Wilshire

Asset Allocation Research

2022 Asset Allocation Return & Risk Assumptions

As of December 2021

Contents

Introduction: Expected Future Returns

This report describes Wilshire's capital market assumptions process, which derives key inputs for use within institutional asset allocation studies. As the asset allocation decision drives more than 90% of a portfolio's return variance [1], it serves as a critical process that can assist fiduciaries in managing the key risks facing institutional investors. Unless otherwise noted, all return assumptions contained within this report represent median geometric returns based on a log-normal distribution.

Wilshire has been formulating long-term return, risk and correlation assumptions since the early 1980s and now updates these asset class forecasts on a quarterly basis. As it relates to our standard asset class forecasts used in asset-liability studies, we define "long-term" as estimates that span at least the next 10 years. This extended time horizon is consistent with the benefit / spending obligations of most institutional investors. In addition to our standard long-term assumptions, Wilshire maintains a suite of ultra-long-term (ULT) asset class assumptions that are intended to serve as estimates of the equilibrium level of returns available through various investment classes. These ULT assumptions can be blended with Wilshire's standard asset class forecasts to project portfolio returns for periods greater than 10 years. Unless otherwise noted, all future references made to long-term assumptions within this report reflect Wilshire's standard 10-year forecast horizon.

Wilshire's forecasting methodologies, which are illustrated in exhibits throughout the paper, have generally shown accuracy over 10-year intervals and we believe are superior to short-term estimates. Because of this long-term forecasting horizon, Wilshire's assumptions typically experience only a moderate level of change from quarter to quarter or year to year. However, during volatile or transformative market environments, one can expect more significant forecasting adjustments.

Further to the specific forecasting models described in this report, Wilshire imposes maximum return bands on growth assets. These bands are designed to protect against the occasional risk of individual asset class models pointing to outsized return forecasts. Rather than imposing a static or absolute return cap, we implement a dynamic process that establishes return bands based on risk-adjusted returns relative to those implied by Wilshire's U.S. Stock forecast. We believe this approach provides our desired level of protection, while allowing the practical impact of the bands to expand and contract with the general risk premiums priced into markets. Wilshire's current application limits the returns on individual growth / equity segments from exceeding the Sharpe Ratio (SR) of U.S. Stocks by more than 0.10; thus imposing a current SR limit of 0.34, which is 0.10 above the 0.25 SR implied within our U.S. Stock forecast. Although our expectation is that these return bands will only occasionally constrain our various forecasting models, a number of real asset class components were impacted for December 2021, which will be highlighted in their respective sections.

2021 Market Environment

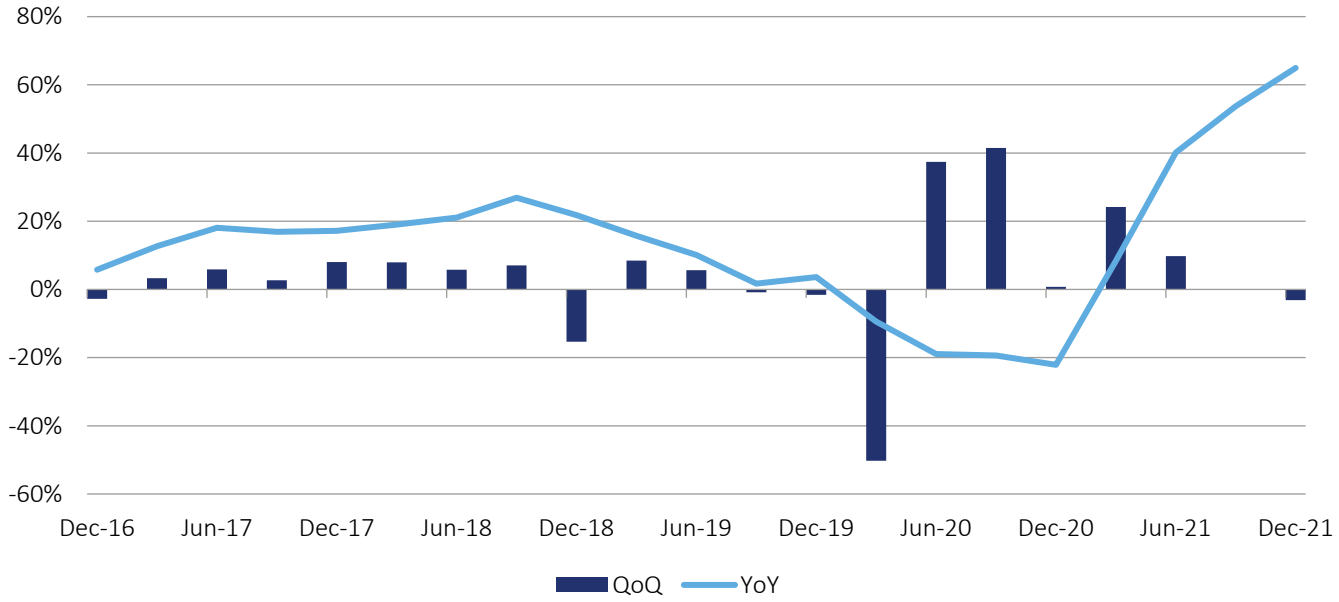
Assumption changes to the various asset classes reflect changes in underlying economic and market conditions as well as a discounting of how those conditions might change in the future. During 2021, the U.S. economy continued to rebound from the Coronavirus pandemic particularly during the first half of the year. Growth in hourly earnings was strong and unemployment fell while retail sales surged during the fourth quarter. Interestingly, consumer sentiment declined all year – likely due, in part, to new COVID variants and mounting inflation. Sharply rising inflation will be remembered as the economic story of 2021 as increases in the Consumer Price Index (CPI) have reached rates not seen in 40 years. Food and energy prices are up meaningfully, but so too are the major "core" CPI items of automobiles and apparel. The year started off with a bang as real GDP grew 6.5% (annualized) during the first six months while economic growth was up by an annual rate of 4.9% for the four quarters ending September 2021 versus a loss of -2.3% in 2020. Inflation pushed higher throughout the year as the CPI advanced 7.1% during 2021 compared to 1.3% the previous year. The 10-year break-even inflation rate also rose steadily last year and closed in December at 2.61% (up 62 bps for the year). The Treasury curve spiked higher to start the year with the 10-year Treasury going from 0.93% to 1.74%. The curve then fell in the longer end with the short end rising, for a fairly flat curve starting at the seven-year mark. By year's end, the 10-year yield was 1.52%, up 59 bps from a year earlier.

As can be seen in Exhibit 1, operating earnings rebounded from COVID-related restrictions by jumping 24% during the first quarter of 2021. Businesses continued to rebound during the second quarter although earnings growth is estimated to have

[1] Brinson, Singer and Beebower, Financial Analysts Journal 1991: "Determinants of Portfolio Performance II: An Update"

slowed during the second half of the year. While growth in operating earnings on the S&P 500 Index fell -22.1% in 2020, the annual growth rate for 2021 is a massive number at 65.0% (based on estimates as of early January).

Exhibit 1 – S&P 500 Earnings Growth (Operating EPS)



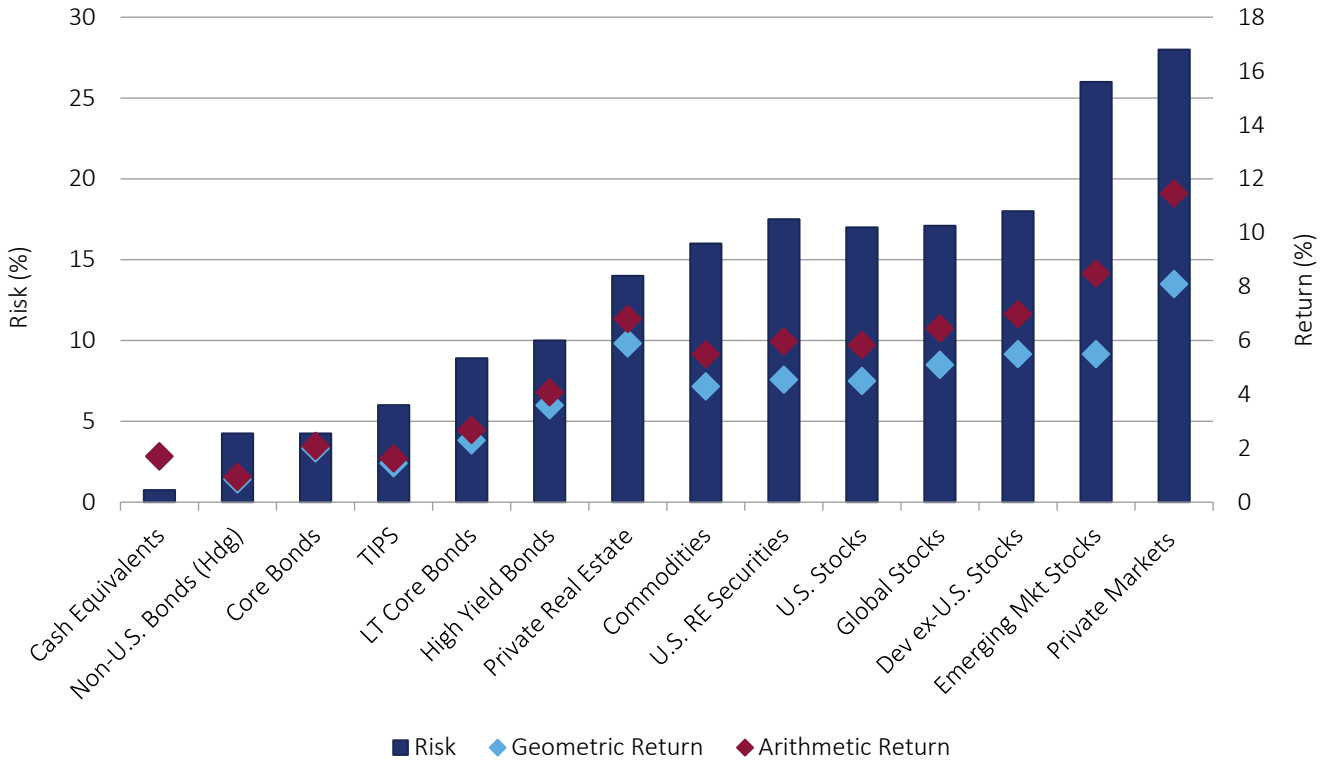
Data Source: S&P Dow Jones Indices

Spurred by strong earnings growth, it was a third consecutive huge year for U.S. stocks with the FT Wilshire 5000 Index up 26.7%, ending the year at an all-time high, after a gain of 20.8% for 2020. While non-U.S. equities could not keep pace, other developed markets delivered strong results (MSCI EAFE Index 11.8%) but emerging markets fell (MSCI EM Index -2.2%) as weakness in the Chinese real estate market weighed both on the country's economic growth and the broad EM index. Results with credit market indexes were mixed as investment grade bonds could not escape rising rates (Bloomberg Corporate Index -1.0%) but tightening high yield spreads pushed prices on those bonds higher (Bloomberg High Yield Index 5.3%). The aggregate spread on the high yield market finished the year near a decade-long low at 2.83% versus 3.60% a year earlier. Exhibit 2 presents Wilshire's December 2021 return forecasts and contrasts them with our December 2020 assumptions, while Exhibit 3 displays our current projections in graphical form.

Exhibit 2 – Wilshire's December 2021 Expected Return and Risk Assumptions

	Total Return			Risk		
	December			December		
	2020	2021	Change	2020	2021	Change
Investment Categories						
U.S. Stock	5.00 %	4.50 %	-0.50 %	17.00 %	17.00 %	0.00 %
Dev Ex-U.S. Stock (USD)	5.75	5.50	-0.25	18.00	18.00	0.00
Emerging Market Stock	5.75	5.50	-0.25	26.00	26.00	0.00
Global Stock	5.55	5.10	-0.45	17.15	17.10	-0.05
Private Equity	6.95	8.10	1.15	28.00	28.00	0.00
Cash Equivalents	0.70	1.70	1.00	0.75	0.75	0.00
Core Bond	1.30	2.00	0.70	4.30	4.25	-0.05
LT Core Bond	1.75	2.30	0.55	8.85	8.90	0.05
U.S. TIPS	0.80	1.45	0.65	6.00	6.00	0.00
High Yield Bond	3.10	3.60	0.50	10.00	10.00	0.00
Non-U.S. Bond (HDG)	0.35	0.85	0.50	4.30	4.25	-0.05
U.S. RE Securities	5.20	4.55	-0.65	17.00	17.50	0.50
Private Real Estate	6.20	5.90	-0.30	14.00	14.00	0.00
Commodities	2.85	4.30	1.45	15.00	16.00	1.00
Real Asset Basket	5.65	5.60	-0.05	10.15	10.35	0.20
Inflation	2.15	2.60	0.45	1.75	1.75	0.00
Total Returns Minus Inflation						
U.S. Stocks	2.85	1.90	-0.95			
U.S. Bonds	-0.85	-0.60	0.25			
Cash Equivalents	-1.45	-0.90	0.55			
Stocks Minus Bonds	3.70	2.50	-1.20			
Bonds Minus Cash	0.60	0.30	-0.30			

Exhibit 3 – December 2021 Return and Risk Assumptions



Historical Returns

A key check on the reasonableness of asset class assumptions is their relationship to historical returns. Exhibit 4 contrasts Wilshire's return assumptions with historical returns over various periods of time and market regimes.

Exhibit 4 – Historical Returns[2] vs. Wilshire Forward-Looking Assumptions

	Historical Returns (%)					Wilshire Dec. 2021	
	1802 - 2021 *	1926 - 2021	Inflationary 1970-1979	Bull Market 1980-1999	Lost Decade 2000-2009	Asset Class Forecasts 10-Year	30-Year
Total Returns							
Stocks	8.4	10.5	5.9	17.8	-1.0	4.5	6.9
Bonds	4.8	5.4	7.2	10.0	6.3	2.0	4.2
T-Bills	4.0	3.4	6.4	7.2	3.0	1.7	2.8
Inflation	1.5	2.9	7.4	4.0	2.5	2.6	2.6
Returns Minus Inflation							
Stocks	6.9	7.6	-1.5	13.8	-3.5	1.9	4.3
Bonds	3.4	2.5	-0.2	6.0	3.8	-0.6	1.7
T-Bills	2.5	0.4	-1.0	3.1	0.5	-0.9	0.2
Stocks Minus Bonds	3.6	5.1	-1.3	7.8	-7.3	2.5	2.7

*Returns 1802-2001 from "Stocks for the Long Run" (Siegel, 2002), S&P 500 and Bloomberg Barclays U.S. Aggregate Index thereafter.

[2] The source of historical returns presented in this report is Wilshire Compass℠ unless otherwise noted.

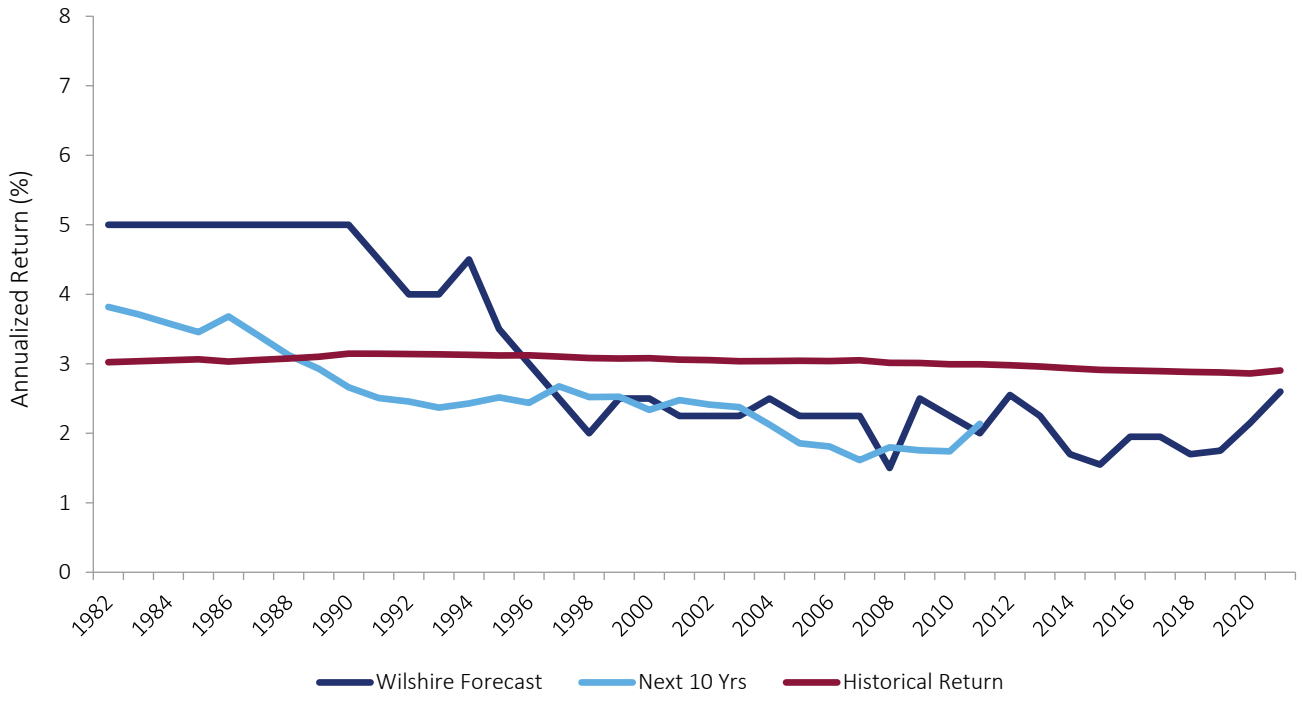
There are several notable relationships, in both absolute and relative terms.

- Reflective of the current low yield / low return environment, Wilshire's U.S. stock and bond return forecasts, 4.5% and 2.0%, respectively, are below the actual returns achieved during the 220- and 96-year periods ending 2021.
- Due to current short-term rates near zero and rising inflation expectations, Wilshire's expected real return on cash is still negative at -0.9%. This estimate is well below the 0.4% real return earned by cash during the 96 years since 1926.
- Building up from the low real return on cash, Wilshire's return estimates for stocks and bonds relative to inflation of 1.9% and -0.6%, respectively, are lower than the historical spreads of 7.6% for stocks and 2.5% for bonds.
- Wilshire's implied return forecast for stocks relative to bonds has decreased to 2.5% and is now below the 3.6% spread over the 220-year period and the 5.1% realized equity risk premium over the 96-year historical period.

Inflation

Wilshire's long-term inflation forecast is 2.60%, which is up 0.45% from last year's assumption. Our practice since 2003 has been to derive our inflation forecast by observing the market's break-even inflation rate – the spread between the yield on a 10-year Treasury and the real yield on a similar maturity Treasury Inflation Protected Security (TIPS). During periods of market stress, TIPS pricing may be affected by liquidity demands or a high level of inflation uncertainty, as was the case in 2008 when our inflation forecast was higher than actual break even. In 2020, an elevated level of volatility in the signal again resulted in our quarterly inflation assumption being different from 10-year break even. While Wilshire believes that the market's implied estimate of future inflation serves as a reasonable forecasting signal, there are times when several years of experience with these indicators, combined with a review of relevant macroeconomic data, will push our forecast away from the exact break-even spread. While our quarterly assumptions updates included a spread to break even during most of 2021, our December 2021 inflation forecast of 2.60% is the same as the rounded year-end break even of 2.61%. Exhibit 5 provides a summary of Wilshire's historical inflation forecast and the actual result for the following 10-year period.

Exhibit 5 – Wilshire's Inflation Forecast and Historical CPI



Equity

U.S. Stocks

The U.S. stock market, represented by the FT Wilshire 5000 Index℠, continued its upward climb throughout most of 2021, with indexes setting new record highs. The equity market was up 26.70% for the year with a relatively minor sell-off of -5% around the end of the third quarter. While strong returns could be found across all sectors and market segments, the Energy sector was particularly strong, up 56%, as was public listed Real Estate, up 40%. The largest U.S. sector, Information Technology at more than a quarter of the broad market, was up 31%. Despite three years of very strong equity returns, totaling 101%, cumulative, the P/E ratio on the U.S. index actually fell during 2021 as reported earnings improved – although the ratio was still elevated in a historic sense at year-end.

Wilshire employs two primary and distinct models in deriving our long-term stock forecasts: an Income-Growth-Valuation ("IGV") component model and a dividend-discount model (DDM), which we then evaluate through a purely valuation-based CAPE (cyclically-adjusted price / earnings) model. We see complementary value among the three signals and, therefore, consider each when deriving our equity forecasts. While the models are quantitative in design, we interpret each qualitatively, assessing their potential strengths and weaknesses through time and, importantly, within the current economic and market environment.

Wilshire's base IGV model, which we formally introduced during the global financial crisis, begins by utilizing the market's current dividend yield for income, a real earnings growth rate for growth (which combines with our inflation assumption to form a nominal growth estimate) and a valuation component that assumes a market price in 10 years that leads to a historical average dividend yield. As of the end of 2021, the IGV model suggests a long-term return for U.S. stocks of 2.40%. This signal compounds up from component contributions of approximately 1.35% from income, 4.65% from growth (2.00% real growth above Wilshire's 2.60% inflation assumption) and -3.45% from valuation change.

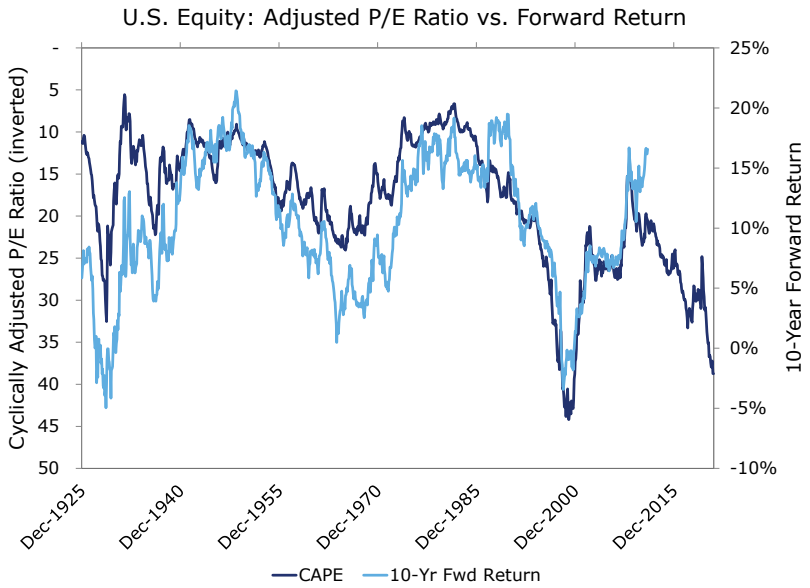
Turning to Wilshire's dividend discount model, we incorporate the following inputs as of December 2021:

- A year-end 2021 S&P 500 Index price of 4,766;
- A base earnings level of $202 per share;
- Earnings-per-share growth of 11.50% during the next five years, dropping incrementally to 4.65% from years six through 15;
- A 45% dividend payout ratio over the next five years.

Although our short-term earnings growth rate is elevated in the low double digits, it is still meaningfully below the earnings growth rates reported in 2021. Wilshire's current DDM forecast, which builds from the inputs listed above, points to a 7.50% long-term stock assumption.

In 2019, we explicitly introduced a CAPE signal into our equity forecasting process. While both the IGV and DDM incorporate measures of valuation levels – the IGV explicitly through its valuation component and the DDM through its use of both the market's current price and EPS levels, we find the CAPE ratio's cyclical nature of smoothing historical earnings to provide additional and valuable insights into anchoring long-term return prospects. Exhibit 6 below shows the strong relationship between the raw CAPE ratio and 10-year forward equity returns. Our various CAPE model signals (derived from varying regression time periods) point to a minimal return of 0.25% for U.S. stocks. As will be discussed in the non-U.S. equity segments which follow, we find the CAPE signal to be particularly useful in assessing relative return prospects between the U.S. and non-U.S. regions.

Exhibit 6 – Cyclically-adjusted Price/Earnings (CAPE) Signal



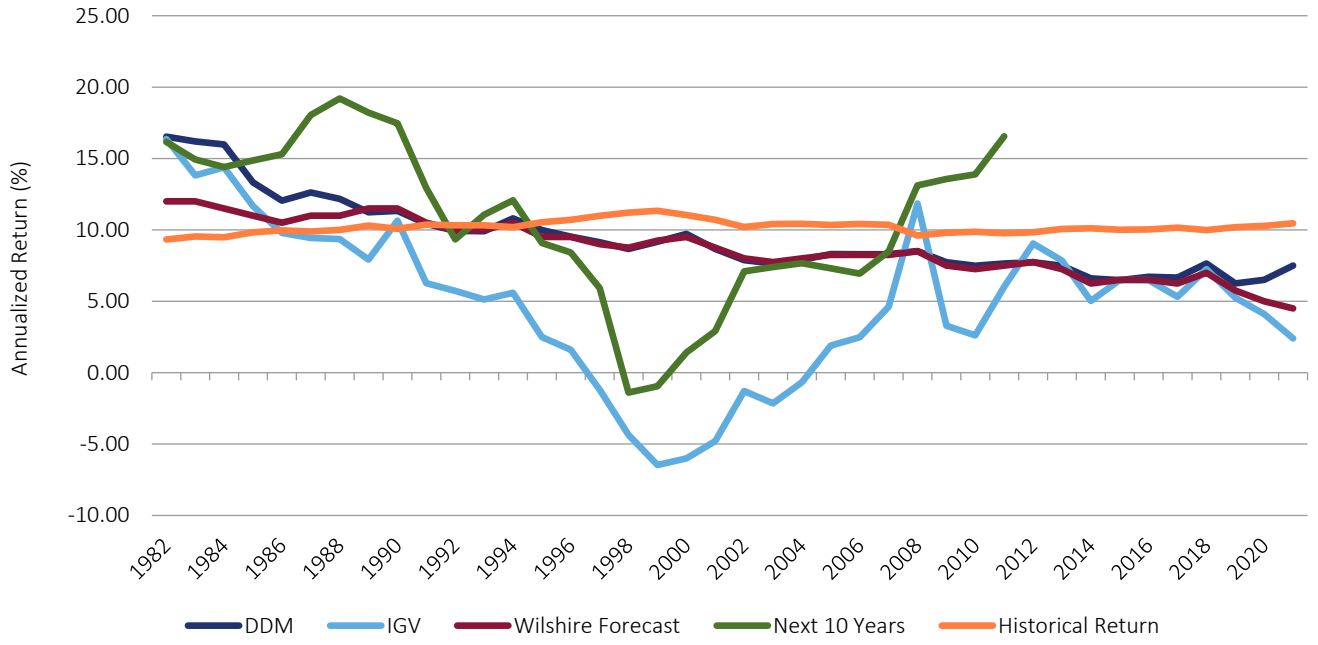
Data Source: Robert J. Shiller, Wilshire Compass

While we continue to value the DDM result, Wilshire believes that the IGV and CAPE models can offer valuable market insights, particularly during market regimes that present a significant challenge to a DDM framework. For example, the DDM failed to anticipate the depth of the negative equity environment experienced in the early-2000s. The heavy dependence on valuation levels within Wilshire's IGV and CAPE models better positioned them to forecast negative 10-year returns, although to differing magnitudes. Recent results reveal the potential value of these signals during periods of large fluctuation in price multiples. Our process incorporates these and other considerations when weighing the value of each model's signal against the current economic environment.

Wilshire's current long-term U.S. Stock assumption is 4.50%, which is well below the DDM model in recognition of the elevated valuation components of the IGV and CAPE signals. Exhibit 7 details the history of Wilshire's stock return forecast together with the IGV and DDM models' return forecasts, historical returns and the rolling returns for the 10-year period following each estimate[3].

[3] Historical signals for the IGV model reflect its current structure (i.e., nominal growth built from long-term real earnings growth plus Wilshire's inflation estimate, etc.), while the CAPE signal simply shows one of many constructs we observe (i.e., each being constructed through regression analysis performed over varying time periods.

Exhibit 7 – Wilshire U.S. Stock Forecast and Historical Equity Returns



Developed ex-U.S. Market Stocks

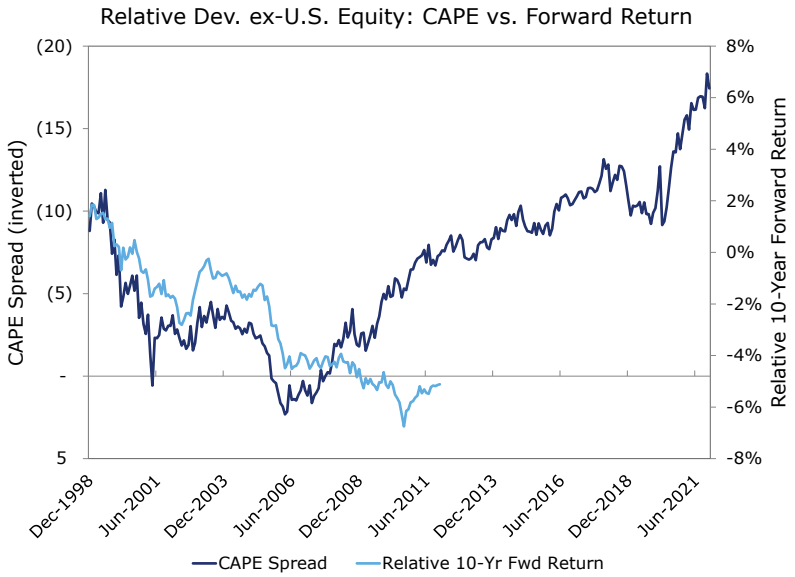
Wilshire has historically assumed the same expected return for the stocks of non-U.S. developed markets as it does for U.S. stocks. As demonstrated in Exhibit 8, the historical record supports the general view of return parity between these broad regional markets in the long run. In the 52 years since 1970, U.S. stocks, as represented by the S&P 500 Index, have returned 11.1% per year, versus 8.7% for developed market ex-U.S. stocks as measured by the MSCI EAFE Index in U.S. dollars. On a rolling basis, however, there have been several periods where the developed markets index has significantly outperformed U.S. stocks for prolonged periods of time. Given this long-term performance record, similar risk levels and common financial attitudes toward risk-taking, it would seem reasonable to anchor the return forecasts of non-U.S. developed market stocks to long-term expectations for U.S. stocks, barring significant relative valuation levels.

Exhibit 8 – Historical Equity Returns: 1970 – 2021

1970 - 2021 Annua	U.S. Dollar Return	U.S. Dollar Risk	Local Currency Return	Local Currency Risk
S&P 500 Index	11.1 %	15.2 %	11.1 %	15.2 %
MSCI EAFE Index	8.7	16.7	7.6	14.2
Europe	9.0	17.3	8.8	15.0
Pacific	8.8	19.2	6.9	16.6

Despite our default position of return parity, Wilshire does monitor relative valuation levels across regional markets to serve as a possible signal to add/deduct a return premium/discount to our non-U.S. equity forecasts. While we expect to have potential informational value at extreme market levels where significant deviations from the norm appear, we anticipate meaningful departures from return parity to be quite rare. The CAPE model discussed above within the U.S. Stocks section, serves as a valuable indicator of relative return prospects across regions. Exhibit 9 below demonstrates the strength of this signal by graphing relative CAPE ratios (U.S. vs. developed-ex-U.S.) against relative 10-year subsequent returns. As can be seen in the chart, current pricing points to relatively attractive non-U.S. valuations, which lead us to project a 100 bps return premium for developed-ex-U.S. stocks above U.S. stocks, leading to our December 2021 forecast of 5.50%.

Exhibit 9 – Developed-ex-U.S. vs. U.S. Stocks Relative CAPE Signal



Data Source: Robert J. Shiller, Wilshire Atlas, Wilshire Compass

Emerging Market Stocks

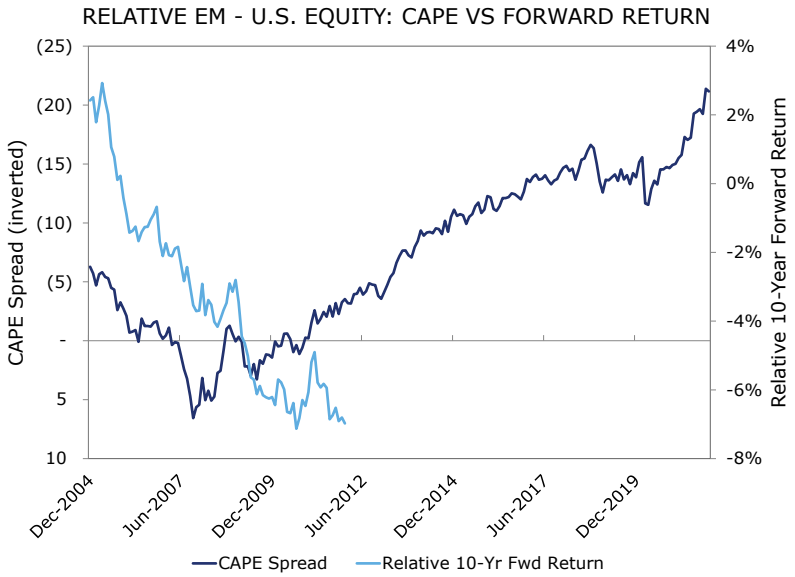
Consistent with the discussion of developed ex-U.S. stocks above, we incorporate a relative valuation component to our modeling of emerging market stocks. Wilshire continues to examine the relationships between the U.S. and emerging markets and believes that the rationale for starting with a consistent return expectation from U.S. to developed markets stocks applies to emerging markets. Some investors have long supported the view that emerging market stocks should produce returns above those of developed markets given their far higher growth projections in terms of GDP. While growth rates can be in the high single digits, they are also far more volatile than in developed markets – and emerging markets equity returns generally follow that risk profile. It is important to note that the historical record on emerging market performance shows mixed results. The rolling 5- and 10-year relative return lines in Exhibit 10 demonstrate the questionability of anticipating a sustainable return premium for emerging stocks over the long-term and serves as a reminder to global investors of how the segment's risk can result in periods of significant underperformance. These results give us little confidence in forecasting a perpetual return premium to emerging markets above our return forecast for the developed stock markets.

Exhibit 10 – Emerging Market Returns: 1988 – 2021

1988 - 2021 Annual	U.S. Dollar Return	Risk
S&P 500 Index	11.5 %	14.4 %
MSCI Emrg. Mkts.	10.3	22.2

Consistent with the process described above within the developed-ex-U.S. markets, we believe an assessment of a premium/discount to our U.S. forecast when relative valuations reveal meaningful departures from historical ranges provides the best opportunity to capture future return divergences. As with developed stocks and as can be seen in Exhibit 11 below, current relative CAPE valuations provide support for an expected return premium for emerging stocks. This relative signal leads us to attach a 1.00% premium above our U.S. forecast, resulting in a 5.50% assumption for emerging markets stocks.

Exhibit 11 – Emerging vs. U.S. Stocks Relative CAPE Signal



Even in our base case of geometric return parity with developed equity markets, Wilshire's research shows that efficient portfolios include a meaningful allocation to the emerging markets, consistent with a market-weighting. For example, setting all three regions to a common 4.50% return (i.e., to match our U.S. Stock forecast) and otherwise constructing an efficient frontier from Wilshire's underlying assumptions of risks and correlations for U.S., non-U.S. developed market and emerging market stocks suggests an allocation of approximately 11% to the emerging markets at a 17.10% risk level, which is representative of our expected risk for global stocks. This allocation is consistent with the emerging markets' market weight within the global equity opportunity set, reflecting a market-commensurate attraction to emerging market stocks despite their elevated risk level. We believe that, aside from periods of significant relative valuation levels, which we observe today, this provides strong support for our outlook of geometric return parity between the developed and emerging markets.

Global and Global ex-U.S. Market Stocks

Despite creating separate forecasts for the developed and emerging markets as discussed above, Wilshire's asset allocation work – unless otherwise directed by client circumstances – will implicitly assume a market weighted combination of our non-U.S. developed and emerging market components in a single non-U.S. equity asset class (currently with relative weights of 70% and 30%, respectively, which leads to a return expectation of 5.75% at 19.10% risk).

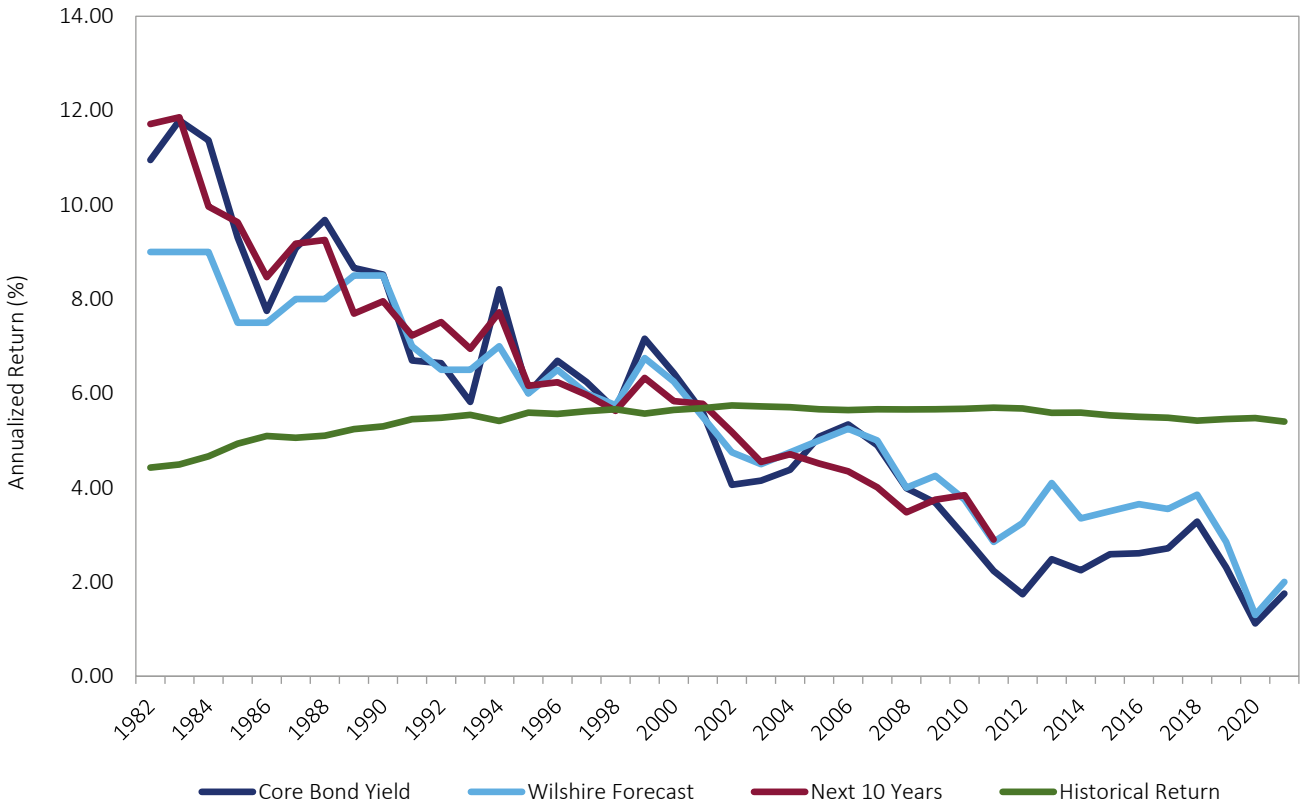
We can move the process one step further for clients that view the entire global equity market as a single asset class; thus seeking to eliminate any home-country bias within equity portfolios. Within this context, we currently construct the global market-weighted portfolio with allocations of 61% to U.S. stocks and 39% to the Global ex-U.S. market, resulting in a 5.10% return forecast at 17.10% estimated risk. We do note that, when incorporating the current regional return premiums discussed above, an optimized mix of our U.S., developed-ex-U.S. and EM stock forecasts at a 17.10% portfolio risk level leads to weights of approximately 30%, 66% and 4%, respectively (vs. 61%, 27% and 12% within the cap-weighted market). The optimized portfolio return estimate is 5.35% vs. 5.10% for the cap-weighted mix.

Fixed Income

Fixed Income Forecast Model

Wilshire's fixed income forecasting model has, since its inception, incorporated the contemporaneous yields-to-maturity of key sectors of the bond market as a key contributor to its return projection. Yields tend to be very strong predictors of bond returns, as demonstrated in the following graph that compares Wilshire's past bond return assumptions with historical returns, yields and rolling returns for the 10-year period following each forecast.

Exhibit 12 – Wilshire Bond Forecast and Historical Fixed Income Statistics



Data Source: Bloomberg

Forecasting fixed income involves two major components – current Treasury yield and credit spread levels along with expectations for changes in both of those inputs during the next 10 years. While default assumptions are important, as well, they mainly influence below-investment grade fixed income and will be discussed in more detail in relevant sections below. Wilshire's model begins with current market conditions, including inflation, and considers a gradual normalization of real yields and market spreads along with a 10-year forward yield curve. Expected returns are then based on moving from current conditions to forecasted levels. Details for specific market segments are included below.

In 2014, Wilshire introduced a separate forecast model for global developed market ex-U.S. fixed income. Our model utilizes the same framework as our U.S. fixed income forecast model while recognizing the fundamental differences between these bond markets. We also have formalized a separate but similar forecast model for the inflation-linked bond market outside of the U.S. The salient details of the global ex-U.S. fixed income forecast model are discussed below.

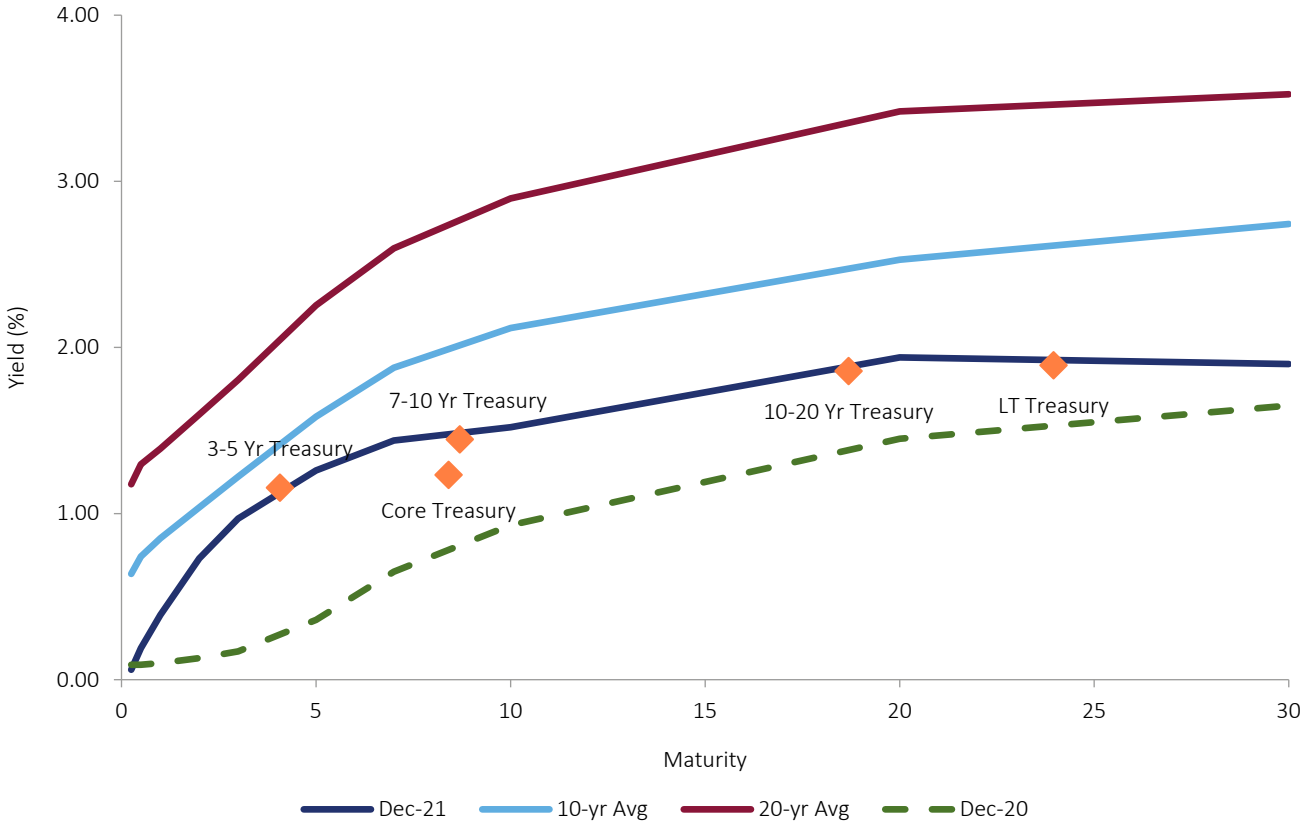
From a volatility perspective, it is worth noting that we revised our risk assumptions for a number of fixed income asset classes and segments during 2020, and remain at lower levels through year-end 2021. Interest rates have a natural floor, although that does not necessarily mean zero as recent history has shown that rates can go slightly negative by 25-100 bps. As rates approach that bottom, total returns tend to become less volatile as any significant rate changes are positive. Wilshire has, therefore, reduced our fixed income risk assumptions in recognition of this market environment. For example, our forecast for the risk of Core Bonds has gone from 5.15% to 4.25%.

The U.S. Treasury Yield Environment

The U.S. yield curve ended 2021 meaningfully higher across nearly all maturities and upward sloping. Long-term yields were up 49 bps (at the 20-year maturity) while the one-year yield rose 29 bps. Exhibit 13 illustrates the yield curve shift and compares the current curve to the historical 10 and 20-year averages. U.S. Treasuries are still near historically low yields across the maturity spectrum, anchored at the short end by the fed funds rate, with a sharp slope that flattens somewhat in the long end. The current spread between the 10- and two-year yields is 0.79% versus 1.08% for the 10-year average and

1.30% for 20-years. The current spread between the 30- and 10-year yields is 0.38% versus 0.63% for both the 10- and 20-year averages. As will be explained in the discussion of U.S. TIPS, the Bloomberg Barclays 7-10 Year Treasury Index shown in Exhibit 13 provides the supporting data for our TIPS forecast.

Exhibit 13 – Treasury Yield Curve Environment



Data Source: Bloomberg Index Services Limited, U.S. Department of Treasury

U.S. Treasury Bonds: Market and Long-Term

The Federal Reserve left the fed funds rate unchanged throughout 2021 at a range of 0% - 0.25%. Through the Fed's "dot plot," they are messaging that the current intent is for three, 25 basis point increases in the overnight rate before the end of 2022. Their median forecast for year-end 2023 is for a fed funds rate of 1.625%. During the December meeting, the committee announced that it would begin to reduce (i.e., taper) the monthly pace of its asset purchases starting in January. Wilshire's fixed income forecasting model assumes that bond market yields will rise during the next 10 years and that the yield on the Treasury Index will reach 2.50% based largely on current 10-year forward rates on Treasuries. Rising rates affect a current investment in Treasuries in two ways: 1) the principal value would decline as rates rise and 2) the reinvestment rate would increase, boosting interest income. Based on the Dec. 31, 2021, yield-to-maturity of 1.23% for the Bloomberg Treasury Index and its duration, Wilshire's model indicates that the improving reinvestment rate during the next 10 years is more than enough to compensate for the drop in principal value from rising rates. A simulated investment in Treasuries under this environment would yield a return of 1.35%. The same model applied to the Long-Term Treasury Index reveals an opposite result. Based on the Bloomberg Long Term Treasury Index year-end yield-to-maturity of 1.89% and its duration, a simulated investment would return 1.60%.

U.S. Bonds

The core bond market is represented by the Bloomberg U.S. Aggregate Bond Index and is comprised of four major segments: Treasuries, Government-related, Corporate and Securitized. Our approach has been to model each segment based on an

environment of rising Treasury rates but also normalizing spreads versus a historical average. Current spreads for investment grade U.S. credit are generally tighter than historic averages, so our credit model incorporates a slight widening of spreads for this sector during the projection horizon. The performance of a market-duration core bond index (currently 6.78 years) would benefit as rising Treasury rates and widening spreads combine to improve the reinvestment rate within the broad market. Our model suggests that the net effect is an overall boost in return for the core market with an expected return of 2.00% versus the index's year-end yield-to-worst of 1.75%.

Cash Equivalents

Wilshire's approach to forecasting a cash return, which can be thought of as a return on 3-month Treasury bills or something similar, is to observe several market signals as an estimate of short-term yields in 10 years. Historical relationships between cash and both inflation and longer-term Treasuries can be measured and then applied to our 10-year expectation for each to get a sense of what that implies about future cash returns. The market signals that we observe include:

- Historical yield difference between the broad Treasury market and cash
- Historical real yield on cash, or the difference between cash returns and inflation
- Current 10-year forward yield curve for expected short-term yields

Our 10-year cash yield forecast can then be utilized within our fixed income model to simulate what an investment in cash would return. Within that process, an assumed path to reach the yield forecast is necessary, i.e., when rates move and by how much. It is worth noting that our forecasted rise in rates is currently set to begin in 2022 and reach its terminal value after three years. Our assumptions for year-end 2021 result in a cash forecast of 1.70% versus the year-end yield on 91-day Treasury bills of 0.06%.

Non-U.S. Bonds

Exhibit 14 compares historical core U.S. bond return and risk values[4] with hedged and unhedged values of the Citigroup Non-U.S. Government Bond Index.

Exhibit 14 – U.S. vs. Non-U.S. Bond Returns: 1985 – 2021

	U.S. Dollar		Local Currency	
1985 - 2021 Annual	Return	Risk	Return	Risk
Core U.S. Bonds	6.6%	4.4%	6.6%	4.4%
FTSE Non-U.S. Govt.	6.9%	10.7%	6.2%	3.9%

Unhedged non-U.S. bonds offered better returns over the 37-year period due to a net fall in the dollar, in aggregate, for the entire period. Hedged non-U.S. bond returns take out expected and unexpected currency movements and have exhibited returns 0.4% below core U.S. bonds at less risk. Wilshire's long-term forecast for non-U.S. bonds does not include a currency return, positive or negative (i.e., we assume that currency impacts will wash out over time), and, therefore, relies upon historical hedged returns. Our risk forecasts, however, are derived from the experience of the unhedged indexes unless a hedged strategy is employed.

As mentioned earlier, Wilshire's Global Ex-U.S. Fixed Income forecast model explicitly reflects the fundamental and structural characteristics of this market. The framework for our return assumption forecasting is the same as that used for U.S. bonds. Due to the non-U.S. bond markets' elevated exposure to local-market Treasury securities and a lower yield environment outside of the U.S., our current return assumption for dollar-hedged global ex-U.S. core bonds is 0.85%; this reflects a 10-bps reduction to our unhedged global ex-U.S. core bond forecast return of 0.95%.

[4] Wilshire uses the Bloomberg U.S. Aggregate Index as the principal benchmark for core bonds.

Treasury Inflation Protected Securities (TIPS)

Wilshire typically recommends using an expected return for Treasury Inflation Protected Securities (TIPS) equal to the expected return for nominal Treasury bonds of similar maturity. As with other fixed income asset classes, we have modeled the Treasury segment closest in maturity to TIPS including our forecast for the interest rate environment during the next 10years. The average maturity for the Bloomberg Barclays U.S. TIPS Index was 7.97 years at year-end; the index with the closest average maturity is the U.S. Treasury 7-10 Year Index, at 8.70 years. The modeled return assumption for this index is 1.45%, resulting in a U.S. TIPS assumption equal to 1.45%.

Long-Term Bonds

Wilshire's return assumption for long-term bonds is derived from the yield-to-maturity on the Bloomberg Long Term Government/Credit Index. This index consists of Treasuries, government-related and corporate securities with a minimum maturity of 10 years. As with the core bond market, we modeled the various sectors within the index reflecting our custom return forecast for long-term Treasuries. The net effect of the changes is that the higher reinvestment rate during the period is not enough to offset the projected principal loss for the broad long-term market. Our return forecast for long-term core bonds is 2.30% versus an index yield of 2.58% at year-end.

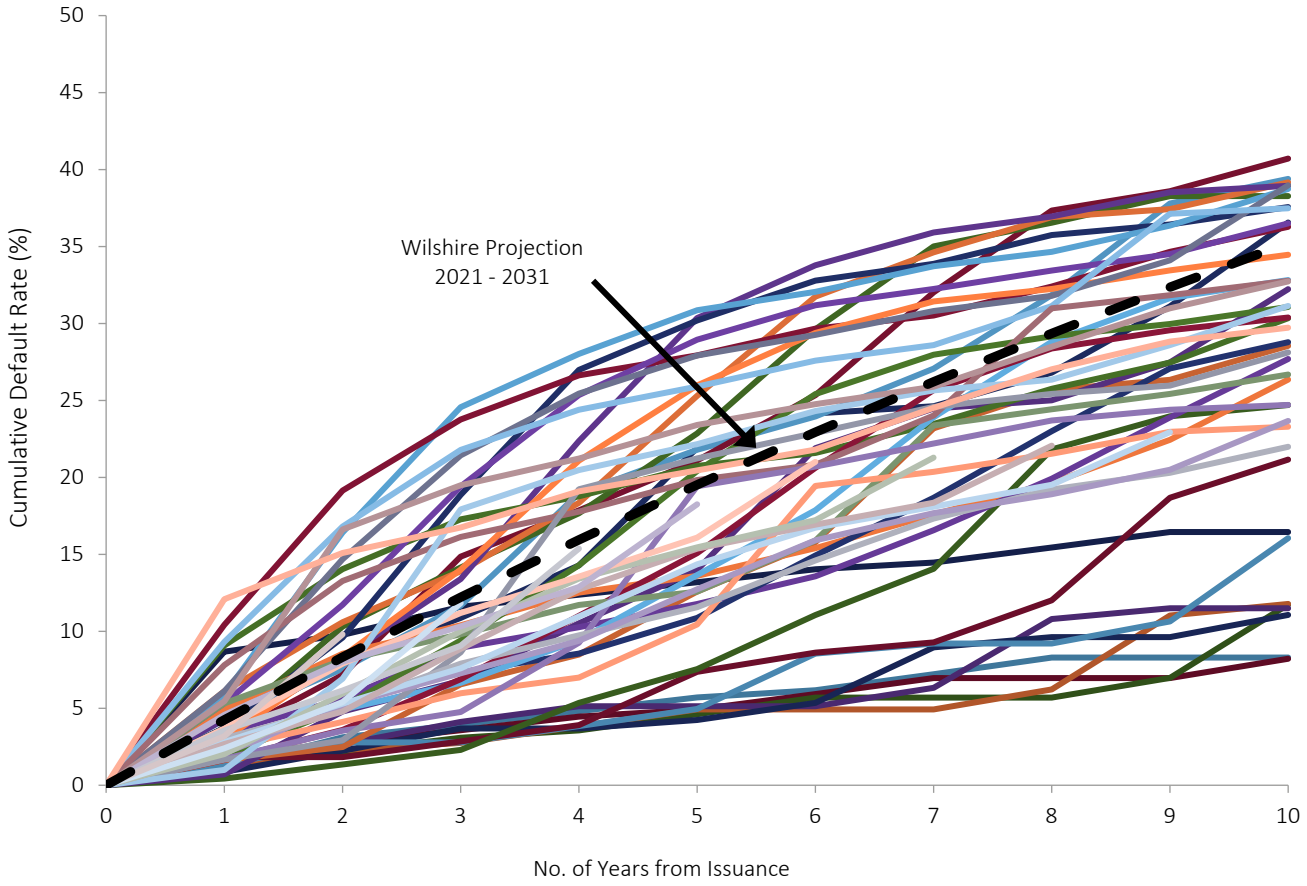
High Yield Bonds and Emerging Market Debt

Wilshire's return forecast for high yield bonds is 3.60%, 50 basis points higher than last year's assumption. Our return forecast is based upon our high yield bond model that accounts for the dynamic nature of credit yield spreads, defaults and recoveries. The current forecast incorporates the following assumptions:

- An initial yield spread of 3.21%, tighter than the 3.87% spread of one year prior;
- An annual default rate of 4.25% during the forecast period, reflecting the 20-year average default rate of speculative-grade U.S. debt;
- A 10-year cumulative default rate of 35%;
- An annual recovery rate of 45%, again reflecting the long-run average rate;
- A 10-year cumulative annual loss rate – defaults less recoveries – equal to 21%.

In Exhibit 15 we graph Wilshire's expected future default rates against all historical cumulative default rates from 1970 through 2020. Each line represents the historical cumulative default rates for high yield bonds issued in a single vintage year. The black dotted line is Wilshire's forward-looking default rate that is used in our expected return model for high yield bonds. Wilshire's default forecast line represents default expectations for a market portfolio holding bonds issued across various years. While it differs in nature from the vintage year default lines, which represent cumulative default rates specific to each single year of issue, the chart is useful in comparing our projection to historical default rate paths.

Exhibit 15 – Historical Cumulative Default Paths: 1970 – 2020



Data Source: Moody's Investor Service, Wilshire

Emerging market debt (EMD) has rapidly evolved into a unique segment of the fixed income universe. Until recently, EMD was typically viewed as simply a spread product among other high yield fixed income components, providing exposure to credit spread risk as well as country-specific risk. Investors today have multiple options to gain exposure to emerging market debt; they can invest in bonds denominated in hard currencies such as U.S. dollars or euros, as well as local currency denominated paper that may or may not be hedged into base currencies. Management of currency risk as a result becomes an important consideration with EMD investment. Local-currency EMD managed on an unhedged basis unsurprisingly introduces currency-related risk; however, even hard-currency EMD exposes investors to embedded currency risk, since issuers must convert earnings collected in local currency to hard currency to service bond debt[5]. Wilshire incorporates the mechanics of the high yield model described above in deriving our core hard-currency emerging market debt forecast of 3.35%. Wilshire assumes identical return forecasts for hard currency EMD and unhedged local-currency EMD; our hedged local-currency EMD forecast of 3.20% deducts 15 bps for the explicit and implicit costs of hedging emerging-economy currencies. Note that risk forecasts for hard-currency EMD and unhedged local-currency EMD are higher than those for hedged local-currency EMD due to currency risk.

Convertible Bonds

Convertible bonds are fixed income instruments that make regular interest payments but that can be converted into a predetermined number of common stock shares, usually at the discretion of the bondholder. Convertibles have grown in popularity as investors have searched for yield and looked to diversify their fixed income portfolios. Therefore, Wilshire now has a return forecast for convertibles but not through a separate or dedicated model. Given their structure, these bonds will

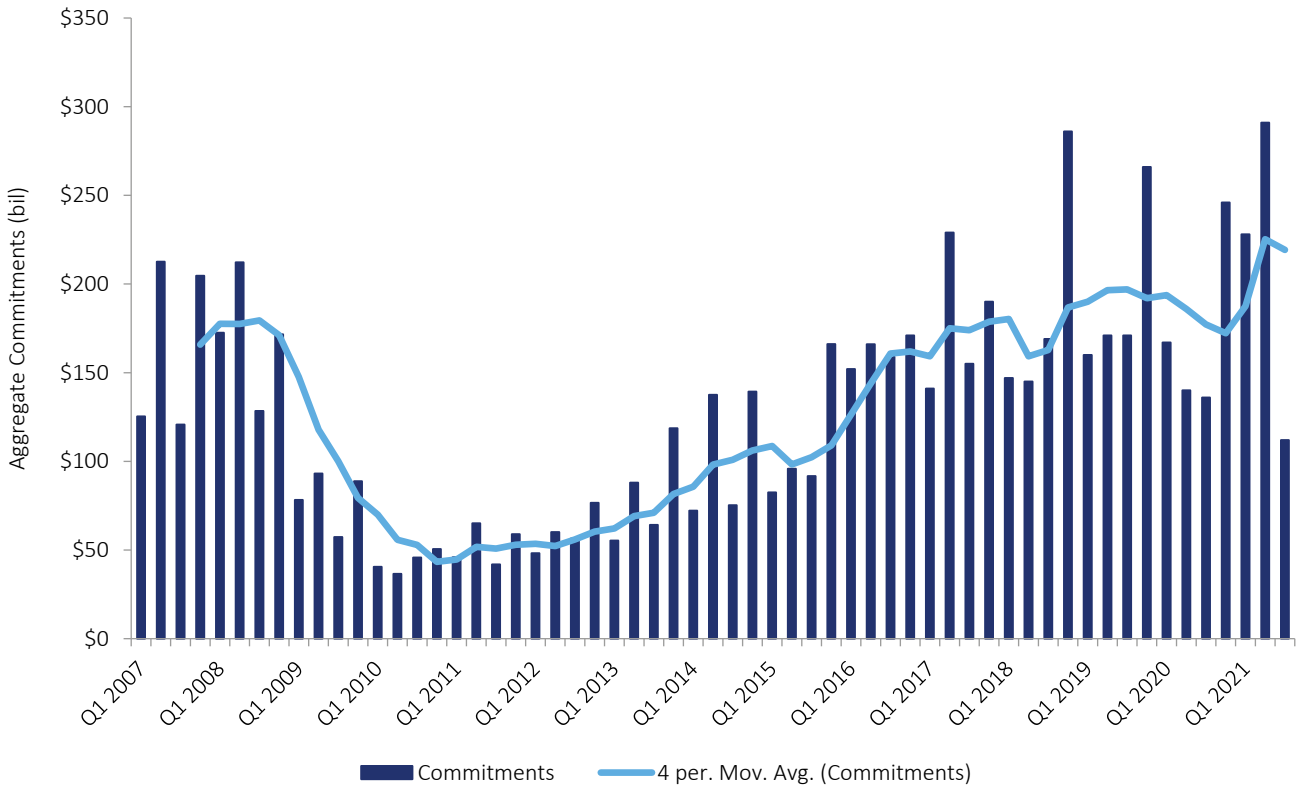
[5] Wilshire Associates Incorporated (2013). *Recent Developments in Emerging Markets Debt*: Walker.

"behave" both like credit instruments and equity, depending on market conditions. Our approach to forecasting convertible bonds is to create a basket of stocks and bonds that mirror their return pattern. A regression of a convertible bond index versus other asset classes produces a relatively strong relationship with U.S. equity explaining 55% of the history, investment-grade bonds equaling 19% and high yield bonds equal to 36%. Our model is, therefore, equal to a composite of those asset classes at those weights, with a negative 10% allocation to cash to arrive at a 100% weighted basket. As of December 2021, Wilshire's return forecast for convertible bonds equals 4.25% with an expected risk of 12.25%.

Private Market Investments

Private equity fundraising trended higher in 2021, exceeding levels seen before the global financial crisis. Global fundraising has averaged $219 billion per quarter during the year ending September 2021 versus $177 billion, on average, for the four quarters ending September 2020. Global private equity fundraising is displayed in Exhibit 16, including the $631 billion raised during the first three quarters of 2021.

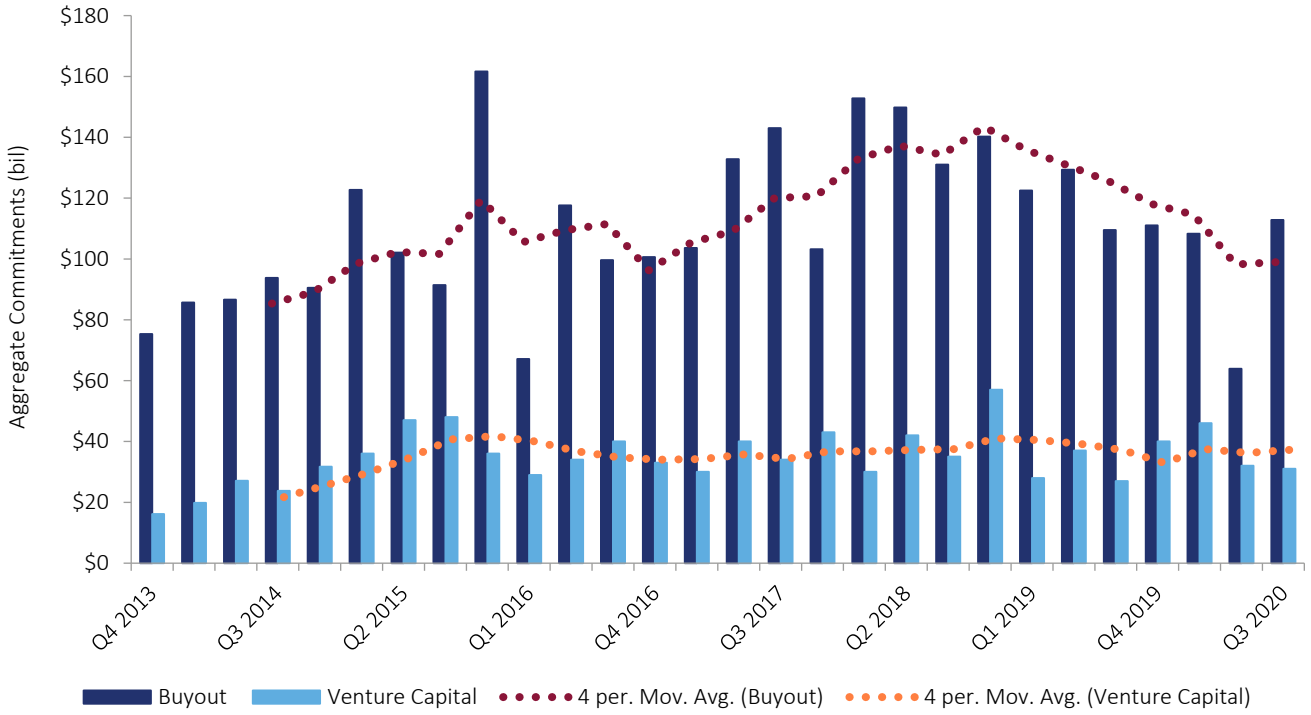
Exhibit 16 – Global Private Equity Fundraising



Data Source: Preqin

Exhibit 17 shows quarterly equity investments in buyout and venture capital-backed deals since 2013. Buyout commitments increased 97% for the four quarters ending September 2021 versus the preceding four quarters, while venture capital has increased 23% during the same periods.

Exhibit 17 – Buyout and Venture Capital Commitments



Data Source: Preqin

Wilshire's return and risk assumptions for individual private market asset classes are contained in Appendix B. Our private market return expectations are derived by drawing parallels to the public markets where appropriate, along with using private market data if available. Since there is not a passive, beta-only option when placing capital in the private markets, these investments necessitate an important element of active management whose results can vary dramatically. As such, Wilshire's return methodology embeds an assumption that investors can identify and access managers that can deliver above-median returns. This underscores the importance of implementation decisions, since without the ability to deploy capital with skillful managers one would likely not find private market returns compelling.

Risk estimates pose a unique challenge because infrequent private market investment valuations preclude the calculation of short-term periodic returns. As a result, projections of risk based on accounting data consistently understate risk. However, our return methodology offers a sense of what the true risk levels might be if the public markets were adjusted for commensurate leverage exposure or greater business risk. In general, Wilshire views the use of private equity as a type of leveraged equity return rather than a diversification tool. The linkage between these markets is quite intuitive, as private equity returns are subject to the receptiveness of the capital markets to generate potential outsized returns.

Buyouts and Venture Capital

Given the difficulty in accurately observing performance within private equity and a general lack of transparency, Wilshire employs a few return signals when forecasting such investments. Our "component model" attempts to identify and account for all key factors that contribute to an investment's realized return. The model includes five primary return components:

- Market beta: Sensitivity to systematic risk (i.e., public market equity); current assumptions for buyouts and venture capital are 1.10 and 1.25, respectively.
- Financial leverage: Adjustments for differences in leverage between public and private markets, including public market proxies for senior and subordinated debt within the private markets. Our total debt assumption for buyouts is 65% (i.e., a 2.9x leverage ratio) while for venture capital it is 0%.
- Illiquidity premium: Compensation for lack of access to invested capital, currently equal to 0.50%.

- Operational premium: Based on the historical results of successful managers, currently equal to 3% for buyouts and 4% for venture capital.
- Fee: Base and incentive fees paid to general partners based on a typical structure, currently equal to 2% base fee and 20% carry with a preferred return of 8%.

Given the complex financial composition of most buyout deals, we employ a second signal that is far more direct with less moving pieces. The first step is to adjust the public market equity forecast by the higher expected beta within buyouts, again equal to 1.10. The difference with this step and the component model is that we do not try and dissect the public equity assumption, therefore freeing this signal from changes in the public debt markets that may or may not flow through to private markets. The next step in the process is to add a "typical" return premium based on historical differences in buyout and public equity returns, currently equal to 6%. As this signal relies heavily on the public equity assumption, we include a valuation adjustment should there be any current relative pricing differences between the public and private markets. Finally, a fee structure is applied to the final buyout signal similar to the one described within the component model.

Therefore, this approach offers multiple return signals for buyout and venture capital investments. (Note, we arrive at a separate non-U.S. buyout forecast using inputs appropriate to the non-U.S. market.) Much like with our approach to public equity markets, we arrive at our private equity assumptions after a discussion about the final signals and what drove any changes during the quarter. As a final check, the assumptions are compared to a public markets-plus corridor, currently equal to the U.S. equity assumption plus 2% (on the low end) and then plus 6%. The final return forecast may lie outside of that corridor but, if so, must be firmly supported by the underlying inputs. As of year-end 2021, Wilshire's buyout assumptions are 6.75% (for the U.S.) and 7.25% (for non-U.S.) with a venture capital forecast of 7.65%, which is already built from a global public equity assumption.

Private Market Debt: Mezzanine and Distressed

Private market debt instruments offer investors fixed income-like private securities but at higher expected risk than public market bonds. Wilshire views mezzanine debt like a convertible bond. However, unlike publicly traded convertibles with characteristics combining stocks and bonds, mezzanine debt possesses characteristics combining buyouts and high yield bonds. Historical return data confirms a sensitivity to both asset classes. Wilshire's return forecast for mezzanine debt is 5.75% with a 20% risk expectation, which does lie between our high yield and buyout assumptions.

Distressed debt represents issues that are in default and should, therefore, provide higher expected returns than mezzanine debt, while also exhibiting sensitivity to underlying economic forces that impact the performance of buyouts and high yield bonds. Wilshire's return forecast for distressed debt is 6.00% with a 20% risk expectation. As a final step in our private market debt modeling, we compare forecasts across a spectrum of non-investment grade debt (bank loans, high yield, direct lending, mezzanine debt and distressed debt) to either confirm intuitive relative relationships or to identify a rationale when divergences from these historical relationships arise.

Private Markets Portfolio

The return and risk forecast for a diversified private markets portfolio is provided in Appendix B. The makeup of the private markets portfolio is as follows:

U.S. Buyouts	50%
Non-U.S. Buyouts	20%
Venture Capital	20%
Mezzanine Debt	5%
Distressed Debt	5%

When the components are geometrically calculated with a log-normal assumption, the forecast return for a diversified private markets portfolio is 8.10%, which is 3.60% above Wilshire's 4.50% expected return for U.S. stocks. The expected risk for the diversified private markets portfolio is 28.00%, which is slightly more than 1.6x the forecasted risk of U.S. stocks.

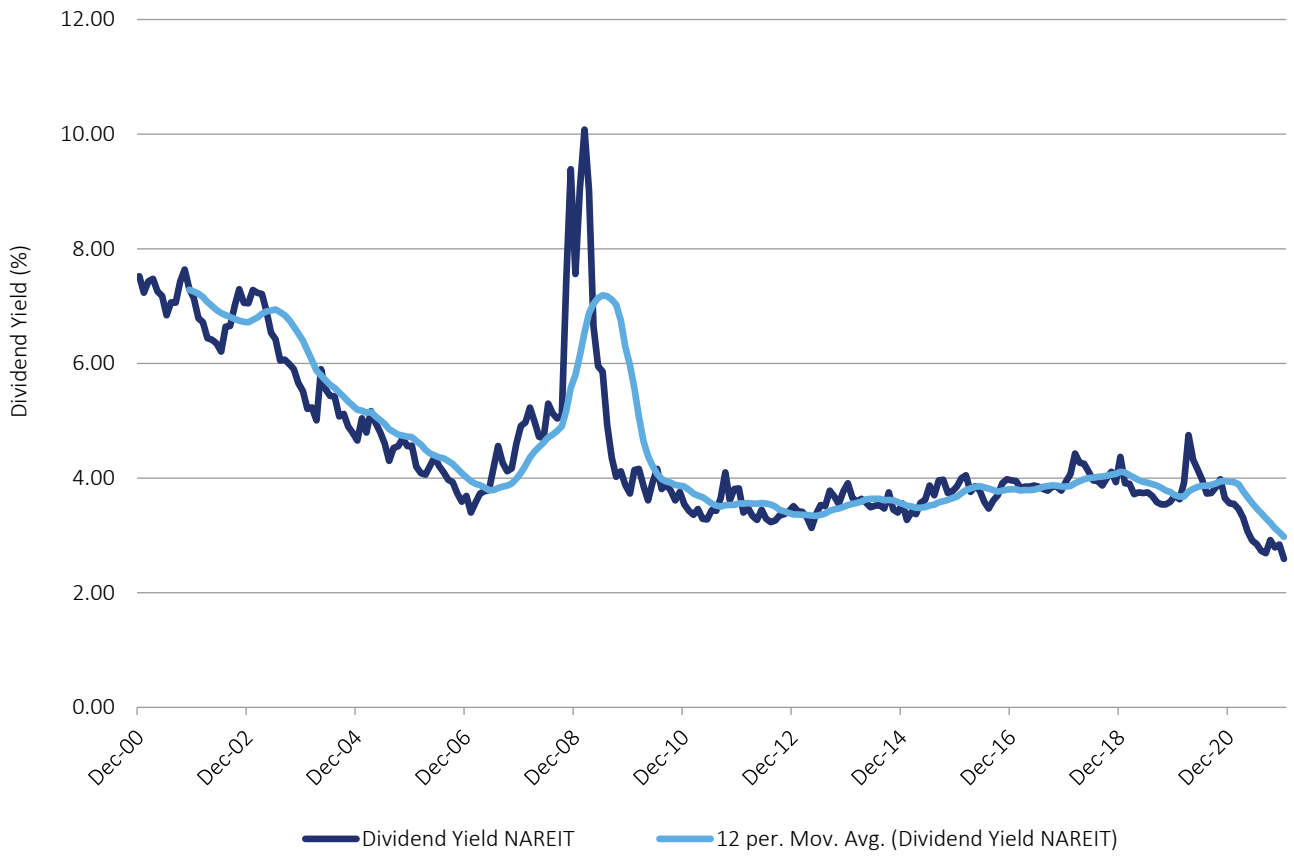
Real Assets

Asset correlation, or the degree to which asset prices move in tandem, results from a common sensitivity to underlying economic forces (i.e., growth, inflation, etc.). Real assets share a common sensitivity to inflation and therefore can partially protect real asset investment values against inflationary environments. This connection with inflation typically generates a relatively low correlation with other traditional assets. Therefore, Wilshire groups together the discussion of several asset classes into a Real Assets[6] section – Real Estate, Infrastructure, Timberland, Commodity Futures, Oil and Gas Partnerships and Midstream Energy Infrastructure. While we consider TIPS a member of the real asset class, they are absent from this section as a discussion of our TIPS methodology was included in the Fixed Income section above.

U.S. Real Estate Securities

Wilshire currently forecasts an expected return of 4.55% for U.S. real estate securities, which is 0.65% lower than our December 2020 assumption. Wilshire derives its forecast by combining the current dividend yield environment of Equity REITs with an expected dividend growth rate equal to three-quarters of long-run inflation.[7] Exhibit 18 contains the historical REIT dividend yield along with a one-year moving average.

Exhibit 18 – Equity REIT Dividend Yields



Data Source: FTSE Group and the National Association of Real Estate Investments Trusts

[6] Wilshire Associates Incorporated (2007). *Real Asset Investments*: Browning.

[7] Examining REIT dividend growth historically, Wilshire found that REITs were able to pass through about three-quarters of long-run inflation through rent and dividend increases.

Non-U.S. Real Estate Securities

Wilshire's usual practice is to assume comparable non-U.S. and U.S. returns within a global asset class containing regional components. Within this context we often employ a market or model-based approach to forecasting the U.S. component return, which we then build into a non-U.S. component assumption. However, we also consider relative valuation signals among regional markets to identify periods of relative valuation mismatch. In looking at yields on global public real estate securities, we do not currently see justification for instituting a premium or discount to our U.S. Real Estate Securities forecast for our non-U.S. assumption. A consistent or permanent return premium for either U.S. or non-U.S. securities is not supported by the historical record of total returns. Therefore, our approach leads to the same 4.55% long-term return forecast for non-U.S. real estate securities.

Private Real Estate

Wilshire's expected return assumption for private real estate is 5.90%, with an expected risk of 14.00%. The forecast is measured as a basket or portfolio of the three major real estate segments: 70% core, 15% value-add and 15% opportunistic real estate. Core real estate includes stable properties with high occupancy rates while the realized return that an investor earns is mostly income-based. Formulating an expected return begins with the available yield, or capitalization rate, in the core private market. The National Council of Real Estate Investment Fiduciaries (NCREIF) Property Index is comprised of thousands of properties acquired on behalf of tax-exempt institutions. NCREIF reports market data on the index on the properties themselves, meaning that any financial leverage that is employed by asset owners is not included. Wilshire's forecasting methodology begins with the most recent yields at the index level as being representative of the broad market generally. We also include an income growth rate as rents on core properties are expected to increase during our forecasting period. The growth rate is based on expected inflation, as owners may capture a portion of an economy's rising prices in increased rents, and is equal to 75% of our current inflation assumption. Beyond this "market return," our methodology focuses on four other potential drivers of return, some of which are informed by the public markets:

- Financial leverage: Debt equal to 20% of total capital, including floating and fixed rate debt
- Illiquidity premium: Core real estate funds offer regular redemptions, so zero in this case
- Operational premium: Based on the historical results of successful managers
- Fees: Average fee on a core real estate fund is 1%

Exhibit 19 contains all the year-end core private real estate inputs, along with the model return. The final assumption of 5.15% that is shown in Appendix B is lower than the 5.95% in the table below due to the Sharpe Ratio return band that was discussed in the Introduction.

Exhibit 19 – Core Private Real Estate: Return Assumption Inputs

	MARKET RETURN		CORE REAL ESTATE
Capitalization Rate +	4.00%	Market Return	5.95%
(Inflation Capture *	75%	Leverage Contribution	0.50%
Expected Inflation)	2.60%	Illiquidity Premium	0.00%
		Operational Premium	0.50%
		Fee (Base/Perf.)	-1.00%
Market Return	5.95%	Net Successful Return	5.95%

Value-add and opportunistic real estate are very different investment types from core, and Wilshire's approach to forecasting returns in each segment is similarly different. Such properties require substantial investment to develop or even repurpose a site before earning a meaningful return, which comes mostly in the form of price appreciation. Active managers in this space deploy significant debt, often more than 50% of total capital, and the illiquidity profile of a fund is similar to what is common within the private equity market. Therefore, Wilshire's approach to forecasting returns within value-add and opportunistic real estate is to observe what managers within these two market segments have been able to earn above core real estate managers. The available data are sufficiently robust to make such observations, with 20 to 30 years of data from multiple sources. Value-add funds have been able to outperform by somewhat less than 2%, at the minimum, but as much as nearly 4% during other periods. The assumption utilized within our methodology is currently 3%, which would imply an 8.95% net

successful return assumption. However, at our 17.50% expected risk for this market segment, such an assumption would violate our Sharpe Ratio-based return band. Therefore, Wilshire's adjusted return forecast as-of Dec. 31, 2021, is 6.30% for value-add real estate.

For the opportunistic segment, we based our assumption on relative performance versus value-add real estate. When considering the previous 30 years of data, opportunistic funds have not performed particularly well on a relative basis. However, the recent history is more promising. Opportunistic funds have outperformed value-add by an average of 2% on a rolling 10-year basis since 2008. The assumption utilized within our methodology is currently 1% (above the model's original value-add forecast of 8.95%), for a 9.95% net successful return for opportunistic private real estate. However, such a return at an assumed risk of 25.00% also would violate the return band and is, therefore capped at 7.55%. For additional detail regarding our methodology, please see our 2018 paper on private real estate forecasting[8].

Infrastructure

Similar to Wilshire's approach to forecasting real estate, we evaluate opportunities in both the public and private segments of the infrastructure asset class. Global listed infrastructure (GLI) consists of public companies that engage in the management and operating of essential infrastructure assets such as power plants, transportation networks and communications systems. Also like with public real estate, GLI companies exhibit dividend yields much higher than the broad equity market and their total return is dependent on yield. Our approach to forecasting returns begins with the current yield on the GLI market and assumes an expected dividend growth rate equal to three-quarters of long-run inflation. This growth assumption is consistent with our public real estate methodology. While the historical dataset for GLI is not as robust as with public real estate, we feel comfortable applying the same growth rate as both asset classes have similar economic sensitivity to inflation. Wilshire currently forecasts an expected return of 4.95% for GLI with risk equal to 17.00%.

Direct, private infrastructure investments cover a broad range of asset types, ranging from stabilized, income producing assets ("brownfield infrastructure") to new and unproven development projects ("greenfield infrastructure"). These physical assets are further differentiated by geographic location, sector, financing and other characteristics. Similar to real estate properties, infrastructure returns are primarily generated by owning and operating physical assets; and like real estate, operating income is often linked directly or indirectly to long-term inflation trends. As such, Wilshire's approach to forecasting private infrastructure mirrors our private real estate model with two modifications: 1) yields reflective of the infrastructure market and 2) leverage typical of private infrastructure funds. The private market infrastructure yield (cap rate) assumption begins with the cap rate found in the private real estate market. We then observe any difference in yields in the public real estate and infrastructure markets and adjust the cap rate accordingly. Wilshire's current forecast of 7.55% for private infrastructure, with a risk of 25.00%, represents an allocation to a typical core infrastructure fund.

Timberland

Timberland investment returns are driven by four primary components: biological growth, the market price for timber, the market price for land and the skill of active management. Wilshire's model return for the timber asset class is 7.60% and is based on a return attribution of 5.00% annual biological growth and a 2.60% increase in timber market prices. The timber market price component is consistent with our inflation forecast and reflects the ability of timberland products to capitalize expected and unexpected inflation over long time periods. The holding period return to land is assumed to be negligible, and thus estimated to have no addition to return unless successful management is employed. However, after our Sharpe-ratio return band is applied to the timber model return, the final assumption becomes 5.80% at a risk of 15.00%. For a more detailed discussion on our forecast methodology, please refer to Wilshire's research paper "Timberland Investments – Does the Return Fall Far From the Tree?"[9]

[8] Wilshire Associates Incorporated (2018). *Forecasting Private Real Estate Returns: Building Return Assumptions in Private Markets*: Foresti and Rush.

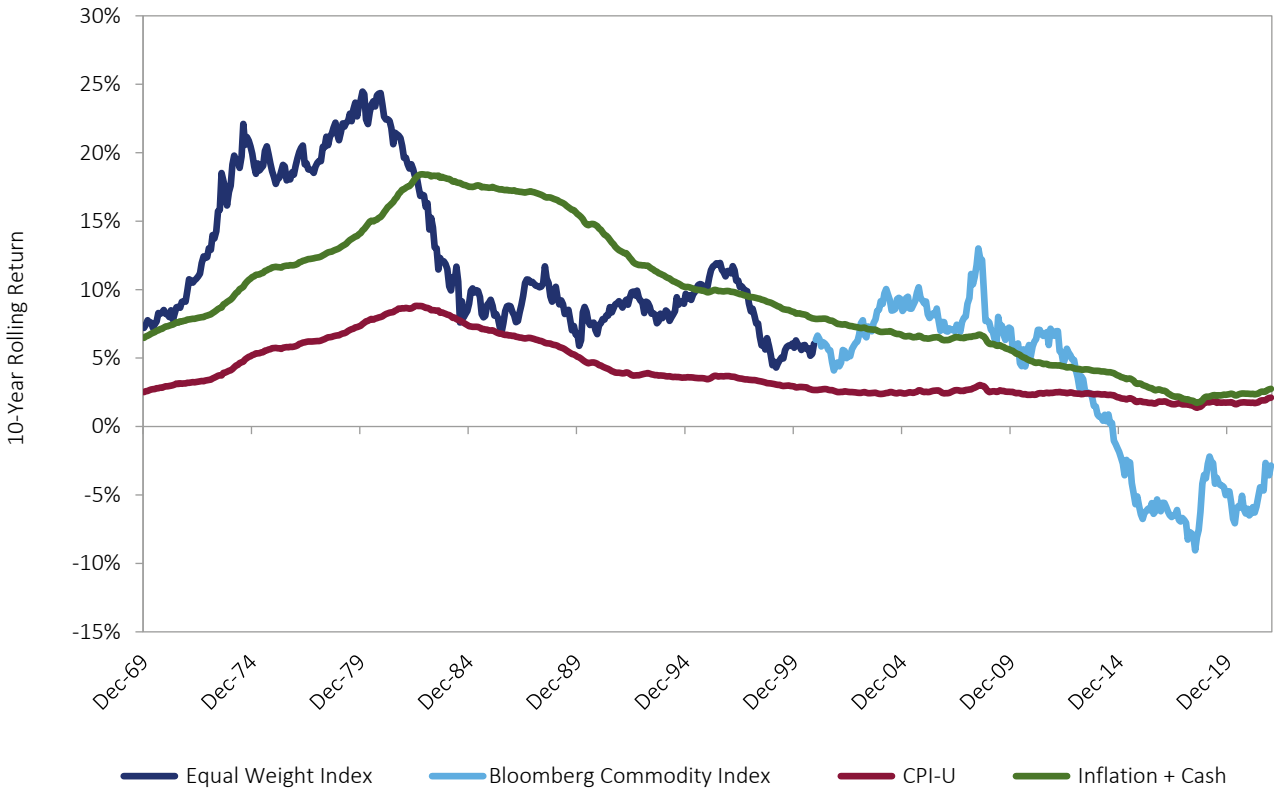
[9] Wilshire Associates Incorporated (2007). *Timberland Investments: Does the Return Fall Far From the Tree?:* Browning.

Commodity Futures

The returns for commodities differ from other asset classes because commodities do not represent compensation for the risk associated with future cash flow uncertainty. Instead, investors in commodity futures can be compensated for providing insurance to producers, thus insulating the business operations of these commodity producers from short-term commodity price fluctuations. In other words, a majority of a commodity future investor's exposure is to short-term economic conditions.

Wilshire's approach to forecasting a return for a basket of commodity futures focuses on the three components of the asset class's total return: changes in spot prices, collateral yield and contract roll yield. The first two inputs are rather straightforward. Our "spot price" return is represented by our inflation assumption and the collateral yield is equal to our forecast on cash. Our assumption for roll yield is currently zero. Prior to the early 2000s, roll yield was positive within the commodities market. However, for the past decade or so, roll yield has been negative. Given these mixed results, we currently find it prudent to assume a 0% return from roll, rather than essentially picking one of the historical trends. We will continue to monitor this component going forward. Therefore, currently our commodities assumption is inflation (2.60%) plus cash (1.70%), equal to 4.30%. Exhibit 20 contains a return history for the Bloomberg Commodity Index, an equal weight index, CPI-U and the sum of actual inflation plus the return on cash through time.

Exhibit 20 – Historical Commodity Index Returns



Data Source: Gorton and Rouwenhorst "Facts and Fantasies about Commodity Futures"

Wilshire's forecasted risk for commodity futures is 16.00% based on the composition of the Bloomberg Commodity Index. It is important to note that other indexes differ in composition from the Bloomberg index and may be substantially more or less risky.

The low measured correlation of commodity returns with more traditional assets, such as stocks and bonds, stems from their price sensitivity to current economic supply and demand forces. In contrast, stock and bond valuations are more heavily

driven by forward-looking expectations. Historically, these factors have caused traditional assets and commodities to have lower correlations. A complete list of correlations for commodities versus other asset classes can be found in Appendix A.

Midstream Energy Infrastructure

As midstream energy infrastructure is predominately a yield-returning asset class, Wilshire looks to both the current yield and potential for yield increases in the future to formulate a return assumption. Our starting point is the current yield environment within the asset class, as represented by the Alerian US Midstream Energy Index. For future growth rates, we utilize the same growth assumption that we employ within other segments of real assets, which is equal to three-quarters of expected long-run inflation. Our model return of 8.30% is equal to the Alerian index's 6.34% yield plus three-quarters of our inflation forecast of 2.60%. However, due to our Sharpe-ratio return band application, the year-end return assumed is 6.60%. Wilshire's risk forecast is based on historical observations and is currently equal to 19.00%. Finally, it should be noted that this asset class differs, somewhat, from global listed infrastructure although some investors choose to invest in both with one allocation, which our asset-liability process can easily accommodate.

Private Energy

Wilshire's private energy assumption utilizes the midstream energy infrastructure assumption as a starting point in forecasting returns. There are two major differences, however, between the two asset classes. The first is the amount of leverage utilized, with the public segment employing a higher level of borrowing. Secondly, private energy funds typically invest in more "upstream," or extraction, projects. This fact results in two adjustments within our forecasting methodology. Exploration projects will have a greater exposure to energy prices than midstream transportation, which we capture by utilizing the risks embedded within our commodity assumptions. The other adjustment is to allow for value-added possibilities through upstream investments. The net result is a current long-term return forecast of 6.40%, after our return band is applied, with an expected annual volatility of 18.00%. It is worth noting that the risk assumption is lower than that for midstream energy and reflects the lower amount of leverage typically employed within the asset class.

Real Asset Basket

In an effort to assist institutions who take a holistic approach to inflation linked investing, Wilshire develops forecasts for a broadly diversified real asset basket. In that approach, we construct a 50 / 50 combination of underlying public and private real asset portfolios. The public market portfolio is designed to provide a meaningful real return while maintaining appropriate diversification benefits and inflation sensitivity. The underlying sub-component asset classes in the private basket are approximately risk weighted to efficiently gain exposure to the inflation capture of the individual underlying investments. The sub-components are as follows:

Public Real Asset Basket	
Global REITs	31%
U.S. TIPS	48%
Commodity Futures	33%
Gold	9%
Infrastructure/Mid. Energy	12%
Borrowing	-33%

Private Real Asset Basket	
Private Real Estate	35%
Timberland	35%
Private Energy	30%

The aggregate real asset basket is expected to return 5.60% and is included in the standard annual asset class matrix (Appendix A). Furthermore, the individual real asset basket component classes along with the private and public combinations can be found in Appendix B.

Hedge Funds

While Wilshire primarily views hedge funds as implementation vehicles, rather than as a separate asset class, we do maintain return, risk and correlation assumptions to support their use within asset allocation studies. We maintain forecasts for five major styles or strategy groupings that are common within the hedge fund industry and can further combine these styles to support Wilshire's Directional vs. Diversifying implementation approach to marketable securities.[10] For each of these strategies, Wilshire uses a building block approach with the following three components: a risk-free rate (i.e., a cash equivalent return), a systematic market component (i.e., beta) and an active component (i.e., alpha). It is important to note that the inclusion of an alpha or skill-based component makes our expectations for hedge funds unique to many of the public market forecasts in this report, whose return expectations are beta-only. Using regression analysis to identify beta factors to different asset classes, Wilshire can create synthetic hedge fund style returns that demonstrate reasonable tracking against actual hedge fund style indexes. We are then able to utilize the information contained in our underlying asset class forecasts to model the implied returns of the five hedge fund styles. Below we summarize the results for December 2021 along with forecasts for an industry representative basket of hedge fund strategies. A more detailed discussion of the forecasting methodology can be found in Wilshire's 2013 research note[11].

Strategy	Basket Weight	Expected Return (%)	Expected Risk (%)
Equity Market Neutral	10%	3.60	4.50
Event Driven	25%	4.80	7.00
Equity Long/Short	35%	5.30	9.75
Global Macro	5%	4.60	6.75
Relative Value	25%	4.35	5.75
HF Industry Representative Basket		**4.80**	**6.60**

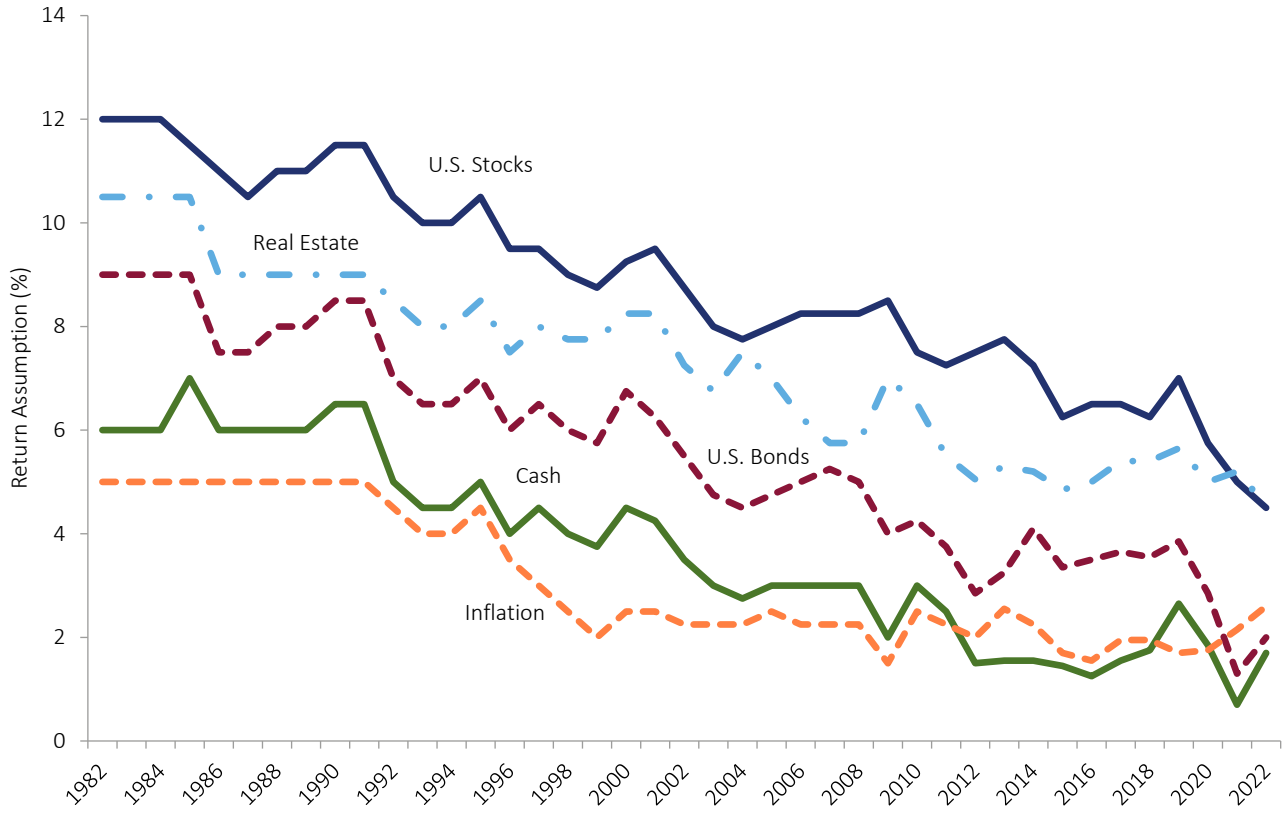
Wilshire's Historical Forecasts

Exhibit 21 shows how Wilshire's annual return forecasts have changed over the past 41 years. Notice the relative relationship between asset classes and how, when the assumptions change, they generally move together. This co-movement in assumptions is the result of common economic drivers, such as the level of growth, inflation and interest rates, which contribute to all asset class valuations, thereby linking various investments to each other in, at minimum, an indirect way.

[10] Wilshire Associates Incorporated (2018). *Hedge Funds 2.0: An Integrated Approach to Investing in Marketable Alternatives*: Foresti and Gnall.

[11] Wilshire Associates Incorporated (2013). *Hedge Fund Style Assumptions*: Foresti.

Exhibit 21 – Historical Returns



Risk and Correlation

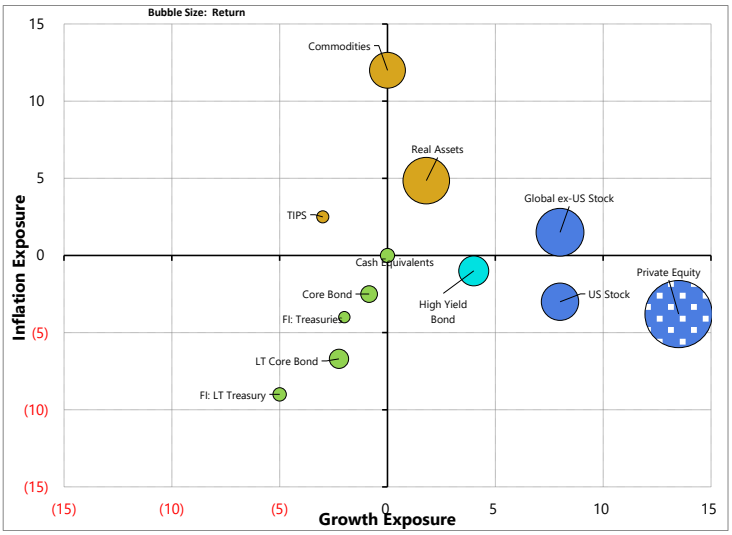
Wilshire's approach to forecasting long-term risk and correlation is largely based on observed historical asset class behavior and an understanding of the discounting properties of individual asset classes to changes in economic factors. Generally, past relationships across market cycles serve as reasonable predictors of future long-term risk and correlation, as they provide statistical evidence of the commonality of asset class reactions to underlying economic conditions. In practice, Wilshire applies financial theory and judgment to the interpretation and analysis of historical results. The role of judgment ("art") versus measured statistics ("science") is more pronounced for investment categories with less historical data or that have experienced material structural changes. In general, Wilshire places much more confidence in the predictive accuracy of past relationships for asset classes with longer and more robust historical data. In this report we rely upon historical measurements of risk and correlation through 2021 to estimate future risk and correlation. To maximize the quality of our estimates, we observe this historical behavior over various time horizons (i.e., five years, 10 years, full history, etc.). Wilshire does not use a preset or static rolling time period to derive these forecasts, as such an approach could result in forward numbers reacting too quickly to what may prove to be short-term relationships or event driven anomalies between markets.

One of the greatest challenges in constructing well-diversified portfolios is the instability of correlation relationships between various asset classes. Having access to longer track records does not resolve this complication; in fact, a longer historical record can sometimes serve as greater evidence of unstable correlations through time. However, many of these unstable relationships can be better understood when observing the more predictable relationship of asset class returns versus underlying economic factors. In 2014, Wilshire published two related research reports on factor-based asset allocation, including one that presented a practical approach to utilizing such factors. In that research, we presented a two-factor framework to assist in understanding the more predictable relationship between asset returns and the common economic factors of inflation and growth.

In Exhibit 22 below, we present several of the major asset classes along these dimensions to provide a sense of the common factor exposures that contribute to either the stability or instability of correlation relationships. Assets with similar exposure

to both factors are more likely to show stable relationships across market regimes, while those with common exposure to just one factor are likely to reveal correlation instability; with high correlations when returns are driven by the factor to which they share similar exposure and divergent returns in periods where the factor to which they have dissimilar exposures is driving returns. As discussed in the aforementioned research report, incorporating these factor exposures within an asset-liability study can assist in protecting against the unpredictability that is the consequence of unstable asset class correlations.

Exhibit 22 – Asset Class Exposures to Growth & Inflation



Finally, and as is the case every year, we did make minor modifications to several risk and correlation assumptions primarily as the result of relative moves in sub-asset class component weights. With the exception of the bond risk estimates discussed earlier, we view these changes as minor and insignificant rather than indicative of a more meaningful shift in our view of asset class relationships.

A full listing of Wilshire's risk and diversification assumptions for all asset classes can be found in Appendix A.

Appendix A: Wilshire December 2021 Correlation Matrix

	Equity						Fixed Income						Real Estate					
	U.S. Stock	Dev. ex-U.S. Stock	Emg. Mrkt. Stock	Global ex-U.S. Stock	Global Stock	Private Equity	Cash	Core Bond	LT Core Bond	U.S. TIPS	High Yield	Non-U.S. Bond	Real Estate Secs.	RI Estate Secs.	Private Real Eestate	Cmdty	Real Assets	U.S. CPI
Expected Compound Return (%)	4.50	5.50	5.50	5.75	5.10	8.10	1.70	2.00	2.30	1.45	3.60	0.85	4.55	4.70	5.90	4.30	5.60	2.60
Expected Arithmetic Return (%)	5.85	7.00	8.50	7.40	6.45	11.45	1.70	2.10	2.70	1.65	4.10	0.95	5.95	5.95	6.80	5.50	6.10	2.60
Expected Risk (%)	17.00	18.00	26.00	19.10	17.10	28.00	0.75	4.25	8.90	6.00	10.00	4.25	17.50	16.45	14.00	16.00	10.35	1.75
Cash Yield (%)	1.25	2.50	2.00	2.35	1.70	0.00	1.70	2.95	3.15	2.25	7.35	1.65	2.60	2.60	2.30	1.70	1.85	0.00
Correlations																		
U.S. Stock	1.00																	
Dev Ex-U.S. Stock (USD)	0.81	1.00																
Emerging Market Stock	0.74	0.74	1.00															
Global Ex-U.S. Stock	0.83	0.96	0.87	1.00														
Global Stock	0.95	0.92	0.83	0.94	1.00													
Private Equity	0.74	0.64	0.62	0.67	0.74	1.00												
Cash Equivalents	-0.05	-0.09	-0.05	-0.08	-0.07	0.00	1.00											
Core Bond	0.28	0.13	0.00	0.09	0.20	0.31	0.19	1.00										
Lt Core Bond	0.31	0.16	0.01	0.12	0.23	0.32	0.11	0.92	1.00									
U.S. TIPS	-0.05	0.00	0.15	0.05	0.00	-0.03	0.20	0.59	0.47	1.00								
High Yield Bond	0.54	0.39	0.49	0.45	0.51	0.34	-0.10	0.25	0.32	0.05	1.00							
Non-U.S. Bond (Hdg)	0.16	0.25	-0.01	0.17	0.18	0.26	0.10	0.66	0.65	0.39	0.26	1.00						
U.S. RE Securities	0.58	0.47	0.44	0.49	0.56	0.50	-0.05	0.17	0.23	0.10	0.56	0.05	1.00					
Global RE Securities	0.64	0.58	0.56	0.61	0.65	0.58	-0.05	0.17	0.22	0.11	0.61	0.03	0.96	1.00				
Private Real Estate	0.54	0.44	0.44	0.47	0.52	0.51	-0.05	0.19	0.25	0.09	0.57	0.05	0.77	0.75	1.00			
Commodities	0.25	0.34	0.39	0.38	0.32	0.27	0.00	-0.02	-0.02	0.25	0.29	-0.10	0.25	0.28	0.25	1.00		
Real Asset Basket	0.48	0.51	0.58	0.57	0.54	0.47	-0.02	0.23	0.25	0.39	0.56	0.05	0.70	0.75	0.70	0.65	1.00	
Inflation (CPI)	-0.10	-0.15	-0.13	-0.15	-0.13	-0.10	0.10	-0.12	-0.12	0.15	-0.08	-0.08	0.05	0.03	0.05	0.44	0.26	1.00

Appendix B: Wilshire December 2021 Alternative Investment Assumptions

	Basket Weight	Expected Return (%)	Expected Risk (%)
Private Equity			
Buyouts	50%	6.75	30.00
Venture Capital	20%	7.65	44.00
Distressed Debt	5%	6.00	20.00
Mezzanine Debt	5%	5.75	20.00
Non-Us Buyouts	20%	7.25	32.00
Private Equity Basket		8.10	28.00
Private Real Estate			
Core	70%	5.15	12.00
Value Added	15%	6.30	17.50
Opportunisitc	15%	7.55	25.00
Private Real Estate Basket		5.90	14.00
Public Real Assets			
Global Real Estate	31%	4.70	16.45
U.S. Tips	48%	1.45	6.00
Commodities	33%	4.30	16.00
Gold	9%	4.30	18.00
Infrastrc. / Mdstrm Energy	12%	4.35	16.20
Borrowing	-33%	1.70	0.75
Public Real Assets Basket		4.50	11.45
Private Real Assets			
Private Real Estate	35%	5.90	14.00
Timber	35%	5.80	15.00
Private Energy	30%	6.40	18.00
Private Real Assets Basket		6.55	11.25
Hedge Funds			
Equity Market Neutral	10%	3.60	4.50
Event Driven	25%	4.80	7.00
Equity Long/Short	35%	5.30	9.75
Global Macro	5%	4.60	6.75
Relative Value	25%	4.35	5.75
Hedge Fund Basket		4.80	6.60

Appendix C: Historical 1-, 5- & 10-Year Rolling

1-Year Returns

Year	S&P 500 Index	Bond Index	T-Bills	CPI	Year	S&P 500 Index	Bond Index	T-Bills	CPI
1926	11.6	7.4	3.3	-1.5	1974	-26.4	0.2	8.2	12.4
1927	37.5	7.4	3.1	-2.1	1975	37.2	12.3	5.8	7.0
1928	43.6	2.8	3.5	-1.0	1976	24.1	15.6	5.0	4.9
1929	-8.4	3.3	4.7	0.2	1977	-7.3	3.0	5.4	6.7
1930	-24.9	8.0	2.4	-6.0	1978	6.4	1.4	7.5	9.0
1931	-43.4	-1.9	1.1	-9.5	1979	18.5	1.9	10.3	13.3
1932	-8.2	10.8	1.0	-10.3	1980	32.2	2.7	11.8	12.5
1933	54.0	10.4	0.3	0.5	1981	-4.9	6.3	14.5	8.9
1934	-1.4	13.8	0.2	2.0	1982	21.1	32.6	11.1	3.8
1935	47.7	9.6	0.1	3.0	1983	22.4	8.4	8.8	3.8
1936	33.9	6.7	0.2	1.2	1984	6.1	15.2	9.9	4.0
1937	-35.0	2.8	0.3	3.1	1985	32.1	22.1	7.7	3.8
1938	31.1	6.1	0.0	-2.8	1986	18.6	15.3	6.1	1.1
1939	-0.4	4.0	0.0	-0.5	1987	5.2	2.8	5.4	4.4
1940	-9.8	3.4	0.0	1.0	1988	16.8	7.9	6.7	4.4
1941	-11.6	2.7	0.0	9.7	1989	31.5	14.5	9.0	4.6
1942	20.4	2.6	0.3	9.3	1990	-3.2	9.0	8.3	6.1
1943	25.9	2.8	0.4	3.2	1991	30.6	16.0	6.4	3.1
1944	19.7	4.7	0.3	2.1	1992	7.7	7.4	3.9	2.9
1945	36.4	4.1	0.3	2.3	1993	10.0	9.8	3.2	2.8
1946	-8.1	1.7	0.4	18.2	1994	1.3	-2.9	4.2	2.7
1947	5.7	-2.3	0.5	9.0	1995	37.5	18.5	6.1	2.5
1948	5.5	4.1	0.8	2.7	1996	23.1	3.6	5.4	3.3
1949	18.8	3.3	1.1	-1.8	1997	33.3	9.7	5.5	1.7
1950	31.7	2.1	1.2	5.8	1998	28.8	8.7	5.4	1.6
1951	24.0	-2.7	1.5	5.9	1999	21.0	-0.8	4.6	2.7
1952	18.4	3.5	1.7	0.9	2000	-9.1	11.6	6.2	3.4
1953	-1.0	3.4	1.8	0.6	2001	-11.9	8.4	4.4	1.6
1954	52.6	5.4	0.9	-0.5	2002	-22.1	10.3	1.8	2.4
1955	31.6	0.5	1.6	0.4	2003	28.7	4.1	1.2	1.9
1956	6.6	-6.8	2.5	2.9	2004	10.9	4.3	1.3	3.3
1957	-10.8	8.7	3.2	3.0	2005	4.9	2.4	3.1	3.4
1958	43.4	-2.2	1.5	1.8	2006	15.8	4.3	4.8	2.5
1959	12.0	-1.0	3.0	1.5	2007	5.5	7.0	5.0	4.1
1960	0.5	9.1	2.7	1.5	2008	-37.0	5.2	2.0	0.1
1961	26.9	4.8	2.1	0.7	2009	26.5	5.9	0.2	2.7
1962	-8.7	8.0	2.7	1.2	2010	15.1	6.5	0.1	1.5
1963	22.8	2.2	3.1	1.7	2011	2.1	7.8	0.1	3.0
1964	16.5	4.8	3.5	1.2	2012	16.0	4.2	0.1	1.7
1965	12.5	-0.5	3.9	1.9	2013	32.4	-2.0	0.1	1.5
1966	-10.1	0.2	4.8	3.4	2014	13.7	6.0	0.0	0.8
1967	24.0	-5.0	4.2	3.0	2015	1.4	0.6	0.1	0.7
1968	11.1	2.6	5.2	4.7	2016	12.0	2.7	0.3	2.1
1969	-8.5	-8.1	6.6	6.1	2017	21.8	3.5	0.9	2.1
1970	4.0	18.4	6.5	5.5	2018	-4.4	0.0	1.9	1.9
1971	14.3	11.0	4.4	3.4	2019	31.5	8.7	2.3	2.3
1972	19.0	7.3	3.8	3.5	2020	18.4	7.5	0.7	1.4
1973	-14.8	2.3	6.9	8.7	2021	28.7	-1.5	0.0	7.0
					Winning Percentage:	**64.6%**	**22.9%**	**12.5%**	

5-Year Returns

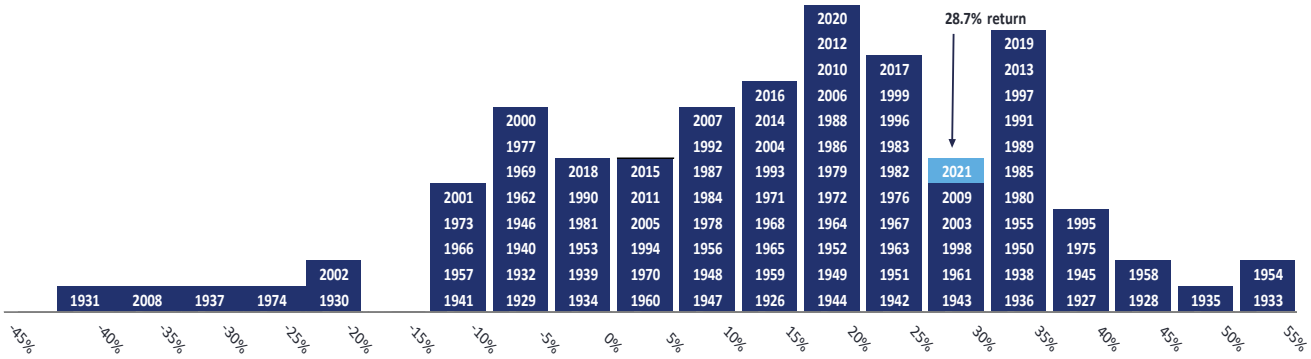
Year	S&P 500 Index	Bond Index	T-Bills	CPI
1926-30	8.7	5.8	3.4	-2.1
1927-31	-5.1	3.9	3.0	-3.7
1928-32	-12.5	4.5	2.5	-5.4
1929-33	-11.2	6.0	1.9	-5.1
1930-34	-9.9	8.1	1.0	-4.8
1931-35	3.1	8.4	0.5	-3.0
1932-36	22.5	10.3	0.3	-0.8
1933-37	14.3	8.6	0.2	2.0
1934-38	10.7	7.8	0.1	1.3
1935-39	10.9	5.8	0.1	0.8
1936-40	0.5	4.6	0.1	0.4
1937-41	-7.5	3.8	0.1	2.0
1938-42	4.6	3.8	0.1	3.2
1939-43	3.8	3.1	0.1	4.5
1940-44	7.7	3.3	0.2	5.0
1941-45	17.0	3.4	0.3	5.3
1942-46	17.9	3.2	0.3	6.8
1943-47	14.8	2.2	0.4	6.8
1944-48	10.9	2.4	0.5	6.7
1945-49	10.7	2.2	0.6	5.8
1946-50	9.9	1.8	0.8	6.6
1947-51	16.7	0.9	1.0	4.3
1948-52	19.4	2.0	1.3	2.7
1949-53	17.9	1.9	1.5	2.2
1950-54	23.9	2.3	1.4	2.5
1951-55	23.9	2.0	1.5	1.4
1952-56	20.2	1.1	1.7	0.8
1953-57	13.6	2.1	2.0	1.3
1954-58	22.3	1.0	1.9	1.5
1955-59	15.0	-0.3	2.3	1.9
1956-60	8.9	1.4	2.6	2.1
1957-61	12.8	3.8	2.5	1.7
1958-62	13.3	3.6	2.4	1.3
1959-63	9.8	4.5	2.7	1.3
1960-64	10.7	5.7	2.8	1.2
1961-65	13.2	3.8	3.1	1.3
1962-66	5.7	2.9	3.6	1.9
1963-67	12.4	0.3	3.9	2.2
1964-68	10.2	0.4	4.3	2.8
1965-69	5.0	-2.2	4.9	3.8
1966-70	3.4	1.2	5.4	4.5
1967-71	8.4	3.3	5.4	4.5
1968-72	7.5	5.8	5.3	4.6
1969-73	2.0	5.8	5.6	5.4
1970-74	-2.4	7.6	6.0	6.6
1971-75	3.2	6.5	5.8	6.9
1972-76	4.9	7.4	5.9	7.2
1973-77	-0.2	6.5	6.3	7.9
1974-78	4.3	6.3	6.4	8.0
1975-79	14.8	6.7	6.8	8.1
1976-80	13.9	4.8	8.0	9.2
1977-81	8.0	3.1	9.9	10.1
1978-82	13.9	8.4	11.0	9.5
1979-83	17.2	9.8	11.3	8.4
1980-84	14.6	12.6	11.2	6.5
1981-85	14.6	16.5	10.4	4.8
1982-86	19.7	18.4	8.7	3.3
1983-87	16.4	12.5	7.6	3.4
1984-88	15.4	12.4	7.1	3.5
1985-89	20.4	12.3	7.0	3.7
1986-90	13.2	9.8	7.1	4.1
1987-91	15.4	9.9	7.1	4.5
1988-92	15.9	10.9	6.8	4.2
1989-93	14.5	11.3	6.1	3.9
1990-94	8.7	7.7	5.2	3.5
1991-95	16.6	9.5	4.8	2.8
1992-96	15.2	7.0	4.6	2.8
1993-97	20.2	7.5	4.9	2.6
1994-98	24.1	7.3	5.3	2.4
1995-99	28.6	7.7	5.4	2.4
1996-00	18.3	6.5	5.4	2.5
1997-01	10.7	7.4	5.2	2.2
1998-02	-0.6	7.5	4.5	2.3
1999-03	-0.6	6.6	3.6	2.4
2000-04	-2.3	7.7	3.0	2.5
2001-05	0.5	5.9	2.4	2.5
2002-06	6.2	5.1	2.4	2.7
2003-07	12.8	4.4	3.1	3.0
2004-08	-2.2	4.6	3.2	2.7
2005-09	0.4	5.0	3.0	2.6
2006-10	2.3	5.8	2.4	2.2
2007-11	-0.3	6.5	1.5	2.3
2008-12	1.7	5.9	0.5	1.8
2009-13	17.9	4.4	0.1	2.1
2010-14	15.4	4.5	0.1	1.7
2011-15	12.6	3.2	0.1	1.5
2012-16	14.7	2.2	0.1	1.4
2013-17	15.8	2.1	0.3	1.4
2014-18	8.5	2.5	0.6	1.5
2015-19	11.7	3.0	1.1	1.8
2016-20	15.2	4.4	1.2	1.9
2017-21	18.5	3.6	1.2	2.9
Winning Percentage:	**72.8%**	**23.9%**	**3.3%**	

10-Year Returns

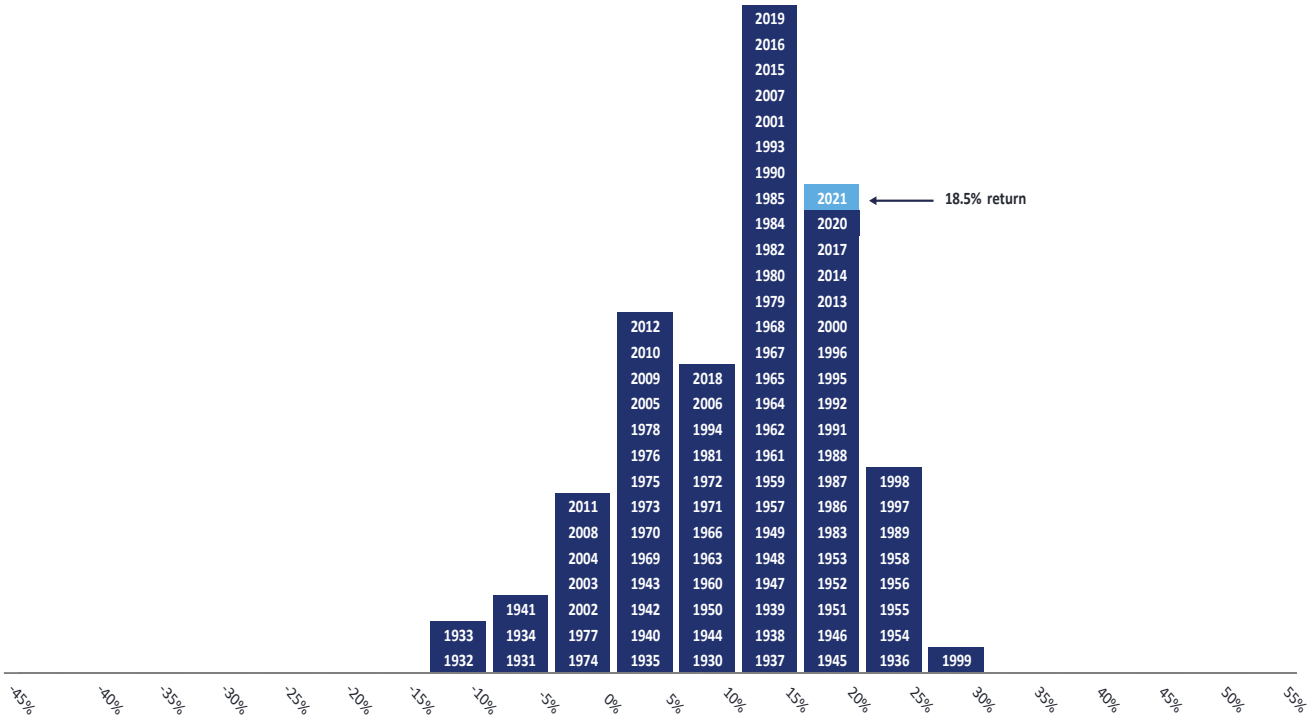
Year	S&P 500 Index	Bond Index	T-Bills	CPI
1926-35	5.9	7.1	2.0	-2.6
1927-36	7.8	7.0	1.7	-2.3
1928-37	0.0	6.5	1.4	-1.8
1929-38	-0.9	6.9	1.0	-2.0
1930-39	-0.1	6.9	0.6	-2.0
1931-40	1.8	6.5	0.3	-1.3
1932-41	6.4	7.0	0.2	0.6
1933-42	9.4	6.2	0.1	2.6
1934-43	7.2	5.4	0.1	2.9
1935-44	9.3	4.5	0.2	2.9
1936-45	8.4	4.0	0.2	2.8
1937-46	4.4	3.5	0.2	4.4
1938-47	9.6	3.0	0.2	5.0
1939-48	7.3	2.8	0.3	5.6
1940-49	9.2	2.7	0.4	5.4
1941-50	13.4	2.6	0.5	5.9
1942-51	17.3	2.0	0.7	5.5
1943-52	17.1	2.1	0.8	4.7
1944-53	14.3	2.2	1.0	4.4
1945-54	17.1	2.2	1.0	4.2
1946-55	16.7	1.9	1.1	4.0
1947-56	18.4	1.0	1.3	2.5
1948-57	16.4	2.1	1.6	2.0
1949-58	20.1	1.4	1.7	1.9
1950-59	19.4	1.0	1.9	2.2
1951-60	16.2	1.7	2.0	1.8
1952-61	16.4	2.4	2.1	1.3
1953-62	13.4	2.9	2.2	1.3
1954-63	15.9	2.7	2.3	1.4
1955-64	12.8	2.7	2.6	1.6
1956-65	11.1	2.6	2.8	1.7
1957-66	9.2	3.3	3.0	1.8
1958-67	12.9	1.9	3.1	1.8
1959-68	10.0	2.4	3.5	2.1
1960-69	7.8	1.7	3.9	2.5
1961-70	8.2	2.5	4.3	2.9
1962-71	7.1	3.1	4.5	3.2
1963-72	9.9	3.0	4.6	3.4
1964-73	6.0	3.0	5.0	4.1
1965-74	1.2	2.6	5.4	5.2
1966-75	3.3	3.8	5.6	5.7
1967-76	6.7	5.3	5.7	5.9
1968-77	3.6	6.2	5.8	6.2
1969-78	3.2	6.1	6.0	6.7
1970-79	5.9	7.2	6.4	7.4
1971-80	8.4	5.6	6.9	8.1
1972-81	6.4	5.2	7.9	8.6
1973-82	6.6	7.4	8.6	8.7
1974-83	10.6	8.1	8.8	8.2
1975-84	14.7	9.6	9.0	7.3
1976-85	14.2	10.5	9.2	7.0
1977-86	13.7	10.5	9.3	6.6
1978-87	15.2	10.4	9.3	6.4
1979-88	16.3	11.1	9.2	5.9
1980-89	17.5	12.4	9.1	5.1
1981-90	13.9	13.1	8.7	4.5
1982-91	17.5	14.1	7.9	3.9
1983-92	16.2	11.7	7.2	3.8
1984-93	14.9	11.9	6.6	3.7
1985-94	14.4	10.0	6.1	3.6
1986-95	14.9	9.6	5.9	3.5
1987-96	15.3	8.5	5.8	3.7
1988-97	18.0	9.2	5.9	3.4
1989-98	19.2	9.3	5.7	3.1
1990-99	18.2	7.7	5.3	2.9
1991-00	17.5	8.0	5.1	2.7
1992-01	12.9	7.2	4.9	2.5
1993-02	9.3	7.5	4.7	2.5
1994-03	11.1	6.9	4.5	2.4
1995-04	12.1	7.7	4.2	2.4
1996-05	9.1	6.2	3.9	2.5
1997-06	8.4	6.2	3.8	2.4
1998-07	5.9	6.0	3.8	2.7
1999-08	-1.4	5.6	3.4	2.5
2000-09	-1.0	6.3	3.0	2.5
2001-10	1.4	5.8	2.4	2.3
2002-11	2.9	5.8	2.0	2.5
2003-12	7.1	5.2	1.8	2.4
2004-13	7.4	4.5	1.7	2.4
2005-14	7.7	4.7	1.5	2.1
2006-15	7.3	4.5	1.2	1.9
2007-16	6.9	4.3	0.8	1.8
2008-17	8.5	4.0	0.4	1.6
2009-18	13.1	3.5	0.4	1.8
2010-19	13.6	3.7	0.6	1.8
2011-20	13.9	3.8	0.6	1.7
2012-21	16.6	2.9	0.6	2.1
Winning Percentage:	**79.3%**	**16.1%**	**4.6%**	

Appendix D: Histogram of 1-, 5- & 10-Year S&P 500 Index Returns

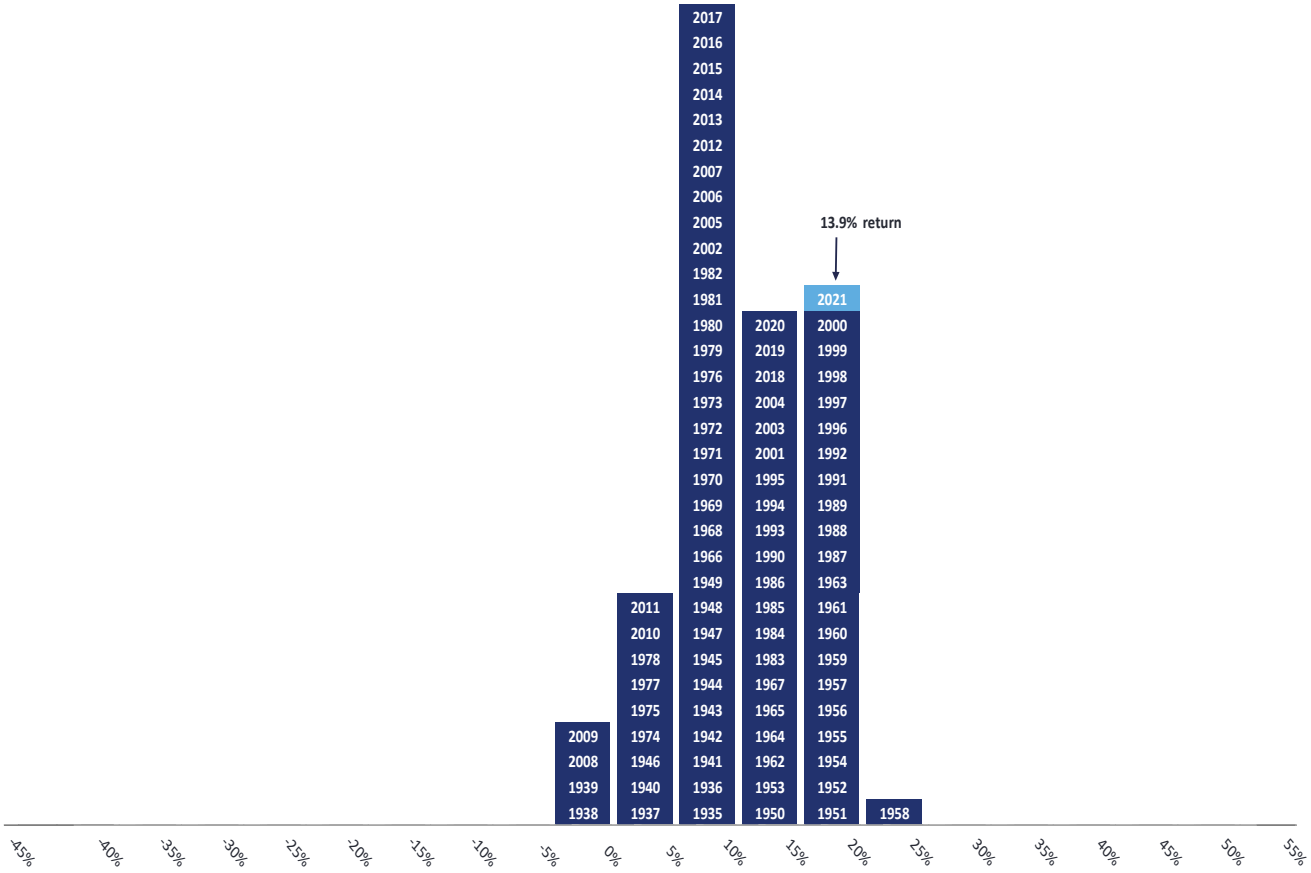
1-Year Returns Ending



5-Year Annualized Returns Ending



10-Year Annualized Returns Ending



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