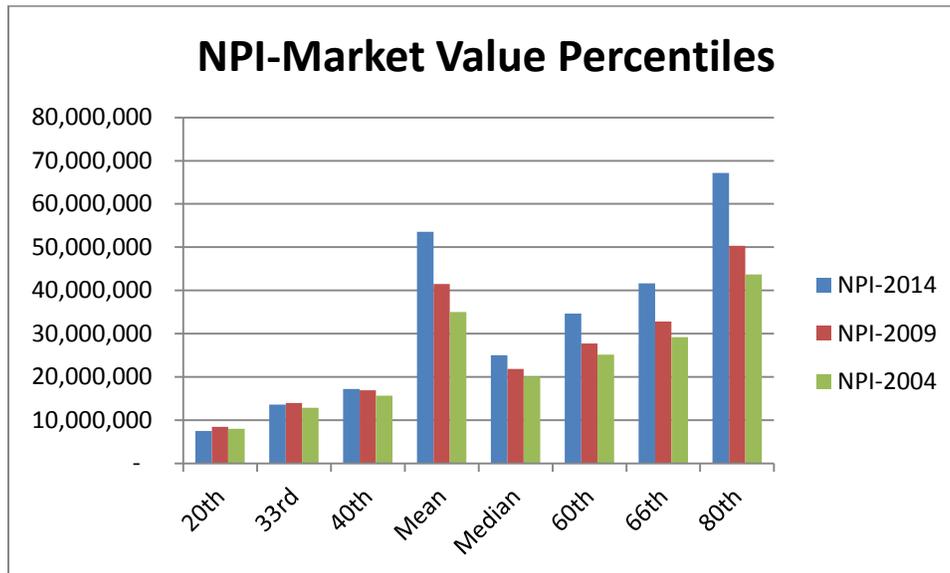


Distributions over Time

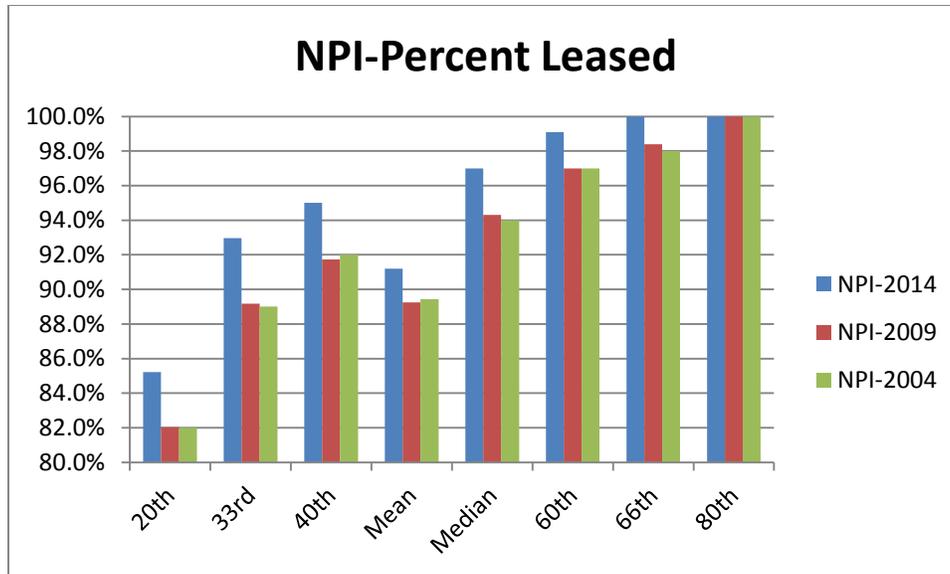
In July, Research Corner looked at data distributions from the first quarter 2014 NCREIF database. This month's Research Corner revisits the subject of distributions from a time series perspective. The charts and analysis look at second quarter data from 2014, 2009 and 2004. The results are driven by several factors. First, the size of the NPI database almost doubled over that time period. Both the number of data contributors and the number of properties from existing members increased. Second, the economy was accelerating at a faster pace in 2004 than currently and the 2009 data comes from the middle of the 'Great Recession'. Third, the investment strategies from the various members and the types of properties that were submitted to the index have changed over time.

The first chart shows the change in market value for various percentiles from the three time periods. For all three time periods, the mean is well above the median and almost equal to the 80th percentile. Other than the very bottom of the distribution, the market values for the later time periods are greater than the market values from the earlier time periods.



The difference in value between 2014 and 2009 is larger than the gap between 2009 and 2004 for the top half of the distribution. This result is not surprising since the market has recovered faster for larger properties due to improved fundamentals.

The next chart compares the occupancy rate for three time periods using the same percentiles as the market value chart. The occupancy rates in 2014 are equal or greater for every percentile compared to the other two time periods.



The more surprising result is that the occupancy rate in 2009 isn't much lower than the occupancy rate in 2004. It is slightly lower for certain percentiles, but higher for three others. The market in 2004 was recovering from the tech bust, but I would have expected lower occupancy rates in 2009.

One of the reasons for this is the change in the composition of the index. There were slightly less than 4,000 properties in the index in 2004 and more than 6,100 properties in 2009. The two tables below show the change in the composition of the index by property count and market value.

NPI Percentage By Property Count			
	2014	2009	2004
Apartment	20.9%	23.7%	20.3%
Hotel	3.1%	1.3%	1.4%
Industrial	40.0%	36.0%	36.0%
Office	20.0%	24.2%	28.4%
Retail	16.1%	14.9%	13.9%

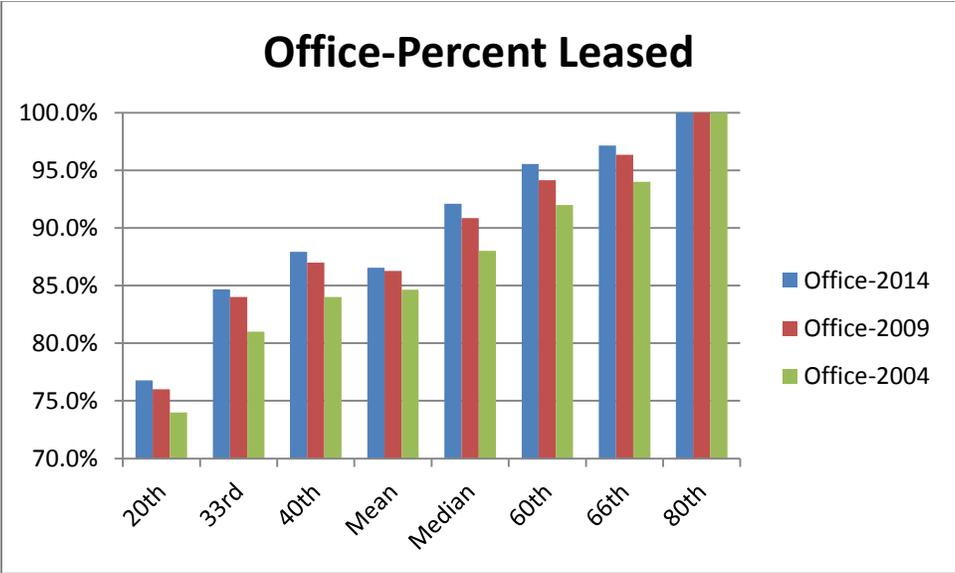
NPI Percentage By Market Value			
	2014	2009	2004
Apartment	24.8%	24.1%	19.2%
Hotel	2.0%	2.0%	1.7%
Industrial	13.7%	15.4%	18.8%
Office	36.5%	36.5%	38.7%
Retail	23.1%	22.1%	21.6%

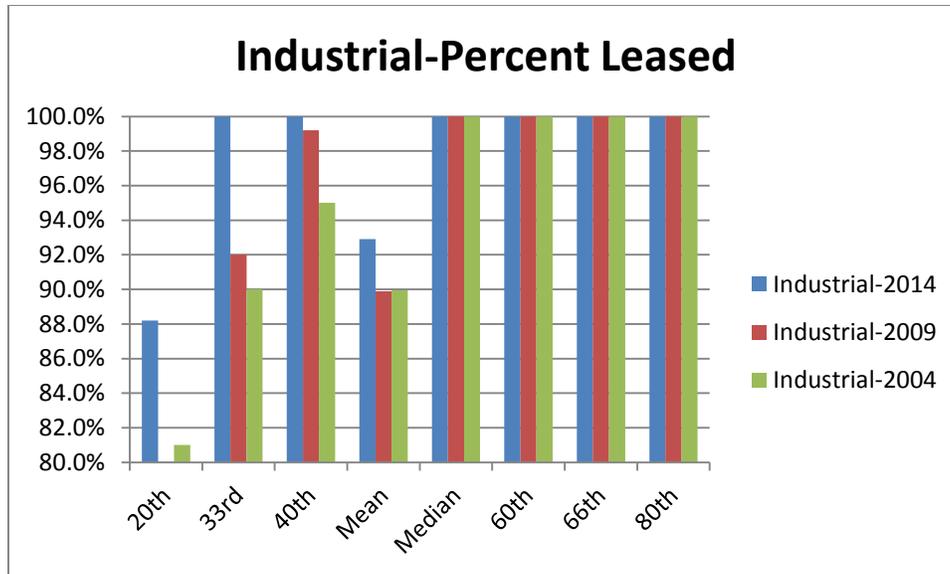
The change in apartments as a percentage of the property count, reflected in top table, shows an increase from 20.3% to 23.7%. Occupancy rates in apartments are higher than other property types, so this may have helped the 2009 data in the distributions.

By looking at the individual property types and the occupancy rates of each of those property types, the movement of the index may be masked by the change in composition. Another example is the increase in industrial properties even as their total value as a percent of the index decreased. The percentage of office properties also declined even as the market value of those properties held steady from 2009 to 2014.

From an occupancy rate perspective, the office market was in better shape in 2009, 86.3%, than in 2004, 84.6%. The overbuilding and tenant defaults from the tech bust were still impacting the office market in 2004, but the higher vacancy rates in the 'Great Recession' didn't impact the 2009 office data as much. The office vacancy rate continued to rise into 2010, and there were a smaller number of tenants that went bankrupt relative to the number of non-paying tenants in the early 2000s. The chart on office vacancies shows higher occupancy rates across the board for all the percentiles: the red bar representing 2009 is higher than the green bar showing 2004 for every percentile.

The next chart shows the industrial market, which also has higher occupancy rates in 2009 relative to 2004 for most of the percentiles. Industrial occupancy rates are very high in the top half of the distribution, but fall off dramatically. In 2014, over two-thirds of the properties were full.

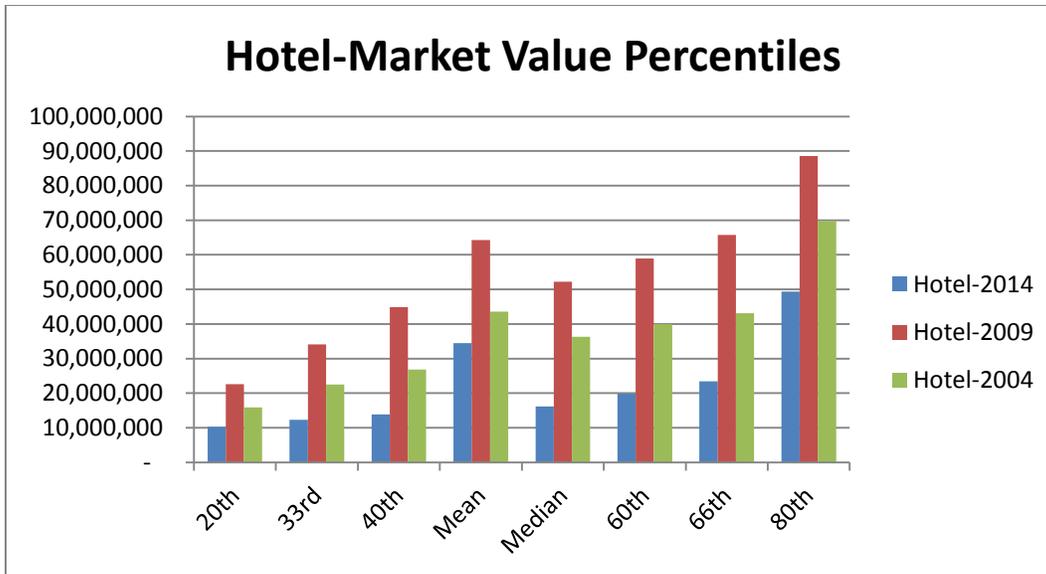




Compare that to the apartment data where none of the percentiles in the chart show 100% occupancy, but the overall occupancy rate for apartments is higher than the occupancy rate for industrial.

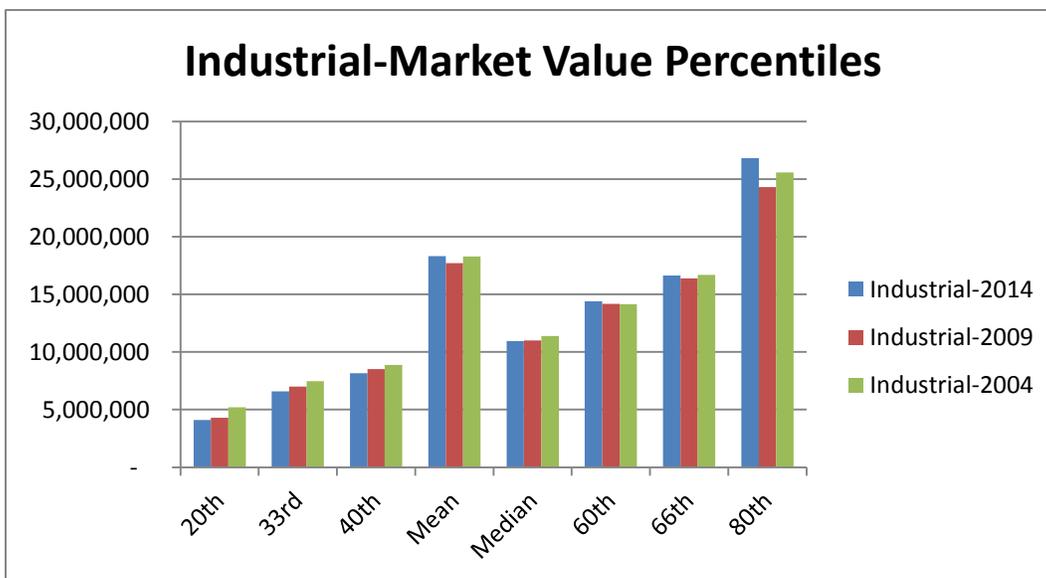


The chart on the following page shows how the change in percentile market values can be impacted by changes in strategy. The graph shows the market percentiles for hotel. The market value in 2009 is higher than 2004 or 2014. The number of hotels increased dramatically from 2009 to 2014, and the most of those new additions were limited service hotels that had a lower market value.



The addition of these hotels changed the composition of the index, so comparing across time periods has limited value. Most other property types wouldn't have this type of dramatic change in such a limited time period. However, as NCREIF rolls out new analytic tools and the ability to consider percentiles expands, the changing composition of smaller subsets (such as property subtypes) may matter. For example, the types of apartments in the index have changed over time and there are significantly more CBD buildings than five or ten years ago.

In contrast, the percentiles for industrial buildings haven't changed much over ten years even as the index has grown and the number of industrial buildings in the index has doubled. The chart below shows the relative consistency of the market values for each percentile.



The three bars are almost even for each percentile excluding the 80th percentile where there is slight growth from 2009 to 2014.

Distributions can offer greater insight into the data than static data points such as mean or median. These distributions change over time as the economy, the submitted data, the number of firms, and the strategy of those firms changes. Understanding those nuances is important for any analysis done on the NCREIF data.

Over the next few quarters you will see several new analytic tools from NCREIF that can be accessed via the website. These tools offer a more powerful way to analyze the data and dig deeper into the database. However, with that power comes responsibility. Understanding the “why” in addition to the “what” when doing analysis must be kept in mind by the user of the data.