Are You as Diversified as You Think?

A BERKSHIRE RESEARCH VIEWPOINT

August 2017

Berkshire

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EXECUTIVE SUMMARY

- As the U.S. business cycle matures and expectations for asset returns, including real estate, edge lower, there is a shift of investor focus to strategies that manage the corresponding risks.

- The last economic downturn has shown that even "diversified" private institutional real estate portfolios represented by the industry benchmark indices such as the NCREIF Property Index (NPI) could be highly exposed to macro-economic factors. For example, annual changes in U.S. total employment help explain over 85% of variation in private institutional real estate returns over the last decade compared to 45% over the last thirty years, underscoring the extent of systematic risk posed by a severe recession.

- Extensive research over the last thirty years has shown the benefits of diversification in institutional real estate portfolios yet the NPI is now highly concentrated in six major markets: New York, Los Angeles, Chicago, Washington, D.C., San Francisco, and Boston. Together, these gateway markets currently account for about 45% of NPI value, or three times their share in U.S. total employment.

- In addition, each of the four major property types has high exposure to New York, Los Angeles, and Chicago and/or Washington, D.C., contributing to high correlations across sectors over the last decade and further limiting diversification potential of portfolios whose property type or market allocations mirror those of the NPI.

- A closer look at real estate returns since 2007 suggests that, even in periods following extreme downturns, investors have the opportunity to achieve higher returns with lower volatility by increasing allocation to property types/subtypes and markets/submarkets that are less correlated to the traditional benchmarks.

HOW DO YOU KNOW IF YOUR REAL ESTATE PORTFOLIO IS TRULY DIVERSIFIED?

Given the rising uncertainty regarding the economic outlook, it should not be surprising that more investors are looking for ways to better manage risk, with proper diversification being one of the key elements.

As the business cycle has matured, expectations for total unleveraged returns for U.S. real estate have declined by about 100 basis points over the last year and are now averaging slightly less than 6% compared to 8% historically. Given the rising uncertainty regarding the economic outlook, it should not be surprising that more investors are looking for ways to better manage risk, with proper diversification being one of the key elements. Past research has shown that proper diversification should be a key consideration in developing and implementing investment strategies focusing on that goal. In the case of commercial real estate portfolios, diversification based on location (across markets and submarkets within those markets) helps reduce volatility in returns that is associated with regional rather than global and national factors–sources of the systematic risk.

Several questions around the topic of diversification are still being tackled by the real estate industry from both theoretical and applied perspectives:

- How many property sectors, markets and assets should a portfolio include to be properly diversified and what factors should determine these allocations or weightings?
- How should investors judge whether their real estate portfolios are sufficiently diversified or are diversified relative to the appropriate benchmark?
- Are some approaches to diversification more effective than others in producing higher risk-adjusted returns, and how does their application vary depending on practical constraints with respect to portfolio size, investment horizon, target return, risk tolerance, geographic focus, and maximum allocations to an individual market or asset?

Considering that there are no straightforward answers to these questions, investors can have subjective views on diversification within their own portfolios. It is not uncommon to see investment presentations with charts showing how a given fund might be "well-diversified" across different property sectors or markets, sometimes even comparing it to a benchmark. However, if one were to ask how much risk is in the portfolio, what that risk includes, how it compares to a benchmark, and whether it is a proper benchmark, the answers would likely be unclear.

Based on the performance of real estate portfolios during the Global Financial Crisis, in a severe recession virtually all of the portfolio risk could be systemic in nature offering limited potential for diversification across sectors and markets. In such an environment, a portfolio that is concentrated in a property sector whose performance is less correlated to the broader economy could be less exposed to systematic risk.

The portion of overall risk driven by unsystematic factors can potentially be reduced through proper allocation across various markets/ submarkets and property type/ subtypes as well as careful asset selection.

The good news is that over the long-run, about half of the total risk in a real estate portfolio is driven by "unsystematic" or idiosyncratic factors. This portion of risk can potentially be reduced through proper allocation across various markets/submarkets and property type/subtypes as well as careful asset selection. Whether investors are actually taking advantage of this opportunity is the question.

Extensive research over the last thirty years has shown the benefits of diversification in institutional real estate portfolios, yet the NPI is now highly concentrated in six major markets: New York, Los Angeles, Chicago, Washington DC, San Francisco, and Boston.[1] In addition, each of the four major property types is also concentrated in a handful of markets with consistently high exposure to New York, Los Angeles, Chicago and/or Washington, D.C.

The table below lists the top six markets for the Total NPI and for each major property type (highlighted in blue).[2] One would expect the index to be concentrated in large markets given the size of their local economies and real estate inventories, but not quite to the degree reflected in NPI. Historically, not all of these markets have outperformed NPI on either an absolute or volatility-adjusted basis, and when they did, it was usually by a relatively narrow margin. Furthermore, only some of these markets have a track record of higher occupancy or rent growth, or are expected to have it going forward.

[1] For the purposes of this analysis the market definition for Boston aggregates Boston and Cambridge metropolitan statistical areas (MSAs) while market definition for Washington, DC aggregates Washington, DC and Silver Spring MSAs.
[2] Riverside has the highest concentration among all industrial markets but a relatively minor concentration in other sectors.

Each major property type was heavily weighted to generally the same markets, contributing to high correlations across major property sectors and geographic regions.

Table 1. Market Concentration of the National Property Index (NPI) as of Q2 2017.

	Share of the Total Market Value, %				
Market	**Total NPI**	**Office**	**Apartment**	**Retail**	**Industrial**
New York	12.3	20.9	10.7	5.0	5.0
Washington, DC	8.2	11.9	7.8	7.1	1.3
Los Angeles	7.8	8.0	7.8	6.0	10.8
Chicago	5.9	4.2	6.9	6.9	7.1
Boston	5.8	10.8	4.7	2.5	0.4
San Francisco	4.7	10.0	2.2	1.5	1.4
Seattle	4.1	4.5	5.0	2.1	4.7
Dallas	4.0	2.4	5.3	4.2	5.2
Houston	3.8	3.0	3.9	5.7	2.7
Riverside	2.5	0.1	1.0	1.7	12.9
Top 6 Markets	44.8	66.1	43.5	34.8	45.7

Sources: NCREIF, Berkshire Group Research, Q2 2017.

The basis for diversification is reduction in idiosyncratic risk of a real estate portfolio through target allocations that account for correlations across markets as well as property types and subtypes. From this perspective, heavy exposure to markets whose economies are highly correlated can pose major challenges to performance as the experience of the last cycle has clearly shown. For example, New York, Los Angeles, and Chicago showed an over 90% correlation in annual job growth and real estate returns since the last business cycle peak (Q4 2007).

Annual return correlations were high for each major property type compared to NPI. A contributing factor is that each major property sector was heavily weighted to generally the same markets. Since 2007, correlations in annual returns ranged from 98.5% in apartments to 99.9% in office. The four NCREIF regions are also highly correlated to NPI with each region showing over a 99% correlation. This implies that diversification across property types and regions had limited potential in enhancing the investment performance of an institutional real estate portfolio during the period.

Table 2. Correlations in Total Annual Returns across Major Property Sectors and Geographic Regions, Q4 2007-Q4 2016

	NPI	*Apartment*	*Industrial*	*Office*	*Retail*
NPI	1.000				
Apartment	0.985	1.000			
Industrial	0.981	0.940	1.000		
Office	0.999	0.982	0.981	1.000	
Retail	0.995	0.969	0.982	0.993	1.000

	NPI	*East*	*Midwest*	*South*	*West*
NPI	1.000				
East	0.992	1.000			
Midwest	0.995	0.978	1.000		
South	0.995	0.977	0.997	1.000	
West	0.998	0.983	0.997	0.994	1.000

Sources: NCREIF, Berkshire Group Research, Q2 2017.

Savvy investors have an opportunity to better manage and diversify risk instead of just "hugging the benchmark" with respect to their portfolio construction.

One of the reasons behind the bias to large markets could be partially a function of certain practical constraints for a typical fund today. For example, allocation to the apartment sector within diversified institutional funds is typically within a range of $1.5 to $2.5 billion in gross asset value.[3] Given the current pricing in gateway markets, investors could quickly fill their "buckets" by investing in less than a dozen properties in less than a dozen markets. From a purely practical standpoint, it is more efficient to invest in one asset in a market like New York than a handful of assets in smaller markets such as Nashville or Raleigh. The same pattern appears to be even more pronounced in the office sector, which could also explain why over 70% of the office sub-index is concentrated in its top seven markets, the highest among the major property sectors.

BEATING THE BENCHMARK WITH ECONOMIC DIVERSIFICATION

Considering that the current industry benchmarks may not be diversified in a sense of reflecting an optimal weighting of property sectors and markets within those sectors, savvy investors have an opportunity to better manage and diversify risk instead of just "hugging the benchmark" with respect to their portfolio construction.

One of the first steps in diversifying the risk within a portfolio would be to examine how projected real estate returns across different property sectors, and markets within those sectors, might be correlated with

[3] Sources: MSCI/IPD, Berkshire Group Research

the broad economy and each other over the investment horizon and to understand the factors contributing to such correlations as well as confidence intervals around returns. Depending on the potential constraints of a given portfolio, including size and allocations to a given property sector or market, a manager can determine the number of target investments that could further diversify their portfolio. This would, in turn, provide initial parameters to run a standard portfolio optimization procedure based on forward-looking risk/return profiles of property sectors, subsectors, and markets to determine allocations that achieve target returns while minimizing risk.

Careful attention should be given to the correlation of returns across different property sectors, subsectors and markets, and factors impacting such co-movements such as differences in geography and the economic drivers of local real estate fundamentals. A number of research studies over the last 30 years provide compelling evidence that a more effective approach is diversifying a real estate portfolio based on the economic drivers of its constituent markets rather than on their geographic attributes. The reasoning behind this is intuitive– just as a stock portfolio with heavy exposure to just one or two sectors (technology and energy, for example) is likely to be volatile relative to the broad index, so would a real estate portfolio heavily concentrated in locations where demand for office space or apartments is primarily driven by employment in technology or energy industries. In other words, what matters more to investors is how different (or similar) their target portfolio locations are in terms of their real estate demand drivers and how these locations are correlated with each other and the overall portfolio, than how distant (or close) they are based on pure geography.

Assessing the economic diversification potential of a market/ submarket involves analysis of the main sectors driving its employment growth, its entire industrial composition and its correlation to other markets/ submarkets as a whole.

One example is the contrast between San Francisco and Oakland, two adjacent metro areas that are part of the Bay Area regional economy. Despite their geographic proximity, Oakland's local economy is more diverse than San Francisco's and historically its job growth has been more correlated with that of the U.S. compared to San Francisco. Assuming that these correlations in job growth are then also reflected in real estate fundamentals and investment returns, San Francisco would be a better candidate from a portfolio diversification standpoint, all else being equal.

Assessing the economic diversification potential of a given market/submarket involves the analysis of not only the main sectors driving employment growth, but also its entire industrial composition, its correlation to other markets/submarkets within the portfolio, and its correlation with the overall portfolio. For example, both Austin and Raleigh are metro areas with strong economic and demographic trends as well as below-average correlations to the U.S. This means that either market has good diversification potential when added to a national portfolio. However, it is important to consider that both metros have a similar industry composition, with high-tech, education, and healthcare being the key growth drivers and government

accounting for almost 18% of their local economies. Not surprisingly, the two markets are more correlated with each other than with the nation, which should be taken into account when deciding their allocations within a portfolio.

From a practical investment perspective, the process of diversification often comes down to deciding if or how to add another market/submarket to an existing portfolio. For example, if a portfolio already has a heavy exposure to metro areas such as New York or Chicago, where the financial services sector is known to be one of the main sources of economic volatility, adding a market such as Charlotte or Tampa, where finance also plays a key role, should be carefully evaluated. Submarket level selection within a market is also an important consideration. For example, adding a property in the Energy Corridor submarket of Houston, a market with concentration in energy-related employment, will only increase exposure to risk associated with volatility in oil prices, whereas adding a property in the Bellaire/Medical Center submarket can help mitigate such a risk.

Much also depends on the outlook for real estate fundamentals for a particular property type and market, expected returns based on pricing levels, and the likelihood of achieving those returns. A market with the highest expected risk-adjusted return and the lowest correlation to the target portfolio will have the greatest diversification benefit.

POTENTIAL FOR ECONOMIC DIVERSIFICATION FOLLOWING A RECESSION

The ultimate test for economic diversification is whether it protects against downside risk over holding periods that begin with recessions.

The ultimate test for economic diversification is whether it protects against downside risk over holding periods that begin with recessions. The most recent nine-year period following the last business cycle peak (Q4 2007) was unusual in a number of ways. It spanned the financial crisis and the Great Recession, an era of historically low interest rates and, in the case of U.S. housing, a severe contraction in homeowner demand and associated record growth in renter households, which contributed to a strong expansion in apartment demand despite relatively slow job growth. This was also a period of extreme volatility in oil prices–an important consideration given that three out of the top ten markets based on returns (Fort Worth, Houston and Denver) had notable concentrations in energy-related industries.[4]

[4] West Texas Intermediate (WTI) oil price changed from $60 in Q4 2006 to $124 in Q4 2008 to $43 in Q2 2009 to $106 in Q2 2013 to $33 in Q1 2016 to $49 in Q4 2016

The table below shows the average annual total unleveraged apartment returns and volatility over the five- and nine-year periods that began at the business cycle peak for the five markets where job growth correlated the most and the least with that in the U.S. over the 20 year period preceding the peak.

Table 3. Apartment Returns Since 2007

	Q4 2007 - Q4 2012 (5 years)	
	Average Annual Return, %	**Standard Deviation, %**
5 Least Correlated Markets	6.6	13.9
5 Most Correlated Markets	2.2	15.3
Difference, bps	*440*	*-140*

	Q4 2007 - Q4 2016 (9 years)	
	Average Annual Return, %	**Standard Deviation, %**
5 Least Correlated Markets	9.0	10.5
5 Most Correlated Markets	6.8	11.8
Difference, bps	*220*	*-130*

Sources: BLS, NCREIF, Berkshire Group Research, Q2 2017.

What ultimately matters in portfolio diversification are correlations in future returns and risks around those returns across sectors and markets.

Over the five-year period since the recession started, markets whose job growth was least correlated with the nation (Houston, Austin, San Diego, Fort Worth and Denver) have outperformed the most correlated markets (Charlotte, Chicago, New York, Tampa, and Atlanta) by 440 basis points per year based on total return and with lower volatility of those returns (averaging 140 basis points). The least correlated markets also maintained a substantial 220 basis points per year advantage in returns and lower volatility (averaging 130 basis points) over the nine-year period following the recession.

It is clear that in either of those two periods, a potential increase in allocation to least correlated markets at the expense of most correlated markets could have made a material difference in terms of both return and risk of a portfolio. This example can be expanded to include all markets within the apartment sub-index with selective overweighting and underweighting of markets relative to the benchmark. The resulting portfolio would have beaten the apartment sub-index producing higher returns with lower volatility. There could be additional diversification benefits if the allocation process further adjusts market weightings by the apartment subtypes, such as, selective overweighting of high-rise apartments in one set of markets and garden-style apartments in another.

The point here is not to argue that markets with low correlation in job growth are always good candidates for economic diversification but to demonstrate the principle. Of course, correlation is one of many factors that are being evaluated as part of constructing and optimizing an actual portfolio. A market might have a low correlation in job growth but the growth itself could be too weak to support local real estate demand and property incomes, or the industries driving it could

be facing challenges. For example, since the last oil bust, Houston went from being one of the best to one of the worst performers. What ultimately matters in portfolio diversification are correlations in future returns and risks around those returns across sectors and markets, which will be impacted by both global/national trends as well as local economic dynamics.

CONCLUSION

Warren Buffett once said: "Diversification is protection against ignorance. It makes little sense if you know what you're doing." In the case of real estate, diversification for diversification's sake is not always effective. To make the most impact on portfolio investment performance, the process requires a deeper understanding of properties and markets and the interrelationship of their underlying drivers and various sources of risk. Those who believe they are getting proper diversification by setting property sector and market allocations based on current industry benchmarks should know that they can do better, and the first step is to learn from the lessons of the last downturn.

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