

# NCREIF Research Corner

## June 2015

### New NCREIF Indices – New Insights: Part 2

This month's Research Corner article by Mike Young and Jeff Fisher is a follow up to January's article which introduced three new metrics formally released by NCREIF during the first quarter of 2015. The new metrics are designed to supplement the NCREIF Property Index (NPI) by providing measures of how market values are changing over time, how much cash flow is being generated each quarter and the ratio of capital expenditures to market value.

Part 1 discussed the rationale for three new data series as indicators of property value appreciation (the Market Value Index or MVI) and periodic operating indicators of distributable cash flow (the Free Cash Flow Yield or FCFY) and of routine capital expenditures (the Capital Expense Ratio or CXR).

In Part 2, we will concentrate on the FCFY and CXR with a short reprise of the logic behind filtering and equal weighting of the data.

The NCREIF Research Corner is produced by NCREIF.

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## **New Indices – New Insights: Part 2**

Jeff Fisher and Mike Young

In Part 1 of this Research Corner article, we discussed the rationale for three new data series as indicators of property value appreciation (the Market Value Index or MVI) and periodic operating indicators of distributable cash flow (the Free Cash Flow Yield or FCFY) and of routine capital expenditures (the Capital Expense Ratio or CXR).

In the past, the NCREIF Property Index (NPI) and its component returns had been used as indicators of these trends, but that had never been their intent. Rather, the NPI was initially designed for the purpose of calculating returns. Thus, the new series are another tool for researchers and practitioners alike to gain insight into the financial economic performance of commercial real estate in ways not possible with the classic NPI series.

The MVI is designed to indicate property appreciation over a reporting period. The FCFY is designed to indicate operating cash flow yields of properties. The sum of these first two indicators is a number that is almost identical to the total return on the NPI – but, will differ slightly owing to the different denominators used to compute the NPI versus the new series and to the filters used to exclude properties in quarters when major capital expenditures occur in order to preserve the concept of “same store” in the new series. Notice that we use the term “indicator” as the intent is not to suggest that these statistics be used to create indices. While an index series is appropriate for the MVI, it is not appropriate for the FCFY or CXR that are intended as a snapshot for each reporting period.

Part 1 discussed the filter rule for gathering the data needed to construct the new series, the formulas for each, and the MVI in some detail. In Part 2, we will concentrate on the FCFY and CXR with a short reprise of the logic behind filtering and equal weighting of the data.

### **Equal Weighted Methodology**

Before showing the actual formulas and results, one more point to be made is that these new indicators will be equal weighted instead of value weighted like the NPI. The NPI is value weighted because it is the best way to capture the return for a portfolio. That is, the NPI is interpreted as a portfolio of all properties held by NCREIF data contributing members. Higher value properties do impact the portfolio more than lower value properties.

The purpose of these new indicators, however, is to provide insight into operations of the broader market of domestic commercial real estate. Market value changes over time are important indicators of capital appreciation by property types and by geographic location, information vital to owners, researchers, and portfolio strategists alike. For many owners and investors, periodic cash flow is a distinguishing characteristic of real estate and an important consideration when real estate earnings are expected to fund other expenses or obligations.. Statistically, equal weighting is more appropriate when generalizing from a sample of properties to a broader universe. Thus, the “headline” indicators of the three new series will be equal weighted, although value weighted versions will be available in NCREIF Property Value Trends and the Query Tool.

## **Filtering for Major Capital Expenditures**

Broadly speaking, capital expenditures serve two purposes. In the ordinary course of property ownership, some capital expenditures are made to attract and retain tenants and to maintain the physical asset and its various systems such as plumbing, HVAC, elevators, and the like. These capital expenditures are every day costs of operating commercial property as an investable asset.

From time to time, property owners may decide to make substantial changes to the physical asset through major renovation or expansion. These activities have the effect of changing the physical, functional, or economic condition of the property in a material way.

The intent of the three new data series is to produce indicators of performance of properties while each property retains its original physical, functional, and economic condition. In other words, the data that underlie the three new data series should exclude properties while they undergo major capital expenditures. Once normal operations resume, the properties will once again be included in the data set.

Prior to 2000, only Total Capital Improvements were reported to NCREIF. Subsequently, additional subcategories of capital improvements gave us more information on composition of Total Capital Improvements. In particular, the subcategories included Added Acquisitions Costs, Leasing Commissions, Tenant Improvements, Building Improvements, Building Expansion, and Other Capital Improvements.

We divide these subcategories into two groups: those that are typical recurring expenses related to changing tenancy and ordinary repairs, and those that are occasional high dollar value expenses that alter the physical, functional, or economic condition of a property. Leasing Commissions, Tenant Improvements, and Building Improvements fall into the former group and are included in Capital Improvements in the FCFY and CXR series. Added Acquisitions Costs, Building Expansion, and Other Capital Improvements fall into the latter group and are all candidates for filtering properties for exclusion within all three series.

We use the latter group of capital improvements from the post-2000 era to create filter rules for excluding properties undergoing substantial capital improvements and apply a similar ratio of capital improvements to market value to establish a filter rule for the pre-2000 era.

After considerable analysis and testing, we chose to filter capital improvements in the subcategories of Added Acquisitions Costs, Building Expansion, and Other Capital Improvements that show an absolute value greater than 5% of Beginning Market Value of a property in any quarter in the post-2000 era.

We tried several filter rules for pre-2000 data in order to get a similar rate of filtering or exclusion as the 5% filter rule generated in the post-2000 era. An absolute value of Total Capital Improvements greater than 10% of Beginning Market Value provided the most similar fraction of excluded quarters for most property types and for the aggregate of all properties in the NPI. For a more complete discussion of the filter rules, refer to Part 1 of this series.

## Property Income Available for Distribution

For many years, NCREIF has provided researchers an option within the Query Tool to subtract Capital Expenditures from the Net Operating Income (NOI) to produce an alternative formulation of the NPI Income Return component of Total Return. However, this reformulated Income Return has often been misused in that it has been likened to a stock earnings yield or worse to a stock dividend yield.

In common stock market parlance, the term “free cash flow” is used to describe the net earnings of a firm after all current expenditures have been deducted from gross revenue. Expressed as a yield, free cash flow would be divided by stock price or value.

In real estate, what should be compared to stock free cash flow yield is the amount of cash flow generated by property after ordinary capital expenditures have been paid. As we said earlier, ordinary ongoing capital expenditures are appropriate deductions from NOI rather than total capital expenditures including extraordinary items. Free Cash Flow Yield (FCFY) is the commercial real estate equivalent to stock free cash flow yield.

In other words, FCFY is a measure of the actual cash flow that a commercial property will generate periodically. Knowledge of this statistic can help, for example, in the formulation of portfolio strategies for maximizing net distributions for property owners. As we will see below, FCFY has varied by property type and across time.

**Free Cash Flow Yield (FCFY)** is computed for each property as the quantity Net Operating Income *minus* Capital Improvements *divided by* Beginning Market Value for each quarter. Major capital expenditures for expansions or renovations are not included in the formula. Accordingly, in quarters where the *absolute value* of capital improvements defined in the filter rule exceed a fraction of Beginning Market Value, the property’s FCFY computation *shall be excluded from the data series*.

Thus, the FCFY formula is:

$$(NOI_t - CI_t) / MV_{t-1}$$

where NOI is the Net Operating Income, CI is Capital Improvements, and MV is Market Value reported to NCREIF in quarter t.

## Capital Expenditures as Ordinary Expenses of Real Estate Investment

The Capital Expense Ratio (CXR) that excludes major renovation costs is designed to give us insight into how much recurring or operating capital expense is typically incurred for properties. In effect, this is what explains the difference between an income return and the Free Cash Flow Yield – although again there will be a slight difference due to the different denominator and same store methodology.

Like FCFY, CXR has varied by property type and across time. This knowledge can aid property underwriting, valuation, and portfolio strategy and tactics.

**Capital Expense Ratio (CXR)** is computed for each property as Capital Improvements *divided by* Beginning Market Value for each quarter. In quarters where the *absolute value* of capital improvements defined in the filter rule exceed a fraction of Beginning Market Value, the property’s computation CXR computation *shall be excluded from the data series*.

The CXR formula is:

$$CI_t / MV_{t-1}$$

where CI is Capital Improvements, and MV is Market Value reported to NCREIF in quarter t.

### Results: Direct and Derived

Each data series is computed quarterly from 1978.1 to 2014.4 on the same sample of properties each quarter. Average quarterly results and quarterly standard deviations are shown in Exhibit 1 for each property type and for the aggregate of all properties. Over time the number of properties within the NPI has varied considerably, but the average number of properties included in these sample statistics per quarter is included for information purposes.

PropertyType	MVI		FCFY		CXR		Ave No. Properties
	Ave	StDev	Ave	StDev	Ave	StDev	
Apartment	1.16	2.00	1.47	0.36	0.29	0.11	589
Hotel	0.77	3.21	1.40	1.05	0.78	0.38	55
Industrial	0.76	1.94	1.57	0.33	0.36	0.12	1,175
Office	0.55	2.45	1.26	0.39	0.59	0.21	750
Retail	0.70	1.72	1.66	0.33	0.32	0.11	511
All Properties	0.73%	1.89%	1.49%	0.34%	0.40%	0.12%	3,080

### Exhibit 1

#### Summary Statistics, Quarterly, 1978.4 to 2014.4

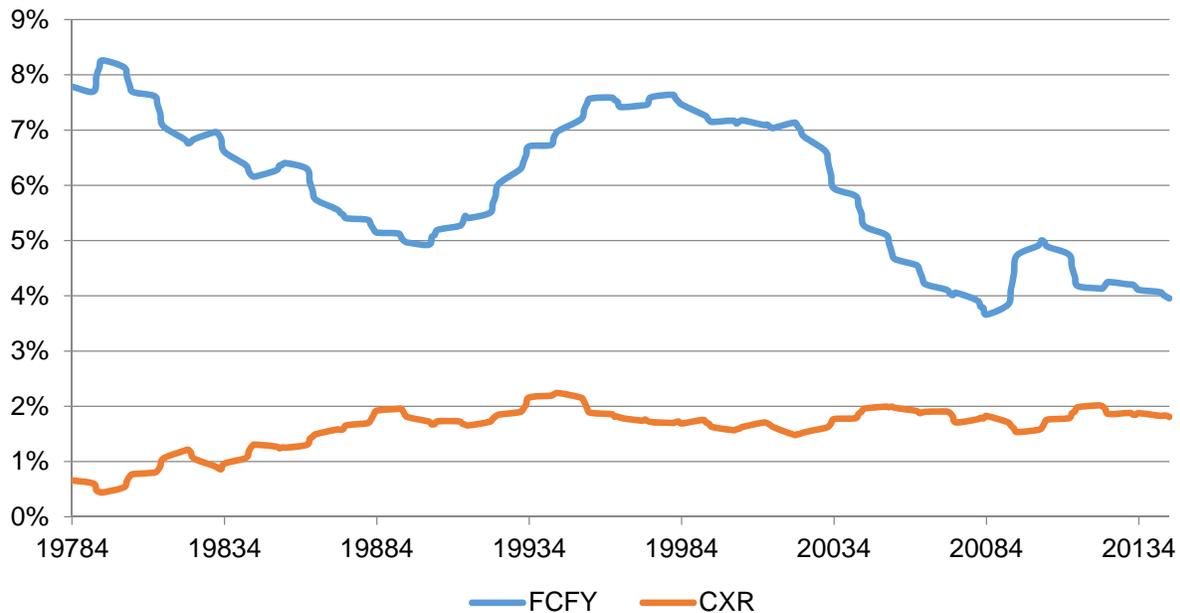
Among the property-type statistics, those exhibiting above the average for All Properties are shown in green boxes. The standout performer in terms of MVI is the Apartment property category with a quarterly average MVI over the 148 quarters of 1.16%. Hotel properties were in second place, but showed an exceptionally large amount of quarterly variation as evidenced by the standard deviation of 3.21%, well above the average of 1.89% for All Properties.

In terms of FCFY, Retail and Industrial properties performed best with 1.66% and 1.57% per quarter. Office properties, the laggard among property types in terms of MVI, also trailed the other types in terms of FCFY with just 1.26% per quarter, well below the average of All Properties of 1.49% per quarter. As one might expect given the uncertainty of the rental stream without long duration, Hotel properties exhibited the highest standard deviation of quarterly FCFY at 1.05%, substantially higher than all the other property types that clustered tightly around the average for All Properties at 0.34%

Characteristics of the physical structures and of the tenancies vary notably across the property types. Thus, we would expect a similarly wide range of ordinary capital expenditures among the property types, which is certainly evident in the sample statistics. Not surprisingly, Hotel properties show the highest quarterly average CXR result at 0.78%, nearly double the All Properties average of 0.40%. Apartment properties are generally thought to require the least amount of capital expenditures among the five property types in the NPI. Exhibit 1

confirms this. However, it may come as a surprise to see how low Retail properties are in terms of average quarterly CXR at just 0.32%, the second lowest performer among the five property types. We note that the filter rules used to generate these three series excluded properties in quarters when extraordinarily large capital expenditures were reported.

## FCFY and CXR, Rolling 4-Qtr, All Properties



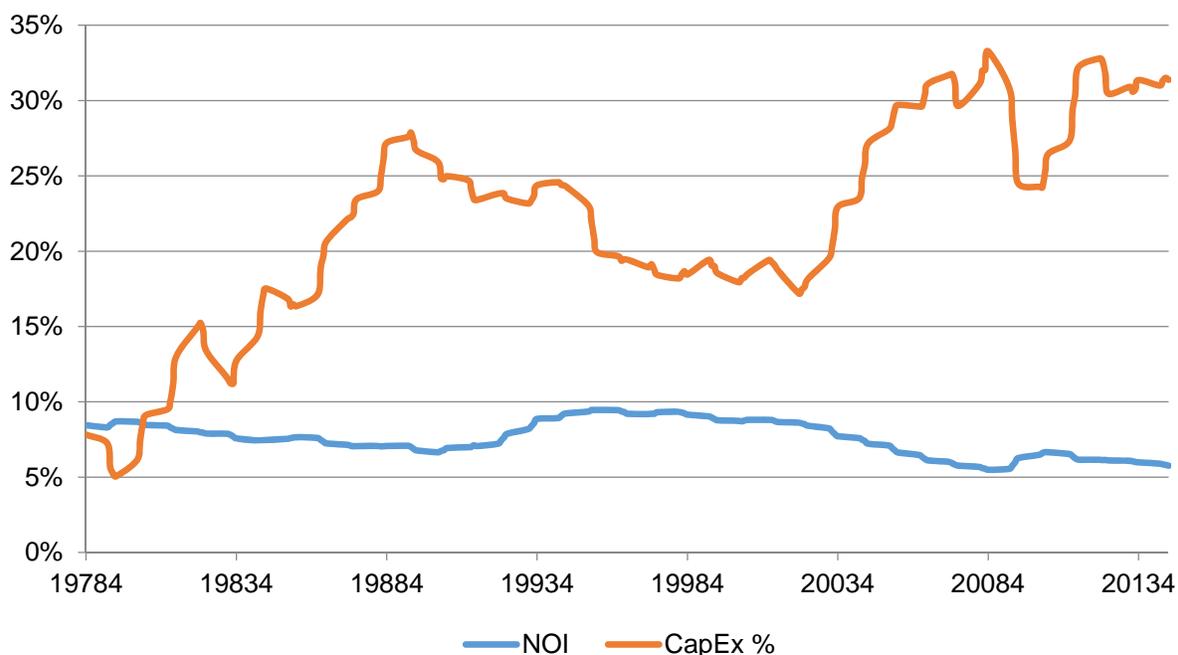
### Exhibit 2

Among all property types, Retail properties are more likely than others to undergo major expansion or renovation. Those quarters have been excluded from these data, so what is shown in the CXR is capital expenditures in the ordinary course of business including leasing commissions and tenant improvements. While these expenditures might be substantial for Retail properties, those same properties also have longer term leases so the expenditures are spread over more quarters of a property's operations.

Exhibit 2 compares the rolling four-quarter sums of average results of FCFY and CXR over the period 1978.4 to 2014.4 for All Properties of the NPI that passed the filter rules. Throughout the first decade of the data series, the FCFY declined from about 8% per annum to about 5% per annum. Over the same period, CXR rose from about 0.8% per annum to nearly 2% per annum. Recall that CXR is ordinary capital expenditures and also that it is a component of the FCFY in that the numerator of FCFY is NOI minus CI. So, we could say that about 40% of the decline in per annum FCFY over the first decade of the data series is attributable to the increase in per annum CXR.

Looking further, the series from 1988 to 2003 saw rise in per annum FCFY to levels seen in the early years followed by a decline to about the place where it started by 2003. All this while, the CXR remained fairly constant at about 1.8% per annum. Indeed, the CXR has been somewhat constant hovering just below 2% per annum since 1988 to the present. Although there was a slight dip in the CXR during the financial crisis and a commensurate blip up in the FCFY until the crisis was over. This is presumably due to managers withholding even ordinary capital expenditures during the crisis in order to conserve cash.

## CapEx as % of NOI and NOI as % of BMV, Rolling 4-Qtr, All Properties



**Exhibit 3**

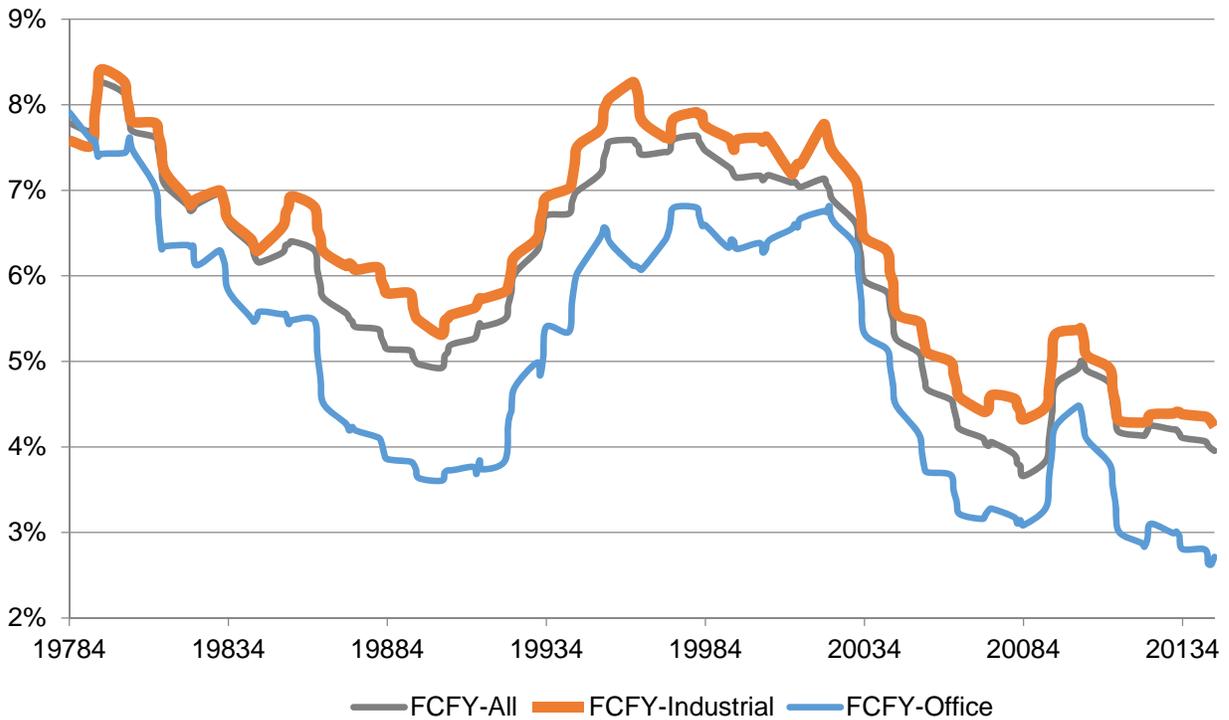
These new data series offer researchers new opportunities to explore the operating characteristics of commercial real estate and to relate those results to macroeconomic conditions or local economic conditions.

Exhibit 3 is a simple transformation of the FCFY and CXR data that reveals just how much the changing pattern of ordinary capital expenditures have affected the Net Operating Income (NOI) flows from commercial real estate. The NOI in Exhibit 3 is expressed as a percent of the Beginning Market Value and was generated by adding the CXR to the FCFY for each period. This rolling four-quarter NOI line shows the same pattern as the FCFY line in Exhibit 2, albeit at a scale that makes the comparison a bit less obvious. Next, we computed the CXR, the ordinary capital expenditures, as a fraction of the total NOI for each rolling four-quarter period.

Quite clearly, ordinary capital expenditures have been consuming a considerable chunk of NOI since the early years of the series and the share has now risen to over 30%.

As interesting as the aggregate figures are, the differences among property types can provide support for strategic and tactical decision-making. Exhibit 4 and 5 focus on the two property types having the largest number of observations, namely Industrial and Office properties. For comparison, each Exhibit also shows the aggregate All-Property FCFY and CXR results respectively. All the data shown are rolling four-quarter figures in the same manner as Exhibits 2 and 3.

## FCFY, Rolling 4-Qtr, All Properties-Industrial-Office

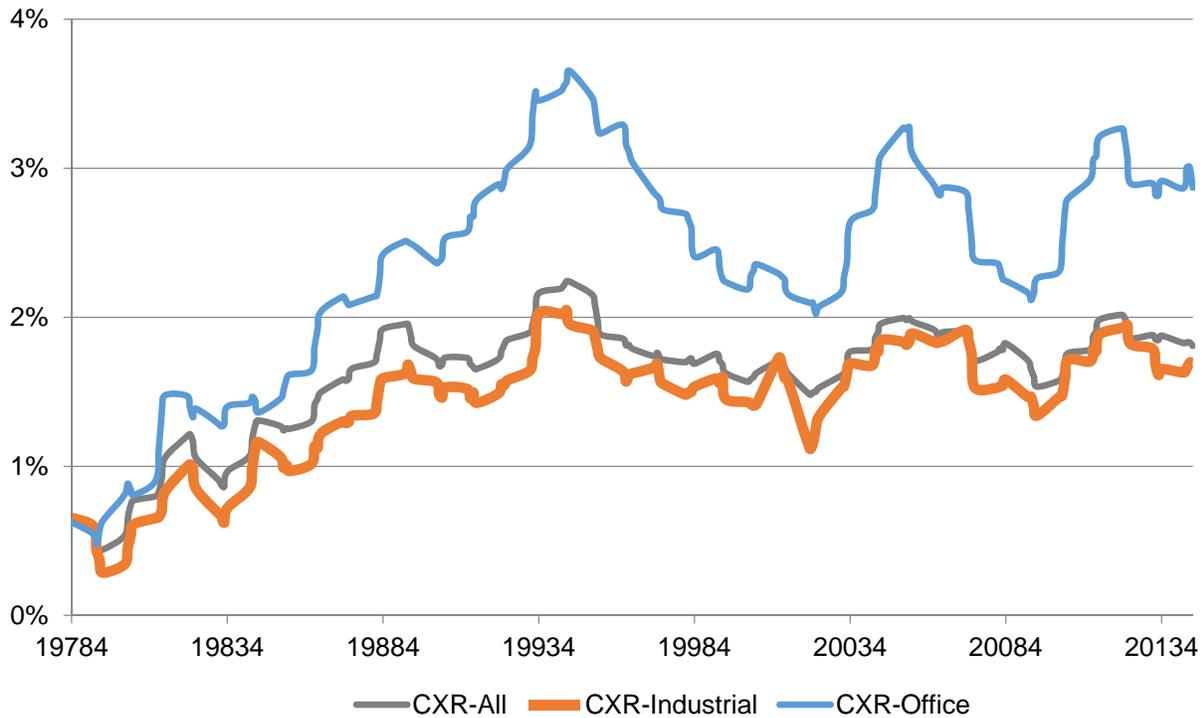


### Exhibit 4

In Exhibit 4, the Industrial property rolling four-quarter FCFY results outpace the Office property results for all periods except the first year of the series. The differences are substantial at roughly 1.25% per period. Additionally, the Industrial and Office FCFY results are highly correlated at 0.956. As we would expect given the large sample sizes relative to the aggregate All-Property samples, the correlations between the two property type results and the All-Property results are even greater at 0.988 for Industrial versus All Properties and 0.971 for Office versus All Properties.

The lower level of FCFY rolling four-quarter results for Office properties are largely attributable to the amount of ordinary Capital Expenditures that Office properties experience relative to Industrial properties. The differences are evident in Exhibit 5, which shows CXR rolling four-quarter results for the two property types as well as the aggregate of All Properties. The average difference in rolling four quarter results is about 0.9%.

## CXR, Rolling 4-Qtr All Properties-Industrial-Office



### Exhibit 5

The correlations between the Office and Industrial CXR results are less highly correlated than the FCFY statistics. In particular, the CXR results between Office and Industrial property are correlated at 0.944. However, the timing and magnitude of the differences are worth noting. The enlarged gaps between the CXR statistics for the property types in the 1991-94, the 2002-05, and the 2009-14 periods might be worthy of greater study. It is precisely these sorts of differences that offer opportunities for researchers to delve more deeply into the operational and financial economic characteristics of properties distinguished by their type, as shown here, or along other dimensions like subtype, size, or geography as would be possible with other cuts of the data available to NCREIF members.

### Conclusion

This is Part 2 of the introduction to three new series being implemented by NCREIF and the rationale for each. Part 1 focused on ways in which various series in the classic NPI have been misused. The new series correct these shortcomings and, by highlighting equally weighted results, provide samples from the universe of domestic commercial income-producing properties. The Market Value Index (MVI) covered in Part 1 measures changes in market value of properties with a consistent physical, functional, and economic condition. In other words, the data set has been filtered to remove properties in quarters where substantial capital expenditures alter the characteristics of a property and, as such, depart from the “same store” notion this is inherent in the new series.

This article provides more detail on the Free Cash Flow Yield (FCFY) and Capital Expense Ratio (CXR), measures of the operating performance of properties. FCFY can be understood as a measure of net cash flow available for distribution to the property owner after covering all operating expenses and ordinary capital expenditures such as leasing commissions, tenant improvement costs, and ordinary remodeling or renovation. In short, FCFY is a measure of the net cash flow potential of commercial real estate.

The CXR is simply the ordinary, routine capital costs required to attract, retain, and accommodate tenants.

The differences among properties distinguished by their type, subtype, location, or other attributes offer researchers the data with which to learn more about the operational and financial economic characteristics of the commercial real estate asset class.