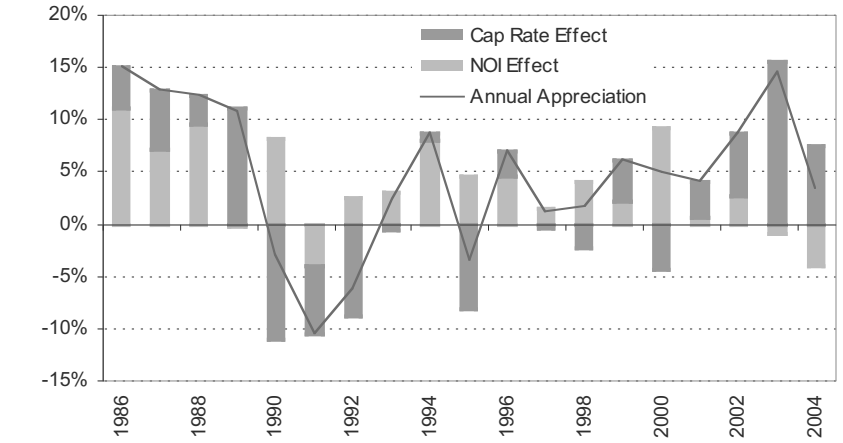
SUMMARY

Decomposition of property appreciation into net operating income and cap rate effects confirms our intuition about the two most recent real estate market downturns, even if the relative contributions of the two variables may not be exactly precise. Capital market forces clearly dominated property market forces during both periods but with very different results. In the early 1990s' downturn, property income fell and cap rates rose as investors liquidated assets at distressed prices. During the recent downturn, however, property income fell sharply, except in the retail sector, but cap rates declined as capital poured into the asset class.

Our decomposition may also provide some guidance for future pricing trends. The current backlog of equity capital that is trying to find a way into the real estate market and the availability of cheap debt suggest that capital market forces will remain favorable in the near term. The positive liquidity premium persisted through first-quarter 2005 and likely will remain through the rest of 2005 at least.

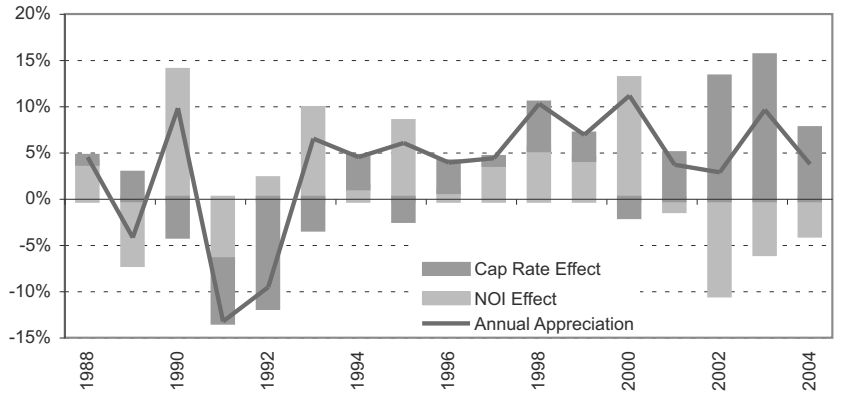
At the same time, as property market fundamentals recover this year and next, property income should also improve, particularly in the apartment sector, where shorter lease terms make property income more responsive to changing market conditions. Real estate pricing,

EXHIBIT 13
Decomposition of Retail Appreciation



Sources: NCREIF; Prudential Real Estate Investors

EXHIBIT 14
Decomposition of Apartment Appreciation



Sources: NCREIF; US Federal Reserve; Prudential Real Estate Investors.

therefore, should remain firm for at least another year.

The longer-term outlook will depend on how cap rates respond to rising interest rates. As interest rates rise, capital market forces should abate, and cap rates should drift back toward their long-term averages. Obviously, if cap rates rise quickly or sharply, then real estate pricing will suffer. But if cap rates rise slowly and moderately enough, while NOI recovers, real estate should not experience a sharp correction in pricing.

While external non-real estate forces will largely determine the timing and pace of any increases in interest rates, structural changes in the real estate capital markets, namely, the improved liquidity and transparency that have come with the development of the public markets, should help limit the extent of cap rate movements.

ENDNOTES

[1]For example, the cap rates for year-end 2004 (6.6% and 7.0%) are averages of cap rates for the second, third, and fourth quarters of 2004 and the first quarter of 2005.

[2]Per Standard & Poor's.

[3]Since property value is inversely related to the cap rate, the cap rate effect is defined as the percentage change in cap rates in a reverse time order, from period 2 to period 1.

[4]Although using same-store income data eliminates the effects of changes in the number of properties in the NPI, the changing composition of the index over time may also affect earnings growth over longer periods.

[5]The adjusted NPI appreciation index is calculated as [(Ending Market Value − Beginning Market Value) + Partial Sales]/Beginning Market Value. The primary difference between the adjusted index and NPI capital appreciation index is in the numerator of the equation. The actual capital appreciation index deducts capital improvements from the value change between the beginning and end of the period. Although the effect of this deduction is offset partly by a positive adjustment to the denominator for capital improvements, the index understates the actual historical appreciation.