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A Better Way to **ASSESS INFLATION AND RISK** in Real Estate (2021)

GOAL

The goal of this paper is to introduce new ways for the real estate industry to view inflation, risk-adjusted performance, and risk in general. Our research spans three main sections:

1. U.S. Private CRE vs. U.S. Equity REITs vs. U.S. Stock Market
2. Comparing Property Types, and more
3. U.S. Private Apartment Markets – Primary and Secondary

We encourage a comprehensive reading of the piece but also encourage time-conscious readers to skip to sections of particular interest.

BACKGROUND

Investors have always considered inflation a threat to their portfolios, but these considerations are often limited to the most rudimentary of analyses. Most will classify an inflation hedge as an asset which beats inflation over the long run, but this analysis oversimplifies a far too important threat. Additionally, many erroneously believe stocks are potent inflation hedges, and by association assume REITs too exhibit powerful inflation-hedging properties. The counterintuitive truth is that higher inflation typically implies poor returns for both stocks and REITs.

Likewise, risk and risk-adjusted performance are often assessed either narrowly or not at all. Assessing the risk-adjusted performance of your market or portfolio can uncover otherwise unknown insights. Understanding risk-adjusted behavior, and how inflation affects it, is vital if you want to truly understand your market and stay ahead of the competition.

KEY INSIGHTS

Post-GFC, higher inflation tends to help private CRE returns while hurting REIT and stock returns.

U.S. private CRE risk-adjusted returns tend to be larger during times of high inflation.

Using conventional beta, the attractiveness of secondary apartment markets may be understated.

U.S. private apartments have the strongest risk-adjusted performance during both times of moderate and high inflation.

Post-GFC, higher inflation tends to help private apartment returns while hurting apartment REIT returns.

Post-GFC, secondary apartment market returns are more sensitive to inflation than their primary counterparts. Primary apartment markets, however, tend to have more stable excess returns under rising inflation.

In both Orlando and Atlanta apartment markets, gains are amplified in strong markets more than losses are amplified in weak markets.

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A Better Way to Assess Inflation and Risk in Real Estate (2021)

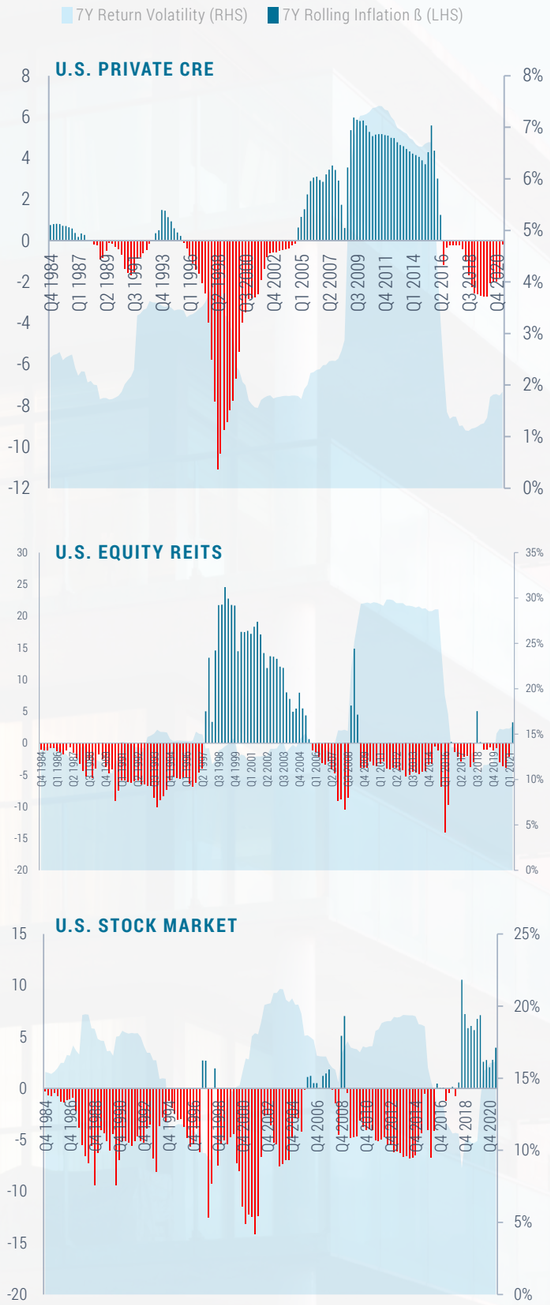
U.S. Private CRE vs. U.S. Equity REITs vs. U.S. Stock Market: Inflation ß

Real estate market participants commonly view the asset class as an "inflation hedge" based on its general ability to beat inflation over the long run. However, this analysis and other simple ones alike fail to quantify the sensitivity of returns to changes in the inflation rate. Luckily, there's a highly explanatory metric capable of exposing this relationship, called inflation ß. Not to be confused with the volatility ß, as discussed in Multifamily Return Volatility and Why it Matters, the inflation ß quantifies the implied marginal rise or decline in excess returns given a rise in the inflation rate. An asset with inflation ß of two implies that for a 1% rise in inflation, excess returns will rise by 2%. As measured by inflation ß, a(n) favorable (unfavorable) inflation sensitivity is when excess returns tend to rise (decline) with rising inflation. Therefore, a higher inflation ß is better.

TAKEAWAYS

- **Volatility catalyzes the favorable inflation sensitivity of U.S. private CRE returns:** U.S. private CRE's favorable inflation sensitivity is catalyzed by increases not only in its return volatility (endogenous vol), but the return volatility of the stock market (exogenous vol). The inflation sensitivity of REITs tends not to be affected by exogenous vol in the stock market.
- **Debunking the idea that stock and REIT returns react positively to rising inflation:** Post-GFC, higher inflation meant poor returns in both asset classes.
- **Does inflation itself affect inflation sensitivities?** For all three asset classes, a given period's average inflation rate has little to do with that period's inflation ß.

INFLATION SENSITIVITY OVER TIME, MEASURED BY INFLATION ß (4Q 1984 – 2Q 2021)



	POST-GFC INFLATION ß	HISTORICAL CORRELATION BETWEEN INFLATION ß AND RETURN VOLATILITY (4Q 1984 – 2Q 2021)
	Post-GFC, a 1% rise in inflation implies a 1.20% rise in private CRE excess returns. Over the same period, a 1% rise in inflation implies a decline in the returns of REITs and stocks.	*The higher the return volatility, the more favorable the inflation sensitivity of U.S. private CRE returns. For REITs and stocks, volatility tends to reduce favorable inflation sensitivity.*
U.S. PRIVATE CRE	1.20	58%
U.S. EQUITY REITS	-5.27	-23%
U.S. STOCK MARKET	-2.49	-39%

U.S. Private CRE vs. U.S. Equity REITs vs. U.S. Stock Market: Risk-Adjusted Performance

Generally, risk-adjusted returns have been diminishing, causing many investors to actively seek out high risk-adjusted performance. Commonly used as a risk-adjusted return measure is the Sharpe ratio, but this return-to-risk ratio is punished for all types of volatility – good and bad. Investors tend to welcome upside volatility, so in our view a different ratio is needed to achieve more explanatory results. Such a ratio would be punished only for downside volatility, or bad swings in the market, rather than being punished for good and bad swings. The Sortino ratio is a risk-adjusted return measure that is punished only for downside deviation, so we use this metric. A Sortino ratio of two may be interpreted as achieving two units of excess return per one unit of downside risk; higher Sortino ratios are better.

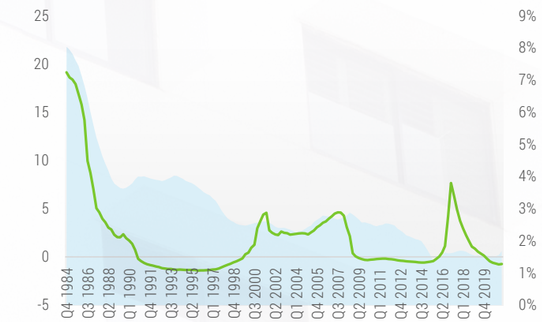
TAKEAWAYS

- **U.S private CRE has the highest average risk-adjusted performance of the three asset classes considered:** the stock market, REITs, and U.S. private CRE have average historical Sortino ratios (risk-adjusted returns) of 0.20, 0.54, and 1.88, respectively.
- **Inflation tends to catalyze risk-adjusted performance in U.S. private CRE:** REITs and the broad stock market share this quality but to a lesser extent.
- **Is favorable inflation sensitivity swapped for better risk-adjusted performance?** During times of high inflation, U.S. private CRE and REITs tend to become more favorably sensitive to rising inflation while achieving better risk-adjusted performance.

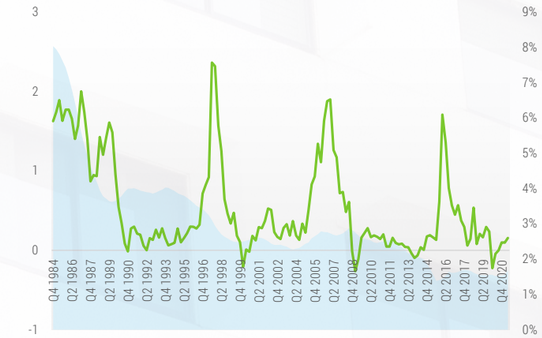
RISK-ADJUSTED PERFORMANCE OVER TIME, MEASURED BY THE SORTINO RATIO (4Q 1984 – 2Q 2021)

7Y Rolling Average Inflation (RHS) — 7Y Rolling Sortino Ratio (LHS)

U.S. PRIVATE CRE



U.S. EQUITY REITS



U.S. STOCK MARKET

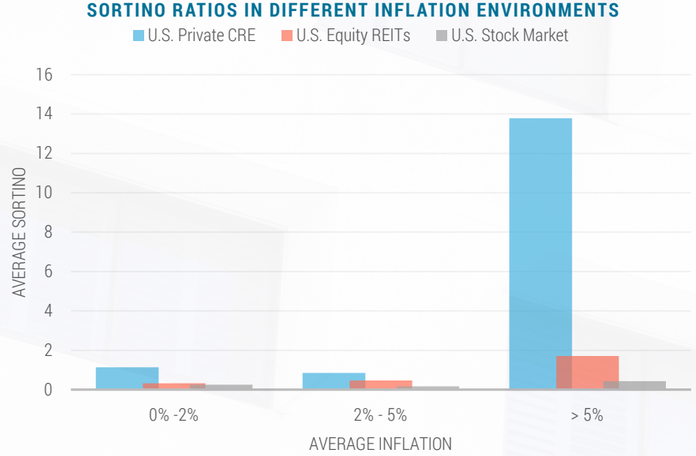
	HISTORICAL AVERAGE 7Y SORTINO RATIO (4Q 1984 – 2Q 2021)	HISTORICAL CORRELATION BETWEEN SORTINO AND INFLATION (4Q 1984 – 2Q 2021)
	U.S. private CRE has an average 7Y Sortino of 1.88, compared to 0.54 and 0.20 for REITs and the stock market, respectively.	*Surprisingly, risk-adjusted performance in U.S. private CRE tends to be better during times of higher inflation. REITs share a similar but dampened relationship, while stocks share this quality but to a lesser extent.*
U.S. PRIVATE CRE	1.88	67%
U.S. EQUITY REITS	0.54	53%
U.S. STOCK MARKET	0.20	13%

For all Sortino ratios above, downside deviation is computed using a minimum acceptable return (MAR) equal to the average historical nominal return of the NCREIF Property Index. Therefore, all three asset classes are held to the same standard allowing for comparison.

U.S. Private CRE vs. U.S. Equity REITs vs. U.S. Stock Market: Risk-Adjusted Performance

A Closer Look at Risk-Adjusted Performance in different Inflation Environments

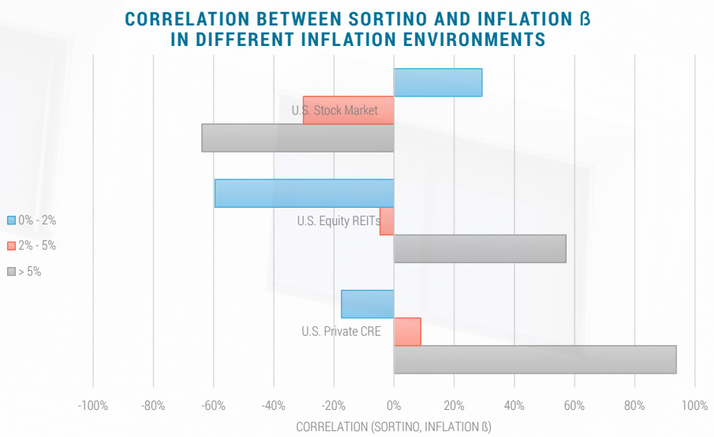
SORTINO RATIOS IN DIFFERENT INFLATION ENVIRONMENTS



U.S. private CRE Sortino ratios tend to be larger during times of high inflation. REITs and the broad stock market share this quality but to a lesser extent.

Does one gain favorable inflation sensitivity and risk-adjusted performance only by losing the other?

CORRELATION BETWEEN SORTINO AND INFLATION ß IN DIFFERENT INFLATION ENVIRONMENTS

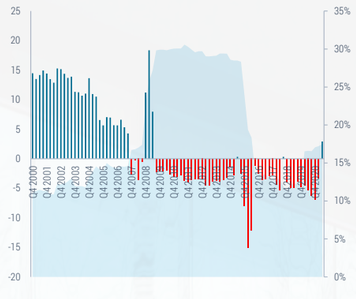


In most inflationary environments, the stock market exhibits less favorable sensitivity to rising inflation when achieving better risk-adjusted performance. This trend continues with REITs in times of low inflation. Strikingly, when inflation is greater than 5%, both REITs and U.S. private CRE tend to become more favorably sensitive to rising inflation while achieving better risk-adjusted performance.

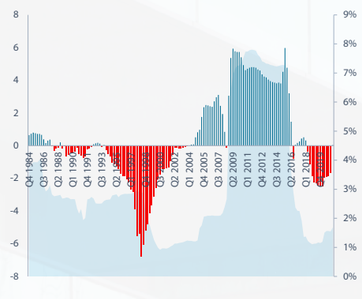
Comparing Property Types, and more: Inflation ß

7Y Rolling Return Volatility (RHS) 7Y Rolling Inflation ß (LHS)

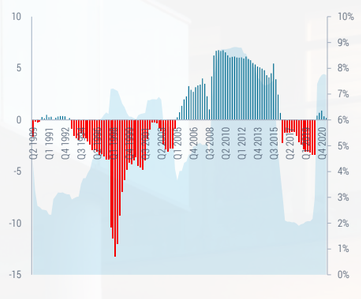
U.S. EQUITY APARTMENT REITS



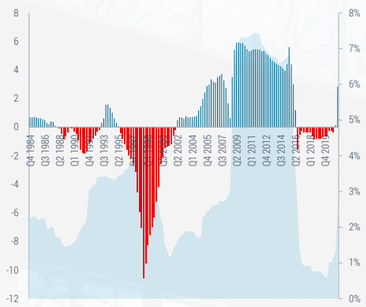
U.S. PRIVATE APARTMENTS



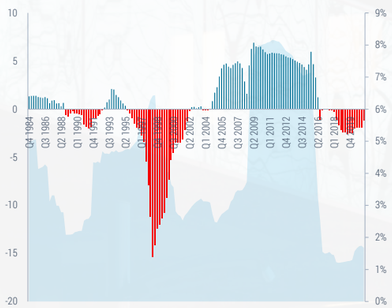
U.S. PRIVATE HOTELS



U.S. PRIVATE INDUSTRIAL

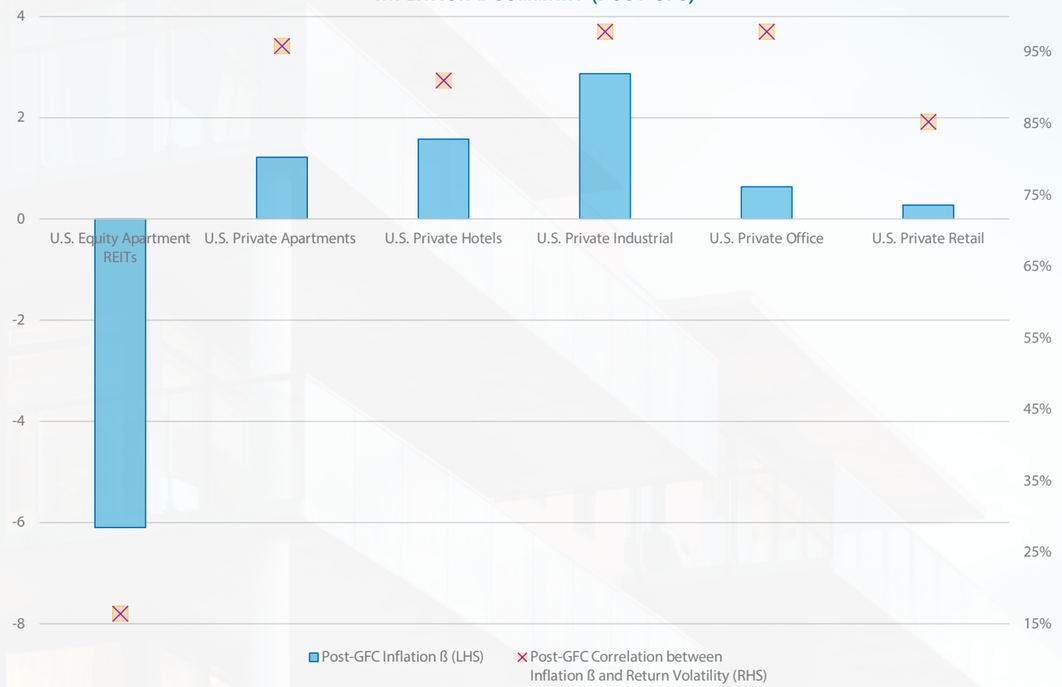


U.S. PRIVATE OFFICE



U.S. PRIVATE RETAIL

INFLATION ß SUMMARY (POST-GFC)



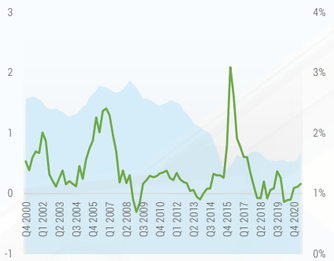
Post-GFC, higher inflation is associated with lower U.S. equity apartment REIT returns (Inflation ß = -6.10). Conversely, higher inflation is associated with higher U.S. private apartment returns (Inflation ß = 1.22).

All U.S. private CRE property types tend to become more favorably sensitive to rising inflation when volatility is higher. Apartment REITs share this quality but to a much lesser extent.

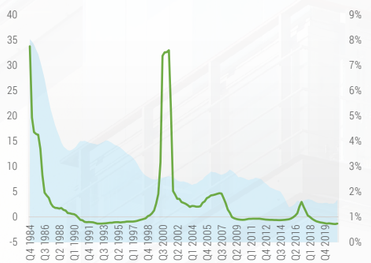
Comparing Property Types, and more: Risk-Adjusted Performance

7Y Rolling Average Inflation (RHS) 7Y Rolling Sortino Ratio (LHS)

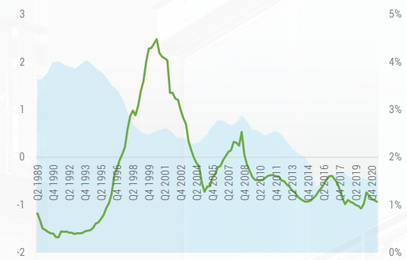
U.S. EQUITY APARTMENT REITS



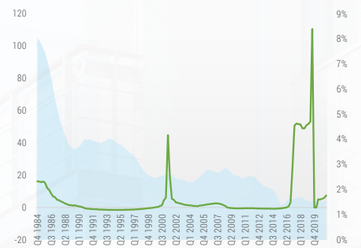
U.S. PRIVATE APARTMENTS



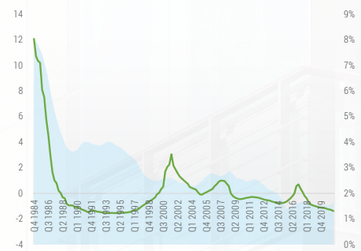
U.S. PRIVATE HOTELS



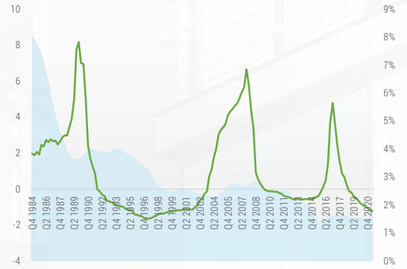
U.S. PRIVATE INDUSTRIAL



U.S. PRIVATE OFFICE

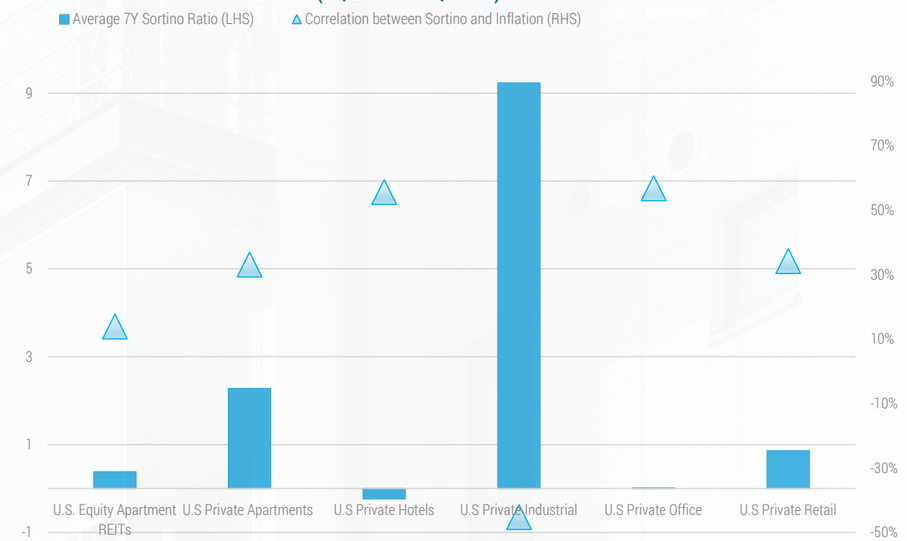


U.S. PRIVATE RETAIL



For all Sortino ratios above, downside deviation is computed using a minimum acceptable return (MAR) equal to the average historical nominal return of the NCREIF Property Index (All Apartments). Therefore, all sectors are held to the same standard allowing for comparison.

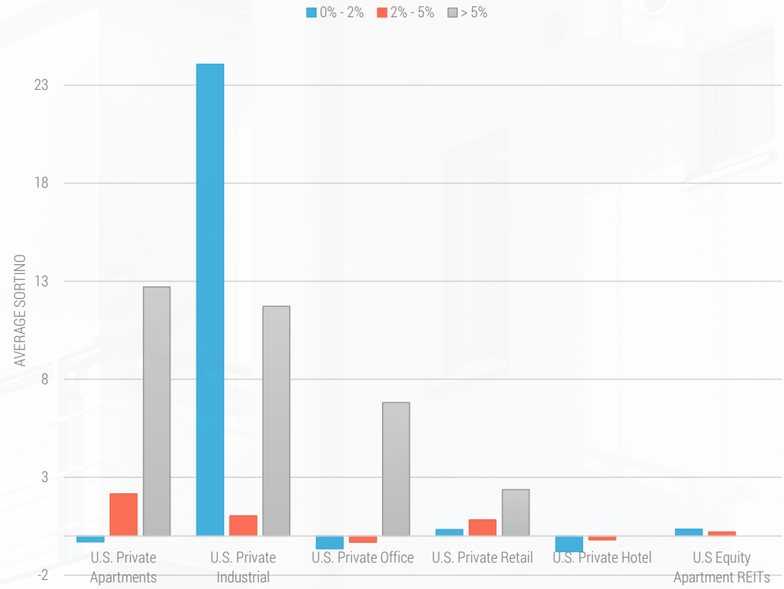
SORTINO SUMMARY (4Q 2000 – 2Q 2021)



Many of the high Sortino ratios in periods above are driven by near-zero downside volatility in those periods. Remember, all else equal, as downside vol approaches zero the Sortino ratio approaches infinity.

Compared to apartment REITs, U.S private apartments have a significantly higher average risk-adjusted return. As expected, U.S. private industrial and apartment property types are top performers in a risk-adjusted sense. Risk-adjusted returns for some property types are catalyzed by inflation.

SORTINO RATIOS IN DIFFERENT INFLATION ENVIRONMENTS

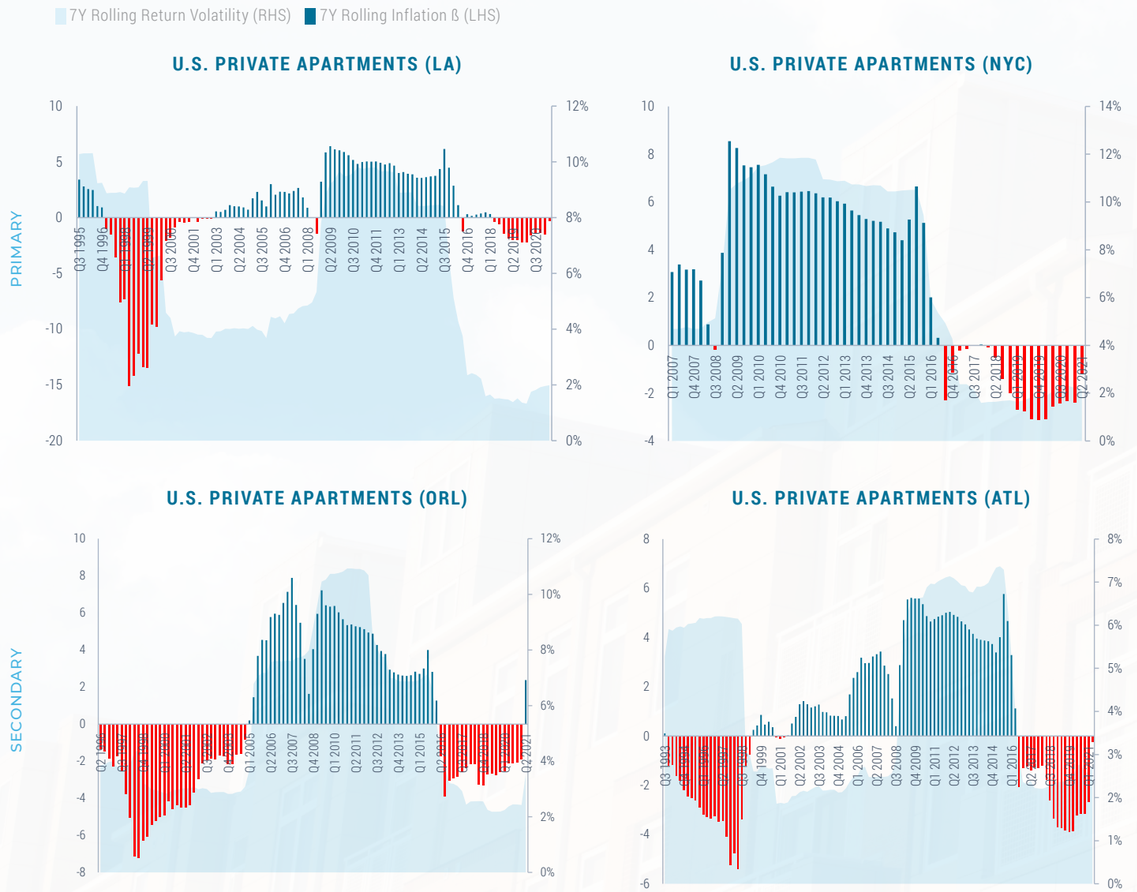


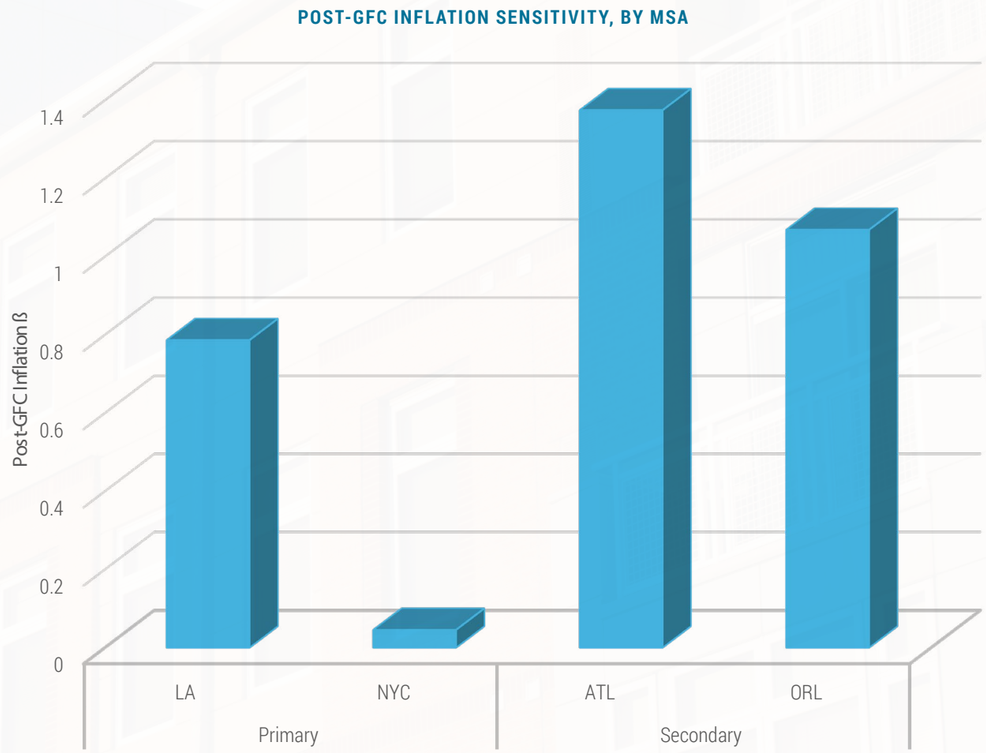
A CLOSER LOOK AT RISK-ADJUSTED PERFORMANCE IN DIFFERENT INFLATION ENVIRONMENTS

U.S. private apartments have the strongest risk-adjusted performance during both times of moderate and high inflation.

Some series are not shown due to lack of data under given parameters.

U.S. Private Apartment Markets - Primary and Secondary: Inflation ß

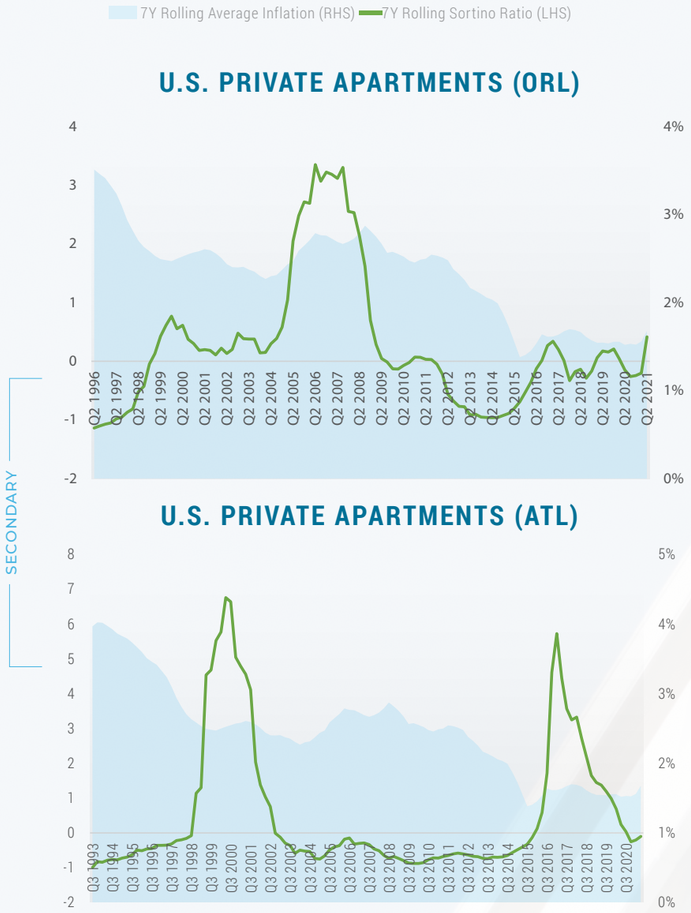




Post-GFC, secondary apartment market returns in our analysis are more sensitive to inflation than their primary counterparts. Primary apartment markets, however, tend to have more stable excess returns under rising inflation.

U.S. Private Apartment Markets – Spotlighting Risk-Adjusted Performance in Secondary Apartment Markets

SECONDARY



ORL has a positive recent Sortino. The MSA's risk-adjusted performance also skyrocketed leading up to the GFC.

When risk-adjusted performance is high in ATL, it tends to be very high.

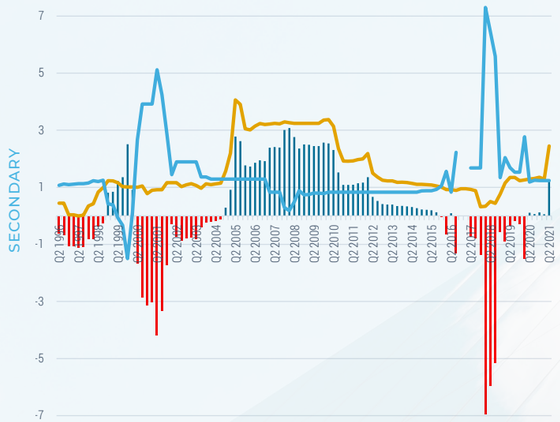
For all Sortino ratios above, downside deviation is computed using a minimum acceptable return (MAR) equal to the average historical nominal return of the NCREIF Property Index (All Apartments). Therefore, both MSAs are held to the same standard allowing for comparison.

Do some MSAs provide leveraged upside ***and*** shielded downside?

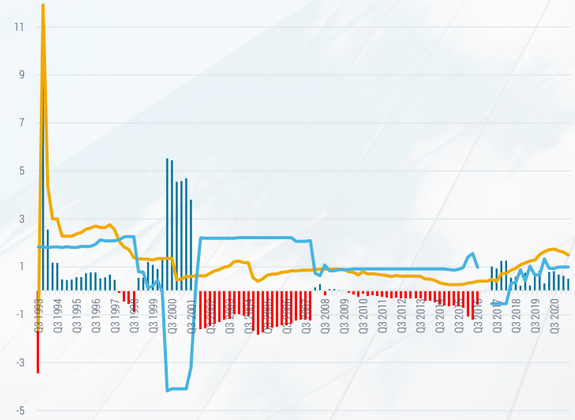
The volatility ß discussed in Multifamily Return Volatility and Why it Matters assumes a market's relative upside potential is equal to its relative downside potential, but is this always a safe assumption? Much of the time, the answer is no – some assets tend to provide leveraged upside potential in "strong" markets and shielding potential in "weak" markets. To quantify this phenomenon, we use upside ß and downside ß, where the former tells us our exposure to the upside during "strong" markets, and the latter tells us our downside exposure during "weak" markets. A "strong" market is defined to be one where U.S. private apartment market excess returns are above their historical average, while "weak" markets are those where market excess returns fall short of their historical average.

An upside ß greater than one means we do better than the market during strong markets. A downside ß between zero and one means we lose less than the market during weak markets. Therefore, having a high upside ß with a low downside ß means we have an MSA with favorable upside / downside asymmetry.

U.S. PRIVATE APARTMENTS (ORL)



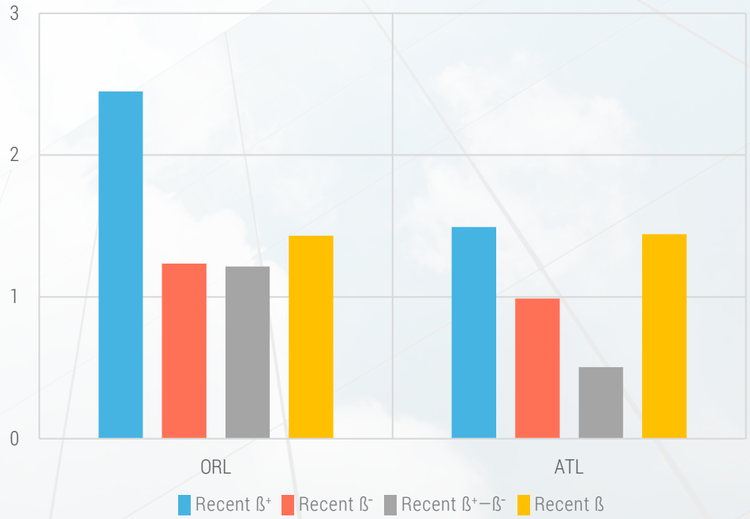
U.S. PRIVATE APARTMENTS (ATL)



Every period, we plot the 7-year upside ß (7Y ß⁺), 7-year downside ß (7Y ß⁻), and the difference between the two (7Y ß⁺ - 7Y ß⁻). A positive difference is good.

Many investors have been interested in secondary markets for demographic and other reasons. The below analysis may in part explain why secondary apartment markets have been attracting institutional capital.

DUAL-BETA SPOTLIGHT: SECONDARY APARTMENT MARKETS



Secondary apartment markets in our analysis exhibit favorable asymmetry in upside and downside exposure.

Both ORL and ATL have upside ß greater than downside ß, meaning that gains are amplified in strong markets more than losses are amplified in weak markets.

More specifically, ORL amplifies gains in strong markets more than it amplifies losses in weak markets. ATL, however, amplifies gains in strong markets but loses effectively the same as the market in weak markets.

	ORL	ATL
Recent ß⁺	UE	UE
Recent ß⁻	OE	OE

"Recent" is defined to be the most recent 7-year period in our rolling analysis: 3Q14 to 2Q21.

"UE" means standard ß underestimates given measure. "OE" means standard ß overestimates given measure.

Using conventional beta, the attractiveness of secondary apartment markets may be understated.

For ORL and ATL, employing a standard beta analysis overestimates downside exposure and underestimates upside exposure.

We can help you navigate the complexities of commercial real estate.

Assessments of inflation and risk come in various forms, and it's vital that every serious real estate investor consider more sophisticated performance measures to assess inflation, risk-adjusted performance, and volatility in the market. Our team at Berkadia can help you navigate these complexities and equip you with some of the most explanatory analytical tools available today. Reach out to learn more.

Contact Us

research@berkadia.com

ABOUT BERKADIA RESEARCH

Berkadia Research leverages proprietary models and analytics to deliver actionable insights to the commercial real estate industry. Covering markets and submarkets across the nation, our experts monitor and interpret market fundamentals and utilize data science to uncover hidden trends. Through a combination of curiosity and expertise, we aim to augment client decision-making by providing data-driven and unique research not found elsewhere.

Sources: Proprietary statistical models by Berkadia Research, National Council of Real Estate Investment Fiduciaries (NCREIF), National Association of Real Estate Investment Trusts (Nareit), Federal Reserve Economic Data (FRED).

Proxies: Riskless rate proxied by 10Y Treasury Constant Maturity Rate; Inflation rate based on CPI-U; U.S. stock market proxied by Wilshire 5000 Index; REITs proxied by Nareit; Private commercial real estate proxied by NCREIF.

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