

Q3 2020

STABILIZING A PORTFOLIO IN A VOLATILE ENVIRONMENT

Investing in an Uncertain and Volatile Economic Environment

Summary

"In a rising market, everyone makes money"¹; however, it is in a volatile recessionary environment where uncertainty abounds that historically effective investment strategies are truly tested. In these volatile environments, an appetite for risk and rapid growth is often substituted with a desire for fundamentals driven stability and superior risk-adjusted returns. The extreme market dislocation caused by COVID-19 has incentivized investors to reevaluate their portfolios and reassess their market risk. As the recession grips the equity and debt markets, alternative asset classes, particularly multifamily real estate, can add increased stability to a portfolio in a highly volatile macro environment.

Real estate investing has traditionally provided a return profile between fixed income and equities.

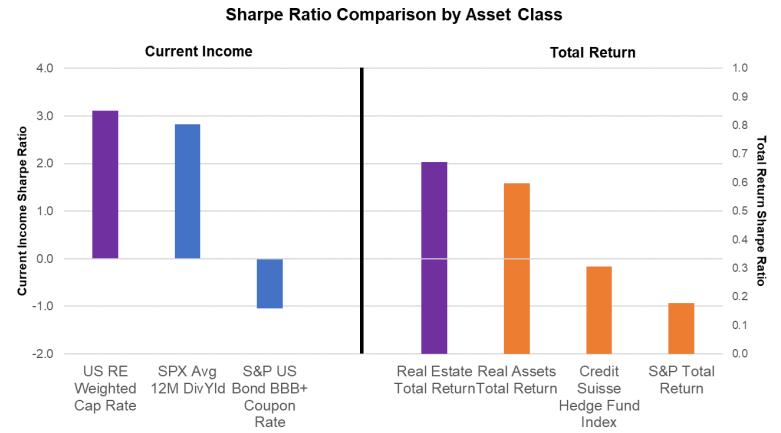
- Fixed income instruments, like bonds, have historically yielded low but stable returns due to their priority in the capital stack, while equities have yielded nearly double those of fixed income but with significantly more risk. Real estate offers a middle ground. It has current income, similar to bonds, and also benefits from capital appreciation, as equities do. Due to these factors, as well as several favorable demographic and economic fundamentals, real estate assets have proven capable of generating stable and consistent returns, especially when adjusted for volatility and compared to other asset classes.

Real estate asset values have exhibited greater stability during past recessions than the S&P 500.

- On average, during past recessions, when real estate values fluctuate negatively, they decrease 43% less than the S&P 500.
- Additionally, the standard deviation of real estate values during past recessions, which measures volatility, was significantly smaller than that of the S&P 500.

When accounting for volatility, using the Sharpe Ratio, real estate has been a relatively safer risk adjusted investment than the S&P 500, offering total returns 3x higher than the S&P 500².

- From a current income perspective, and when adjusting for volatility, real estate has generated superior returns relative to both equities and investment grade bonds over the last 20 years.
- On a total return basis, real estate has outperformed most competing investment strategies on a risk adjusted basis, having outperformed hedge funds, real assets (commodities), and the S&P 500.



Of the four core real estate sectors, multifamily real estate has proven the most resilient through various periods of economic distress.

- Multifamily valuations and rent growth fell the least in past recessions and were the first to recover.
- Between 1978 and 2019, multifamily real estate exhibits the second lowest volatility level of any real estate sector relative to the entire industry, as measured by beta.
- Between 1978 and 2019, multifamily achieved the strongest nominal and risk adjusted return profile of any real estate sector, as measured by Sharpe Ratio, nominal and risk-adjusted alpha, and nominal and risk-adjusted total return.

¹ Seth Klarman – *The Timeless Wisdom of Graham and Dodd* Preface to the Sixth Edition of Security Analysis by Benjamin Graham & David Dodd

² Kingbird Analysis of Bloomberg Economic Workbench Data and NCREIF NPI Data

- These factors, when examined together, reflect multifamily's superior investment returns when adjusting for volatility, relative to other real estate sectors.

The rise of multifamily as an investment is due to the US's shifting demographics, as the country has generally shifted from a nation of owners to one of renters, through a combination of preference and economic necessity.

- Wage growth has failed to keep pace with the growth of home prices, which have skyrocketed due to general undersupply. This has rendered homeownership out of reach for an increasingly large share of households and has increased demand for rentals.
- The chronic shortage of affordable housing in the US, and the inability of the US's apartment supply to keep pace with its increasing population of renter households has widened the existing supply/demand gap. The COVID-19 Recession is exacerbating these previously in-place trends and, as such, will create further benefits for multifamily real estate going forward.
- This continuing supply/demand void and unaffordability issue has kept multifamily vacancies low, with multifamily exhibiting the lowest vacancy rate of any real estate sector between 2005 and 2019.

The consistent lack of adequate multifamily rental supply to meet demand growth has been especially impactful on the US's population of workforce households (those earning between \$35K-\$75K per annum).

- As of 2018, there were 1.8 million more workforce renting households than there were workforce apartments.
- This supply demand void has resulted in significantly lower workforce apartment vacancy rates in comparison to the luxury sector.

Due to these fundamental shifts in market and demographic trends, and the industry's historical financial outperformance through recessionary environments, investors should consider allocating additional portfolio weight to real estate, specifically multifamily real estate, in response to the increased volatility exhibited during the COVID-19 Recession.

Introduction

The most distinctive and disorienting feature of the COVID-19 pandemic is the unpredictability with which our world shifts on a daily basis. Wild swings in the direction of equity markets, the pace of COVID's spread, and the liquidity in capital markets create a backdrop of confusion that is evident across financial markets and the economy at large. This increase in volatility has created an unstable and uncertain investment environment, one in which investors are more likely to take outsized risk without receiving commensurate return.

While volatility is not synonymous with risk, it is a causal factor. Historically speaking, as volatility proliferates, the probability of principle loss increases. Volatility is dangerous and it can quickly derail the fundamentals of an investment strategy and cause even the most disciplined investors to take losses, even while hedged.

In uncertain economic environments, such as today's, stable assets bring outsized value to an investor's portfolio. This understanding has forced a renewed focus on alternative assets and specifically real estate which has demonstrated itself to be exceptionally stable during historically volatile periods. Of all real estate types, multifamily apartments has proven to be the most stable as it benefits from several demographic and economic trends that have driven unprecedented renter demand. This durable demand has helped bolster multifamily returns and valuation stability throughout previous recessions and has made it one of the strongest investments available when adjusted for risk.

The purpose of this White Paper is to examine the ways volatility is measured, evaluate how volatility in this recession compares to prior recessions and explore how to best allocate capital going forward, adjusting for volatility, in alternative assets and specifically multifamily real estate.

Part I. Uncertainty and Volatility in the COVID-19 Era³

Each recession has its own unique causes; however, once a new one emerges it seems to generally follow a familiar pattern: an adverse event (or series of adverse events) takes place, unemployment rises and capital markets become illiquid, leading to an uneven marketplace replete with winners and losers. As the markets sort out which is which, volatility proliferates, with values and investor expectations swinging wildly until a consensus is reached through price discovery. Even the most seasoned investment professionals become victims of this uncertainty and volatility, taking losses despite holding hedged positions, and are forced to change their strategies to adjust to a new reality.

The coronavirus pandemic has followed this pattern. It has resulted in numerous adverse shocks in the US and global economy. A shrinking of global demand and production signified by negative real GDP growth, high unemployment, and decreased consumer spending have all been evidenced, as indicated in Table 1 below. To date, since the start of the pandemic, GDP has declined by -9.5%, the unemployment rate has more than doubled, from 4.0% in January to 8.4% in August—with a peak of 14.4% in April, almost 1.5x of the highest peak unemployment rate of the prior recessions⁴—and consumer spending, which typically accounts for roughly 70% of GDP, fell -18.7% between February and June⁵.

Table 1: Recessionary Economic Distress

Recession	Period	Duration	Real GDP Change	Peak Unemployment Rate	Consumer Spending Recession Start to Trough
Non-Recession Average			0.8%	6.1%	
COVID-19 Recession	February 2020 – Present	TBD	-9.5%	14.4%	-18.7%
Global Financial Crisis	December 2007 – June 2009	19 Months	-4.0%	9.7%	-1.9%
Dotcom & 9/11 Recession	March 2001 – November 2001	9 Months	-0.4%	5.3%	-0.1%
Gulf War Recession	July 1990 – March 1991	9 Months	-1.3%	7.3%	0.0%
Iran/Energy Crisis	July 1981 – November 1982	17 Months	-2.6%	10.4%	0.0%
Energy Crisis	January 1980 – July 1980	7 Months	-1.9%	7.9%	-0.1%

Source: Kingbird Analysis of Bloomberg Economic Workbench Data

As economic distress materializes it can give rise to volatility, upending investment strategies and destroying any previously held sense of foresight. Hence, investors would be wise to measure and track historical and current volatility—a practice

³ As the COVID-19 Recession is ongoing, all data in this White Paper is subject to change. All data cited herein is as of August 14, 2020.

⁴ Bureau of Labor Statistics

⁵ Kingbird Analysis of Federal Reserve Bank of St. Louis Data

that has been beneficial to many, as it allows an observer to reference other volatile periods, specifically recessions—to evaluate what volatility's effects were on different asset classes and to better gauge what they may be today.

Volatility and the Volatility Index

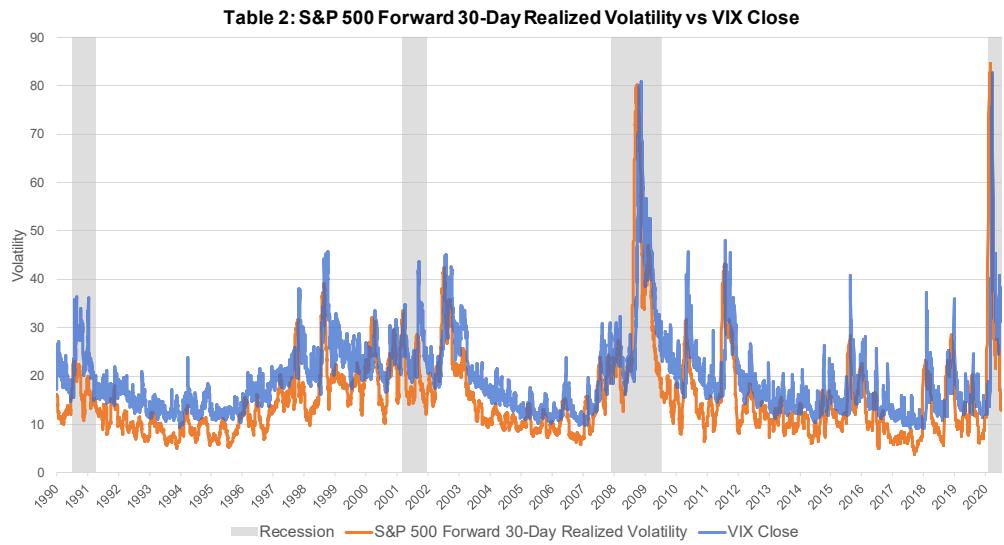
Market volatility is measured and examined through numerous metrics, each of which provides unique insight into its effects on markets. Among the most widely used are the Industrial Production Index ("IPX"), the trading volume of the S&P 500, and the VIX. When looked at together, these metrics paint a clear picture of volatility and reflect the historical context of the COVID-19 recession relative to recessions past.

Month-over-month decreases in the IPX have been identified by the Federal Reserve as a key measure of volatility.⁶ The IPX's decline during the COVID-19 Recession thus far has been unprecedented; in April 2020, industrial output shrank by -12.8%, while the worst decline during the Global Financial Crisis of 2007-2009 was -4.3%.^{7 8}

Trading volume, measuring the overall number of trades in a single day within the S&P 500 indicates a similar story. For context, from October 1996 to August 14, 2020, approximately 35% of days during non-recessionary periods, had total trades exceed 1 billion, whereas in recessionary periods, over 1 billion share trades occurred in 75% of trading days. This increase in trading implies a disconnect between buyers and sellers and a shift in their perceptions of where value can be found. Significant trading increases also often coincide with an increase in the frequency and severity of trading losses. During recessionary periods, 50% of the trading days in which S&P 500 trade volume exceeded 1 billion experienced daily trading losses, averaging -1.6%, whereas 45% of these days during non-recessionary periods experienced negative returns, averaging -0.9%.^{9 10}

While only 20% of the trading days during the COVID-19 Recession to date have exceeded 1 billion trades, the average daily change in the S&P 500 has been more severely negative than prior recessions. The average daily change in the S&P during the COVID-19 Recession when trading volume exceeded 1 billion has been -1.5%, while during the Global Financial Crisis it was -0.15% and during the Dotcom & 9/11 Recession it was -0.1%. Further, given the extremely uncertain nature of the COVID-19 outbreak in the US, it can be reasonably expected that there will be more trading days in which trade volume exceeds 1 billion, especially as the virus's economic impact unfolds further and as additional risk factors manifest.¹¹

While each of the above measures provide useful insight into volatility, the most prominent market-based measure of volatility is the CBOE Volatility Index ("VIX"). The VIX estimates the expected future 30-day volatility of the S&P 500 Index by aggregating the weighted prices of SPX puts and calls over a wide range of strike prices, during varying time periods. In this way, the VIX provides "a crowd-sourced estimate for the degree to which the market is uncertain about the future"¹³. The VIX has



Source: Kingbird Analysis of Bloomberg Economic Workbench Data and Chicago Board of Exchange Data

⁶ The Board of Governors of the Federal Reserve System, Economic Research, IFDP Notes, Understanding Global Volatility January 19, 2018

⁷ See Appendix 3 for more information on the IPX

⁸ Kingbird Analysis of Federal Reserve Bank of St. Louis Data

⁹ Overall, 43% of trading days, regardless of the trade volume or whether a recession was occurring, saw negative returns, averaging -0.9%.

¹⁰ Kingbird Analysis of Bloomberg Economic Workbench Data

¹¹ See Appendix 4 for more information on trading volume and volatility

¹² Kingbird Analysis of Bloomberg Economic Workbench Data

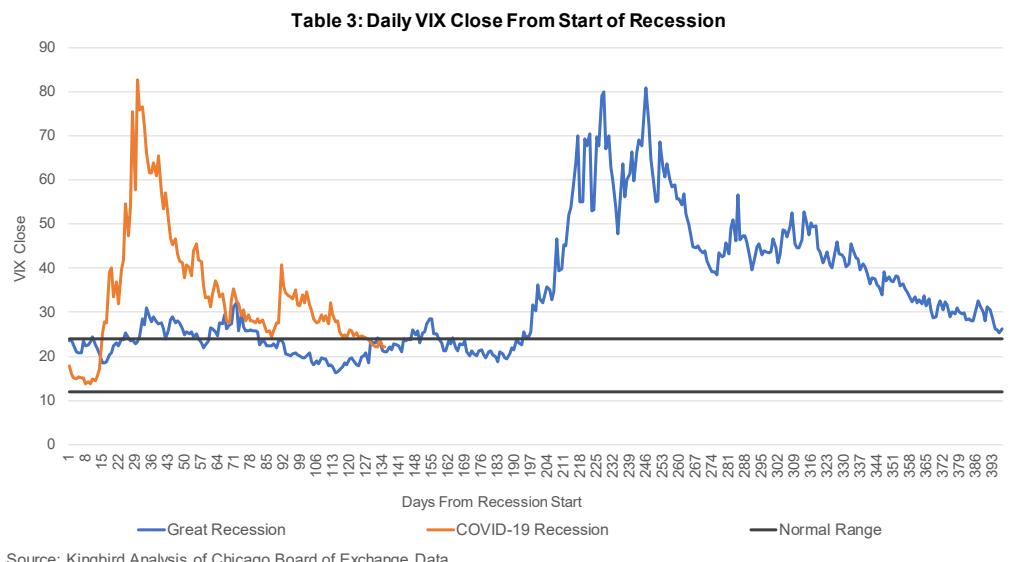
¹³ Chicago Board of Exchange White Paper: CBOE Volatility Index 2019

proven quite accurate. Short term options trading can provide powerful insight into investors' expectations as they represent predictions about future swings in the S&P 500.

While the VIX is not a perfect predictor of future realized volatility, it is a very useful gauge of 30-day future volatility and it has tracked well with realized volatility¹⁴, as depicted in Table 2.

During non-recessionary periods, the VIX ranges from 12-24¹⁵, implying that this range is the normal expectation for future volatility and that any VIX below it is atypically non-volatile and any VIX above this range is atypically volatile.

The COVID-19 Recession has experienced some of the most extreme spikes in the VIX's history. As exhibited in Table 3, on March 16, the VIX reached an all-time closing high of 82.69, slightly higher than the Global Financial Crisis's peak (and the previous high) of 80.86, and well outside the bounds of normal volatility expectations. While the COVID-19 Recession's peak is only marginally higher than in the Global Financial Crisis, the speed at which it was reached exemplifies the severe nature of current market volatility. While it took approximately 8 months from the start of the Global Financial Crisis for the VIX to peak, it took just 1 month during the COVID-19 Recession.



While the VIX has subsided from its COVID-19 peak, it remains near the upper level of the historically normal bound of activity during times of economic stability and growth.

As increases in VIX measurements become more extreme¹⁶, they tend to correspond with increasingly large S&P 500 Index losses, as indicated in Table 4. Based on this observation, it can be surmised that when the VIX is above its normal upper bound, it is less likely that investors will see positive returns. In this way, periods of heightened volatility, as measured by the VIX, signal increased risk of principle loss.

As the COVID-19 Recession continues, volatility will likely remain high, as evidenced by the VIX's maintenance near its normal upper level. With a high probability of future volatility within financial markets, risk will likely increase substantially, which will in turn increase the likelihood of principle loss. During these

Table 4
S&P 500 Returns as VIX Increases

StDev Above VIX Upper Bound	Avg Daily S&P 500 Return
0	-0.10%
1	-0.08%
2	-0.21%
3	-0.62%
4	-1.34%
5	1.09%
6	0.33%
7	-1.50%
8	-1.70%
9+	-6.35%

Source: Kingbird Analysis of Bloomberg Economic Workbench Data and Chicago Board of Exchange Data

¹⁴ Realized Volatility = $\sqrt{\frac{252}{30} \times \sum_{t=1}^{N+30} \ln\left(\frac{P_t+1}{P_t}\right)^2} \times 100$, where $P_{30}, P_{29}, \dots, P_N$ are the daily closing levels of the S&P 500 price index on consecutive trading days, the final closing level P_N and P_1 corresponding to the current date and P_{30} corresponding to the latest trading day that was more than 30 calendar days past to the current date, per a modification of the realized volatility formula from the S&P Dow Jones Indices *Reading VIX: Does VIX Predict Future Volatility* November 2017

¹⁵ This range is calculated as +/- one non-recessionary standard deviation (6.02) above and below the non-recessionary average of the VIX (17.90). Between January 1990 – when the VIX starts – and August 14, 2020, 69.5% of VIX measures fall within this range. Standard deviation is defined as a dataset's "dispersion around an arithmetic mean" and is a commonly utilized measure of volatility. The larger the standard deviation of a dataset, the more volatile it is. $StDev = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$, where x_i is each value from the sample population, μ is the populations mean, and N is the population size.

¹⁶ More extreme, meaning as a VIX measurement's distance above the VIX's normal upper bound by number of non-recessionary standard deviations increases.

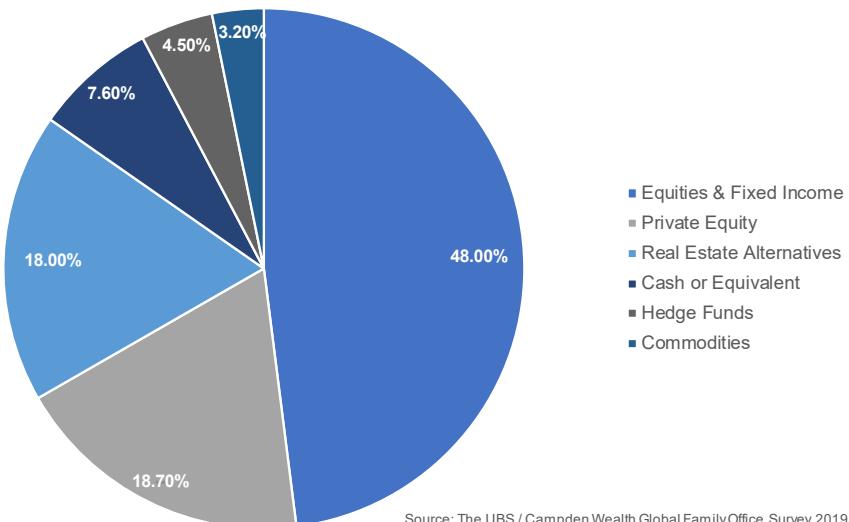
times investors, specifically those with a long-term focus, would do well to evaluate their portfolio allocations and consider shifting resources away from equities and toward other, more historically stable asset classes.

Part II. The Role of Real Estate in Portfolio Reallocation

The economic distress caused by the COVID-19 Recession has startled many investors and caused widespread reassessment of portfolio allocation strategies. In a volatile, uncertain environment, the need for security, principal protection, and superior risk-adjusted returns becomes evident.

Historically, family offices have maintained their largest allocations to equities and fixed income, with smaller investments in alternative strategies such as hedge funds, private equity, and real estate, as indicated in Table 5. As discussed in Part I, such large exposure to the equity markets during periods of volatility indicates that investors may be unnecessarily exposed to increased risk and lower returns. As such, a strategic reallocation of capital is often necessary for investors to avoid outsized losses, rebalance their portfolios and meet their target returns.

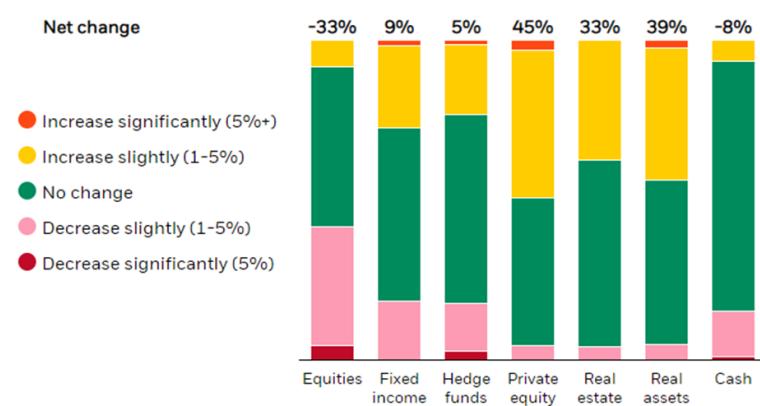
Table 5: Family Office Portfolio Allocation



Source: The UBS / Campden Wealth Global Family Office Survey 2019

Table 6: Asset Allocation Intentions

Net percentage of respondents intending to increase/decrease allocations across asset classes.



Given the continuing uncertainty and unique risks inherent in the COVID-19 Recession, (e.g., the possibility of a second viral wave and a slow, turbulent recovery), investors have already begun evaluating how to reallocate their resources in order to avoid loss and achieve superior risk-adjusted returns. The primary trend of this reallocation, according to BlackRock's 2020 Institutional Rebalancing Survey (Table 6), has been away from equities, with 41.6% of respondents expecting to decrease their allocation to equities and just 8.3% expecting to increase their allocation, for a net change of -33.3%.

As evidenced in Table 6, real estate has gained more recognition as a reliable alternative investment during uncertain and volatile recessionary periods; it is increasingly seen as an important part of any portfolio seeking a stable stream of inflation-protected and risk-adjusted returns. In the COVID-era, several large institutional investors, including the

California State Teachers' Retirement System ("CalSTRS"), are increasing their real estate allocation target from "13% to 14% due to market volatility"¹⁷. This reallocation strategy reinforces the view that real estate is a viable alternative strategy during highly volatile periods.

¹⁷ IPE Real Assets CalSTRS to increase real estate allocation on market volatility July 2020

Real Estate as an Investment

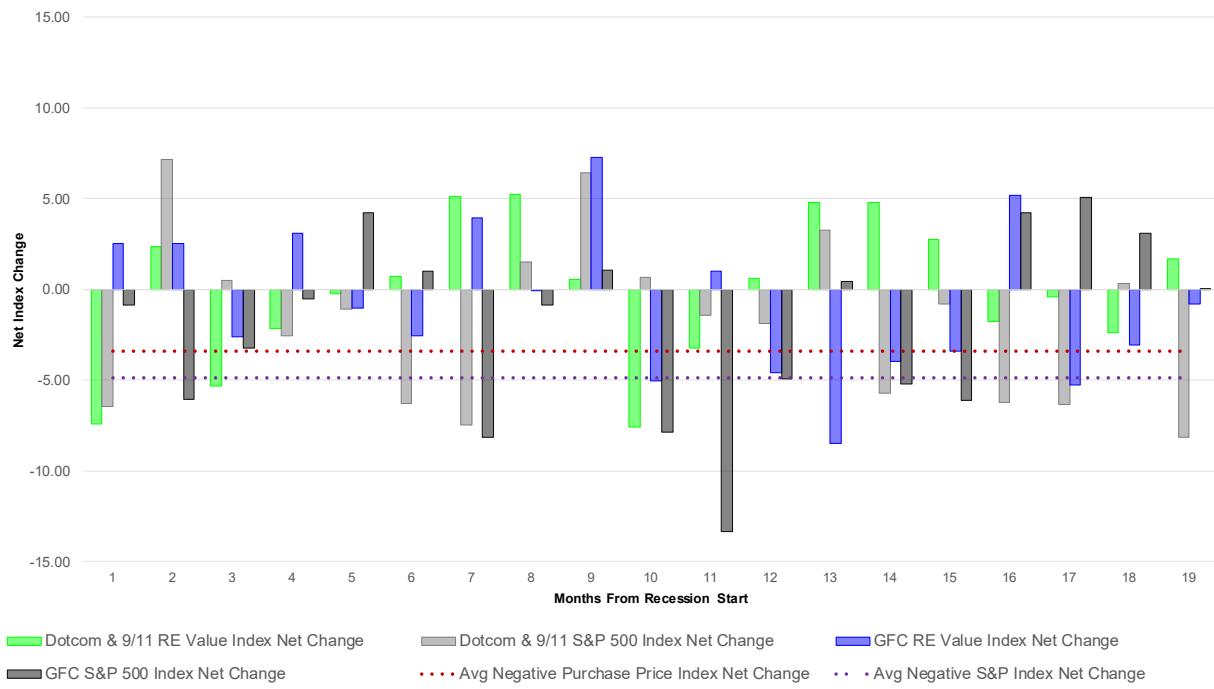
Real estate investing has traditionally been expected to provide a return profile between fixed income and equities. Fixed income instruments, such as bonds, have historically yielded low but stable returns due to their priority in the capital stack. Equities, while riskier, have yielded nearly double those of fixed income but with significantly more risk. Real estate offers a middle ground. Real estate generates current income, similar to bonds, while also benefiting from capital appreciation, like equities. Due to these factors, as well as the evolution of a number of favorable demographic and economic fundamentals over the last 20 years, real estate has proven capable of generating stable and consistent returns, especially when adjusted for volatility.

Real estate has demonstrated resilience through various periods of economic distress, presenting investors with opportunities that have an attractive combination of stable yet growing cash flows and capital appreciation.

Value Maintenance

Real estate's ability to maintain strong returns even during volatile financial environments is due to its own lack of volatility. One example of this is the ability of real estate to maintain its value through recessions. On average, real estate asset values have historically fluctuated less than the value of the S&P 500 during recessions, as evidenced in Table 7 below. Table 7 shows that, on average, real estate asset values fluctuated by -0.1 index points and -0.8 index points during the Dotcom & 9/11 Recession and the Global Financial Crisis, respectively, while the value of the S&P 500 fluctuated by -1.8 and -2.0 index points¹⁸.

Table 7: Recessionary Real Estate Value Index Net Change vs S&P 500 Index Net Change



Source: Kingbird Analysis of Bloomberg Economic Workbench Data

Additionally, as evidenced above, when average real estate values fluctuated negatively during past recessions, they did so by an average of only 3.40 index points, whereas the S&P 500 Index fluctuated negatively by an average of 4.86 index points, a 43% greater fluctuation than real estate values. This implies that the S&P 500, on average, loses 43% more value when it fluctuates negatively during a recessionary period than real estate assets. In this way, if an investor were invested in real estate during these recessions, their investment would lose less value than if they were invested in the S&P 500.¹⁸

¹⁸ For a detailed explanation of the index calculations of US real estate values and the S&P 500, refer to Appendix 1, Part 1

Further exemplifying real estate's lower volatility is the low standard deviations exhibited by asset values during the Global Financial Crisis and the Dotcom & 9/11 Recession, in comparison to the S&P 500, as indicated in Table 8¹⁹.

Table 8: Recessionary RE Value Index & S&P 500 Index Standard Deviation			
Dotcom & 9/11 Recession RE Value Index	Dotcom & 9/11 Recession S&P 500 Index	Global Financial Crisis RE Value Index	Global Financial Crisis S&P 500 Index
4.50	6.32	8.60	16.67
Percent Difference: 40.6%		Percent Difference: 93.9%	

Source: Kingbird Analysis of Bloomberg Economic Workbench Data

As noted above, the dispersion of real estate values around their mean during both the Dotcom & 9/11 Recession and the Global Financial Crisis is smaller than that of the S&P 500 Index, by 40.6% and 93.9%, respectively. This implies that, even as real estate values change during recessions, they tend to remain closer to their average than S&P 500 values do, meaning that they fluctuate to a relatively smaller degree (i.e., they are less volatile).

Real Estate Liquidity Premium

A fundamental reason behind the lack of volatility in private market real estate valuations is their relative illiquidity compared to equity markets. While the liquidity of public equity markets is unparalleled and valuable in its own right, as it offers the ability to mitigate opportunity cost, it does create additional volatility risk as prices are more likely to fluctuate when transaction volume increases based on short term and sometimes fickle investment information.

The time related barriers to entry and exit of real estate allow for the absorption of news to be priced into valuations. While this may seem somewhat problematic because investors are unable to sell an asset quickly, history would say otherwise. Rather, by allowing for news absorption before assets can be sold in a panic, real estate owners' reactions to volatility are generally tempered, which often prevents them from making panicked sales decisions, which can cause principal loss. In this way, the market barriers to quick hard asset exits serve as circuit-breakers for panic-stricken owners.

Additionally, real estate's illiquidity carries with it a liquidity premium. As investors are more hesitant to invest in illiquid assets, they often require additional yield to compensate them for the risk that illiquidity poses, similar to the higher yields typical to long term bonds. This built-in liquidity premium further enhances returns to real estate investments.

Robust Risk-Adjusted Returns

As a result of its lack of volatility, real estate investments generally tend to have stronger returns on a risk adjusted basis than competing investments. As evidenced in Table 9 below, the average return on an investment in real estate from 2001 through 2019, adjusted for volatility, has outperformed the S&P 500 and investment grade bonds based on both total return (cash on cash annual return + capital appreciation) and income (cash on cash annual returns), as measured by the Sharpe Ratio²⁰.

Table 9

Yield Type	Average Annual Return	StDev Excess	Sharpe Ratio
Current Income			
S&P 500 Dividend Yield	2.0%	1.3%	-1.0
S&P US Bond BBB+ Coupon Rate	5.3%	0.7%	2.8
Real Estate Weighted Cap Rates²¹	7.1%	1.2%	3.1
Total Return			
S&P 500	6.4%	17.7%	0.2
Real Estate Total Return	8.9%	8.3%	0.7

Source: Kingbird Analysis of Bloomberg Economic Workbench and NCREIF NPI Data

¹⁹ Standard deviation is defined as a dataset's "dispersion around an arithmetic mean" and is a commonly utilized measure of volatility. The larger the standard deviation of a dataset, the more volatile it is. $StDev = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$, where x_i is each value from the sample population, μ is the populations mean, and N is the population size.

²⁰ One of the ways to measure returns across asset classes accounting for volatility is the Sharpe Ratio. The Sharpe Ratio $S(x) = \frac{(Avg\ Return - R_f)}{StDev(Excess\ Return)}$, normalizes for volatility when looking at the returns of a particular investment above a risk-free rate, where R_f is the average risk free rate of the measured time period (see Footnote 20) and $StDev(Excess\ Return)$ is the standard deviation of each time periods' return less the corresponding risk free rate for each period.

²¹ Cap rates are defined as $Cap\ Rate = NOI/AP$ where NOI is the Net Operating Income of an asset and AP is the acquisition price of the asset. Cap rates therefore represent current income and can be compared to coupon rates and dividend yields. Cited cap Rates are weighted by the total transaction volume for each RE sector, in USD.

The above results imply that real estate has been a relatively safer risk adjusted investment than the S&P 500 regarding total returns, returning 3x the S&P 500 when volatility is accounted for. From an income generating perspective, when adjusting for volatility, real estate returns have been superior to both equities and investment grade bonds over the last 20 years. In fact, the average dividend yield for the S&P 500 resulted in a negative Sharpe Ratio, as the risk-free rate utilized in the above calculations²² was actually greater than the historical average dividend yield in the S&P. It should be noted that there may be some external causes for this, such as the recent trend toward share buybacks which inflate the price of the underlying equity, lowering its dividend yield.

Tables 10 and 11 further illustrate real estate's superior risk-adjusted return profile as compared to the S&P 500 regarding both total returns and current income. Additionally, Table 11 shows that real estate also outperforms hedge funds and real assets (commodities) regarding total returns, although real estate does fall short of non-real estate private equity.

As evidenced in Table 11, real estate investments generally provide more stable and durable yields than equity investments – and other alternatives – during volatile periods. In past recessions, real estate assets maintained their value to a far greater degree than the S&P 500. This stability lends itself to real estate's robust risk-adjusted return profile. Historically, it has exhibited generally stronger returns than most competing investment strategies on a risk-adjusted basis and this holds especially true for the equity markets; through past recessions, in the aggregate, real estate investments exhibited higher returns than the public equity markets.

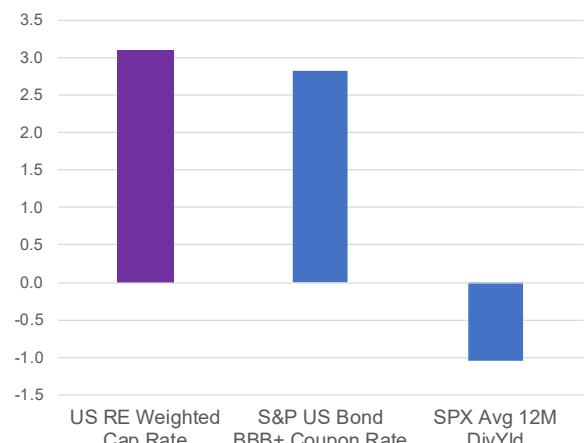
Part III. Multifamily Real Estate

While real estate has proven to be a resilient investment during volatile economic periods, not all real estate is created equally.

Real estate's viability is dependent on a number of factors, the most important of which are locational, demographic, economic, and capital market related. Simply buying a real estate asset in a well-established market will not ensure stability or the attainment desired returns. Not all markets exhibit the correct supply/demand imbalances or demographic trends to drive yields and not all real estate sectors can take advantage of these factors adequately to produce superior risk-adjusted returns or consistent cash distributions.

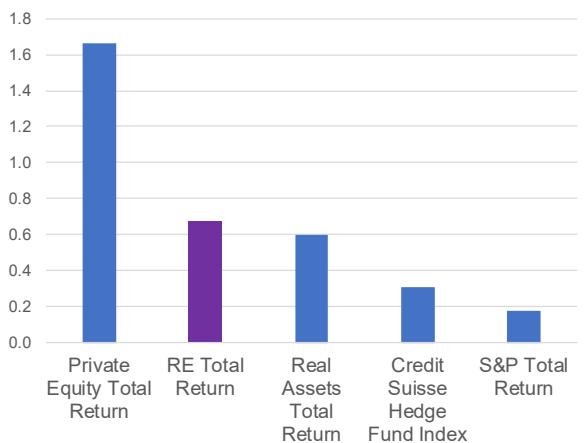
Each of the four major real estate sectors carry with them unique risks and benefits and are tied to separate, unequal economic drivers, which in turn lend themselves to the unique return profile of each sector. Of the four sectors, the U.S. residential apartment market has historically been the most resilient and stable asset class. As depicted in Table 12 below, for the period of 1978-2019, multifamily apartment returns exceeded all other real estate asset classes with a lower variance, and a stronger return per unit of risk (as measured by the Sharpe ratio)²³.

Table 10: Current Income Sharpe Ratio



Source: Kingbird Analysis of Bloomberg Data

Table 11: Total Return Sharpe Ratio



Source: Kingbird Analysis of Bloomberg Data and NCREIF NPI Data

²² To compensate for the artificially low contemporary risk-free rate, the average coupon rate of the US 10-Year Treasury Bill over the observed period of 2001-2019 (3.28%) was utilized as the risk-free rate in the numerator of the Sharpe Ratio calculation.

²³ To compensate for the artificially low contemporary risk-free rate, the average coupon rate of the US 10-year Treasury Bill over the observed period of 1978-2019 (6.16%) was utilized as the risk-free rate in the Sharpe Ratio, Beta, Alpha (Risk-Adjusted), and Avg Annual Return (Risk-Adjusted) calculations.

Table 12

Property Type	Average Annual Return	StDev Excess	Sharpe Ratio
All	9.36%	7.49%	0.43
Apartment	10.49%	7.33%	0.59
Industrial	10.22%	7.81%	0.52
Office	8.78%	9.28%	0.28
Retail	9.52%	7.04%	0.48

Source: Kingbird Analysis of NCREIF NPI Data

A significant contributor to the multifamily real estate sector's superior performance versus other real estate sectors, as well as the overall industry on a risk adjusted basis, is that apartment assets exhibit the second least volatile return profile of any sector compared to the overall real estate industry, as measured by beta²⁴, and indicated in Table 13 below, which exhibits the beta of each real estate sector for the period of 1978 to 2019.

Table 13

Beta	Multifamily	Office	Retail	Industrial
β	0.94	1.22	0.74	0.95

Source: Kingbird Analysis of NCREIF NPI Data

Further, Table 14 shows that multifamily real estate had the highest Avg Annual Return (Nominal) and Avg Annual Return (Risk-Adjusted) of any real estate sector between 1978 and 2019. Additionally, multifamily exhibited the highest nominal and risk-adjusted alphas of all real estate sectors. These measures indicate that the multifamily sector's return profile is robust in comparison to other real estate sectors and in relation to the industry as a whole, on both a nominal and risk adjusted basis.

Table 14 ^{25 26}

Measurement	Multifamily	Office	Retail	Industrial
Alpha (Nominal)	1.13%	-0.58%	0.16%	0.86%
Alpha (Risk-Adjusted)	1.31%	-1.29%	1.00%	1.02%
Avg Annual Return (Nominal)	10.49%	8.78%	9.52%	10.22%
Avg Annual Return (Risk-Adjusted)	10.67%	8.07%	10.36%	10.38%

Source: Kingbird Analysis of NCREIF NPI Data

When the multifamily sector's comparably high Sharpe Ratio, low beta, high Alpha (Nominal and Risk Adjusted), and high nominal and risk adjusted average annual returns are examined collectively, they exemplify the strength of multifamily real estate as a preferential investment option when compared to other real estate sectors. This preferred status is due to a number of factors. Multifamily real estate is a need-based asset class that is unlikely to be rendered obsolete by changing market dynamics, whereas retail and office real estate are slowly declining utility due to trends toward e-commerce and remote work, respectively. Multifamily remains a lower risk alternative as the sector is subject to shorter lease lengths than industrial real estate, which has numerous benefits, including the ability to factor inflation into rent increases, as outlined below. Additionally, the pool of reliable tenants is much larger for multifamily than for industrial, as the universe of credit-rated industrial tenants is somewhat limited.

²⁴ $\beta = \frac{\text{Covariance}(R_e, R_m)}{\text{Variance}(R_m)}$, where R_e is the average annual return of the individual real estate sector and R_m is the average annual return of the total real estate industry. A beta of 1 implies that the individual sector is equally as volatile as the total industry, a beta above 1 implies that it is more volatile, and a beta of less than 1 implies that it is less volatile.

²⁵ $\text{Alpha (Risk-Adjusted)} = R_e - \text{CAPM}_{am}$, where CAPM_{am} is the volatility-adjusted return of the overall market; $\text{CAPM}_{am} = R_f + \beta_e(R_m - R_f)$, where R_f is the risk-free rate and β_e is the beta of the individual sector. Alpha (Risk-Adjusted) is defined as the measure of a portfolio's (or investment's) actual return above a market index or benchmark return, normalized for risk, whereas Alpha (Nominal), the standard definition of Alpha, is the measure of a portfolio's (or investment's) return above a non-normalized market index or benchmark return. Alpha (Nominal) does not take risk into account, while Alpha (Risk-Adjusted) does. In this sense, Alpha (Risk-Adjusted) is Alpha (Nominal), minus any additional risk inherent to the investment. $\text{Alpha (Nominal)} = R_e - R_m$, while $\text{Alpha (Risk-Adjusted)} = R_e - R_m - \text{Additional Risk}$. When Alpha (Risk-Adjusted) is greater than Alpha (Nominal), this means the sector is less risky than the overall industry. Alpha (Risk-Adjusted) adjusts for risk by essentially rendering the beta measurement for the entire real estate industry equal to that of each individual sector, thus normalizing for volatility. Alpha (Risk-Adjusted) is also known as Jensen's Alpha.

²⁶ Avg Annual Return (Risk-Adjusted) is the Actual Return less any additional risk $\text{Avg Annual Return (Risk-Adjusted)} = R_e - (\text{Alpha}_n - \text{Alpha}_{ra})$, where Alpha_n is Alpha (Nominal) and Alpha_{ra} is Alpha (Risk-Adjusted). When the Avg Annual Return (Risk-Adjusted) is greater than the Avg Annual Return (Nominal), this means the sector is less risky than the overall industry. Avg Annual Return (Risk-Adjusted) adjusts for risk by essentially rendering each sector's beta measurement equal to that of the entire real estate industry, thus normalizing for volatility.

Multifamily Value Stability

During past recessions, as economic strife has taken hold, real estate property values have typically fallen. However, among real estate sectors, multifamily has proven the most resilient during such periods. As exhibited in Table 15 below, multifamily property values fell the least during the Global Financial Crisis and were the first to recover, having fallen from its pre-recession average value by just -17.34% and having recovered to this pre-recession level in just 33 months, from the GFC's start in December 2007²⁷.

Table 15: Global Financial Crisis Real Estate Sector Value Maintenance

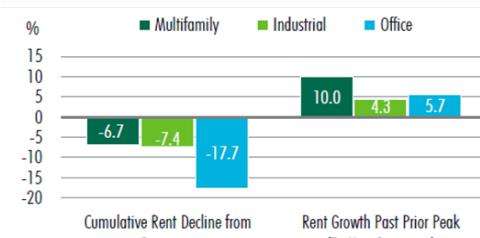
Sector	Multifamily Value Index	Office Value Index	Retail Value Index	Industrial Value Index
Pre-Recession Value	129.90	143.17	205.31	115.58
Trough	107.37	80.20	161.97	93.30
Pre-Recession Value to Trough	-17.34%	-43.98%	-21.11%	-19.27%
Months to Value Recovery	33	79	72	81

Source: Kingbird Analysis of Bloomberg Economic Workbench Data

Multifamily Rent Growth and Collections Resiliency

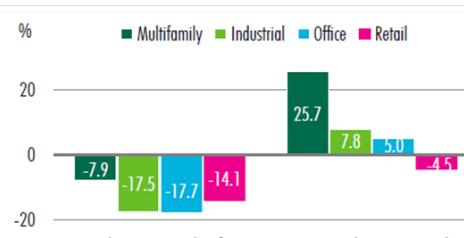
Multifamily has historically been the most resilient sector during recessionary periods with regard to rent growth. As noted in Tables 16 and 17 below, multifamily rents fall the least during a recession and recover the fastest after a recession. The Tables below illustrate the resiliency and durability of the apartment sector in the last two downturns. Multifamily apartments have demonstrated a remarkable ability to pivot quickly from a down cycle by re-establishing rent growth sooner and for longer periods than other real estate sectors; in addition, apartment assets have also garnered much higher cumulative rent revenue growth both during and after a cycle downturn.

Table 16: Cumulative Effects on Rent During and After Dotcom & Dotcom Recessions



Source: CBRE Research, CBRE Econometric Advisors, Q4 2018. Retail rents did not decline during this recession.

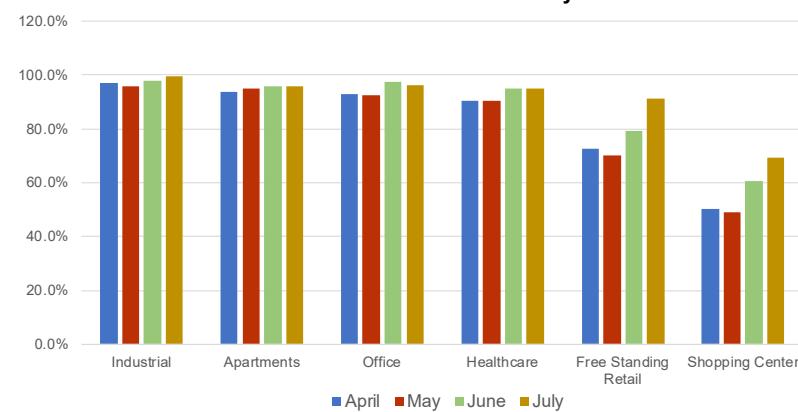
Table 17: Cumulative Effects on Rent During and After Global Financial Crisis



Source: CBRE Research, CBRE Econometric Advisors, U.S. Census Bureau, Q4 2018.

The resiliency and durability of the multifamily sector is continuing during the current downturn, as exemplified by multifamily's stable rent collections during the COVID-19 Recession, exhibited in Table 18. Only the industrial sector has consistently collected a larger share of its contracted rent payments during the COVID-19 Recession²⁸. This trend underscores multifamily tenants' prioritization of rental payments as compared to the tenants of other property types; multifamily renters prioritize rent payments in order to avoid eviction.

Table 18: COVID-19 Rent Collections by Sector



Source: NAREIT

²⁷ For a detailed explanation of the index calculations of US real estate values, refer to Appendix 1, Part 2

²⁸ NAREIT July Rent Collection Data

Inflation Hedge

An additional benefit of multifamily real estate over other real estate sectors is its ability to hedge against inflation through periodic inflation indexed rent adjustments. Multifamily leases are, on average, one-year long, whereas retail, office, and industrial leases generally range anywhere from 3 to 10 years. The shorter lease duration allows for more frequent and deliberate rent adjustments which can account for and offset rising costs, as exhibited in Table 19.

Table 19 also further exemplifies multifamily's rent growth strength as previously exhibited in Tables 16 and 17. In addition to showing multifamily's superior inflation hedging ability, Table 19 shows that during the Global Financial Crisis, multifamily rent growth slowed less than other real estate sectors and also began recovering sooner and to a greater degree.

Favorable Demographic and Economic Fundamentals

People will always need a safe, affordable place to live, yet the US suffers from a chronic undersupply of affordable housing, creating significant unmet demand. In the 2010s household formation in the US grew by 1 million households annually on average, yet only approximately 880,000 housing units (single family and multifamily) were constructed per year²⁹. This significant discrepancy between supply and demand, paired with increased labor and commodity costs, has led to rapidly increasing housing costs, even as household income growth has stagnated. Over the past eight years, single-family housing experienced sales price increases of 6.8% per year, much higher than the average wage growth of 2.5%³⁰. At the start of 2019, the median priced single-family home exceeded the median household income by a multiple of four, the highest ever multiple recorded, as indicated in Table 20.

The United States is increasingly becoming a nation of renters-by-necessity as wage growth has remained stagnant and average debt per household and home prices have increased. Rising student debt among the Millennial and Gen X cohorts, coupled with lower household savings and discretionary funds, and reduced credit scores, have further impaired a household's ability to afford the down payment required for a home purchase, as depicted in Table 21; collectively, these factors have significantly reduced the potential for homeownership. This unaffordability issue is a main driver of the increased demand for multifamily housing in the US, as those households that have been priced out of homeownership must rent.

Table 19: Real Estate Rent Growth by Sector vs Inflation

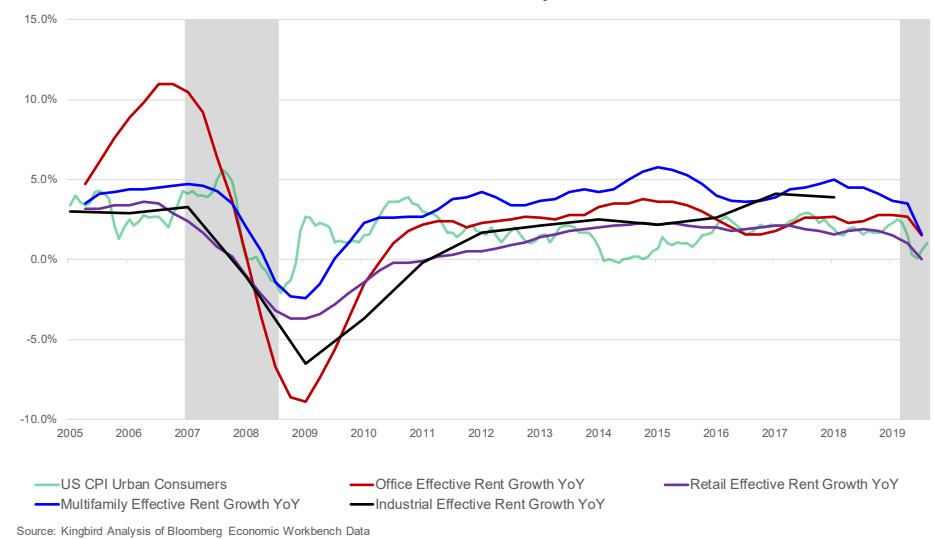
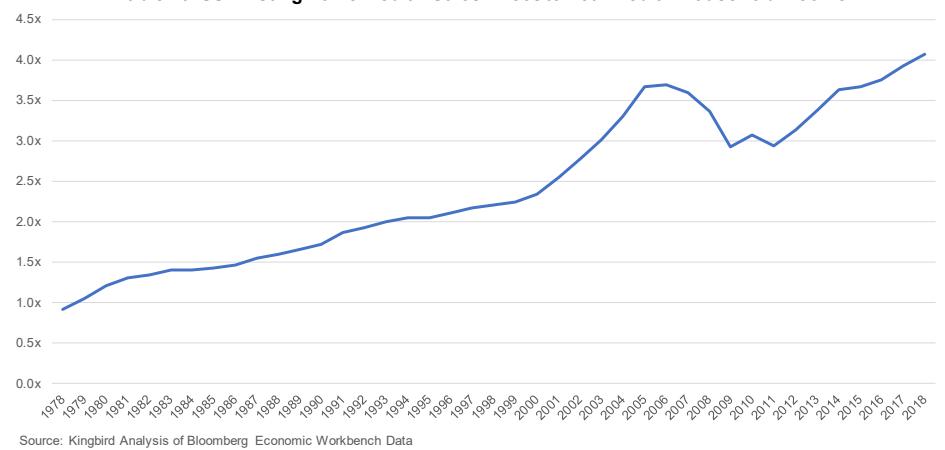


Table 20: US Existing Home Median Sales Prices to Real Median Household Income



²⁹ CBRE Research Housing Undersupply Contributes to Housing Affordability Challenge June 2019

³⁰ Bloomberg, US Existing Home Sales Median Price YoY Percent Change; and Federal Reserve Bank of St. Louis, Average Hourly Earnings of All Employees, Total Private

Table 21

Generation	Population	Avg Credit Score	Avg Debt Load (Non-Mortgage)	Mortgage/Student Debt
Gen Z (Age 18-20)	73.61M	634	\$6,963	\$160,000
Millenials (Age 21-34)	79.41M	638	\$22,784	\$198,000
Gen X (Age 35-49)	65.72M	658	\$30,334	\$232,000
Baby Boomers (Age 50-70)	75.52M	703	\$27,513	\$189,000
Silent (Age 70+)	28.32M	729	\$157,000	\$157,000
US Total/Average	322.58M	675	\$24,506	\$202,000

Source: Experian "State of Credit Report" (2018), USA Today, and US Census Bureau

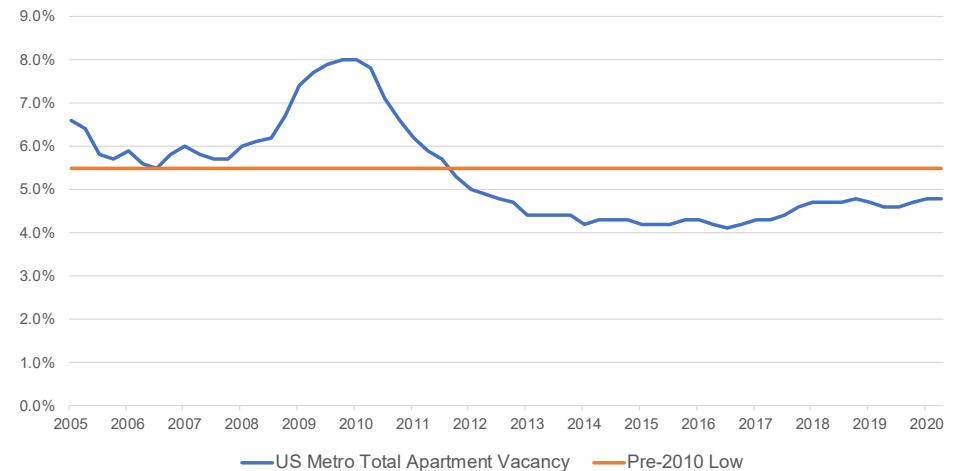
Despite record-high levels of demand for apartment housing in the US, construction of new multifamily apartments is not generating the unit supply required. The number of renter households increased an average of 500,000 per year since 2010³¹, yet the US only added 250,000 apartment units per year³² during that time, leading to an annual shortfall of 250,000 units. This shortfall has driven multifamily apartment vacancies to record lows. Apartment vacancy has remained consistently below the pre-2010 low of 5.5% since 2012, as indicated in Table 22.

Not only is current apartment vacancy low relative to past levels, it is also low compared to other real estate sectors. As exhibited in Table 23, the multifamily property vacancy rate has consistently been lower than the other three core real estate sectors, even though, as indicated in Table 19, multifamily rents grew at a faster pace than other sectors.

The consistently low vacancy exhibited by the apartment sector compared to other sectors implies that the demand drivers associated with multifamily apartment housing are stronger than the other sectors, especially when taken in conjunction with each sector's supply levels.

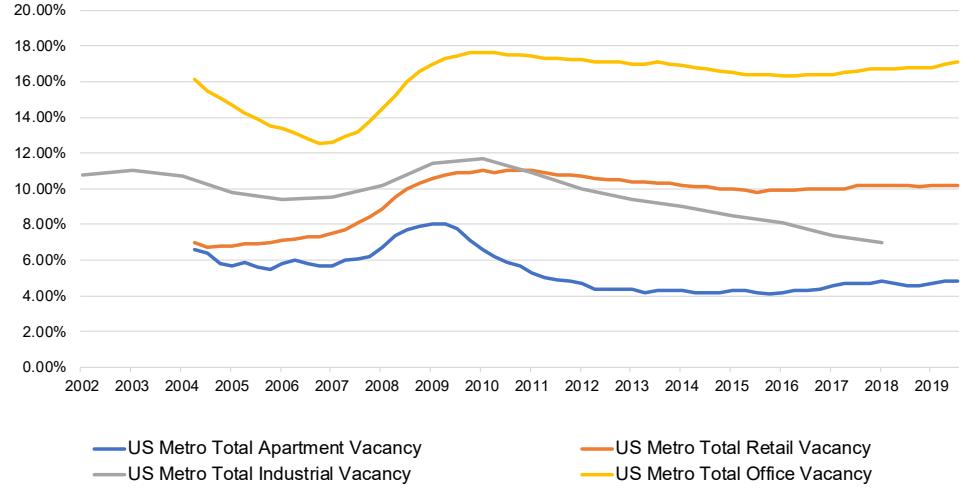
America's housing supply/demand void is likely to become further exacerbated in the years ahead. The US is projected to add 420,000 net new renter households annually over the coming decade, according to the Joint Center for Housing Studies at Harvard University³³. To keep pace with this future rental demand wave, the U.S. requires an additional 5 million

Table 22: US Metro Total Apartment Vacancy



Source: Kingbird Analysis of Bloomberg Economic Workbench Data

Table 23: US Real Estate Vacancy by Sector



Source: Kingbird Analysis of Bloomberg Economic Workbench Data

³¹ Kingbird Analysis of US Census Bureau Data

³² Kingbird Analysis of CoStar Data

³³ Joint Center for Housing Studies of Harvard University *Tenure Projections of Homeowner and Renter Households for 2018-2038* March 2019

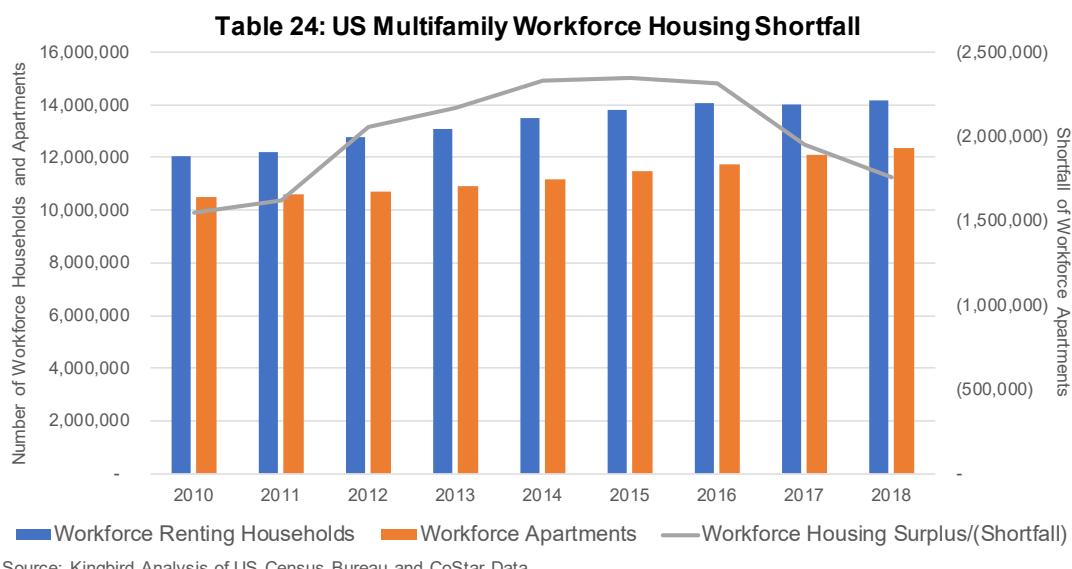
apartment units through 2025. Historically, however, the market has been incapable of producing sufficient new multifamily housing to meet this level of rental demand. CoStar, a leading real estate research and data provider, projects that the US apartment supply will increase by only 1.1 million through 2025, as compared to the 5 million required, creating a shortfall of 4 million apartments.

New apartment construction levels in the COVID-era are expected to remain at low levels. Despite low interest rates, construction lenders have imposed tougher underwriting requirements, including higher equity levels, stricter personal loan guarantees, higher fees, and higher borrower credit standards.

Multifamily remains well positioned to weather market volatility and a recessionary environment with its durable demand drivers, supply constraints and low-cost financing availability; it will also benefit from other factors resulting from the unique circumstances surrounding the COVID-19 pandemic. While multifamily vacancies are projected to rise to 6.3% nationally by 3Q2020, they are projected to begin to decrease in 4Q2020 and return to their pre-COVID levels by 3Q2021³⁴. This represents a relatively rapid recovery period and is consistent with the historical durability of the multifamily asset class. In this light, the multifamily apartment sector can be regarded as an “all weather” asset class because of its chronic undersupply, growing demand, supporting demographic trends, and capital market programs.

Multifamily's consistent undersupply is especially impactful for those households earning between \$35,000 and \$75,000 annually—the “workforce segment”. Workforce households represent the plurality (32.3%³⁵) of renting households yet are one of the least provided for cohorts relative to demand.

As exhibited in Table 24, in 2010, there were 12 million renting workforce households and 10.5 million workforce priced apartments in the US, resulting in a shortfall of 1.5 million. This disparity has only been exacerbated by the above trends; as of 2018, there were 14.1 million renting workforce households and 12.3 million workforce apartments, resulting in an increased shortfall of 1.8 million. The supply of workforce apartments failed to close the above shortfall as the number of renting workforce households in the US grew by 2.1 million, while the number of workforce apartment units grew by just 1.8 million³⁶. While some of the effects of this shortfall are curbed by single family rentals, these are typically leased by higher income households as they are larger, thus requiring higher rents and expenses, such as energy costs³⁷. As such, the shortage of affordable workforce rental housing remains relatively large.



³⁴ CBRE U.S. MarketFlash – Multifamily Market Outlook: Rebound to Begin in Q4 2020 April 2020

³⁵ Kingbird Analysis of US Census Bureau Data

³⁶ Kingbird Analysis of US Census Bureau and CoStar Data

³⁷ Joint Center for Housing Studies of Harvard University America's Rental Housing 2020

Causing and further reinforcing this shortage of workforce apartments is the significant bifurcation of luxury and workforce unit deliveries, which has resulted in substantially more luxury units being delivered than workforce units as a share of each segments' total inventory, as evidenced in Table 25. This bifurcation is a direct result of the elevated prices of residential construction in the US, which require higher rents to justify and recoup costs and achieve required returns; as of April 2020, the average prices of the inputs of residential construction grew by 54% since January 2001, the average cost of wages and salaries for construction workers grew by 60% from January 2001, and the average price of commercial land grew 172% from its January 2001 cost. This represents a much quicker rise in cost than inflation alone would warrant, as consumer prices, as of April 2020, grew by just 46% from their January 2001 levels³⁸.

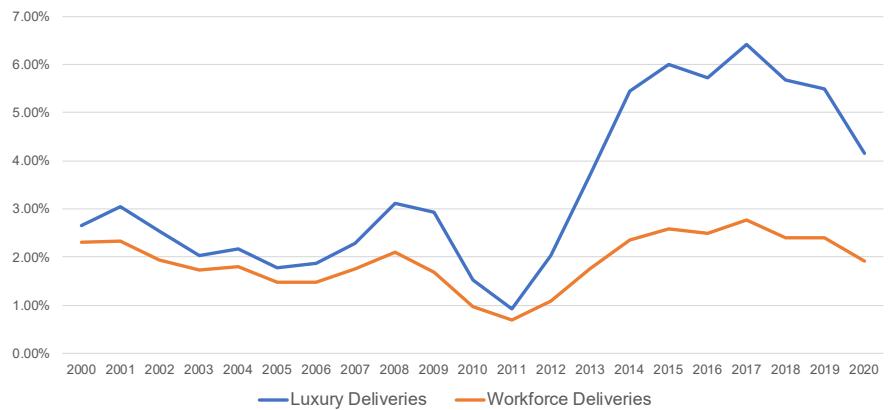
This large workforce apartment supply/demand void, paired with the significant disparity in new deliveries, has led to lower vacancy rates in the workforce segment of the US's apartment supply, as compared to the luxury segment, as evidenced in Table 26. Prior to 2013, luxury apartments were consistently more occupied than workforce units. However, since 2013, the vacancy rate of workforce apartments has been consistently lower than that of luxury apartments. This spread has, as of 2Q2020, reached record levels, with 9.5% of luxury units vacant, versus just 6.8% of workforce units.

The above factors indicate that the demographic and economic trends occurring in the US that benefit multifamily real estate have an especially favorable effect on the workforce sector. These fundamental drivers have created a significant workforce apartment supply/demand gap, resulting in robust demand for, and low vacancies among, workforce apartments, as compared to the multifamily sector as a whole and specifically luxury apartments.

Part IV. Conclusion

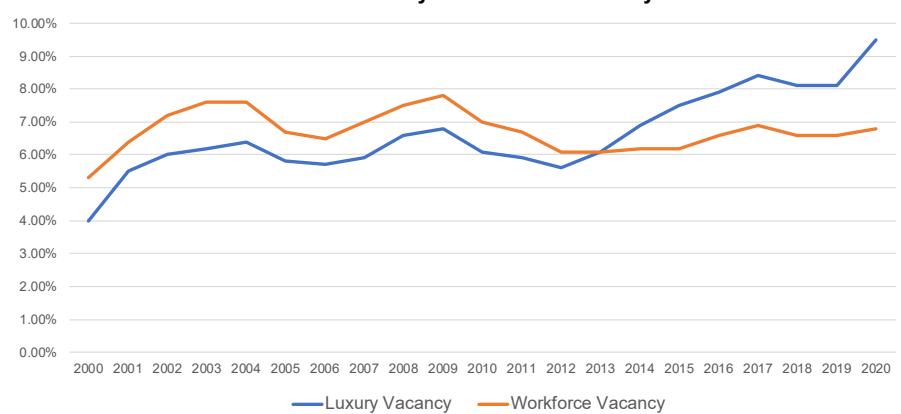
Market volatility, although not interchangeable with the concept of investment risk, is a significant contributing factor to it. Historically, as volatility has risen, the likelihood of negative investment returns and principle loss has increased, especially among investment's in equity markets. This is especially true during economic downturns, when volatility tends to peak. This trend has persisted in past recessions and, although it is still ongoing, appears to be holding true during the COVID-19 Recession.

Table 25: Newly Delivered Units as Share of Total Inventory



Source: Kingbird Analysis of CoStar Data

Table 26: Luxury vs Workforce Vacancy



Source: Kingbird Analysis of CoStar Data

³⁸ Bureau of Labor Statistics Producer Price Index by Commodity: Inputs to industries: Net Inputs to Residential Construction, Goods (Index Jan 2001=100); Bureau of Labor Statistics Employment Cost Index: Wages and Salaries: Private Industry Workers: construction (Index Q1 2001=100); CoStar Commercial Repeat Sale Indices Press Release July 30, 2020; and Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items in US City Average (Index Jan 2001=100)

In order to combat volatility, investors, particularly those with a long-term investment mindset, would be well-served to reassess and reallocate their investment portfolios, shifting weight from those investments that are more vulnerable to volatility and its accompanying risks—equities—to those that are less vulnerable—real estate.

Real estate asset values typically fluctuate less than equity values during recessions, and when they fluctuate negatively, they typically do so to a lesser degree. Real estate has also exhibited higher risk-adjusted returns through past recessions; between 2001 and 2019, real estate outperformed the S&P 500 on both a current income and total return basis when adjusting for volatility, as measured by the Sharpe Ratio.

Within the real estate industry, multifamily real estate has proven to be the most robust; among real estate sectors, between 1978 and 2019, multifamily real estate exhibited the second least volatility as measured by beta and the strongest return profile on both a nominal and risk-adjusted basis. Additionally, multifamily real estate asset values and rents have fallen the least and recovered the quickest during past recessions.

Multifamily's strength in comparison to other real estate sectors is due to a multitude of favorable economic and demographic trends. The US housing market has historically been incapable of providing enough housing for rent or ownership for the growing number of households. This has resulted in a significant supply/demand disparity which has led to an increasingly large housing-affordability issue. As of 2019, the median home in the US was priced at 4x the median income, the highest multiple on record. Due to the increasing unaffordability of homeownership, the US is shifting from a nation of owners to one of renters, bolstering demand for multifamily housing.

Despite this high demand, the supply of multifamily housing has been inadequate, driving multifamily vacancies across the US to record lows; the lowest among all real estate sectors.

The effects of multifamily's substantial supply/demand void have been particularly impactful for workforce households. As of 2018, there were 1.8 million more renting workforce households than there were workforce apartments. This shortfall has been caused and exacerbated by the lack of new workforce apartment supply in the US, which itself has resulted from faster-than-inflation increases in land and construction costs. As a result of this shortfall, workforce apartment vacancies have remained low in comparison to luxury apartments.

Against this backdrop, investments in the workforce apartment sector are a prudent defensive position to take, as it is a "need-based" essential use market segment; regardless of how this recession unfolds, people will still need a place to live, and most renters cannot afford to buy homes. By engaging in targeted investments in the workforce multifamily sector, investors can successfully stabilize their portfolios while still achieving outsized returns.

While the pandemic has changed the way the world lives and works, workforce multifamily apartments still have a stable short term, intermediate and long-term outlook due to the aforementioned economic and demographic trends. In the post-COVID era, both the demographic and supply/demand fundamentals that sustain real estate investment will remain strong.

Part V. Kingbird Investment Management

Kingbird Investment Management is an income-oriented value investor focused on investing below replacement cost, in select growth markets, across various capital stack positions in order to optimize risk-adjusted returns. We target a balanced portfolio with high current income and 10% to 14% IRRs in a 4-6-year time period, using low cost agency debt averaging approximately 65% LTV. Kingbird utilizes a data driven platform underscored by both quantitative and qualitative analytics to identify markets and investment opportunities based on job growth and economic stability, favorable supply/demand dynamics and mis-priced risk.

Kingbird's residential value-oriented apartment investment strategy was designed as an income-oriented alternative, based on current returns, income appreciation and principal protection. Additionally, it provides investors with inflation protection through periodic inflation indexed rent adjustments.

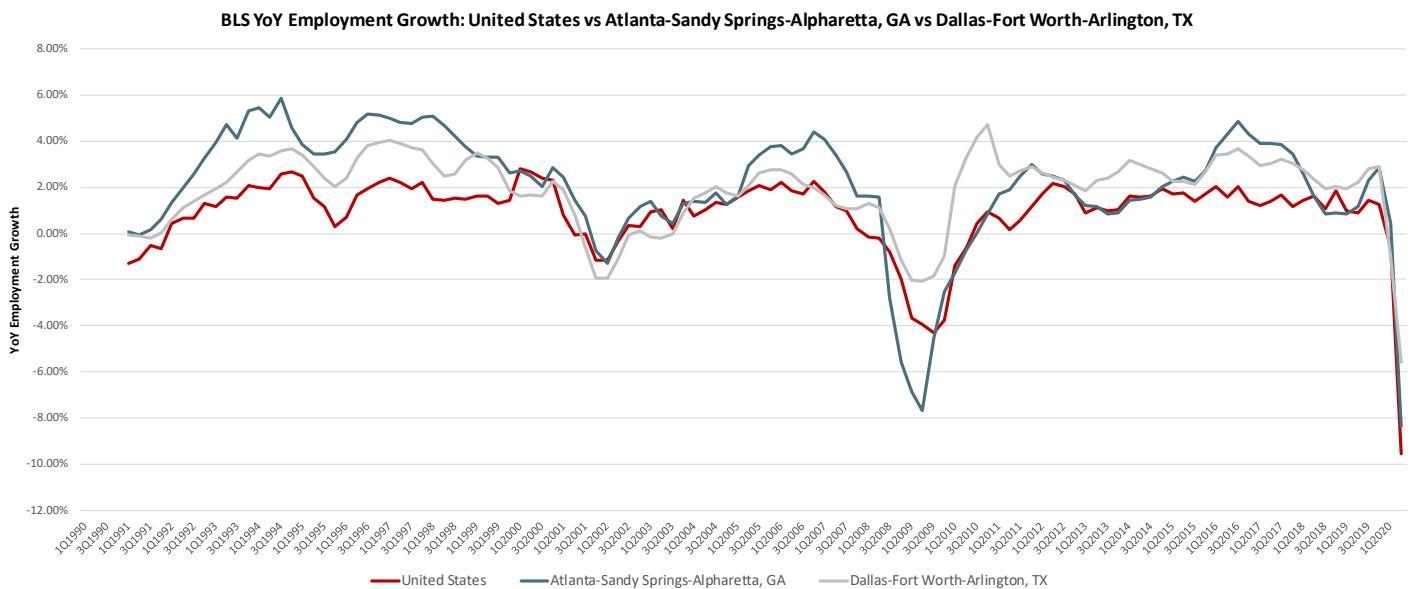
Key attributes of Kingbird Investment Management's strategy include:

Creative and Flexible Structuring: By investing at all levels of the capital structure – from hybrid debt/equity and preferred equity to GP and LP positions – the strategy provides a debt/equity alternative that combines, at once, a defensive posture

that can sustain value and generate durable income with an offensive position that capitalizes on mispriced risk and market dislocation to capture upside.

Value-Oriented Discount Investment Process: Kingbird is continuously re-analyzing markets, focusing on price discovery and engaging with potential sellers and partners. The pandemic has already caused financial stress on some property owners and lenders. This current market turmoil represents an extraordinary opportunity to capitalize upon. Kingbird's value-oriented investment approach deploys a risk-mitigating underwriting model, integrates stress-tested and conservative revenue, rent, and valuation metrics, and does not rely solely on capital appreciation to generate returns.

Top Down and Bottom Up Research Driven Approach: Kingbird has strong convictions regarding the fundamental long-term market demand drivers of the US markets we target. Kingbird draws upon numerous market research and proprietary market monitoring models, which help evaluate supply/demand trends and imbalances for each target market. In addition, to enhance its investment allocation decisions, Kingbird has constructed, and draws upon, its own proprietary market dashboard that incorporates extensive key apartment market variables and data, including over 80 macro-level statistics. Market research and competitive assessments are used to gauge residential trends, competitive supply, demand growth, prices and rents to enhance value, optimize rent rates, and drive revenue. Specifically, Kingbird positions itself by identifying assets in undersupplied markets which benefit from high-quality and diverse employment generators that can support a sustained recovery and future valuations as the economy exits the pandemic. The charts below represent a sample of Kingbird's proprietary market dashboard.



Avg. Job Growth Among Similarly Sized Metros (2014–2019)				Avg. Job Growth Among Similarly Sized Metros (2014–2019)			
Metro	Population	Avg. YoY Growth	Total Net Job Growth	Metro	Population	Avg. YoY Growth	Total Net Job Growth
Dallas-Fort Worth-Arlington, TX	7,539,711	2.72%	502,326	N/A	N/A	N/A	N/A
Houston-The Woodlands-Sugar Land, TX	6,997,384	1.36%	218,326	N/A	N/A	N/A	N/A
Washington-Arlington-Alexandria, DC-VA-MD-WV	6,249,950	1.69%	288,070	New York-Newark-Jersey City, NY-NJ-PA	19,979,477	0.68%	295,520
Miami-Fort Lauderdale-Pompano Beach, FL	6,198,782	1.88%	283,631	Los Angeles-Long Beach-Anaheim, CA	13,291,486	1.30%	407,457
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,096,372	1.13%	156,560	Chicago-Naperville-Elgin, IL-IN-WI	9,498,716	0.55%	97,524
Atlanta-Sandy Springs-Alpharetta, GA	5,949,951	2.75%	395,562	Dallas-Fort Worth-Arlington, TX	7,539,711	2.72%	502,326
Boston-Cambridge-Newton, MA-NH	4,875,390	2.08%	255,167	Houston-The Woodlands-Sugar Land, TX	6,997,384	1.36%	218,326
Phoenix-Mesa-Chandler, AZ	4,857,962	3.78%	419,889	Washington-Arlington-Alexandria, DC-VA-MD-WV	6,249,950	1.69%	288,070
San Francisco-Oakland-Berkeley, CA	4,729,484	1.70%	194,057	Miami-Fort Lauderdale-Pompano Beach, FL	6,198,782	1.88%	283,631
Riverside-San Bernardino-Ontario, CA	4,622,361	2.41%	204,040	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,096,372	1.13%	156,560
Detroit-Warren-Dearborn, MI	4,326,442	2.06%	193,562	Atlanta-Sandy Springs-Alpharetta, GA	5,949,951	2.75%	395,562

Defense and Offense: Portfolio Performance and Lessons Learned

Kingbird has been actively managing its assets to ensure that residents facing crisis-related hardship (e.g., health, employment, etc.) are safe, healthy, and able to pay their rent. Kingbird and its operating partners have been working with residents and have developed flexible payment plans which range from 2 – 10 months with lease extensions for otherwise responsible and timely residents.

To date, we have achieved average rental collections of 97.5%; our collection rates have exceeded the national average and far exceed those of other real estate asset classes. Due to the diversity of our portfolio, both geographically and within the capital stack, Kingbird has maintained consistent and even improved cash flows through the pandemic to date, through careful income and expense management. In addition, we have continued strong new leasing activity and lease renewals. Kingbird has maintained significant cash reserves both for operations and debt service which should mitigate the stress caused by this near-term crisis. In addition, with some of our debt being interest-only (IO) for 3-5 years, our assets have less financial stress because of reduced debt service requirements.

Market Positioning

Kingbird will specifically invest in submarkets in core target cities demonstrating strong employment growth, durable new household formation, lack of new construction, high barriers-to-entry, and access to public transportation, shopping, and quality schools, but which have evidenced limited supply of moderate-income apartments (i.e., for households with incomes between \$35,000 and \$75,000 annually). In addition to anticipated acquisitions in Austin, Texas; Houston, Texas; Dallas, Texas; Tampa, Florida; Columbus, Ohio; Atlanta, Georgia; Portland, Oregon; and in North and South Carolina, Kingbird may pursue other markets with similar compelling fundamentals on a comprehensive basis.

Going Forward: Identifying Opportunities

Kingbird expects that market dislocations and economic stress will create investment opportunities during the COVID-19 Recession. From March to July 2020, the conditions that make for lower asset pricing were beginning to materialize as the number of motivated sellers increased, liquidity tightened, and values began to show signs of being impacted. Price declines, coming off over-heated late cycle valuations in 2019, along with increasingly stressed and distressed property owners, indicated that the prospect for enhanced returns was at its beginning stages and poised to increase as the downturn and recovery process played out.

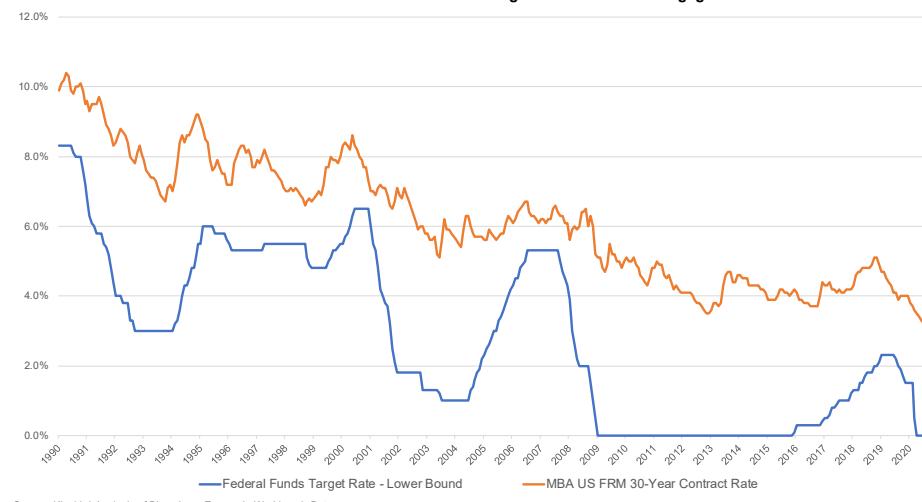
Historically, the greatest price dislocation for multifamily real estate investments has occurred approximately 12 to 18 months after the start of a recession. During the Global Financial Crisis, the average sale price per unit for multifamily properties in the US did not reach its nadir until 15 months after the recession's start, as exhibited in Table 28.

While average sale prices have fallen 4.6% since January (as of May), past trends suggest that there will be opportunities to purchase multifamily properties at a greater discount in the coming months. Well capitalized investors with a long-term outlook, seeking stable returns, will be well positioned to take advantage of these buying opportunities.

Table 28: Great Recession Sale Price per Unit Change From Pre-Recession Levels



Table 29: Fed Funds Lower Bound & US Avg 30-Yr Fixed Rate Mortgage Rate



Furthermore, the COVID-19 Recession provides investors with the added benefit of historically low interest rates. In March 2020, for only the second time in its history, the lower bound of the Federal Funds target rate was reduced to 0%. This historic interest rate move has rippled through the U.S. economy, resulting in significantly decreased mortgage rates on real estate loans, as exhibited in Table 29. This lowered cost of debt substantially enhances leveraged investment returns, cash flow distributions, and valuations.

Kingbird's investment strategy is designed to ensure preparedness, adaptability, and the ability to capitalize on value-driven investment dislocations with potential to generate robust near-and-long-term returns for our investors.

Kingbird Investment Management sees future investment targets generally ranging in size from 100 to 450 units, placing between \$2 million to \$15 million in equity per transaction, representing equity commitments of 30%-95% of total required equity in the property acquisition. Asset leverage will generally take the form of low-cost agency debt with 10-year terms and multi-year interest only periods. Target investments will generally have going-in cash flow of 3% to 5% and will have stabilized cash returns in the 7% to 9% range.

The following represents a summary of opportunities that have been considered in the months following the onset of the pandemic as they relate to Kingbird's research and underwriting framework:



Q2 2020 Representative Assets



Portland, OR Multifamily Asset – 64 Units

Avg Unit Size: 892 SF
Est. Total Project Cost: \$12,879,275 (\$201,239/Unit)
Going-In Cap Rate: 6.2%
Exit Cap Rate: 5.0%
Hold Period: 3 Years
Co-Investor Net IRR / EqM: 15.33% / 1.52x
Co-Investor Avg Cash-on-Cash: 6.0%

Portland, OR has a reputation of being one of the most affordable cities on the West Coast, without sacrificing quality-of-life, with a low regional price parity of just 103.8, as compared to Seattle's 112.9 or San Francisco's 131.6. This has helped attract a skilled workforce to the city; between 2014 and 2019, Portland experienced average job growth of 2.6% YoY, the second fastest rate of growth among its peer West Coast cities. Growth has been especially prevalent in the tech industry, in which 7,100 more jobs than the local area colleges could fill were added in the city between 2013 and 2018.

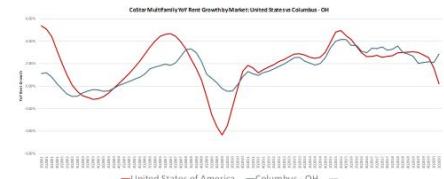


Columbus, OH Multifamily Asset – 285 Units

Avg Unit Size: 828 SF
Est. Total Project Cost: \$52,500,385 (\$184,212/Unit)
Going-In Cap Rate: 6.3%
Exit Cap Rate: 5.0%
Hold Period: 3 Years
Co-Investor Net IRR / EqM: 14.11% / 1.44x
Co-Investor Avg Cash-on-Cash: 8.4%

Columbus, OH is a stable, high-growth market. As the state capital of Ohio, Columbus benefits from a robust employment base provided by government jobs, alongside a significant corporate, healthcare, and education presence. This strong employment base has bolstered rental apartment demand in the city, resulting in resilient rent growth. During the Global Financial Crisis of 2007-2009, when rents across the US grew by an average of only 1.2% YoY, rents in Columbus grew by 2.3% YoY.

City	2014-2019 Avg Job Growth	2018 RPP
Los Angeles-Long Beach-Anaheim, CA	1.30%	117.1
Portland-Vancouver-Hillsboro, OR-WA	2.57%	103.8
Sacramento-Roseville-Arden-Arcade, CA	1.79%	103.6
San Diego-Carlsbad, CA	1.31%	116.4
San Francisco-Oakland-Hayward, CA	1.70%	131.6
Seattle-Tacoma-Bellevue, WA	2.67%	112.9



Atlanta, GA Multifamily Asset – 240 Units

Avg Unit Size: 1,026 SF
Est. Total Project Cost: \$30,762,907 (\$128,179/Unit)
Going-In Cap Rate: 4.8%
Exit Cap Rate: 6.0%
Hold Period: 5 Years
Co-Investor Net IRR / EqM: 13.80% / 1.75x
Co-Investor Avg Cash-on-Cash: 6.97%

Atlanta, GA is one of the fastest growing cities in the US across a number of demographic and economic indicators. Between 2013 and 2018, Atlanta's population grew by an average of 1.5% YoY, doubling the US average of 0.7%. Between 2014 and 2019, Atlanta had the experienced the 2nd fastest rate of job growth of similarly sized metro areas at an average pace of 2.8% YoY. In total, Atlanta added 395K jobs in that time period.

Metro	Population	Avg. YoY Change	Net Growth
Dallas-Fort Worth-Arlington, TX	7,539,711	2.02%	722,193
Houston-The Woodlands-Sugar Land, TX	6,997,384	2.02%	666,727
Washington-Arlington-Alexandria, DC-VA-MD-WV	6,249,950	0.99%	598,999
Miami-Fort Lauderdale-West Palm Beach, FL	6,198,782	1.17%	349,371
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,096,372	0.32%	65,831
Atlanta-Sandy Springs-Roswell, GA	5,949,951	1.54%	438,628
Boston-Cambridge-Newton, MA-NH	4,875,390	0.72%	172,069
Phoenix-Mesa-Scottsdale, AZ	4,857,962	1.98%	453,287
San Francisco-Oakland-Hayward, CA	4,729,484	0.91%	208,172
Riverside-San Bernardino-Ontario, CA	4,622,361	1.12%	250,447
Riverside-San Bernardino-Ontario, CA	4,326,442	1.12%	250,447

These investments are emblematic of Kingbird's investment strategy in that they represent workforce multifamily investment opportunities that are diversified by both market and value-add strategy.

Disclosure and Disclaimers

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Appendices

Appendix 1

Part 1

RE Purchase Price Index

Given the disparate valuation metrics across real estate assets, based on size, location, etc., in order to create a single, comprehensive measure of RE purchase prices, Kingbird thought it prudent to utilize per spatial unit figures to track purchase price data. However, while multifamily purchase prices are often measured on a literal per apartment unit basis, industrial, retail, and office property values are measured on a per SF basis. As such, multifamily and the other sectors cannot be simply averaged together to create a comprehensive RE industry tracker.

To account for this, Kingbird indexed the average per spatial unit prices for each sector to the first monthly datapoint on record for each, (January 2001), by dividing each datapoint by the first datapoint then multiplying by 100 $CRE\ Index = \left(\frac{PP_n}{PP_1}\right) \times 100$. Next, to create one overarching comprehensive index of the industry, Kingbird calculated the monthly weighted average of all four sectors, by weighing the newly indexed monthly figures against each sector's number of sale transactions for the corresponding month. The result was a weighted index of the average per spatial unit purchase price of the overall RE industry in the US.

However, due to the general continuous upward trend of real estate, in order to calculate relative volatility across recessionary periods, as measured by standard deviation, time had to be taken into account. As such, Kingbird indexed each recessionary period index value to the period index value immediately prior to the recession's start. Kingbird then took the standard deviation of these secondary values that occurred during each recessionary period. This allowed Kingbird to measure the relative volatility of each recession as compared to its immediate temporal locality.

S&P 500 Index Methodology

Due to the general continuous upward trend of the S&P 500, in order to calculate relative asset value volatility across recessionary periods, as measured by standard deviation, time had to be taken into account. As such, Kingbird indexed each recessionary period value of the S&P 500 Index to the period value immediately before the recession's start. Kingbird then took the standard deviation of the values that occurred during each recessionary period. This allowed Kingbird to measure the relative volatility of each recession as compared to its immediate temporal locality.

If Kingbird had not time indexed these values, the more contemporary recessions would have appeared extremely more volatile than those further in the past. For example, the un-indexed standard deviation of the S&P 500's asset value during the Energy Crisis of January 1980 through July 1980 was 6.3, while the standard deviation of the S&P 500 during the Dotcom & 9/11 Recession of March 2001 through November 2001 was 78.4, yet it is very unlikely that the Dotcom & 9/11 Recession was 12.5x as volatile as the Energy Crisis.

Part 2

RE Sector Purchase Price Indices

Given the disparate valuation metrics across real estate assets, based on size, location, etc., in order to create a single, comprehensive measure of RE purchase prices, Kingbird thought it prudent to utilize per spatial unit figures to track purchase price data. However, while multifamily purchase prices are often measured on a literal per apartment unit basis, industrial, retail, and office property values are measured on a per SF basis. As such, multifamily and the other sectors cannot be simply averaged together to create a comprehensive RE industry tracker.

To account for this, Kingbird indexed the average per spatial unit prices for each sector to the first monthly datapoint on record for each, (January 2001), by dividing each datapoint by the first available datapoint then multiplying by 100 $CRE\ Index = \left(\frac{PP_n}{PP_1}\right) \times 100$. The result was an indexed measure of each real estate sector's (multifamily, industrial, retail, and office) per spatial unit purchase price.

Appendix 2

Workbook Data and Source Documentation

Table 1

Comparison of Real GDP Change, Peak Unemployment, and Consumer Spending

Source: Bloomberg

Bloomberg Codes:

Real GDP: GDP CQOQ Index

Unemployment: USURTOTN Index

Consumer Spending (Personal Consumption Expenditures): PCE CUR\$ Index

Table 2

CBOE Volatility Index and S&P 500 Forward 30-Day Realized Volatility

Source: CBOE and Bloomberg

Link: <http://www.cboe.com/products/vix-index-volatility/vix-options-and-futures/vix-index/vix-historical-data>

Bloomberg Code: SPX Index

Table 3

CBOE Volatility Index

Source: CBOE

Link: <http://www.cboe.com/products/vix-index-volatility/vix-options-and-futures/vix-index/vix-historical-data>

Table 4

CBOE Volatility Index and S&P 500 Daily Returns

Source: CBOE and Bloomberg

Link: <http://www.cboe.com/products/vix-index-volatility/vix-options-and-futures/vix-index/vix-historical-data>

Bloomberg Code: SPX Index

Table 5

Family Office Portfolio Allocation

Source: UBS and Campden Research

The Global Family Office Report 2019

Table 6

Asset Reallocation Intentions

Source: BlackRock 2020 Institutional Rebalancing Survey Canada/US

Link: <https://www.blackrock.com/institutions/en-us/insights/rebalancing-survey>

Table 7

RE Purchase Price Index and S&P 500 Index Value Maintenance

Source: Bloomberg

Bloomberg Codes:

S&P 500 Index: SPX Index

Multifamily Purchase Price per Unit: APRTNPPU Index

Multifamily Number of Properties Sold: APRTNAA# Index

Retail Purchase Price per SF: RETRPNAT Index

Retail Number of Properties Sold: RETRNAR# Index

Industrial Purchase Price per SF: RINDPNAT Index

Industrial Number of Properties Sold: RINDNAI# Index

Office Purchase Price per SF: OFCRPNAT Index

Office Number of Properties Sold: OFCRNAO# Index

Table 8

RE Purchase Price Index and S&P 500 Index Standard Deviations

Source: Bloomberg

Bloomberg Codes:

S&P 500 Index: SPX Index

Multifamily Purchase Price per Unit: APRTNPPU Index

Multifamily Number of Properties Sold: APRTNAA# Index

Retail Purchase Price per SF: RETRPNAT Index

Retail Number of Properties Sold: RETRNAR# Index

Industrial Purchase Price per SF: RINDPNAT Index

Industrial Number of Properties Sold: RINDNAI# Index

Office Purchase Price per SF: OFCRPNAT Index

Office Number of Properties Sold: OFCRNAO# Index

Table 9

S&P 500 Dividend Yield, S&P US Bond BBB+ Coupon Rate, US RE Weighted Cap Rates, S&P 500 Total Returns, RE Total Returns, and 10-Yr Treasury Bill

Source: Bloomberg and NCREIF

NCREIF National Property Index ("NPI")

Bloomberg Codes:

S&P Dividend Yield: SPX Index, Financial Analysis Dividend 12 Month Yld – Gross

S&P US Bond BBB+ Coupon Rate: SPUIGBDC Index

S&P 500 Total Returns: SPXT Index

10-Yr Treasury Bill: USGG10YR Index

Office Cap Rate: OFCRANAT

Apartment Cap Rate: APRTNCAP

Retail Cap Rate: RETRANAT

Industrial Cap Rate: RINDANAT

Office Transaction Volume: OFCRVNAT

Apartment Transaction Volume: APRTNSLV

Retail Transaction Volume: RETRVNAT

Industrial Transaction Volume: RINDVNAT

Table 10

S&P 500 Dividend Yield, S&P US Bond BBB+ Coupon Rate, US RE Weighted Cap Rates,

Source: Bloomberg

Bloomberg Codes:

S&P Dividend Yield: SPX Index, Financial Analysis Dividend 12 Month Yld – Gross

S&P US Bond BBB+ Coupon Rate: SPUIGBDC Index

10-Yr Treasury Bill: USGG10YR Index

Office Cap Rate: OFCRANAT

Apartment Cap Rate: APRTNCAP

Retail Cap Rate: RETRANAT

Industrial Cap Rate: RINDANAT

Office Transaction Volume: OFCRVNAT

Apartment Transaction Volume: APRTNSLV

Retail Transaction Volume: RETRVNAT

Industrial Transaction Volume: RINDVNAT

Table 11

S&P 500 Total Returns, RE Total Returns, Private Equity Total Returns, Real Asset Total Returns, Hedge Fund Total Returns

Source: Bloomberg and NCREIF

NCREIF National Property Index ("NPI")

Bloomberg Codes:

S&P 500 Total Returns: SPXT Index

Private Equity Total Returns: Private Equity Returns Analysis, Annual Average of Venture, Buyout, Growth, Debt, and Fund of Funds

Real Asset Total Returns: Private Equity Returns Analysis, Real Assets

Hedge Fund Total Returns: Credit Suisse Hedge Fund Index, HEDGNAV Index

10-Yr Treasury Bill: USGG10YR Index

Table 12

RE Sector Sharpe Ratios

Source: NCREIF

NCREIF National Property Index ("NPI")

Table 13

RE Sector Betas

NCREIF National Property Index ("NPI")

Table 14

RE Sector Alpha (Risk Adjusted), Total Returns, and Required Return

Source: NCREIF

NCREIF National Property Index ("NPI")

Table 15

RE Sector Value Maintenance

Source: Bloomberg

Bloomberg Codes:

Multifamily: APRTNAA# Index

Office: OFCRNAO# Index

Retail: RETRNAR# Index

Industrial: RINDNAI# Index

Table 16

Cumulative Effects on Rent During and After Dotcom & 9/11 Recession

Source: CBRE

US Multifamily Research Brief – February 2019

Link: <https://www.cbre.us/research-and-reports/US-Multifamily-Research-Brief-February-2019>

Table 17

Cumulative Effects on Rent During and After Global Financial Crisis

Source: CBRE

US Multifamily Research Brief – February 2019

Link: <https://www.cbre.us/research-and-reports/US-Multifamily-Research-Brief-February-2019>

Table 18

COVID-19 Rent Collections by Industry

Source: NAREIT

REIT Industry July Rent Collection Data

Link: <https://www.reit.com/data-research/research/nareit-research/reit-industry-july-2020-rent-collections>

Table 19

RE Rent Growth by Sector vs Inflation

Source: Bloomberg

Bloomberg Codes:

Multifamily: RAPTUSME Index

Industrial: INR USME Index

Retail: RRETUSME Index

Office: ROFFUSME Index

Table 20

US Existing Home Median Sales Prices to Real Median Household Income

Source: Bloomberg

Bloomberg Codes:

US Existing Home Median Sales Prices: HSANETMP Index

Real Median Household Income: HOUIMEDI Index

Table 21

Generational Financial Standing

Source: Experian "State of Credit Report" (2018)

Link: <https://www.experian.com/blogs/insights/2018/01/state-of-credit/>

Table 22

US Apartment Vacancy

Source: Bloomberg

Bloomberg Code: RAPTUSMV Index

Table 23

US RE Vacancy by Sector

Source: Bloomberg

Bloomberg Codes:

Multifamily: RAPTUSMV Index

Industrial: INR USMV Index

Retail: RRETUSMV Index

Office: ROFFUSMV Index

Table 24

US Multifamily Workforce Housing Shortfall

Source: US Census Bureau and CoStar

Census: American Community Survey, Financial Characteristics

CoStar: Class B and C US Unit Inventory, Class B and C Asking Rent per Unit

Table 25

Luxury vs. Workforce Construction

Source: CoStar

Class A, B, and C Under Construction Units, Class B and C Asking Rent per Unit

Table 26

Luxury vs. Workforce Vacancy Rates

Source: CoStar

Class A, B, and C Inventory Units, Class B and C Asking Rent per Unit, Class A, B, and C Vacancy Rates

Table 27

Luxury vs Workforce Rent Index

Source: CoStar

Class A, B, and C Asking Rent per Unit

Table 28

Global Financial Crisis Multifamily Sale Price per Unit

Source: Bloomberg

Bloomberg Code: APRTNPPU Index

Table 29

Federal Funds Target Rate – Lower Bound and Average 30-Yr Mortgage Rate

Source: Bloomberg

Bloomberg Codes:

Fed Funds Lower Bound: FDTRFTRL Index

30-Yr Mortgage Rate: MB30 Index

Table 30

Industrial Production Index MoM Change

Source: Federal Reserve Bank of St. Louis

Link: <https://fred.stlouisfed.org/series/INDPRO>

Table 31

S&P 500 500 Trading Volume

Source: Bloomberg

Bloomberg Code: VOLSPX Index

Table 32

S&P 500 Volatility During Recessions

Source: Bloomberg

Bloomberg Code: SPX Index

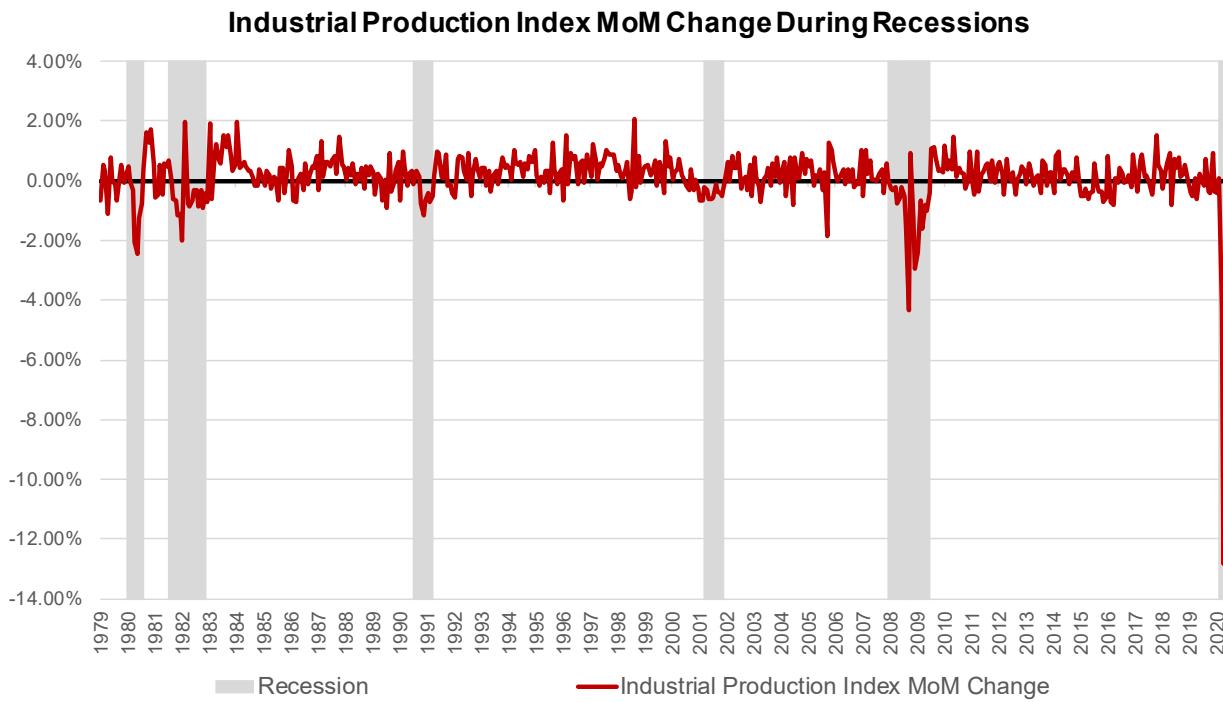
Appendix 3

The Industrial Production Index

An historical constant during recent recessions has been falling industrial production, which has been identified by the Federal Reserve as a key volatility driver³⁹, due to its direct relationship to output within major industries⁴⁰. Industrial production is tracked by the Industrial Production Index (“IPX”), a monthly tracking index of changes in the real output for all U.S. manufacturing, mining, and electric and gas utilities facilities⁴¹.

During past recessions, industrial output slowed, a symptom of decreased demand and declining faith in economic and business fundamentals. These trends can cause volatility to increase in equity markets as investors become fearful and uncertain. As such, significant slowdowns in industrial output typically correspond with recessionary periods, as exhibited in Table 30 below, which shows significant negative month-over-month changes in the IPX during past recessions, as well as the present.

Table 30



Source: Federal Reserve Bank of St. Louis

As depicted in Table 30 above, the IPX's decline during the COVID-19 Recession is unprecedented. In April 2020, industrial output shrank by -12.8%. The largest previous month-over-month decrease occurred during the Global Financial Crisis (“GFC”) of 2007/2008, but paled in comparison, at just -4.3%.

Appendix 4

Volatility and the S&P 500

As discussed earlier, recessions, by nature, tend to create volatile public equity markets. This can be seen historically by the increased trading activity that occurs during recessions. As depicted in Table 31 below, in non-recessionary periods, from October 1996 to August 14, 2020, roughly 35% of days had the total number of share trades exceed 1 billion, whereas in recessionary periods, days with more

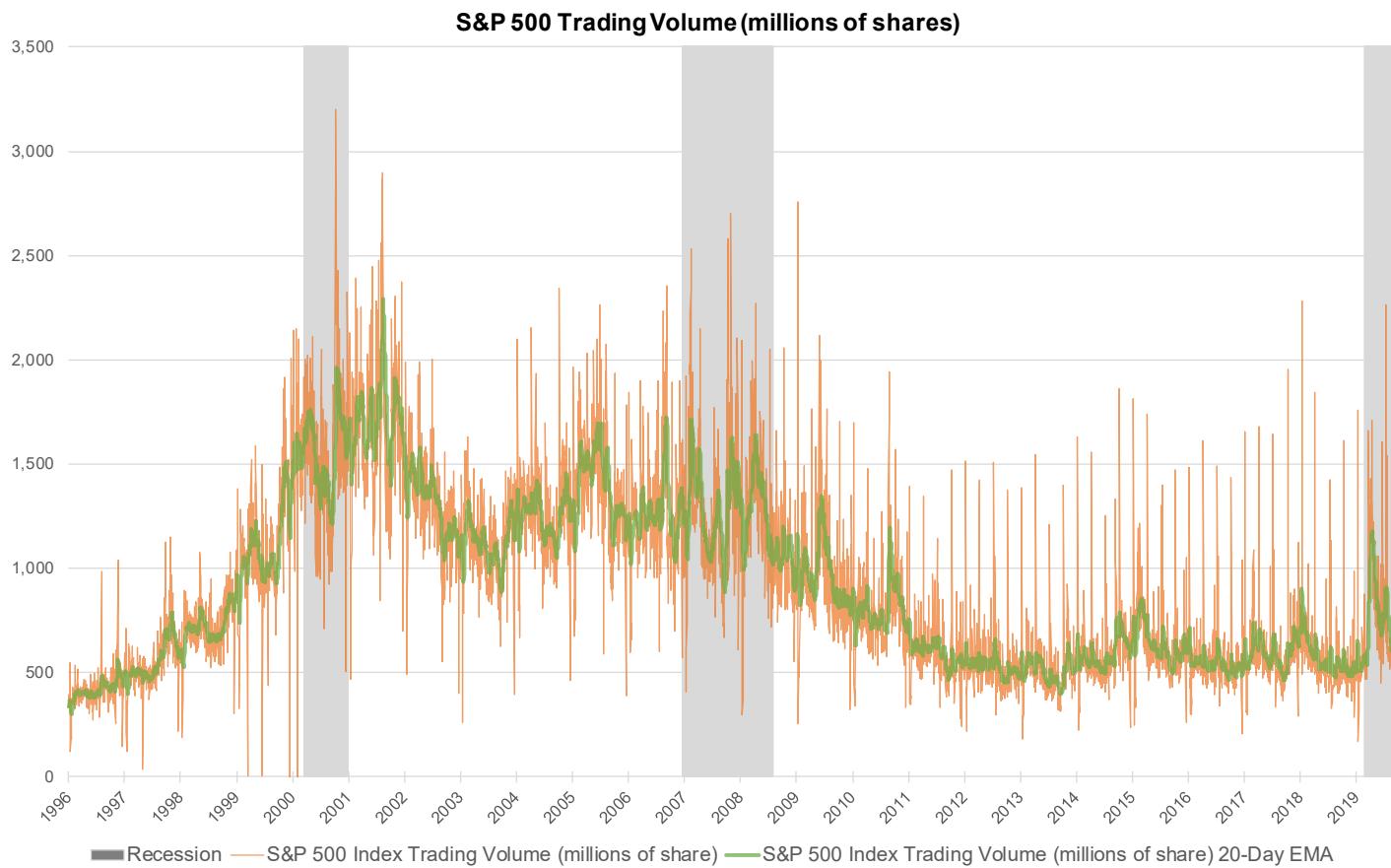
³⁹ A statistical regression analysis of historical industrial output month-over-month change and the CBOE’s Volatility Index (“VIX”), reveals the extent of the relationship between the IPX and volatility. This regression analysis outputs a P-Value of 0.00002433%. A P-Value this close to 0% requires that one reject the null hypothesis, which states that there is no relationship between the VIX and changes in the IPX. With such a statistically significant relationship between the IPX and volatility, an observer can conclude that when the IPX displays a large negative month-over-month change, volatility will soon follow.

⁴⁰ The Board of Governors of the Federal Reserve System, Economic Research, IFDP Notes, *Understanding Global Volatility* January 19, 2018

⁴¹ Federal Reserve Bank of St. Louis

than 1 billion share trades occurred in 75% of trading days. This increase in trading implies a disconnect between buyers and sellers and a shift in their perceptions of where value can be found.

Table 31



During recessionary periods, between October 1996 and August 14, 2020, 50% of the trading days in which S&P 500 trade volume exceeded 1 billion experienced negative daily changes in the S&P 500's value, averaging -1.6%, whereas 45% of the days during non-recessionary periods in which S&P 500 trades exceeded 1 billion experienced negative changes in the S&P 500's value, averaging -0.9%⁴². Overall, 43% of trading days, regardless of the trade volume or whether a recession was occurring, saw negative returns, averaging -0.9%. This increase in the frequency and severity of losses during high-trade volume days in recessionary periods exemplifies the effect that increased volatility can have on investment returns, especially when paired with the aforementioned increased frequency of trading days during recessionary periods in which trade volume exceeded 1 billion trades⁴³.

⁴² While 47% of all trading days during recessionary periods, regardless of trade volume, and 43% of all trading days during non-recessionary periods, regardless of trade volume, experienced negative returns, the average negative returns during the periods of greater than 1 billion trades were more negative than the average negative return for periods with less than 1 billion trades. During recessionary periods, the average negative return for periods with less than 1 billion trades was -1.4%, whereas the average for periods with more than 1 billion trades was -1.6%. Likewise, during non-recessionary periods, the average negative return for periods with less than 1 billion trades was -0.8%, while the average for periods with more than 1 billion trades was -0.9%.

⁴³ While only 20% of the trading days that have occurred during the COVID-19 Recession thus far have exceeded 1 billion trades made, the average daily change in the S&P 500 has been more severely negative than prior recessions. The average daily change in the S&P during the COVID-19 recession when trading volume exceeded 1 billion has been -1.5%, while during the Global Financial Crisis it was -0.2% and during the Dotcom & 9/11 Recession it was -0.1%. Further, given the extremely uncertain nature of the COVID-19 outbreak in the US, it can be reasonably expected that there will be more trading days in which trade volume exceeds 1 billion, especially as the virus's economic impact unfolds further and as additional risk factors manifest.

More frequent trading begets more volatility and the most efficient way to measure this volatility is by measuring the standard deviation of the S&P 500⁴⁴ and by tracking the S&P 500's trailing 30-day realized volatility⁴⁵, as noted in Table 32 below. Standard deviation is defined as a dataset's "dispersion around an arithmetic mean" and is a commonly utilized measure of volatility. The larger the standard deviation of a dataset, the more volatile it tends to be. Similarly, trailing 30-day volatility is an annualized measure of volatility calculated as the compounding closing price daily change over the prior 30 days from the current period, that results in an indexed measure of volatility; the higher the realized volatility, the more volatile the period.

Table 32

S&P 500 Volatility During Recessions

Recession	Period	Duration	Avg S&P 500 Index Trailing 30-Day Realized Volatility	S&P 500 Daily Return StDev
Non-Recession Average				14.2 1.0%
COVID-19 Recession	February 2020 – Present	TBD	37.6	2.8%
Global Financial Crisis	December 2007 – June 2009	19 Months	33.9	2.4%
Dotcom & 9/11 Recession	March 2001 – November 2001	9 Months	21.7	1.4%
Gulf War Recession	July 1990 – March 1991	9 Months	18.7	1.1%
Iran/Energy Crisis	July 1981 – November 1982	17 Months	15.1	1.1%
Energy Crisis	January 1980 – July 1980	7 Months	15.7	1.0%

Source: Kingbird Analysis of Bloomberg Economic Workbench Data

Such high levels of variance within the S&P 500, as evidenced above, imply that the Index's value is frequently fluctuating by especially wide margins during recessionary periods, which, as examined earlier, can lead to an increased probability of losses. Historically, when both the S&P 500's standard deviation and its average trailing 30-day realized volatility are substantially larger than their non-recessionary counterparts, losses in the S&P 500 have occurred. During the Global Financial Crisis of 2007/2008 and the Dotcom & 9/11 Recession of 2001, the S&P's realized volatility and its standard deviation exceeded their non-recessionary counterparts by more than 150%; simultaneously, the S&P 500 experienced negative annualized average daily returns of -19.5% and -0.7%, respectively⁴⁶, over their duration. As indicated in Table 32 above, during the COVID-19 Recession, these measures are once again significantly larger than their non-recessionary counterparts.

⁴⁴ Standard deviation $StDev = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$

⁴⁵ Trailing 30 – Day Realized Volatility = $\sqrt{\frac{252}{30} \times \sum_{t=1}^{N-1} \ln\left(\frac{P_t+1}{P_t}\right)^2} \times 100$, where P_1, P_2, \dots, P_N are the daily closing levels of the S&P 500 price index on consecutive trading days, the final closing level P_N corresponding to the current date and P_1 corresponding to the last trading day that was more than 30 calendar days prior to the current date, per the realized volatility formula from the S&P Dow Jones Indices *Reading VIX: Does VIX Predict Future Volatility* November 2017.

⁴⁶ Kingbird Analysis of Bloomberg Economic Workbench Data

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