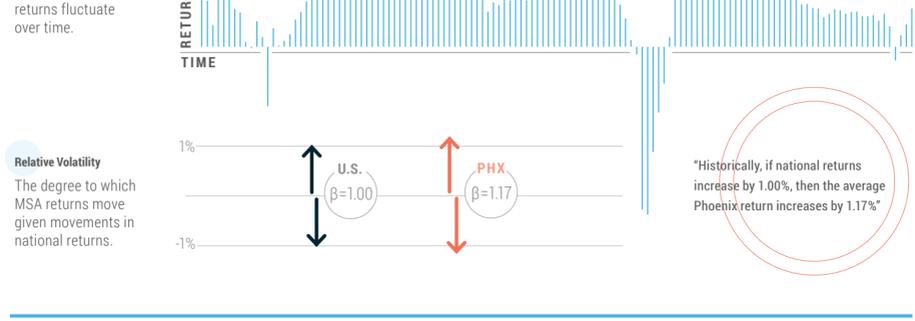


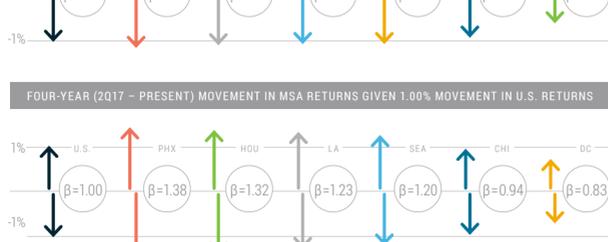
Multifamily Return Volatility and Why it Matters

The ebb and flow of multifamily returns has implications for portfolio structuring, risk management, and overall positioning in the market. In pursuit of a more exhaustive risk assessment, wise investors should examine both relative and absolute volatility, measured by beta (β) and standard deviation (Std Dev), respectively.

Why are these measures important and how do they differ? How have multifamily returns behaved both historically and recently? How do factors like GDP, inflation, household growth, single-family home (SFH) prices, the cap rate yield spread, and an overvalued stock market affect multifamily return volatility?



How has β Changed across and within MSAs?



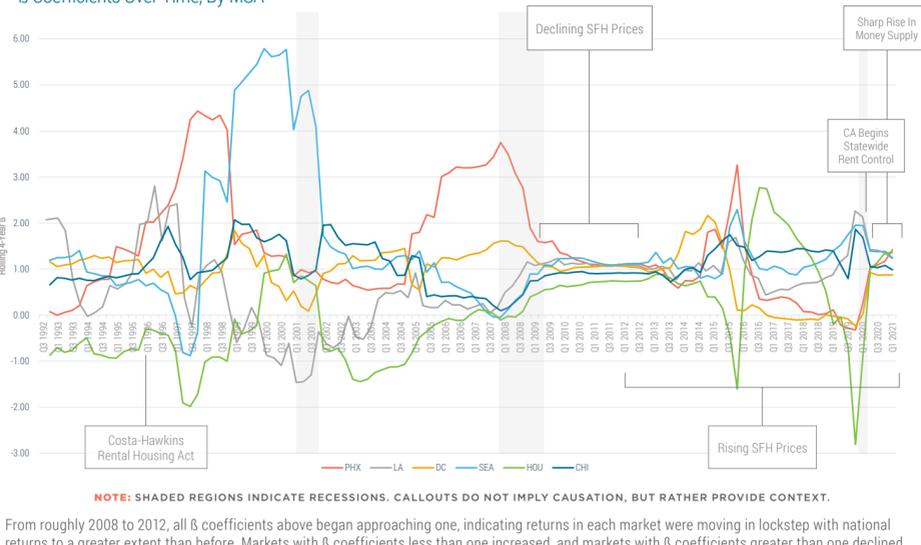
What is Beta (β)?

If the average annualized return in Los Angeles increases by 1.09% given a 1.00% increase in national returns, then Los Angeles provides more upside when overall returns rise but more downside when overall returns fall. Conversely, Houston has historically shielded investors from downside risk—for every 1.00% decline in national returns, average annualized Houston returns decline by 0.44%. In this sense, Los Angeles and Houston are said to have historical β coefficients of 1.09 and 0.44, respectively.

As useful as β is in assessing risk, seldom are financial measurements constant, and β is no exception. To ensure a more comprehensive risk assessment, view the diagrams on the left showing β coefficients for each market both historically and over the past four years.

Switching from a historical to more recent perspective, Houston and DC experienced the most notable changes in their β coefficients: Houston's recent β is nearly 200% greater than its historical β ; DC's recent β is over 20% lower than its historical β . Therefore, compared to each market's respective historical behavior, Houston is now a more aggressive market and DC is now a more defensive market.

The Nonconstant Nature of β , Visualized



From roughly 2008 to 2012, all β coefficients above began approaching one, indicating returns in each market were moving in lockstep with national returns to a greater extent than before. Markets with β coefficients less than one increased, and markets with β coefficients greater than one declined, both approaching the relative volatility of the nation (1.00, by definition). Coinciding with these more homogeneous β coefficients was a reduction in national SFH prices, measured by the Case Shiller HPI. Likewise, the rapid post-2011 rise in SFH prices coincided with the return of heterogeneous β coefficients across these markets, with the exception of recent times. Additionally, the recent return of homogeneity in β coincides with the COVID-induced rise in the money supply. Clearly, there are innumerable factors which may or may not influence MSA β coefficients.

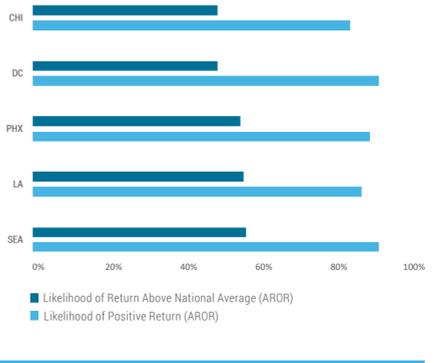
Relationship between Absolute and Relative Volatility, and Likelihoods of Positive/Above-Average Returns

A powerful way to measure absolute return volatility in a market is via standard deviation, which measures the degree to which returns are spread out. The higher the standard deviation, the more extreme the fluctuation in returns over time. Historically, Phoenix and Los Angeles are the two most volatile markets out of the considered markets, in an absolute sense. Notably, Phoenix's historical upside potential (β) is greater than that of Los Angeles, but Phoenix's historical absolute volatility is less than that of Los Angeles. As such, Phoenix has historically provided leveraged upside potential alongside less drastic fluctuations.

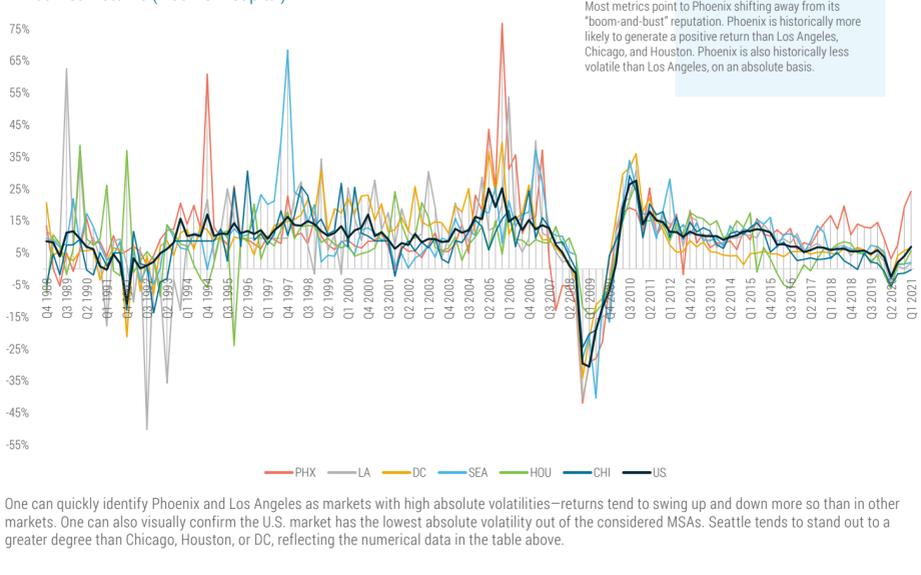
Notice how the absolute volatility of each market over the past four years is significantly lower than its historical counterpart. Discussed in more detail later, the recent β values are also more similar than they are historically.

Generally, higher absolute volatility implies a higher likelihood of generating a positive return in any given period, but this trend is anything but perfect. Seattle has a lower historical absolute volatility than that of Los Angeles and Phoenix but is more likely to generate a positive return. Additionally, Phoenix is more likely than DC, Chicago, and Houston to generate a return above the national average. Seattle is historically most likely to generate an above-average return.

MSA	HISTORICAL		2017 - PRESENT	
	ABSOLUTE (STD DEV)	RELATIVE (β)	ABSOLUTE (STD DEV)	RELATIVE (β)
PHX	13.08%	1.17	5.08%	1.38
LA	14.17%	1.09	3.31%	1.23
DC	10.29%	1.05	2.20%	0.83
SEA	11.51%	1.05	3.92%	1.20
HOU	8.87%	0.44	3.83%	1.32
CHI	8.94%	0.88	2.68%	0.94
U.S.	8.08%	1.00	2.30%	1.00



Absolute Volatility Visualized



One can quickly identify Phoenix and Los Angeles as markets with high absolute volatilities—returns tend to swing up and down more so than in other markets. One can also visually confirm the U.S. market has the lowest absolute volatility out of the considered MSAs. Seattle tends to stand out to a greater degree than Chicago, Houston, or DC, reflecting the numerical data in the table above.

Revisiting β : How do macro and micro factors affect β in each market over time?

The below highlights the extent to which six macro and micro factors influence the observed changes in β in each market over time.

PHOENIX

OF THE METRICS CONSIDERED, THE STRONGEST RECENT DRIVER OF β IN PHOENIX IS THE WILSHIRE 5000 TO GDP RATIO, WHICH MEASURES THE EXTENT TO WHICH THE U.S. STOCK MARKET IS OVERVALUED. OTHER METRICS HELPING TO DRIVE INCREASED β RISK IN PHOENIX INCLUDE THE NUMBER OF U.S. HOUSEHOLDS, SFH PRICES, AND THE APARTMENT RISK PREMIUM.

LOS ANGELES

LOS ANGELES' RECENT β IS MODERATELY DRIVEN BY INFLATION, SFH PRICES, AND THE APARTMENT RISK PREMIUM, AND STRONGLY DRIVEN BY THE NUMBER OF U.S. HOUSEHOLDS. OTHER FACTORS MAY INCLUDE LEGISLATIVE ACTIONS SUCH AS RENT AND EXPENSE CONTROLS.

WASHINGTON D.C.

β IN DC TENDS TO BE LARGELY DRIVEN BY HOUSEHOLDS, SFH PRICES, AND THE WILSHIRE 5000 TO GDP RATIO, CONSIDERING THE METRICS EXAMINED. OF THE SIX MARKETS CONSIDERED, DC'S HISTORICAL AND RECENT β VALUES INDICATE THE MARKET'S RETURNS MOVE CLOSELY WITH THE NATION. DC'S β IS ALSO SECOND-MOST STABLE OUT OF THE SIX.

SEATTLE

INFLATION IS A RATHER STRONG DRIVER OF RECENT β RISK IN SEATTLE; HOWEVER, INFLATION'S EFFECT ON SEATTLE'S β RISK IS HISTORICALLY WEAK. CONTINUING THE TREND IN OTHER MARKETS, SEATTLE'S RECENT β RISK HAS BEEN DRIVEN BY HOUSEHOLDS, SFH PRICES, AND THE APARTMENT RISK PREMIUM.

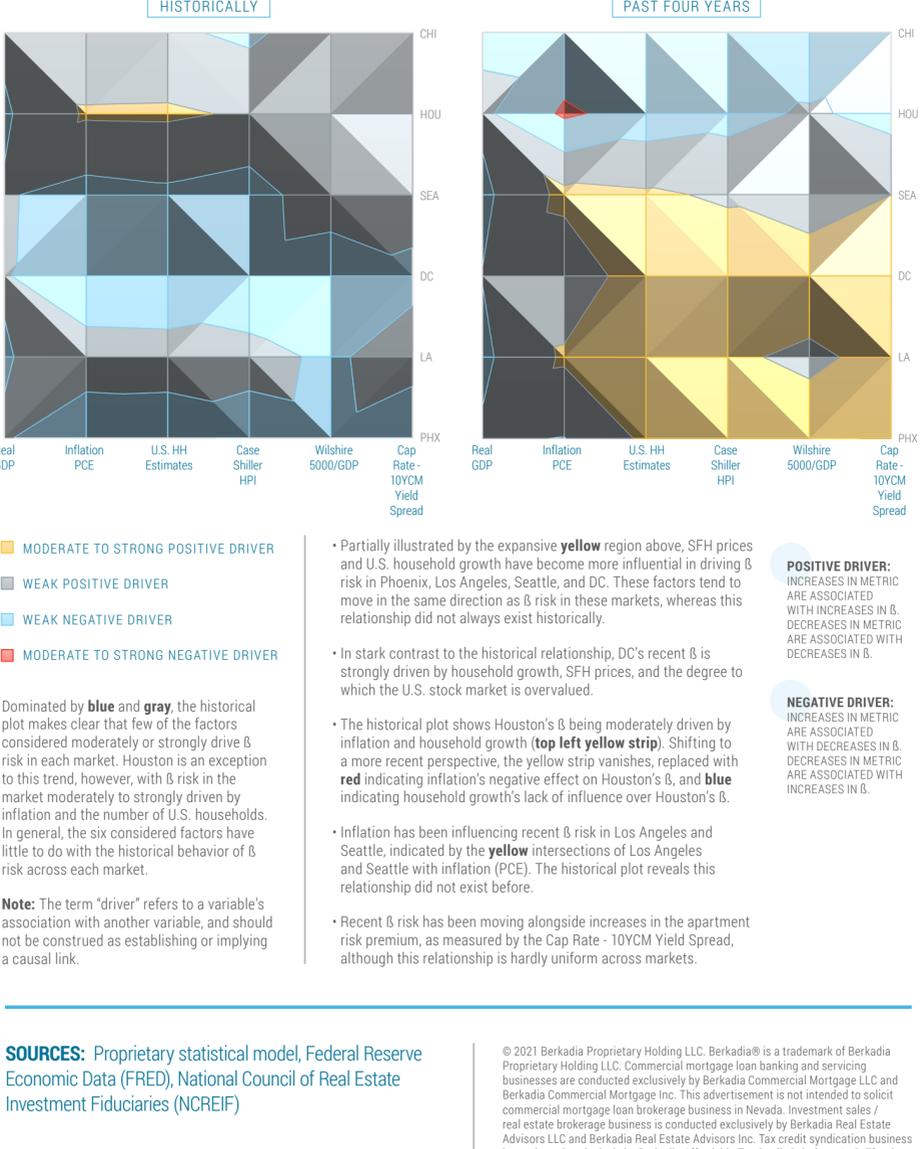
HOUSTON

HISTORICALLY, THE NUMBER OF U.S. HOUSEHOLDS AND INFLATION HAVE BEEN MODERATE TO STRONG DRIVERS OF β IN HOUSTON, SWITCHING PERSPECTIVES FROM HISTORICALLY TO RECENTLY. HOUSTON'S β IS LARGELY UNAFECTED BY ALL FACTORS BUT INFLATION, ADDING TO THE CHANGING NATURE OF HOUSTON'S β AND THE RECENT RELATIONSHIP BETWEEN INFLATION AND β IS SUCH THAT THEY MOVE IN OPPOSITE DIRECTIONS.

CHICAGO

CHICAGO'S RECENT β IS LARGELY UNAFECTED BY ALL SIX FACTORS. COINCIDENTALLY, CHICAGO'S β IS THE MOST STABLE OF ALL MARKETS CONSIDERED. THERE EXIST NEGATIVE RELATIONSHIPS BETWEEN CHICAGO'S RECENT β AND HOUSEHOLDS, SFH PRICES, AND THE WILSHIRE 5000 TO GDP RATIO, BUT THEY ARE WEAK.

Visualizing Drivers of β



- Partially illustrated by the expansive yellow region above, SFH prices and U.S. household growth have become more influential in driving β risk in Phoenix, Los Angeles, Seattle, and DC. These factors tend to move in the same direction as β risk in these markets, whereas this relationship did not always exist historically.
- In stark contrast to the historical relationship, DC's recent β is strongly driven by household growth, SFH prices, and the degree to which the U.S. stock market is overvalued.
- The historical plot shows Houston's β being moderately driven by inflation and household growth (top left yellow strip). Shifting to a more recent perspective, the yellow strip vanishes, replaced with red indicating inflation's negative effect on Houston's β , and blue indicating household growth's lack of influence on Houston's β .
- Inflation has been influencing recent β risk in Los Angeles and Seattle, indicated by the yellow intersections of Los Angeles and Seattle with inflation (PCE). The historical plot reveals this relationship did not exist before.
- Recent β risk has been moving alongside increases in the apartment risk premium, as measured by the Cap Rate - 10YCM Yield Spread, although this relationship is hardly uniform across markets.

SOURCES: Proprietary statistical model, Federal Reserve Economic Data (FRED), National Council of Real Estate Investment Fiduciaries (NCREIF)

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