

Retirement &amp; Goals Based Solutions | March 31, 2020

# On Retirement

## Every American's Home Is Their Retirement Asset

The answer to the question, “How prepared are you for retirement,” depends a lot on whether you look holistically at the balance sheet, including home equity, or just at the portfolio and income sources like Social Security. When home equity is ignored, that can cause households to make suboptimal decisions, such as forgoing long-planned spending it could afford or taking more investment risk than it’s comfortable with. When a questionable decision like that encounters the kind of market downturn we are currently experiencing, it can do serious damage to household finances and well-being.

We created a model of national home prices that incorporates both market and macroeconomic factors to facilitate goals-based planning that includes home equity. Our analysis indicates that many retirees might benefit from using a home-equity line of credit to cover expenses in down markets, in order to mitigate the damage to portfolios from sharp and sudden downturns in the market.



### Goals Based

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## Home Equity on the Scale

The biggest item households often have on their balance sheet—their home—is ironically also the one most commonly overlooked in a goals-based financial plan. A home differs from other investments in that there is more to making decisions about it than the raw calculus of risk and return. But while some people don't see their homes as marketable assets that can be used to help support spending needs, others willingly embrace the idea of borrowing against homes or even selling them and cashing out. For those people, an assessment of the health of their retirement plan should factor in the equity they've built up in their homes.

There is a catch, however, and that is complexity. The calculus of factoring home equity into a goals-based plan has a lot of moving parts, which accounts for why it's often not done. For starters, incorporating a home within a retirement plan means folding a set of projections of potential future home prices into a broader market analysis. That's difficult for home prices for reasons we'll get into later. What's more, unlike investments, wealth in homes can't easily be tapped to pay expenses. In order to be able to represent the usefulness of the wealth locked up in home equity, an analysis needs to evaluate each of the multitude of factors that drive costs and benefits when either selling the home or borrowing against it, each of which have implications for household finances.

For example, selling a home and renting a similar type of property creates a substantial change in tax and living costs for a household. Maintenance payments are exchanged for rent. While the twin burdens of mortgage payments and property taxes go away, so do their potential tax benefits, with varying costs, depending on the household's tax circumstances (for example, property taxes are unlikely to be written off when there are material state income taxes). Borrowing against a home is more like taking out a securitized loan that can support the portfolio, allowing its investments to continue to grow. However, loans produce future interest expenses and eventually must be repaid, in addition to having their own tax implications. And of course, there is also the potential to combine these strategies, initially borrowing against a home and then selling it later on.

In the following report, we walk through each of these challenges to draw out the implications of incorporating home equity in a retirement plan, both in terms of the degree to which it can alter the picture of retirement readiness and, more importantly, how it can lead to recommendations for more suitable investment strategies.

**IN CASE YOU MISSED LAST QUARTER:** Too often products and strategies aimed at enhancing tax efficiency are discussed independently of one another, rather than as part of an overall picture. Tax efficiency depends on context—complementary combinations of strategies will vary—so understanding how different products and strategies connect across an investment program is crucial. The greatest benefits lie in combining strategies like tax-loss harvesting, asset location, munis, intelligent withdrawal and income smoothing within an integrated approach. Different strategies are more or less important depending on client circumstances.

**GOALS-BASED INVESTING IS WHOLE BALANCE SHEET:** The term “goals-based investing” may sound peculiar to people outside the financial services industry. After all, isn't investing, like most everything else, supposed to be done with a goal in mind? The answer to that question is, yes, of course, however, traditionally the goal has performance relative to some bogey, like the annual percentage rate (APR) on a savings account or the return on the S&P 500 index, depending the risk tolerance associated with the portfolio. Goals-based investing is an explicit recognition that investors' true goals aren't about performance per se, but instead are about stuff like their retirement or kids' education, which changes the foundation on how decisions should be made. In other words, goals-based investing is a decision-making framework that explicitly makes investing a means to the end of the household's real spending and bequest goals. Unfortunately, many versions of this type of framework limit the means available to the household to its investment portfolio. In reality, households have far more resources at their disposal to finance their goals. The distinction is important because a goals-based planning analysis that doesn't take the household's entire balance sheet into account can frame key choices in a misleading way, which can lead to suboptimal decisions.

## The Guts of Goals-Based Planning

A goals-based financial plan is built on projections of key variables evolving over time, along with the uncertainty associated with them. For example, in order to know how much income an investment portfolio can support during retirement, you need to have some idea of the returns it is likely to deliver, together with some estimate of what happens if things turn out better or worse than expected. To include the effect of home equity, the plan also needs to incorporate a forecast of how home prices may change over time.

Modeling home price on a stand-alone basis is insufficient, however. It's also imperative to know how it's likely to behave in relation to other aspects of the balance sheet: Without understanding whether elements on the balance sheet are more or less likely to move in the same direction at the same time, we can't know how diversified household assets are, and consequently what the overall risk exposure is. For example, during the recent novel coronavirus-related market and economic shock, US Treasury bond prices have risen while stock prices have fallen. In contrast, stocks and commodity investments have both fallen steeply in a coordinated fashion.

The less correlated balance-sheet assets are, the less likely they all decline simultaneously, thus softening the blow to household finances in a difficult market and/or economic environment. In practice, most investment assets are positively correlated, but imperfectly so, which is why combining them tends to reduce risk. As we observed in this modeling exercise, one nice quality of property is that it tends to be very weakly correlated with portfolio investments. More on that in a moment.

## Housing Is a Consumer Good

Home prices are challenging to predict. Much like portfolio investments, house prices are influenced by systemic factors, such as interest rates and market sentiment, but also by idiosyncratic factors. But unlike stocks and bonds, which can be purchased in relatively small amounts such that a portfolio can contain many of them, a house is a stand-alone asset whose value can't be hedged in the way that equities or bonds can. So while an investment in a company whose CFO is found to be cooking the books may hurt the overall portfolio performance, that pain might be balanced by another company whose new product offering takes its industry by storm. In a diversified portfolio, these things tend to cancel out, leaving for the most part the systemic factors that drive the overall market. In the case of a home, if a hoarder moves next door, there's no offset to the negative impact. As such, idiosyncratic events play an outsized role in returns. That said, most properties will cluster around the median experience, where our model makes its forecast. As to

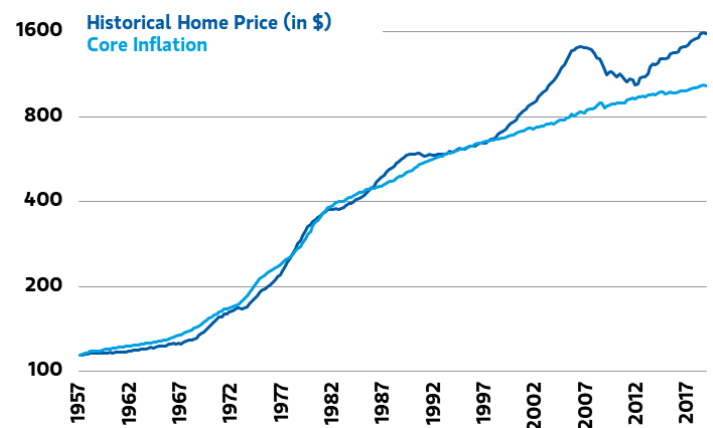
the model itself, the price for residential real estate is linked to the cost of producing it. This is because, theoretically at least, the supply of housing is not fixed. If home prices increase by a significant amount, developers will build more of them until they no longer can make a profit. If homes decrease in value, homebuilding will slow, and supply will be constrained until eventually prices rise again. Consequently, as can be seen in Exhibit 1, one of the more important factors driving house prices over the past 70 years has been inflation.

### Exhibit 1: National Home Prices Track Changes in the Inflation

**IN BRIEF:** The price of homes is tightly linked to the cost of building them, which is why home prices over time have tracked inflation closely, albeit with notable exceptions.

**WHAT'S HAPPENING?** National home prices are much less volatile than stock prices, partly due to the fact that strong price moves up or down can be corrected by increasing or reducing the production of homes. This has kept home prices in line with inflation, with some evidence of a lift-off in recent decades.

**WHAT'S NEXT?** There is a substantial amount of variability in home prices beyond what can be accounted for by inflation. We look to identify the sources of that additional variability and incorporate them in our model.



Source: Bloomberg, Robert Shiller as of February 29, 2020.  
See Endnotes (pages 11-12) for details of the assumptions used in this analysis.

As seen in the Case-Shiller data, home prices have tended to track inflation closely up until 2000, when they began outpacing core inflation, albeit with larger swings and some evidence of mean-reversion. This suggests other factors are at play in determining home prices. Those factors arise out of flaws in the notion that housing supply and demand can be balanced relatively easily. The truth is that the supply in homes often is constrained due to zoning law restrictions on building or land scarcity in urban centers. This increases price

sensitivity to changes in housing demand, including those related to shifts in economic fortunes, monetary conditions and generalized risk appetite.

## Home Price Factors

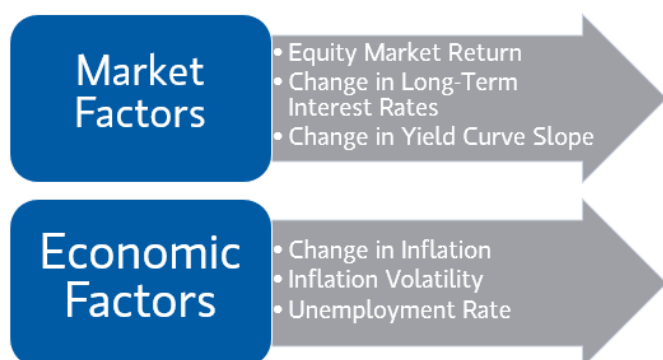
The factors used to estimate those forces in the home price model can be categorized into two groups, as illustrated in Exhibit 2. One group consists of market factors; the other is made up of macroeconomic forces. Market factors include interest-rate changes and the yield curve, which affect home prices via mortgage rates and the degree to which they anticipate the direction of economic activity. It also includes equity market returns, as strong stock performance indicated a greater appetite for risk and produces a wealth effect the encourages home buying.

### Exhibit 2: Factors in the Home Price Model

**IN BRIEF:** The fundamental drivers of home prices include market factors like the stock market or long-term interest rates and macroeconomic factors, like inflation and the level of unemployment.

**WHAT'S HAPPENING?** Low unemployment and a strong equity market (the wealth effect) tend to encourage risk-taking behavior such as buying a home. Rising long-term interest rates cut both ways, reducing housing affordability but also signaling better growth. Using these factors and more, we can improve our understanding of what moves home prices and use that understanding to make a forecast.

**WHAT'S NEXT?** We evaluate the explanatory power of the model, and look to use it to help support decision making involving home equity.



Source: Morgan Stanley Wealth Management Global Investment Committee

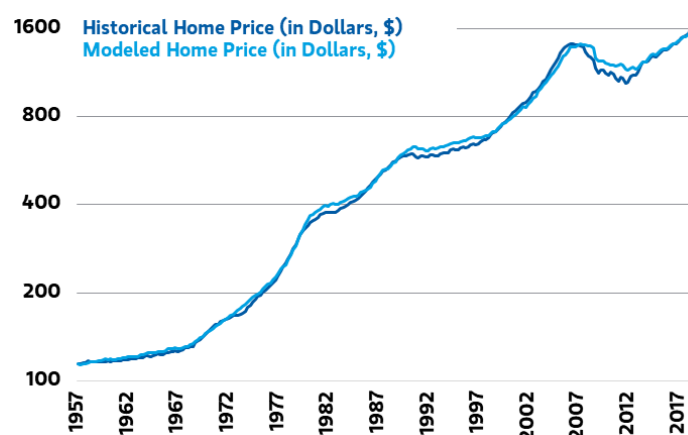
The model's economic factors include inflation, which goes both to the issue of supply discussed earlier and to the cyclical nature of inflation, where it tends to accelerate during periods of easy credit and lending standards and decelerate when credit is tight. The second inflation factor—its volatility—is a more subtle influence. Essentially, in periods of highly volatile inflation, the attractiveness of home buying increases as a hedge against inflation's wealth-destroying effect. Finally, the model incorporates the rate of unemployment, a key indicator of economic health and housing demand. The fit of the model to the underlying Case-Shiller Home Price Index is illustrated in Exhibit 3.

### Exhibit 3: Fitting Model to Data

**IN BRIEF:** Combining its relationship with inflation and other market and macroeconomic factors, as well as the historical momentum in the unexplained portion of home price changes, we get a tight fit to home prices.

**WHAT'S HAPPENING?** Specifying the model for home prices was a challenge, due to asymmetric patterns in explanatory variables such as interest rates and the volatility of home prices, as well as strong autocorrelation. After devising quantitative adjustments for those features of the data, we were able to produce a model containing the important factor relationships uncovered in the data, and produce a good fit to the historical data.

**WHAT'S NEXT?** The value of a model is in its usefulness. This one gives us the capacity to forecast price returns and their relationships to other key variables that also affect household finances.



Source: Robert Shiller, Bloomberg, Wells Fargo, Morgan Stanley Wealth Management Global Investment Committee. Data as of February 29, 2020. See Endnotes (pages 11-12) for details of the assumptions used in this analysis.



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Note that home prices exhibit strong serial correlation, which creates momentum in the significant portion of home price changes that can't be explained by systemic factors. That property of home prices violates some of the core assumptions of the type of linear regression methods that are often used to model financial series data. To address those challenges, our model includes two autocorrelation terms, which correct for the bias caused by serial correlation. The plotted data in Exhibit 3 contain both the explicit factor terms and the autocorrelation terms, which explain approximately 50% of the variation in the historical data.

Models Are Useful

Estimating a model of home prices permits us to begin analyzing financial decisions that revolve around housing. For example, a decision that often confronts households is whether to buy or rent and keep the down-payment money invested in the markets. This can come up in younger households or with retirees who may have sold their home to move to a more retirement-friendly locale. Many people have strong opinions about this choice, but for an objective basis for the decision, we have to run the numbers. Here, we construct a case study for a new retiree who's in the process of selling their home with the intention of moving to a new state, and who is faced with the choice of buying or renting. To ensure the results are comparable, we assume they have the option to rent or buy the same property, with the same market value and carrying cost (note that if we assume rental yields remain constant, rents will be projected to grow in-line with house prices).

After the sale of their home, we assume the household in question has \$1 million in liquid savings, together with income from Social Security. The home for purchase or rent costs roughly \$400,000, and calls for a 20% down payment. We assume a standard 30-year mortgage at 4% interest, initial rent is 5.4% of the home value, (as per the current US median), and that rents grow in line with home value, keeping yields constant. Our analysis can be seen in Exhibit 4, and provides strong backing for the idea that buying is superior to renting across the gamut of financial considerations, including wealth accumulation, progress to goals and potential downside risk. The third category, Buy & Sell, is a version of the "buy" scenario that recognizes that a retiree can sell their home at some later point as their retirement investment portfolio shrinks as needed to support their income. These results make an even stronger case for buying versus renting.

There are several reasons why buying is more favorable than renting, including many well-appreciated facts, such as the tax benefits of homeownership, and less well-appreciated facts, that rising house prices do not necessarily correlate with portfolio investments, helping to diversify the household balance-sheet. But while this result is robust to a range

of assumptions, the calculation is obviously sensitive to mortgage terms, maintenance costs, tax circumstances, home-price forecasts and rental yield forecasts. The devil is in the details, and different permutations of those details can make renting superior to buying. Generally however, buying tends to have a leg up on renting, and in this case study, the difference is substantial.

Exhibit 4: Rent or Buy?

**IN BRIEF:** Our analysis supports the common wisdom that buying is often considerably more financially sound than renting. Part of that are the tax benefits and other public subsidies afforded to homebuyers.

**WHAT'S HAPPENING?** While conventional wisdom often has a sound evidentiary basis, it's not a subject for a dispassionate analysis of the dynamics of the problem. In this case, buying the post-retirement home rather than renting and then selling if need be is much better for the likelihood of achieving financial goals, and the expected bequest.

**WHAT'S NEXT?** While some retirees may find themselves in the position of selling their home and choosing between buying and renting in their new community, we attempt a more universal analysis in our next case study.

	RENT	BUY	BUY & SELL
Probability of Success	66%	75%	92%
Median Ending Wealth	\$83,575	\$722,455	\$705,911
Average Shortfall	(343,242)	(179,087)	(133,066)

Source: Bloomberg, Wells Fargo, Morgan Stanley Wealth Management Global Investment Committee. Data as of February 29, 2020  
See Endnotes (pages 11-12) for details of the assumptions used in this analysis.

Solve the Whole Problem

Buying versus renting is not the only example of the kind of real-world questions that incorporating home equity into an analysis helps us answer. Perhaps the most important is that it provides, for those who own a home, a more comprehensive answer to the question: "Can I meet my financial goals?" That is because the answer reflects the reality of the whole problem retirees face, not a compartmentalized version of it. It is, in fact, common to hear retirement investors voice the idea that their house provides a backstop in case the portfolio falters. Just how much security it provides, however, depends on the particulars. To get an objective sense for any specific set of circumstances, you have to run the numbers.

To illustrate this, consider an example of a new retiree whose retirement savings are housed in qualified retirement vehicles such as IRA and 401(k) accounts, and have grown to \$2.5 million as of her last day at work. Because taxes in such

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accounts are deferred, not exempt, her plan to draw what sounds like a conservative 4% of her nest egg's initial value is actually in excess of 5% after taking taxes into account. This is an example of the kind of issue a goals-based analysis can identify, and plan around. In this case, the higher withdrawal rate introduces an uncomfortable level of risk to the sustainability of her retirement finances, with a nearly 40% probability of running out of money, given a portfolio mix of 50% equities and 50% bonds.

Advisors will typically recommend remediating around a diagnosis like that by cutting back on planned spending or increasing the risk orientation of the portfolio in the hopes that investment returns will cover the savings gap. Indeed, both of these course corrections do reduce the probability of running out of money. For example, the probability of failure drops to 35% if the planned portfolio has 65% equities instead of 50%. Remediation, however, is not cost free. In cutting back on spending, this retiree may miss out on things she's worked hard to be able to do in retirement. On the other hand, jacking up the portfolio's risk orientation

increases the potential for a shortfall in down markets (witness COVID-19 market performance), especially if you panic and sell if losses materialize, locking them in.

## Know Your Options

But what if those steps aren't actually necessary? In this case, our new retiree also owns a home that's worth an estimated \$1.5 million. She still has 10 years and \$400,000 left on her mortgage, leaving her with \$1.1 million in wealth tied up in home equity. What would be the overall impact on her wealth were she willing to borrow against her home or sell it to supplement her retirement income? How much better financial shape would she be in? As illustrated in Exhibit 5, if we assume she sells her house and moves to a rental when her retirement portfolio is exhausted, the answer is quite a bit, with the probability of her running out of money falling from a worrisome 39% to a more manageable 12%. At that risk level, the retiree generally would not have to alter her spending plan or take on more risk to meet her financial goals.

### Exhibit 5: Home Equity Tips the Scales

**IN BRIEF:** A goals-based financial plan that explicitly factors in home equity frames key decisions very differently, here consequentially so. Using a HELOC is a generally superior way to tap home equity in this case.

**WHAT'S HAPPENING?** Putting home equity on the balance sheet changes a savings/investing picture that was challenged without it. That means the retiree can stand pat if they're comfortable with the idea of selling or borrowing on their homes, rather than cut spending or increase risk. Using a HELOC improves plan outcomes and reduces the frequency a retiree would have to move in their lifetime.

**WHAT'S NEXT?** Before leaving this case study, we seek to evaluate these strategies with a backward-looking analysis called a "back test" that captures markets' natural tendency to mean-revert.

	<b>BASILINE</b>	<b>INCLUDE HOME EQUITY</b>	<b>HELOC WITH GOOD CREDIT SCORE</b>	<b>HELOC WITH EXCELLENT CREDIT SCORE</b>
<b>Probability of Success</b>	61%	88%	92%	92%
<b>Probability of Selling Home</b>	0%	42%	29%	28%
<b>Median Ending Wealth</b>	\$2,138,022	\$1,878,104	\$2,375,195	\$2,436,510
<b>Average Shortfall</b>	(994,040)	(533,468)	(506,510)	(471,445)

Source: Bloomberg, Wells Fargo, Morgan Stanley Wealth Management Global Investment Committee. Data as of February 29, 2020  
See Endnotes (pages 11-12) for details of the assumptions used in this analysis.

The downsides of this plan are signaled by the second and third rows of Exhibit 5, respectively. The lesser Median Ending Wealth in the third row means a lower likely bequest available for heirs (that is, when home equity is not drawn down to subsidize income, it eventually passes to the heirs). Relatedly, in this "Include Home Equity" strategy, there's a relatively high 42% chance she'll have to sell her home and

move out at some point. For some people, the thought of having to move might be less palatable than the idea of cutting their spending and/or increasing portfolio risk. Different people will have different priorities. But if you don't know what options are available to begin with, it's impossible to know what option is best for you.

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Of course, there are other ways to tap home equity, each with their own advantages and drawbacks, which should be considered as well. We'll save a deeper dive into the many iterations of strategy for a future issue of *On Retirement*, but for now, we'll add one more scenario: borrowing against your home via a home-equity line of credit (HELOC). In this strategy, the retiree monitors her funding ratio, and if it dips below its initial level due to subpar portfolio performance, uses a HELOC to cover her income until the portfolio recovers. When the maximum loan-to-value or borrowing term is reached, the strategy reverts to the initial one of selling the home when the portfolio value is exhausted, at which point the HELOC is repaid. As can be seen in Exhibit 5, this strategy is an improvement over the baseline along each dimension, from reducing the likelihood and magnitude of plan failure, to increasing expected bequest. Perhaps the most dramatic improvement is to the likelihood the retiree will have to sell her home, which drops to 29% or 28%, depending on the favorability of the HELOC's terms for the borrower.

### Perseverance Is Strategy

The reasons for the vast improvement in retirement income security and wealth accumulation in the HELOC approach relative to the portfolio-only approach, include what we discussed previously in the "Include Home Equity" strategy, which involves simply marshalling home equity for the retiree's goals. Another reason for the improvement in income security and wealth accumulation is the slight tax benefits of a HELOC, as its payments are currently federal income tax deductible up to a cap (recently reduced to \$750K in loan principal, which was not exceeded in our hypothetical case). But the real value of this strategy over the "Include Home Equity" scenario rests in the opportunity it provides for the retirement portfolio to grow and recover from losses it may have sustained, and enhances its income-generating potential.

There's no better case study than the global financial crisis, when many different investment types saw deep drawdowns. The losses experienced in that event were more severe than the present novel coronavirus related market downturn: In a 10-month period from May 2007 to March 2008, the S&P 500 lost over 50% of its value. As brutal as that wealth destruction was, three years from the day the drawdown ended, the market had clawed back all the losses on a total-return basis. A retirement investor who waited out the period rather than selling into it would have been in a better

condition to support needed spending going forward. To do so, however, that retiree would have needed to find a way to support their income in the interim. Otherwise, they would have been forced to liquidate securities at fire-sale prices to provide income, substantially damaging the viability of their retirement portfolio.

This is why borrowing on your home equity to supplement income is a superior approach to waiting until you have no other choice. Indeed, our analysis in Exhibit 5 probably understates the effectiveness of the HELOC strategy. The real-world evidence indicates that periods of particularly poor investment returns tend to set up periods of stronger investment returns and vice versa. However, incorporating this dynamic within a forward-looking simulation analysis is challenging for reasons that are too technical to get into here. But we can get around those challenges by running a different kind of analysis that uses historical rather than projected data, known as a "back test".

### Key Insights

The back test in Exhibit 6 takes our new retiree back in time to different points in history to start her 30-year retirement, (the column above 1988 corresponds to a 30-year period from 1988 to 2018). Plotted in that chart is the amount improvement that using a HELOC provides above the simple strategy of selling the home after the portfolio runs out of funds. The units here represent the additional number of years of spending the plan could support at the end of 30-year analysis period, which in a deterministic analysis like this is the best proxy for the amount of value-added. Because it is a back test and not a simulation, it reflects the tendency of markets to mean-revert in ways that are challenging for a forward-looking analysis. Consequently, we get a fuller picture of the potential value that sparing the portfolio from selling pressure in down markets can facilitate.

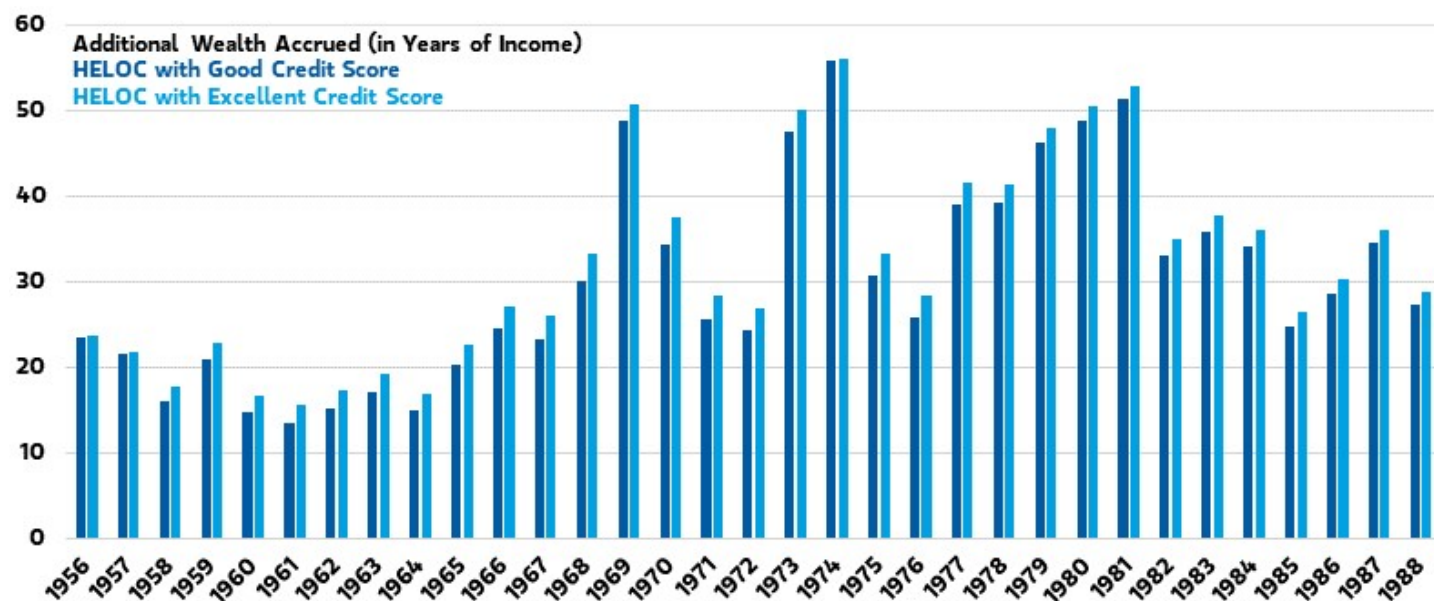
Note that the highest peaks in that chart—the late 1960s, early 1970s and early 1980s—correspond to years where retirement began in a difficult equities market, where the retirement portfolio was at its most vulnerable. Borrowing against the equity built up in a residence during those years added the most value because it mitigated the destructive power of losses on retirement finances. In other words, tapping home equity in this way allows households to mitigate "sequence of return risk": the risk of getting a bear market right before or after retirement.

### Exhibit 6: Perseverance Pays in Retirement

**IN BRIEF:** The back test shows that taking pressure off the portfolio by borrowing against home equity in down markets can create substantial value, as it consistently improved wealth across a range of return patterns for this case study.

**WHAT'S HAPPENING?** Selling into down markets is a wealth destroying behavior that all investors struggle to fight. However, not selling isn't always an option for retirees who are funding their living expenses through their portfolio, and thus face substantial risk, especially just before or after retirement. Using the HELOC to cushion the portfolio to avoid forced selling results in very large wealth gains, especially when retirement starts in bad equity markets, as in the late 1960s, early 1970s and early 1980s.

**WHAT'S NEXT?** We try to draw more general conclusions beyond this case study by stress testing the calculations along several dimensions.



Source: Bloomberg, Wells Fargo, Morningstar, Morgan Stanley Wealth Management Global Investment Committee. Data as of February 29, 2020  
See Endnotes (pages 11-12) for details of the assumptions used in this analysis.

Speaking of market drawdowns, there is another key insight that bears repeating here. The baseline numbers in Exhibit 5 are based on a 50% stock-50% bond investment portfolio because we assumed that the retiree's risk tolerance would restrain her from a more volatile mix with a greater share of stocks. However, our own internal advice engine would recommend 65% and 35% respectively in her case, assuming average risk tolerance. If she went that route, not only would she be exposed to a larger potential deficit and shortfall,

she would also have to endure the short-term pain that comes with major market drawdown events such as we are experiencing now, when people see substantial losses in their portfolio. It is one thing to accept in theory the need to stick with a plan because that is the best way to achieve long-term outcomes. It is quite another thing to follow through in practice, especially if you overstated your appetite for risk because you didn't want to give up those retirement plans.



Caveats and Provisos

While we used a specific case study to highlight the implications of different choices, the general takeaways from our analysis in Exhibits 5 and 6 were sufficiently robust to cover a large number of potential household circumstances. That is not to say they aren't sensitive to certain assumptions or that there aren't circumstances that would change our

conclusions (for example, making the HELOC strategy a less attractive option than going without borrowing). To explore robustness to those assumptions, we ran one factor sensitivity tests across a broad variety of inputs. The results for the most meaningful factors are listed in Exhibit 7, which details the degree that different inputs (such as maximum HELOC loan-to-value) determine the best strategy for mitigating retirement income risk or increasing bequest.

Exhibit 7: Input Sensitivity Analysis

**IN BRIEF:** The results were largely but not entirely robust for a range of potential household circumstances that have an impact on the calculation. The most notable factors we separate into low, medium and high sensitivity.

**WHAT'S HAPPENING?** The key findings of the analysis in Exhibits 5 and 6 were sensitive to input parameters, especially those relating to the HELOC strategy: at what funding ratio trigger it was drawn on (with sooner meaning greater portfolio cushion and strongly preferable) and how much carry investors could expect above its APR (which is influenced by their portfolio risk orientation and the APR). Other factors that influenced the calculation included the household's funding situation and the HELOC terms.

**WHAT'S NEXT?** We look to build on these findings by exploring, in future work, more avenues and lending products for utilizing home equity toward retirement goals.

FACTOR		SENSITIVITY	FACTOR LEVEL		
			HIGH	MEDIUM	LOW
HELOC Terms	Maximum Loan to Value	Low	↑	—	↓
	Repayment period	Medium	↑	—	↓
Strategy Parameters	Funding Status Trigger for HELOC	High	↑	—	↓
	Average Portfolio Carry over HELOC APR	Medium	↑	—	↓
Funding Situation	Housing Overhead (e.g. Maintenance)	Medium	↓	—	↑
	Initial Withdrawal Rate	Medium	↓	↑	↓

Source: Bloomberg, Wells Fargo, Morgan Stanley Wealth Management Global Investment Committee. Data as of February 29, 2020  
See Endnotes (pages 11-12) for details of the assumptions used in this analysis.

The different categories are charted both by their sensitivity and the degree to which higher or lower values of the variable help or hurt the use of the HELOC strategy (green = helped; red = neutral; yellow = hurt). As a general category, the HELOC strategy was sensitive to specific strategy elements. Some of elements are due to household choice, such as the funding ratio trigger at which point the HELOC is opened and used to cover living expenses. Portfolio Carry over HELOC APR involves a mix of circumstances beyond their control, like the interest expense on the HELOC and the expected returns for different categories of investment, and things that they are within their control, such as how much risk the portfolio has and the degree to which it is likely to out-earn the interest expense on the HELOC (after taxes).

Some conclusions were obvious: For example, high maintenance or HOA costs on a home penalize the HELOC strategy, which has a tendency to allow retirees to stay in their homes for longer. Others were less obvious, such as the degree to which high or low withdrawal rates tended to mitigate the usefulness of the HELOC relative to just running the retirement off the portfolio until times of trouble were encountered. Even in the case of higher sensitivity factors, however, most inputs that we evaluated resulted in a net benefit from using the HELOC strategy relative to not doing so. ■

## Progress Update

Updating retiree progress through end of the fourth quarter of 2019, we note that funding ratio changes were positive notwithstanding the drop in interest rates, which magnified the value of retirement income liabilities because of strong equity markets. Of course, the strong gains of 2019 have since been wiped out, so we expect that funding ratios will deteriorate meaningfully in our next issue. At least as of the end of the year, however, each of the three hypothetical retirees was still on track, with our retiree Derek being substantially above 100% funding. As we have noted in the past, Olivia was the most hedged to falling interest rates due to the annuity in her portfolio. That led her to the greatest increase in funding ratio of just shy of 2%. By contrast, our youngest hypothetical investor, Molly, has the greatest interest rate exposure and saw the smallest increase in her funding ratio, rising to just 73%. Strong core and high yield bond allocations also helped enhance returns, somewhat offsetting the pain of the interest rate drop. On balance, it was a good period for retirees, though clearly not strong enough to offset the market losses experienced thus far in the first quarter of 2020.

### Exhibit 8: Updating Progress After 2019

**IN BRIEF:** Funding ratios increased across the board on the back of strong equity returns, but more so for older investors with less interest rate exposure.

**WHAT'S HAPPENING?** Very strong equity markets boosted funding ratios in the second half of 2019. Declining long-term interest rates offset much of the gains, however, except for Olivia whose annuity helped to hedge the drop in interest rates. Derek remains the most well positioned from a tracking perspective, as he is most comfortably on track.

**WHAT'S NEXT?** We look to gauge the fallout on retirement progress from the first quarter selloff in our next issue.

MOLLY, TARGET DATE MODEL	FUNDING RATIO (%)
Beginning Funding Ratio (as of June 30, 2019)	72.3
+ Effect of Equity Returns*	2.7
+ Effect of Alternatives Returns*	0.2
+ Effect of Cash and Bond Returns*	0.2
+ Effect of 30-Year US Treasury Yield Change	-2.4
Ending Funding Ratio (as of December 31, 2019)	73.0

OLIVIA, TARGET INCOME MODEL	FUNDING RATIO (%)
Beginning Funding Ratio (as of June 30, 2019)	83.6
+ Effect of Equity Returns*	2.2
+ Effect of Cash and Bond Returns*	0.2
+ Effect of Change in the Value of VA Benefits*	1.1
+ Effect of 30-Year US Treasury Yield Change	-1.6
Ending Funding Ratio (as of December 31, 2019)	85.5

DEREK, TARGET LIQUIDITY MODEL	FUNDING RATIO (%)
Beginning Funding Ratio (as of June 30, 2019)	101.7
+ Effect of Equity Returns*	2.2
+ Effect of Alternatives Returns*	-0.3
+ Effect of Cash and Bond Returns*	0.6
+ Effect of 30-Year US Treasury Yield Change	-1.4
+ Effect of Change in Expected Longevity**	0.0
Ending Funding Ratio (as of December 31, 2019)	102.8

Source: Bloomberg, FactSet, Morgan Stanley Wealth Management GIC as of February 29, 2020

\*See Endnotes (pages 11-12) for the specific market index proxies of each of the sub-asset classes listed above, as well as assumptions regarding the Target Income Model's variable annuity allocation. \*\*Life expectancy increases with age. For example, the life expectancy of a 21-year-old is 80, while a 65-year-old is expected to live until 83. Increasing expected longevity in retirement increases anticipated spending needs, which reduces a retiree's funding ratio.

## Endnotes

For more information about the assumptions, methodology, and limitations of funding ratio, the three families of retirement models that are the subject of this report, and Monte Carlo simulation, as well as the risks to hypothetical performance, please see the white paper, *Introducing the Morgan Stanley Wealth Management Retirement Framework*.

**Model Calculation Assumptions:** The analyses in this publication are based, in part, on a Monte Carlo simulation, which involves repeated sampling of asset class returns from a known distribution.

**IMPORTANT:** The projections or other information generated by this Monte Carlo simulation analysis regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Results may vary with each use and over time.

As noted in the white paper, starting on Oct. 1, 2015, we began tracking the hypothetical funding ratio of three hypothetical investors in the three retirement models—Target Date, Target Income and Target Liquidity. We will be reporting updates on the progress of these funding ratios on a quarterly basis. Each model's funding ratio is computed as the value of the investment portfolio, assumed to equate to the sum of the value of the positions in the underlying asset classes (whose performance will be measured through representative market indexes), plus the present value of the projected living benefits furnished by an annuity, where applicable, divided by the discounted value of the projected required income, where the discount rate is the 30-year US Treasury bond yield on the final trading day of the quarter. The projected living benefits furnished by an annuity, where applicable, are derived based on 10,000 Monte Carlo simulations, currently using March 2019 GIC capital markets assumptions. They are netted against retirement income cash flows with any surplus discounted to the present on a probability-weighted basis at the applicable 30-year Treasury yield, which is the applicable discount rate for income liability cash flows as well.

The asset classes in the retirement model strategies are represented by the following indexes: for US equities, Russell 3000 Index; for international equities, MSCI EAFE Index; for emerging market equities, MSCI Emerging Markets Index; for investment grade fixed income, Bloomberg Barclays US Aggregate Bond Index; for high yield fixed income, Bloomberg Barclays US High Yield Index; for cash, Citigroup 3-Month T-Bill Index; for REITs, FTSE EPRA/NAREIT Global index; for MLPs, Alerian MLP Index; for absolute return assets, equity hedge assets and equity return assets, HFRI Fund Weighted Composite Index.

After each quarter's new funding ratio is calculated, model strategies are rebalanced based on the strategy, except in the case of the variable annuity in the Target Income Model, which is permitted to drift. All investments are assumed to be housed in qualified tax-deferred retirement accounts. Investment returns will not be netted against assumed transactions costs or other fees, aside from the annuity fees specified. The hypothetical investor utilizing the Target Date model is assumed to have \$300,000 in retirement savings, with total annual income of \$50,000 per year. The hypothetical investor utilizing the Target Income model is assumed to have \$500,000 retirement savings, with total annual income of \$70,000 per year. The individual in early retirement following the Target Liquidity Retirement Model is assumed to have \$1,000,000 retirement savings. The hypothetical investors utilizing the Target Date and Target Income Models are assumed to save 9.5% of pretax income, and to experience real wage growth of 1.0% per annum.

The retirement liability for all investors is assumed to be the real value of \$50,000 per annum, adjusted for inflation, starting at age 65 and lasting until age 80 (except for the hypothetical retiree, whose 100% survivorship age will increase over time, in keeping with the annuity pricing of that liability). After age 80, the investor is assumed to take mortality probability adjusted spending based IRS actuarial table 2000CM. The present value of income liabilities and living benefits from annuity contracts is calculated based on the 30-year US Treasury discount rate. The initial funding ratios for the hypothetical investors in the Target Date, Target Income and Target Liquidity models were 64%, 76% and 93% respectively.

**Variable Annuity Terms:** The projected value of income furnished by annuities is calibrated according to the assumed terms of the contract, (e.g., roll-up rates, withdrawal rate), assuming retirement at age 65 and the simulated value of the subaccount investments, assuming performance in line with the asset allocation indexes. Variable annuity fees are assumed to be 2.5% per annum of the contract value, of which the guaranteed lifetime withdrawal benefits rider accounts for 1.2%. The rider is assumed to provide a minimum roll-up provision of 6% on the benefit base, on an annual, noncompounded basis. The variable annuity is assumed to hold the maximum equity allocation of 70%, with the remaining 30% invested in bonds. Annuity payments are set at 5% of the higher of benefit base or contract value at age 65.

The assumptions used in the analyses outlined in the Exhibits in this report are listed below.

**Exhibit 1:** Historical inflation is represented by Consumer Price Index (CPI). For ease of comparison, CPI index level are scaled up to have a same starting value as Case Shiller House Price Index in 1957.

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**Exhibit 3:** The linear model is implemented to regress the home price log return against seven factors such as equity market return, short term and long term treasury yield, inflation, etc. All factors time series are in absolute return form and normalized using rolling windows. To reduce the heteroscedasticity, the regression is done in two steps. First, Ordinary Least Square is done and residual autocorrelation is checked. Second, a number of lagged residual time series are taken as additional factors and the regression is done again.

**Exhibit 4:** The hypothetical retirees are assumed to be a 65 year old who just starts retirement with \$1,000,000 initial savings. All retirees have individual initial withdrawal rate 6%, adjusted by inflation rate at 1.9% per year.

The mortgage rate is assumed to be 4% for 30 years, while rent is assumed to be 5.41% of the house market value initially and to grow at the consistent rate with home price appreciation. HOA and property tax rate are assumed to be 0.4% and 1%, respectively.

Results are based on a Monte Carlo simulation that simulates both asset returns and investor mortality rate based on the Social Security Office Actuarial Period Life Table 2016. GIC capital markets assumptions are used to simulate asset class returns from age 65.

**Exhibit 5:** The hypothetical retirees are assumed to be a 65 year old who just starts retirement with \$2,500,000 initial savings. All retirees have non-mortgage spending at initial withdrawal rate of 4%, adjusted by inflation rate at 1.9% per year.

The initial house market value is \$1,500,000. The mortgage has 10 years left and balance is \$400,000. The mortgage rate, rent rate, and other house related assumptions are the same as Exhibit 4.

HELOC is triggered as soon as the funding ratio falls below the initial funding ratio. Credit line is assumed to be \$725,000. CLTV is assume to be 75%. Draw period and repay period are assumed to be 10 and 20 years respectively. The starting rate for borrower with good credit score is 4.3%, while the one with excellent credit score is 3.8%.

Results are based on a Monte Carlo simulation that simulates both asset returns and investor mortality rate based on the Social Security Office Actuarial Period Life Table 2016. GIC capital markets assumptions are used to simulate asset class returns from age 65.

**Exhibit 7:** Sensitivity tests are conducted on HELOC by changing CLTV from 55% to 85%, changing repay period from 5 years to 20 years, or changing funding ratio drawdown from -20% to 20%, where funding ratio drawdown is the buffer below the initial funding ratio to trigger HELOC withdrawal.

Sensitivity tests on portfolio strategy are conducted by shocking the total portfolio return by a magnitude from -3% to 3%.

Sensitivity tests on funding situation are conducted by incrementing home cost from 20% to 200% or changing non-mortgage spending initial withdrawal rate from 0.5% to 13.5%.

## Glossary

**ANNUITY** This is a contract in which an insurance company agrees to provide a periodic income payable for the lifetime of one or more persons, or for a specified period.

**AVERAGE SHORTFALL** This is the average amount of income the investor would be short in those simulations of portfolio returns and mortality where the investor has insufficient funds to cover retirement expenses.

**BENEFIT BASE** The benefit base is used to index the payments from a variable or fixed index annuity with an income rider such as a guaranteed lifetime withdrawal benefit. By contrast with the contract value, defined below, the benefit base does not represent the annuity owner's equity in the contract, but is rather an accounting construct by which minimum withdrawal benefits are calculated. During the deferral period, a benefit base will typically grow by a preset "roll-up" amount regardless of what happens to the investments in the annuity. This feature provides protection from market risk. Most typically, if a contract value increases above the benefit base on the contracts reset date, the benefit base will reset higher to the contract value, proportionally increasing future income benefits.

**CONTRACT VALUE** The contract value of an annuity represents the equity the annuity owner holds in that contract. The initial contract value is equal to the initial premium paid, and it will fluctuate subsequently based on the net of additional premiums, withdrawals and the investment performance subject to caps and floors, net of fees. Contract value defines the upside, liquidity and death benefit dimensions of a fixed index or variable annuity without additional riders. This contrasts with the benefit base, which is used only to index regular payments, and cannot be liquidated or transferred to a beneficiary upon death.

**DEATH BENEFIT** The money passed from an annuity contract to its beneficiary upon the death of the owner and/or annuitant. This can include specific death benefit provisions for which the annuity holder pays a fee, or the period-certain provision of a single-premium immediate annuity or a deferred income annuity, or simply the residual contract value of a variable annuity upon death of the owner and/or annuitant.

**DRAWDOWN** This term refers to the largest cumulative percentage decline in net asset value or the percentage decline from the highest value or net asset value (peak) to the lowest value net asset value (trough) after the peak.

## ON RETIREMENT

**FAILURE RATE** The probability that an investment portfolio has failed to provide for the desired level of income throughout retirement, with mortality defined either as a set horizon or an uncertain variable.

**FIXED INDEX ANNUITY** A fixed index annuity is a type of annuity that typically provides the contract owner an investment return based on a formula linked to the change in the level of one or more published equity-based indexes, such as the S&P 500, which tracks the performance of the 500 largest US publicly traded securities. A fixed index annuity provides a guaranteed minimum accumulation value, and may also offer death benefit protection as well as a variety of payout options. Although it is possible to lose money when investing in a fixed index annuity, these products are designed for investors who want a protected investment floor with the ability to partake in the benefits of a market-linked vehicle. The index used, the formula that determines the index rate and the guaranteed minimum value can vary by annuity company and product selected.

**FUNDING RATIO** This ratio is the present value of retirement liabilities divided by the current market value of an investor's retirement savings. In essence, this ratio measures how sufficient a person's savings are relative to projected goal, in this case, retirement needs.

**GUARANTEED LIFETIME WITHDRAWAL BENEFIT** This type of variable annuity income rider promises a certain percentage of a guaranteed benefit base, either paid premiums or a stepped-up base, can be withdrawn annually, regardless of market performance or the actual account balance.

**HIGH-WATER MARK PROVISION** When the contract value of a variable annuity with a guaranteed lifetime withdrawal benefit rider is higher than the contract's benefit base at anniversary, the benefit base will be reset higher to the contract value. Even if the performance of the underlying investments then deteriorates and the contract value falls precipitously, the contract's benefit base will not reset lower, and any guaranteed roll-ups will accrue from that level. In other words, the high-water mark refers to the fact that, once the benefit base has been reset higher, these gains are considered locked in.

**IMMEDIATE ANNUITIES** A class of annuities whose payments begin immediately after the initial purchase.

**ENDING PORTFOLIO VALUE** This is the value remaining in the portfolio in a given simulation at death (whether simulated as uncertain or at a specified age). It reflects the upside an investor experienced during retirement, in terms of additional funds that could be either passed to heirs or used for philanthropy or to increase spending before death, in accordance with the investor's preferences. Portfolio ending value varies based upon market performance and the age of

death. In any given simulation, factors that vary from one simulation to another, so we look at the median and high percentiles to produce representations of average and "best case scenario" upside for a given strategy.

**ROLL-UP RATE** The roll-up rate is the guaranteed percentage that the benefit base of a variable annuity increases by each year during the accumulation stage.

**SINGLE PREMIUM IMMEDIATE ANNUITY (SPIA)** This is an annuity purchased with a single premium on which income payments begin within one year of the contract date. With fixed immediate annuities, the payment is based on a specified interest rate. In the "basic annuities" of this paper, payments are made for the life of the annuitant(s), but SPIAs can also pay out over a specified period, or the greater of a specified period and the life of the annuitant(s) (e.g., 10 years certain and life).

**STEP-UP PROVISION** This is an optional feature of variable annuities which increases the amount of the benefit base if, due to strong performance, the annuity's contract value surpasses its benefit base on specified dates determined in the contract. The variable annuity analyzed in this paper contained a step-up provision.

**SURRENDER CHARGE** The surrender charge is levied against annuitants who withdraw an amount that exceeds a specific percentage. New owners of recently purchased annuities may also be subjected to a surrender charge if they decide to cancel an annuity contract within a specific time period.

**VARIABLE ANNUITY** An annuity contract into which the buyer makes a lump-sum payment or series of payments. In return, the insurer agrees to make periodic payments beginning immediately or at some future date. Purchase payments are directed to a range of investment options, which may be mutual funds or direct investment into the separate account of the insurance company that manages the portfolios. The value of the account during accumulation, and the income payments after annuitization vary depending on the performance of the chosen investment options.

**VARIABLE ANNUITY SUBACCOUNT** This is a portfolio comprised of stocks, bonds or money market securities. Subaccounts can either be actively or passively managed.

**VOLATILITY** This is a measure of the magnitude of variability of the returns of an asset class or security. It is generally the case that a larger dispersion of return implies greater risk, as this implies more substantially adverse outcomes for a given level of likelihood of their occurrence. Volatility is measured statistically as the forecasted standard deviation of return. Standard deviation can be thought of as the average difference between an individual data point (in this case an observed investment return) and the average value of all data points under consideration.



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### Disclosure Section

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For index, indicator and survey definitions referenced in this report please visit the following: <https://www.morganstanley.com/wealth-investmentsolutions/wmir-definitions>

#### Risk Considerations

##### Hypothetical Performance

**General:** Hypothetical performance should not be considered a guarantee of future performance or a guarantee of achieving overall financial objectives. Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets. Hypothetical performance results have inherent limitations. The performance shown here is simulated performance, not investment results from an actual portfolio or actual trading. There can be large differences between hypothetical and actual performance results achieved by a particular asset allocation.

Despite the limitations of hypothetical performance, these hypothetical performance results may allow clients and Financial Advisors to obtain a sense of the risk/return trade-off of different asset allocation constructs. Investing in the market entails the risk of market volatility. The value of all types of securities may increase or decrease over varying time periods. This analysis does not purport to recommend or implement an investment strategy. Financial forecasts, rates of return, risk, inflation, and other assumptions may be used as the basis for illustrations in this analysis. They should not be considered a guarantee of future performance or a guarantee of achieving overall financial objectives. No analysis has the ability to accurately predict the future, eliminate risk or guarantee investment results. As investment returns, inflation, taxes, and other economic conditions vary from the assumptions used in this analysis, your actual results will vary (perhaps significantly) from those presented in this analysis.

The assumed return rates in this analysis are not reflective of any specific investment and do not include any fees or expenses that may be incurred by investing in specific products. The actual returns of a specific investment may be more or less than the returns used in this analysis. The return assumptions are based on hypothetical rates of return of securities indices, which serve as proxies for the asset classes. Moreover, different forecasts may choose different indices as a proxy for the same asset class, thus influencing the return of the asset class.

**International investing** entails greater risk, as well as greater potential rewards compared to U.S. investing. These risks include political and economic uncertainties of foreign countries as well as the risk of currency fluctuations. These risks are magnified in countries with emerging markets, since these countries may have relatively unstable governments and less established markets and economies.

**Alternative investments** often are speculative and include a high degree of risk. Investors could lose all or a substantial amount of their investment. Alternative investments are suitable only for eligible, long-term investors who are willing to forgo liquidity and put capital at risk for an indefinite period of time. They may be highly illiquid and can engage in leverage and other speculative practices that may increase the volatility and risk of loss. Alternative Investments typically have higher fees than traditional investments. Investors should carefully review and consider potential risks before investing. 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**Bonds** are subject to interest rate risk. When interest rates rise, bond prices fall; generally the longer a bond's maturity, the

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more sensitive it is to this risk. Bonds may also be subject to call risk, which is the risk that the issuer will redeem the debt at its option, fully or partially, before the scheduled maturity date. The market value of debt instruments may fluctuate, and proceeds from sales prior to maturity may be more or less than the amount originally invested or the maturity value due to changes in market conditions or changes in the credit quality of the issuer. Bonds are subject to the credit risk of the issuer. This is the risk that the issuer might be unable to make interest and/or principal payments on a timely basis. Bonds are also subject to reinvestment risk, which is the risk that principal and/or interest payments from a given investment may be reinvested at a lower interest rate.

**Bonds rated below investment grade** may have speculative characteristics and present significant risks beyond those of other securities, including greater credit risk and price volatility in the secondary market. Investors should be careful to consider these risks alongside their individual circumstances, objectives and risk tolerance before investing in high-yield bonds. High yield bonds should comprise only a limited portion of a balanced portfolio.

**Interest on municipal bonds** is generally exempt from federal income tax; however, some bonds may be subject to the alternative minimum tax (AMT). Typically, state tax-exemption applies if securities are issued within one's state of residence and, if applicable, local tax-exemption applies if securities are issued within one's city of residence.

**Treasury Inflation Protection Securities' (TIPS)** coupon payments and underlying principal are automatically increased to compensate for inflation by tracking the consumer price index (CPI). While the real rate of return is guaranteed, TIPS tend to offer a low return. Because the return of TIPS is linked to inflation, TIPS may significantly underperform versus conventional U.S. Treasuries in times of low inflation.

**Yields** are subject to change with economic conditions. Yield is only one factor that should be considered when making an investment decision.

**Equity securities** may fluctuate in response to news on companies, industries, market conditions and general economic environment.

Companies paying **dividends** can reduce or cut payouts at any time.

**Investing in smaller companies** involves greater risks not associated with investing in more established companies, such as business risk, significant stock price fluctuations and illiquidity.

**Stocks of medium-sized companies** entail special risks, such as limited product lines, markets, and financial resources, and greater market volatility than securities of larger, more-established companies.

**Value investing** does not guarantee a profit or eliminate risk. Not all companies whose stocks are considered to be value stocks are able to turn their business around or successfully employ corrective strategies which would result in stock prices that do not rise as initially expected.

**Growth investing** does not guarantee a profit or eliminate risk. The stocks of these companies can have relatively high valuations. Because of these high valuations, an investment in a growth stock can be more risky than an investment in a company with more modest growth expectations.

**Asset allocation and diversification** do not assure a profit or protect against loss in declining financial markets.

The **indices** are unmanaged. An investor cannot invest directly in an index. They are shown for illustrative purposes only and do not represent the performance of any specific investment.

The **indices selected by Morgan Stanley Wealth Management** to measure performance are representative of broad asset classes. Morgan Stanley Smith Barney LLC retains the right to change representative indices at any time.

**Credit ratings** are subject to change.

**REITs investing** risks are similar to those associated with direct investments in real estate: property value fluctuations, lack of liquidity, limited diversification and sensitivity to economic factors such as interest rate changes and market recessions.

Because of their narrow focus, **sector investments** tend to be more volatile than investments that diversify across many sectors and companies.

**Rebalancing** does not protect against a loss in declining financial markets. There may be a potential tax implication with a rebalancing strategy. Investors should consult with their tax advisor before implementing such a strategy.

**Investing in foreign emerging markets** entails greater risks than those normally associated with domestic markets, such as political, currency, economic and market risks.

**Investing in foreign markets** entails greater risks than those normally associated with domestic markets, such as political, currency, economic and market risks. **Investing in currency** involves additional special risks such as credit, interest rate fluctuations, derivative investment risk, and domestic and foreign inflation rates, which can be volatile and may be less liquid than other securities and more sensitive to the effect of varied economic conditions. In addition, international investing entails greater risk, as well as greater potential rewards compared to U.S. investing. These risks include political and economic uncertainties of foreign countries as well as the risk of currency fluctuations. These risks are magnified in countries with emerging markets, since these countries may have relatively unstable governments and less established markets and economies.

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## ON RETIREMENT

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