



## The Retirement Conundrum: Untying the Gordian Knot

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Marc Odo, CFA®, CAIA®, CIPM®, CFP®

## PREFACE: THE LEGEND OF THE GORDIAN KNOT

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Legend has it that Alexander the Great spent the winter of 333 B.C. in the city of Gordium, before his conquest of the Persian Empire. For generations a chariot rested in the middle of town, tied to a post via an intricate knot. A prophecy foretold that the person who could undo the Gordian Knot would become the lord of all Asia. Countless challengers, high and low, had attempted to untangle the knot without success. The Gordian Knot seemed an unsurmountable problem.

Never one to back down from a challenge, Alexander took his turn at the Knot. He first attempted the traditional means of simply untying it, but found no success using the same tired and tried means that every other challenger employed.

So Alexander took a step back, unsheathed his sword, and in a single bold stroke cleaved the Knot that had confounded all others.

Having undone the Gordian Knot, Alexander then set out and conquered Asia.

The Legend of the Gordian Knot has become an allegory and an endorsement for using innovative thinking and bold action to solve a seemingly insurmountable problem. This paper will outline and explore the numerous challenges facing a generation of retirees. Moreover, it will make the argument that Swan Global Investment's Defined Risk Strategy is well-suited to be the solution to these challenges.



Alexander Cutting The Gordian Knot, Fedele Fischetti, Naples, 1734-1789

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## THE RETIREMENT CONUNDRUM: UNTYING THE GORDIAN KNOT

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The challenges facing investors entering retirement are vast. Responsible for 54%<sup>1</sup> of the investable wealth the United States, the baby boomers born between 1946 and 1970 are marching into retirement. Although well documented, it is worth outlining the obstacles baby boomers face in maintaining a happy, healthy lifestyle through the decades of their retirement. These include:

- The diminished role of public and private pensions and the greater importance of “do it yourself” defined contribution and IRA plans
- Increased longevity risk as people are living longer than ever before
- Bond yields at historic lows, threatening both the income and capital preservation roles of fixed income
- Stock markets at all-time highs while the global economy is slowing
- The risk of withdrawing from baby boomers’ retirement accounts during bear markets in bonds and/or stocks
- The risk investors pose to themselves by panic-selling during market downturns

Any of these problems individually would be a challenge, but the combined effect of several or all of these issues pose a problem that might appear insurmountable. Tangled together into a big knot, it is difficult to know where to even start to find a solution.

However, we at Swan Global Investments would argue that the retirement challenge is also a profound opportunity. The importance of having intelligent, forward-thinking financial advisors directly solving this situation is more important than ever. One-click solutions like target date funds or robo-advisors will not solve the retirement conundrum. Following the same cookie-cutter, 60/40 solutions outlined in textbooks will not solve the retirement problem. We believe that only bold, forward-thinking solutions that directly address the biggest risks to the retired baby boomers will solve the problem. And moreover, we believe the rewards to those financial advisors who successfully solve this problem will be immense.

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## WHAT IS DIFFERENT THIS TIME?

It has been seven years since the credit crisis and Great Recession of 2007-08. Although the markets have recovered mightily since bottoming out in March 2009, it is worth noting some of the

differences between where we were prior to the credit crisis and where we are today:

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<sup>1</sup> “Uncommon Sense: Most Baby Boomers Are Not Downsizing”, Jeremy Burbank, Nielsen, 1/09/2015 <http://www.nielsen.com/us/en/insights/news/2015/most-baby-boomers-are-not-downsizing-quite-the-contrary.html>

	Pre-Crisis	Today
S&P 500 Price Level	1,503 (as of 6/30/2007)	2,674 (as of 12/29/2017)
P/E ratio of S&P 500, trailing 12 month <sup>2</sup>	17.06 (as of 6/30/2007)	33.31 (as of 12/29/2017)
Shiller P/E ratio of S&P 500 <sup>3</sup>	27.41 (as of 7/01/2015)	32.47 (as of 12/29/2017)
Cumulative return since last bear market <sup>4</sup>	+85.50% (April 2003 – July 2007)	+338.47% (March 2009 – Dec 2017)
10-year Treasury yield curve rates <sup>5</sup>	5.03%	2.40% (as of 12/29/2017)
3-month yield curve rates <sup>6</sup>	4.82%	1.28% (as of 12/29/2017)
Federal Reserve balance sheet <sup>7</sup>	\$0.85 trillion (as of 6/27/2007)	\$4.45 trillion (as of 12/27/2017)

Table 1

The other big difference between 2007-08 and today is simply the fact that ten years have gone by. Within the last decade, the leading cohort of the baby boom generation has surpassed the traditional retirement age of 65 years. Those boomers who stayed diligent and committed to saving and investing through the credit crisis of 2007-08 and dot-com bust of 2000-03 probably actually benefitted from being able to “buy on the lows.” However, as baby boomers transition from the accumulation to the distribution/irreplaceable

capital stage of their life cycle, another large bear market in equities could prove catastrophic. Moreover, based upon the status of the fixed income market, it is unlikely that fixed income will be able to provide its traditional role in a portfolio.

One would be hard-pressed to choose which of the two major asset classes, equity or fixed income, is the more precarious today. This paper will start with fixed income.

<sup>2</sup> Source: Morningstar Direct

<sup>3</sup> <http://www.multpl.com/shiller-pe/table?f=m>

<sup>4</sup> Source: Zephyr StyleADVISOR

<sup>5</sup> Source: <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/>

<sup>6</sup> Source: <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/>

<sup>7</sup> Source: <http://www.federalreserve.gov/releases/h41/>

<sup>8</sup> Source: <https://research.stlouisfed.org/>

<sup>9</sup> Source: Zephyr StyleADVISOR. Average annual return, 12/31/78 - 9/30/2015.

## THE ROLE OF FIXED INCOME IN A PORTFOLIO

Traditionally, fixed income has performed two roles in a portfolio: income and capital preservation. Over the last 30 years, fixed income has performed both roles admirably. Since the Volker Fed tamed inflation in the early 1980s, interest rates on 10-year Treasury bonds have declined from a peak of 15.32% in 1981 to 2.40% at the end of 2017. The decline in rates is displayed as the red line and

right-hand axis on the graph below. Since bond prices and yields move in opposite directions, the Barclays U.S. Aggregate Bond index has returned an average annualized 7.53% over that time. The cumulative return of the bond index is displayed in blue during this period of declining rates.

Decades Long Bull Market in Bonds as Yields Fell

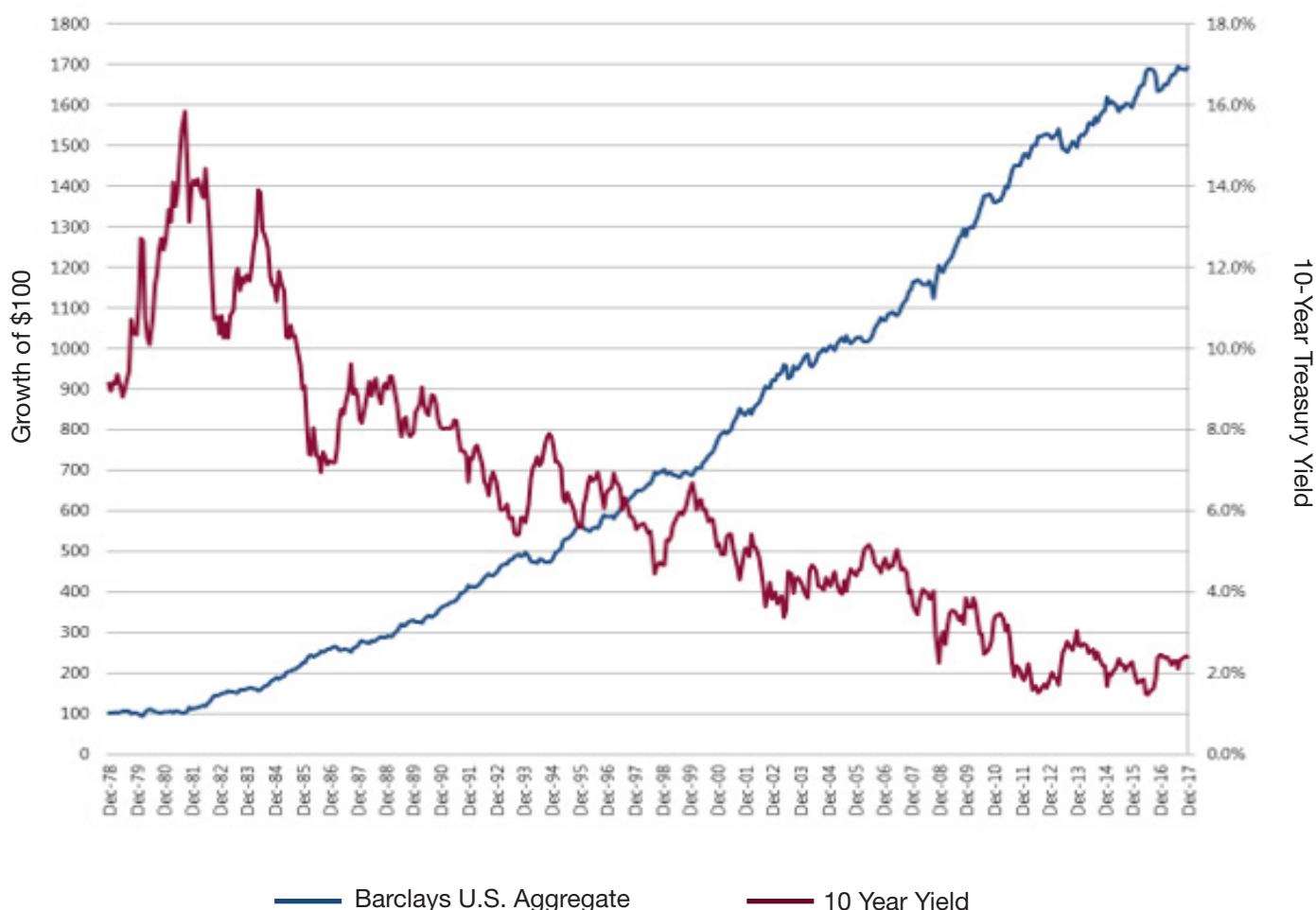


Chart 1

Source: Zephyr StyleADVISOR, Swan Global Investments

Bonds performed their capital preservation role particularly well during the two major bear markets of 2000-02 and 2007-08. During the dot-com bust and the credit crisis the S&P 500 index lost 41.50% and 50.17%, respectively. During those same time periods the Barclays U.S. Aggregate Bond index had positive returns of 32.51% and 7.04%<sup>10</sup>.

However, with rates at historic lows it is difficult to see how bonds would be able to provide much income or capital preservation going forward. A newly issued 10-year Treasury bond locks in a yield of 2.40% over the next decade, which is unlikely to cover the expected rate of inflation. Moreover, as interest rates rise and it is inevitable that the prices of bonds will fall. The duration of the average intermediate-term investment grade bond fund in Morningstar is 5.27 as of 11/30/2017, meaning a 1% rise in interest rates should correspond to a 5.27% price drop. Those hoping

that bonds will retain value or even appreciate at anything close to their historic levels are likely to be very disappointed.

Much of this is due to the fallout from the credit crisis. Granted, the credit crisis of 2007-08 was the biggest threat to the global financial system since the Great Depression of the 1930's and extreme responses were necessary to keep the system from breaking down entirely. That said, the exceptionally accommodative monetary and fiscal policies enacted during the crisis have become a seemingly permanent part of the financial landscape. There have been many unintended consequences of these policies, and no one is quite sure how things will play out in the next crisis. First and foremost, yields have been miniscule for years now.

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<sup>10</sup> Source: Zephyr StyleADVISOR. Dot-com bear market: April 2000 - February 2003. Credit crisis bear market: October 2007 – February 2009.

## Short Term and Long Term Yields: Jan. 1, 2007 - Dec. 31, 2017

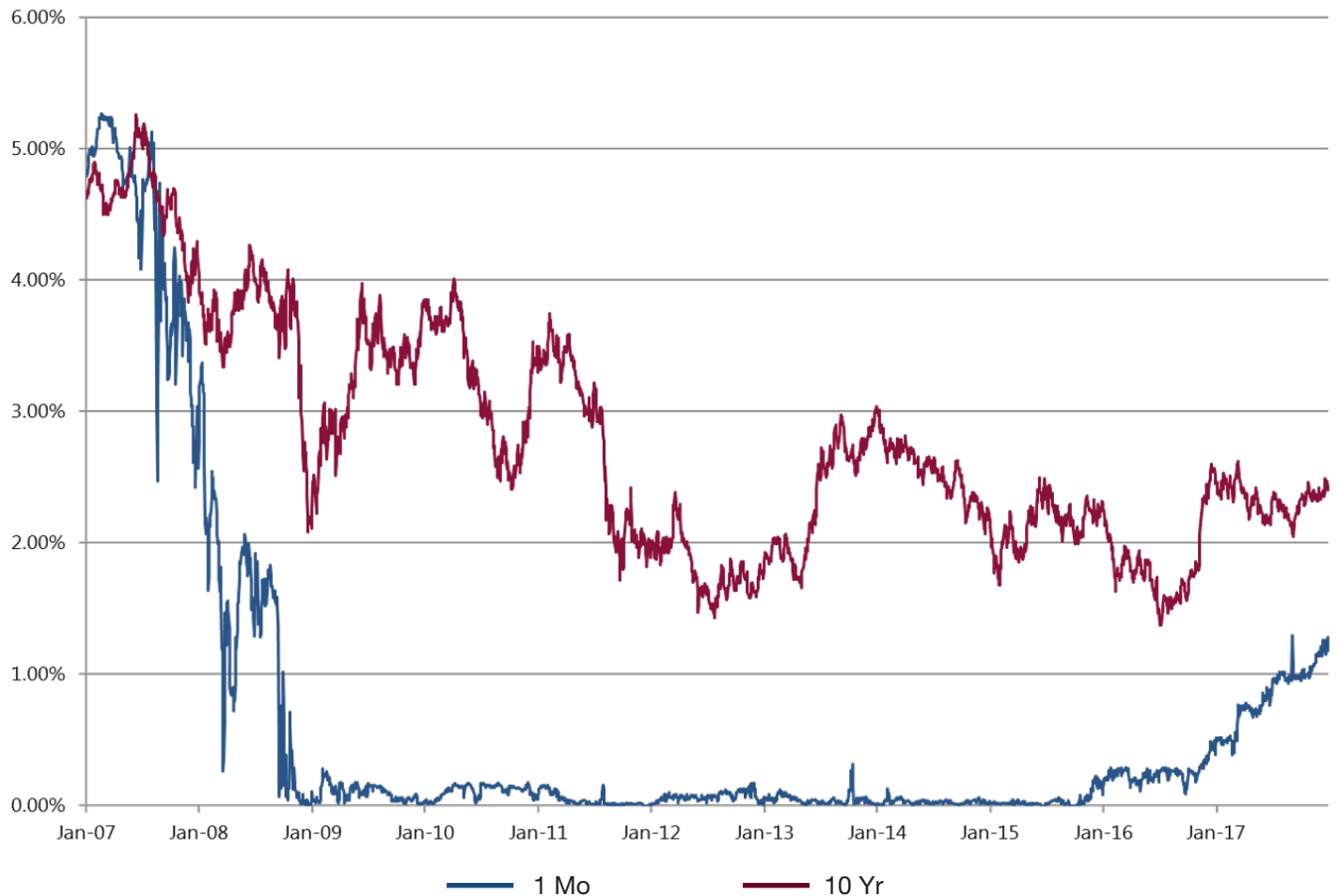


Chart 2

Source: St. Louis Federal Reserve Bank

With rates at rock-bottom levels, central banks around the globe have embraced the previously experimental tactic of quantitative easing or open market operations to create even looser monetary conditions. The Federal Reserve Balance sheet ballooned from under \$1 trillion in assets prior to the crisis, to an estimated peak just under \$4.5

trillion. At various times over the last nine years, the Bank of England, the Bank of Japan, and the European Central Bank have also pursued similar policies. Just how the world's central banks plan to unwind such enormous positions without adversely impacting the markets or the global economies has yet to be seen.



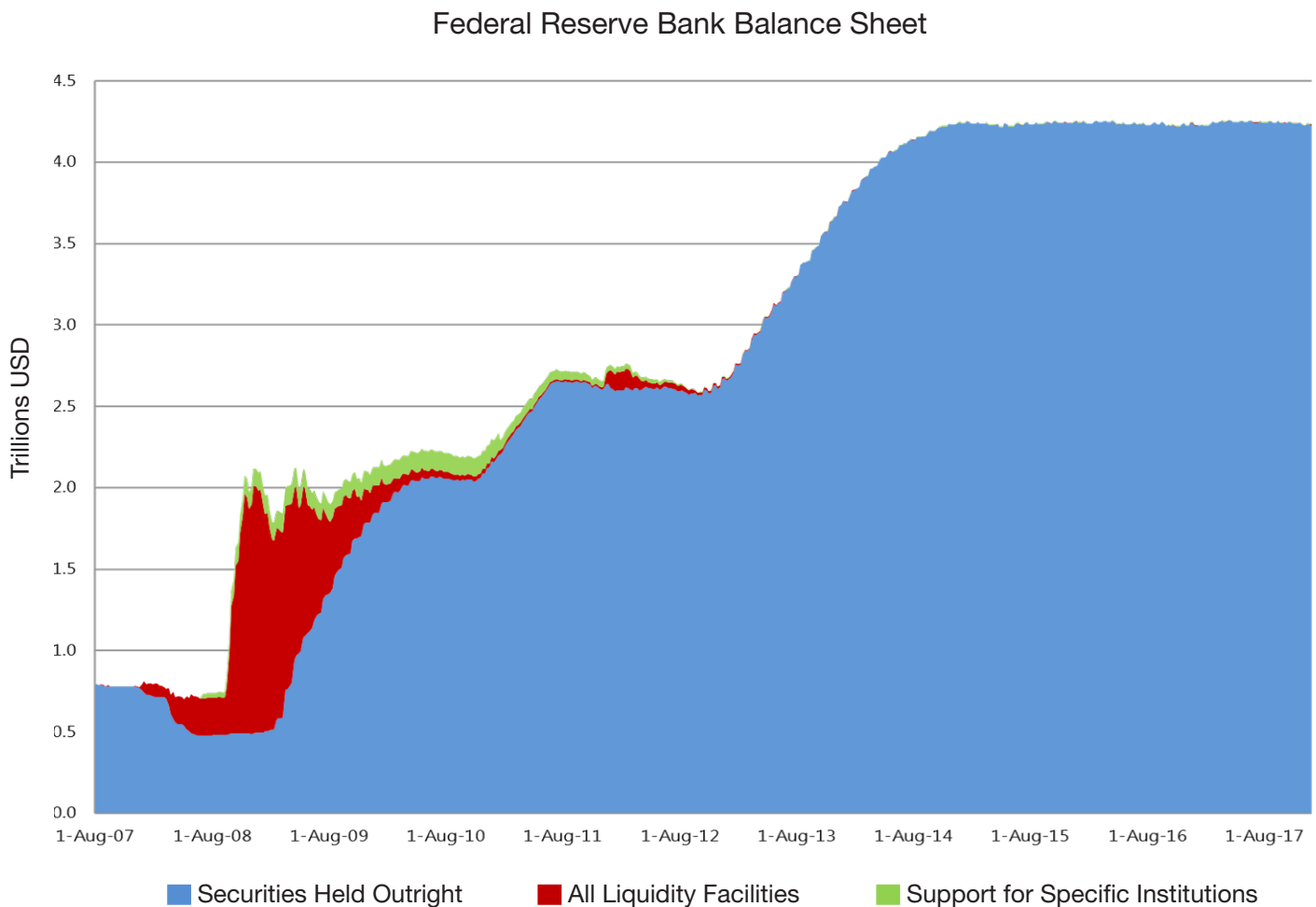


Chart 3

Source: Federal Reserve Bank

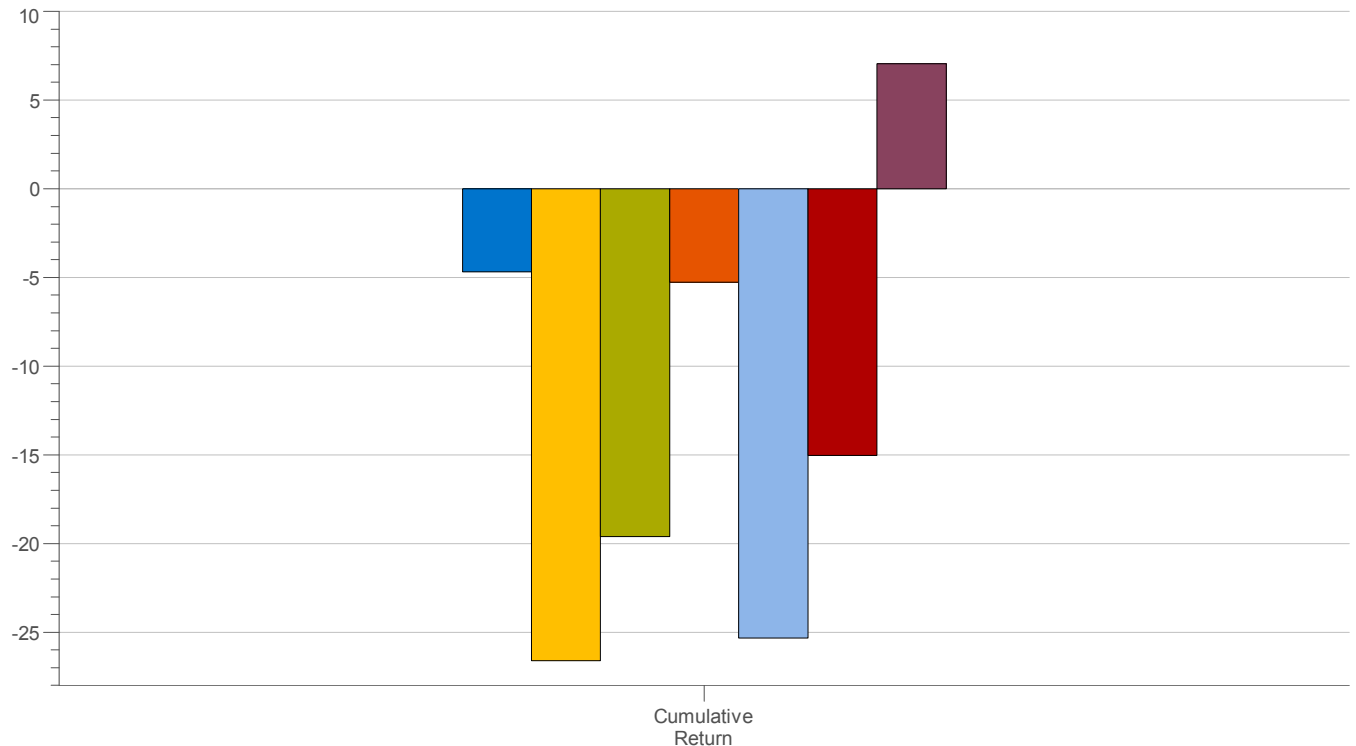
While benefitting borrowers, low rates undoubtedly punish savers. With yield so scarce in investment grade debt around the globe, money has flowed into a wide variety of spread products chasing yield. An estimated cumulative flow of \$550bn into “spread” debt securities like high yield bonds, emerging market debt, world bond funds, bank loan funds, “non-traditional” and “multi-sector” bonds funds, has occurred since January 2007.

These asset classes have traditionally done much worse than investment grade bonds during times of financial crisis. The graph below compares the average Morningstar mutual fund returns of investment grade and non-investment grade bond funds during the period October 2007 to February 2009.



## Multi-Statistic

October 2007 - February 2009



Morningstar Intermediate-Term Bond   Morningstar High Yield Bond   Morningstar Emerging Markets Bond  
 Morningstar World Bond   Morningstar Bank Loan   Morningstar Multisector Bond  
 Barclays U.S. Aggregate

Chart 4

Source: Zephyr StyleADVISOR, Swan Global Investments

Another unintended consequence of government policy has been a dramatic decrease of bond inventories kept on the books of the major banks and brokerages. Under pressure to decrease holdings of non-Treasury debt, banks have been pushed out of their traditional market-maker role in fixed income. Should a run on fixed income occur, the liquidity of the bonds might be severely

tested. A mid-sized money manager was recently forced to limit redemptions of their open ended mutual fund due to the illiquidity of their underlying holdings. Indeed, some forward-looking market watchers are predicting this will be the source of the next financial crisis.

## EQUITY MARKETS: RECENT HISTORY AND OUTLOOK

Certainly the U.S. equity markets have been on a remarkable bull run since bottoming out in March 2009. While the market has endured a couple of short-term, minor corrections in the 10% range, we have not seen a bear market of 20% or larger losses since the dark days of the credit crisis. Cumulatively, the S&P 500 has gained just over 335% between March 2009 and December 2017 and has not experienced a 20% drop during that time. At over eight and a half years, it is now the longest bull market in the history of the U.S. stock market.

Sadly, the outlook for the coming decade is not as rosy. As the following chart shows, many leading investors in the world have recently spoken about the low level of expected returns for both equities and bonds going forward. Most of these expert forecasts are based upon fundamentals. On the equity side, their forecasts are based upon dividend yields, earnings growth, and economic conditions. On the fixed income side, their expectations are built upon current yields and eventual rate increases.

Source	Organization	Equities	Bonds
John Bogle <sup>11</sup>	Vanguard	4%	3%
BlackRock <sup>12</sup>	BlackRock	3.6%	1.8%
Rob Arnott <sup>13</sup>	Research Affiliates	0.4%	2.8%
JP Morgan <sup>14</sup>	JP Morgan	5.5%	2.5%
Morningstar Investment Management <sup>15</sup>	Morningstar	1.8%	2.5%
"Long-Term Asset Class Forecasts" <sup>16</sup>	State Street Global Advisors	5.8%	2.3%-2.9%
"Ten Year Capital Market Assumptions" <sup>17</sup>	BNY Mellon Investment Management	6.3%	2.6%

Table 2

<sup>11</sup>October 2017. <http://news.morningstar.com/articlenet/article.aspx?id=842900> Based on U.S. large cap equities and 50% U.S. 10-year Treasury and 50% U.S. corporate bond index.

<sup>12</sup>November 2017. <https://www.blackrock.com/institutions/en-us/insights/portfolio-design/capital-market-assumptions> Based on U.S. large cap equities and Barclays U.S. Aggregate Bond Index.

<sup>13</sup>December 2018. [https://www.researchaffiliates.com/en\\_us/publications/articles/645-cape-fear-why-cape-naysayers-are-wrong.html](https://www.researchaffiliates.com/en_us/publications/articles/645-cape-fear-why-cape-naysayers-are-wrong.html) Based on U.S. large cap equities and Barclays U.S. Aggregate Bond Index. RA states their returns forecast in real terms.

<sup>14</sup>September 2017. <https://am.jpmorgan.com/gi/getdoc/1383498280832> Based on U.S. large cap equities and U.S. 30-year bond.

<sup>15</sup>September 2017. <http://news.morningstar.com/articlenet/article.aspx?id=842900> Based on U.S. large cap equities and U.S. bonds.

<sup>16</sup>June 2017. <https://www.ssga.com/market-commentary/forecasts/2017/Q3/long-term-asset-class-forecasts-june-30-2017.pdf> Based on U.S. large cap equities and U.S. bonds (range present includes the forecast for 10+ years for U.S. government bonds at 2.3%, U.S. TIPS at 2.4%, to U.S. Investment-Grade bonds at 2.9%).

<sup>17</sup>2017. [http://www.bnymellonam.jp/wordpress/wp-content/uploads/2\\_BNY-Mellon-10yr-CapMkt-2017-WP.pdf](http://www.bnymellonam.jp/wordpress/wp-content/uploads/2_BNY-Mellon-10yr-CapMkt-2017-WP.pdf) Based on U.S. large cap equities and U.S. Bond Aggregate.

About the only ones with optimistic market assumptions are public pension plans. A recent study<sup>19</sup> by the National Association of State Retirement Administrators audited the return expectations of 126 public pension plans. The average expected return expectation was 7.68%. Clearly, this does not reconcile with the expert forecasts. If the experts are right in predicting fixed income returns between 2% and 4% and equities somewhere between 4% and 6%, there is no possible combination of those returns that would get to 7.68%. Unless extraordinary market

returns bail out these defined benefit plans, eventually they will be forced to cut benefits or raise taxes, neither of which are good for the public.

To summarize, it appears that we've painted ourselves into a corner and it is unclear how we will get out the next time a crisis hits. Does any of this matter? In the next section we will explore the impact of bonds and equity on investor portfolios.

## PORTFOLIO CONSTRUCTION FOR THE RETIREE

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Traditional portfolio construction dictates that as investors age they should reposition their portfolios to be more conservative. Certainly this is a logical approach, as in their retirement years a retiree's nest egg becomes irreplaceable capital. Many retirees won't or simply can't go back to work to replenish losses in an investment portfolio.

However, the traditional portfolio solution is to simply increase fixed income exposure and decrease equity. The fixed income/equity exposure was viewed as a dial that one turns towards "conservative" or "aggressive" depending upon years until retirement. The entire Target Date or

LifeCycle fund market is essentially based upon this idea. One of the most significant innovations in the financial markets over the last two decades, Target Date funds have grown to almost \$1 trillion in assets<sup>20</sup>. Some market watchers estimate that will double to \$2 trillion by 2018<sup>21</sup>.

The make-up of such funds is fairly straightforward. Below is a graph illustrating the fixed income-vs.-equity trade-off across target date funds of different time horizons. Across these Morningstar category averages, 90% of the holdings are in either equity or fixed income. The only difference, really, is the relative ratio between the two.

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<sup>20</sup>Morningstar 2014 Target-Date Series Research Paper, "Target Date Funds Take Over". \$700bn in mutual funds, \$300bn in CITs.

<sup>21</sup>Barron's, July 5, 2014, Andrew Bary

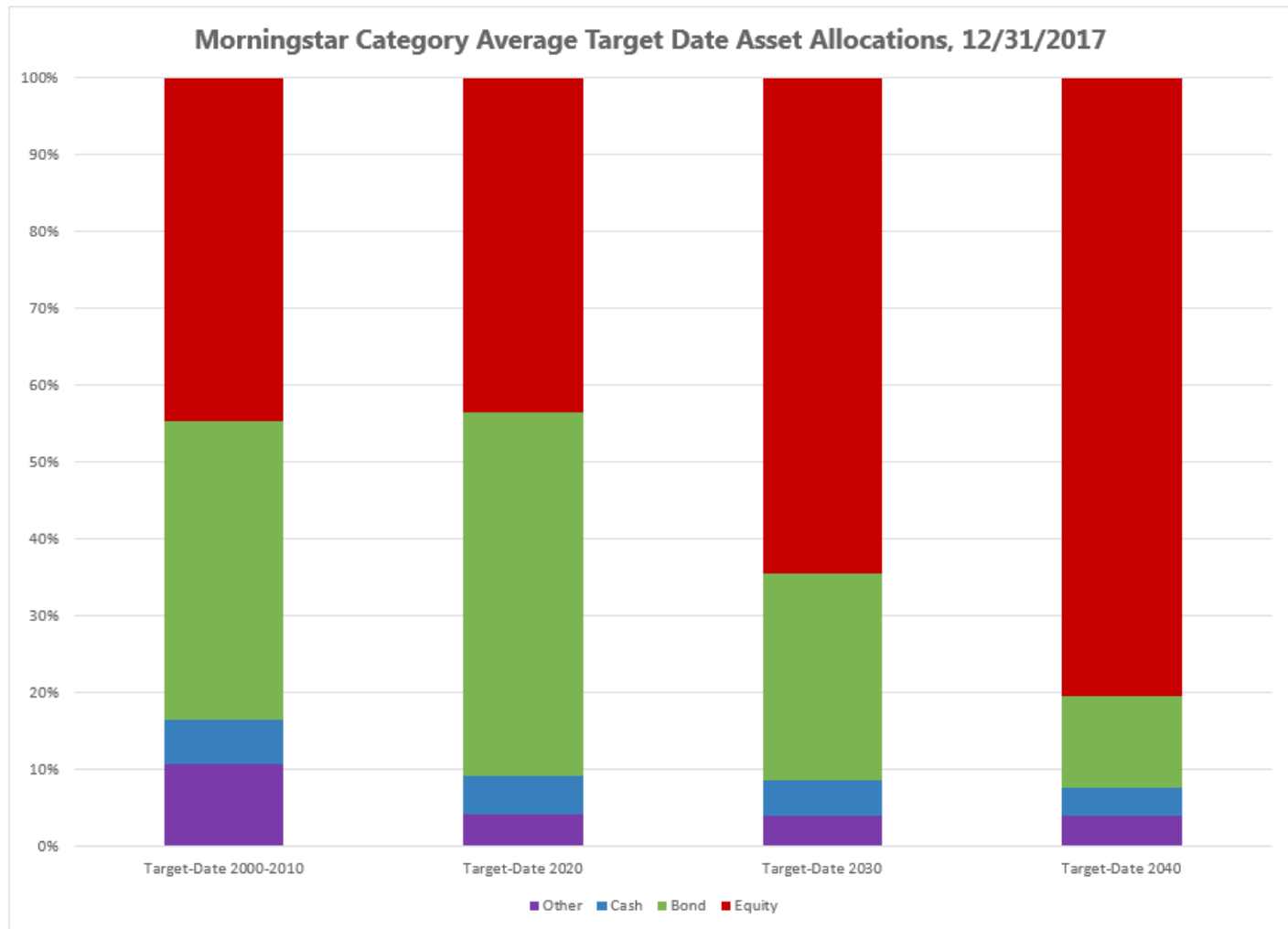


Chart 5

Source: Morningstar Direct, Swan Global Investments

Given the current state of the fixed income markets discussed previously, investors should be very worried about the prospects for portfolios going forward. With almost no “gas left in the tank” in either the fixed income or equity markets, it is difficult to be bullish on the prospects of any of these allocations going forward. In fact, it is entirely possible that both equity and fixed income go into a bear market simultaneously.

Moreover, it is worth examining just how well target date funds have done in good environments. Over the last two decades, we have seen three bull markets and two bear markets. The current bull market in equities is one of the longest on record and the bull market in bonds has continued almost unabated for 35 years. How have target date funds performed, on average, under what were largely favorable conditions?

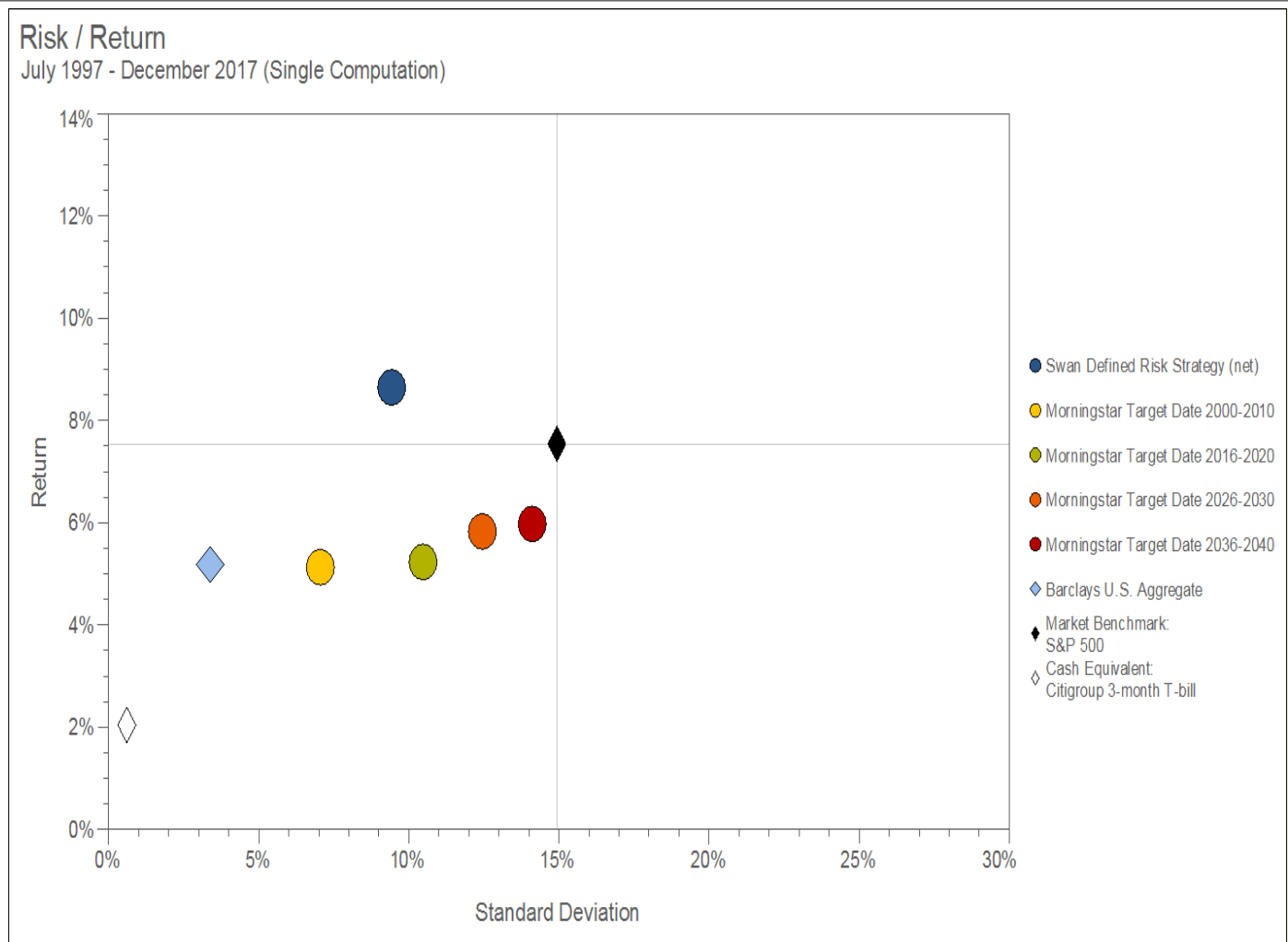


Chart 6

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR

July 1997 - December 2017	Return	Cumulative Return	Standard Deviation	Sharpe Ratio	Up Capture vs. Market	Down Capture vs. Market
Swan Defined Risk Strategy (net)	8.64%	446.89%	9.42%	0.7	52.53%	13.04%
Morningstar Target Date 2000-2010	5.14%	179.24%	7.05%	0.44	45.49%	36.74%
Morningstar Target Date 2016-2020	5.23%	184.36%	10.47%	0.3	64.97%	69.36%
Morningstar Target Date 2026-2030	5.83%	219.55%	12.45%	0.3	77.53%	83.17%
Morningstar Target Date 2036-2040	5.98%	228.82%	14.10%	0.28	87.51%	96.11%
Barclays U.S. Aggregate	5.18%	181.40%	3.39%	0.92	13.37%	-32.32%
S&P 500	7.54%	343.80%	14.94%	0.37	100.00%	100.00%

Table 3

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. The Barclays U.S. Aggregate Bond Index and the S&P 500 Index are unmanaged indices, and cannot be invested into directly. Past performance is no guarantee of future results. Swan DRS results are from the Select Composite, net of fees, as of 12/29/2017.

The results for most target date funds have been roundly disappointing. Certainly, the risk has increased across the spectrum as one moves from conservative to aggressive. But what has been lacking is a corresponding increase in returns. It

is unlikely that returns in the 5-6% range are what investors in these products were anticipating. However, what is perhaps more concerning is how target date funds performed during the big equity bear markets.

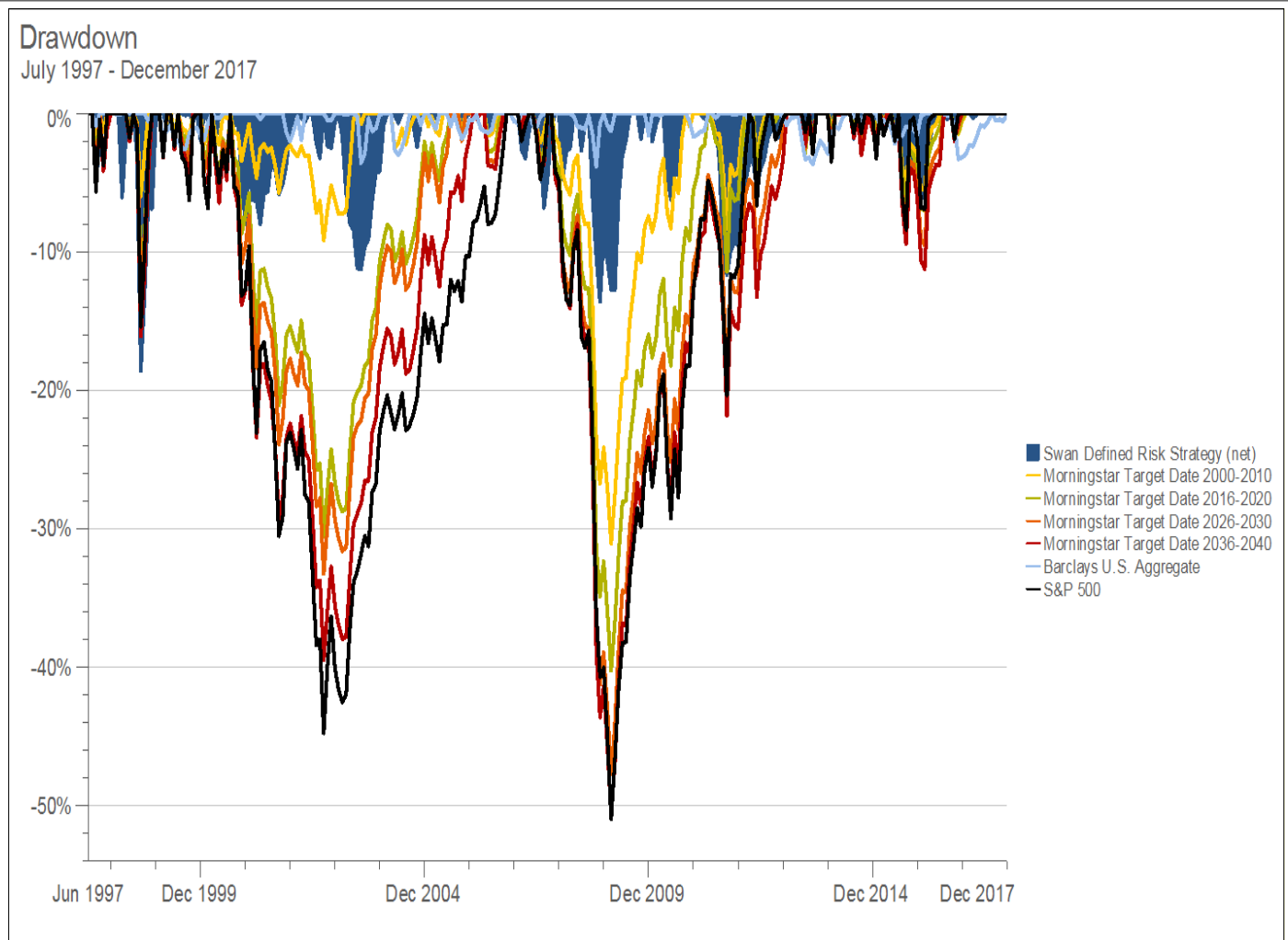


Chart 7

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. The Barclays U.S. Aggregate Bond Index and the S&P 500 Index are unmanaged indices, and cannot be invested into directly. Past performance is no guarantee of future results. Swan DRS results are from the Select Composite, net of fees, as of 12/29/2017.



July 1997 - December 2017	Max Drawdown	Max Drawdown Begin Date	Max Drawdown End Date	Max Drawdown Recovery Date	Months Under-water	Pain Index
Swan Defined Risk Strategy (net)	-18.56%	Jul-98	Aug-98	Jan-99	7	2.21%
Morningstar Target Date 2000-2010	-31.03%	Nov-07	Feb-09	Oct-10	36	2.72%
Morningstar Target Date 2016-2020	-40.24%	Nov-07	Feb-09	Apr-11	42	6.91%
Morningstar Target Date 2026-2030	-47.71%	Nov-07	Feb-09	Jan-13	63	8.83%
Morningstar Target Date 2036-2040	-50.63%	Nov-07	Feb-09	Jan-13	63	10.84%
Barclays U.S. Aggregate	-3.83%	Apr-08	Oct-08	Dec-08	9	0.61%
S&P 500	-50.95%	Nov-07	Feb-09	Mar-12	53	11.44%

Table 4

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. The Barclays U.S. Aggregate Bond Index and the S&P 500 Index are unmanaged indices, and cannot be invested into directly. Past performance is no guarantee of future results. Swan DRS results are from the Select Composite, net of fees, as of 12/29/2017.

The above chart and table detail the peak-to-trough losses of the average target date funds over the last 18 years. Of particular concern is the performance of the average Morningstar Target Date 2000-2010 fund during the 2007-08 correction. These portfolios were some of the most conservative target date funds available, positioned as appropriate for someone who retired sometime between the year 2000 and 2010. And yet when the credit crisis hit in 2007-08 these funds lost an average of 31.03%. They spent a full three years underwater before recovering their losses.

Many Americans were hit doubly hard during this period, where their investment losses were paired with unemployment, stagnant wages, falling home values, or other financial challenges.

Those looking to diversify beyond the traditional stock/bond mix via the use of “alpha strategies” were broadly disappointed as well. Many liquid alternative strategies were not available during the last two bear markets. Those that were available in mutual fund format are encapsulated in the following Morningstar Category Average returns.

**Risk / Return**

January 2001 - December 2017 (Single Computation)

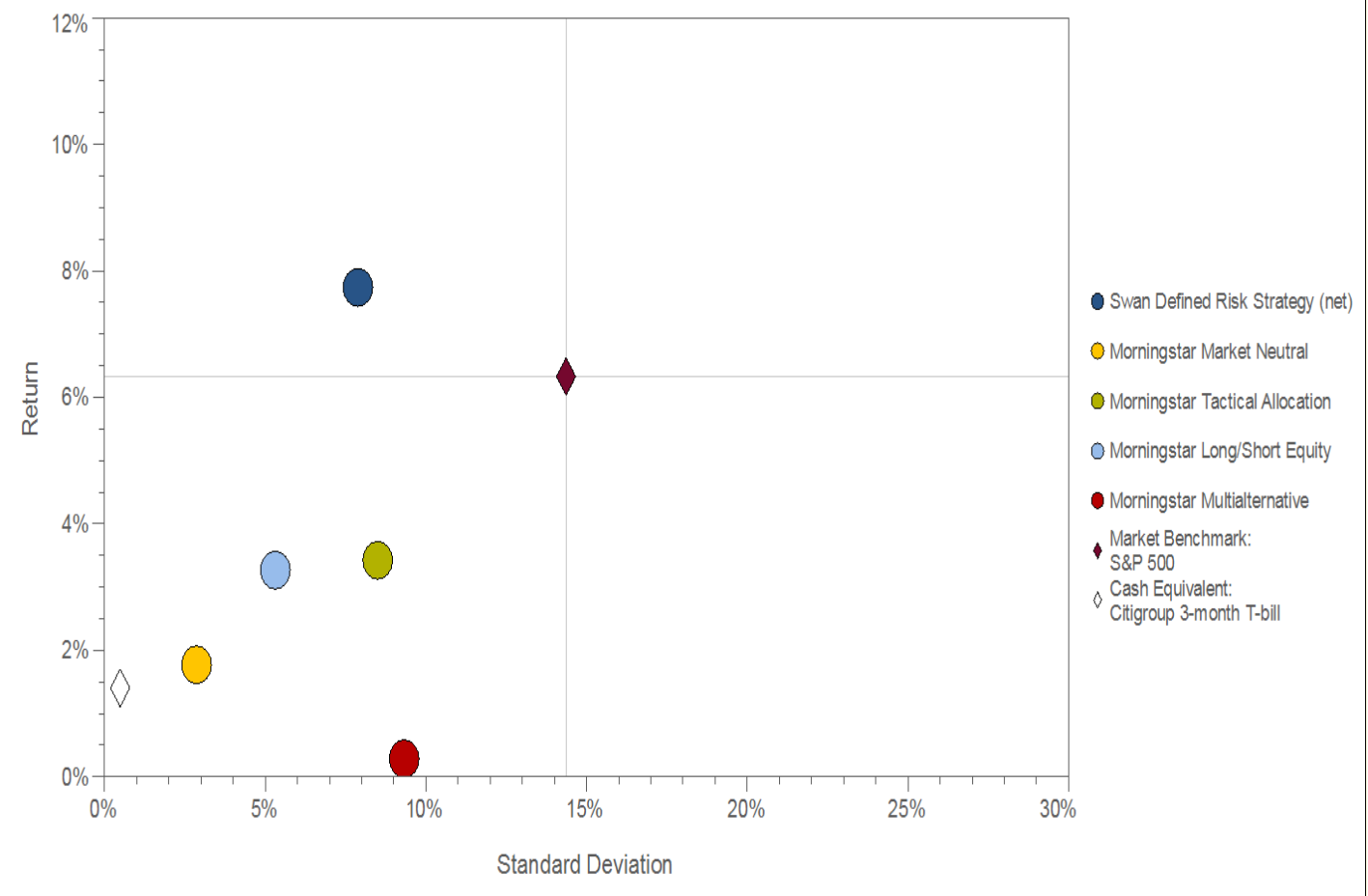


Chart 8

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR

January 2001 <sup>22</sup> – December 2017	Return	Standard Deviation	Sharpe Ratio	Max Drawdown	Pain Index	Up Capture (Qtrly)	Down Capture (Qtrly)
Swan Defined Risk Strategy (net)	7.74%	7.89%	0.8	-13.59%	2.03%	48	8.3
Morningstar Market Neutral	1.77%	2.86%	0.13	-6.08%	2.36%	3.2	-14.5
Morningstar Tactical Allocation	3.43%	8.50%	0.24	-34.07%	5.65%	51.9	58.8
Morningstar Long/ Short Equity	3.27%	5.31%	0.35	-22.94%	3.71%	32.2	27.1
Morningstar Multialternative	0.28%	9.32%	-0.12	-40.27%	11.08%	40	70.1
S&P 500	6.33%	14.36%	0.34	-50.95%	10.59%	100	100

Table 5

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. The Barclays U.S. Aggregate Bond Index and the S&P 500 Index are unmanaged indices, and cannot be invested into directly. Past performance is no guarantee of future results. Swan DRS results are from the Select Composite, net of fees, as of 12/29/2017.

As ugly as the 2000-02 and 2007-08 bear markets were, the one saving grace was that most baby boomers had sufficient time to recover their losses, if they had stayed invested in the market. These days the margin for error and time available to recoup losses in investment portfolios is shrinking rapidly or has disappeared completely.

Put into perspective, an investor who was 45 years old during the start of the dot-com crash in 2000 would now be 60 years old and only five years away from the traditional retirement age. Simply put, a market sell-off of the depth or duration of the two most recent bear markets would be catastrophic for a lot of investors.

## A BETTER SOLUTION: THE DEFINED RISK STRATEGY

Swan Global Investments sought to address the shortcomings of traditional asset allocation all the way back in 1997. Swan identified the biggest risk to an investor's portfolio; the large bear markets that periodically devastate an investor's wealth. As seen in the previous graph, these kinds of markets have wiped out around half of the market value not once but twice since the start of the new millennium. Swan built the Defined Risk Strategy (DRS) to directly address this risk via a simple

and elegant hedging strategy. With a 20 year track record starting in July 1997, the DRS has delivered upon its goal of outperforming the broad market and a traditional 60/40 portfolio on an absolute, relative, and risk-adjusted basis. The graph below shows the cumulative performance of a hypothetical \$100 investment in the DRS as well as the performance of various market indices.

<sup>22</sup>The inception of the Morningstar Multialternative category is January 2001; data prior to that date does not exist.

## Manager Performance

July 1997 - December 2016 (Single Computation)

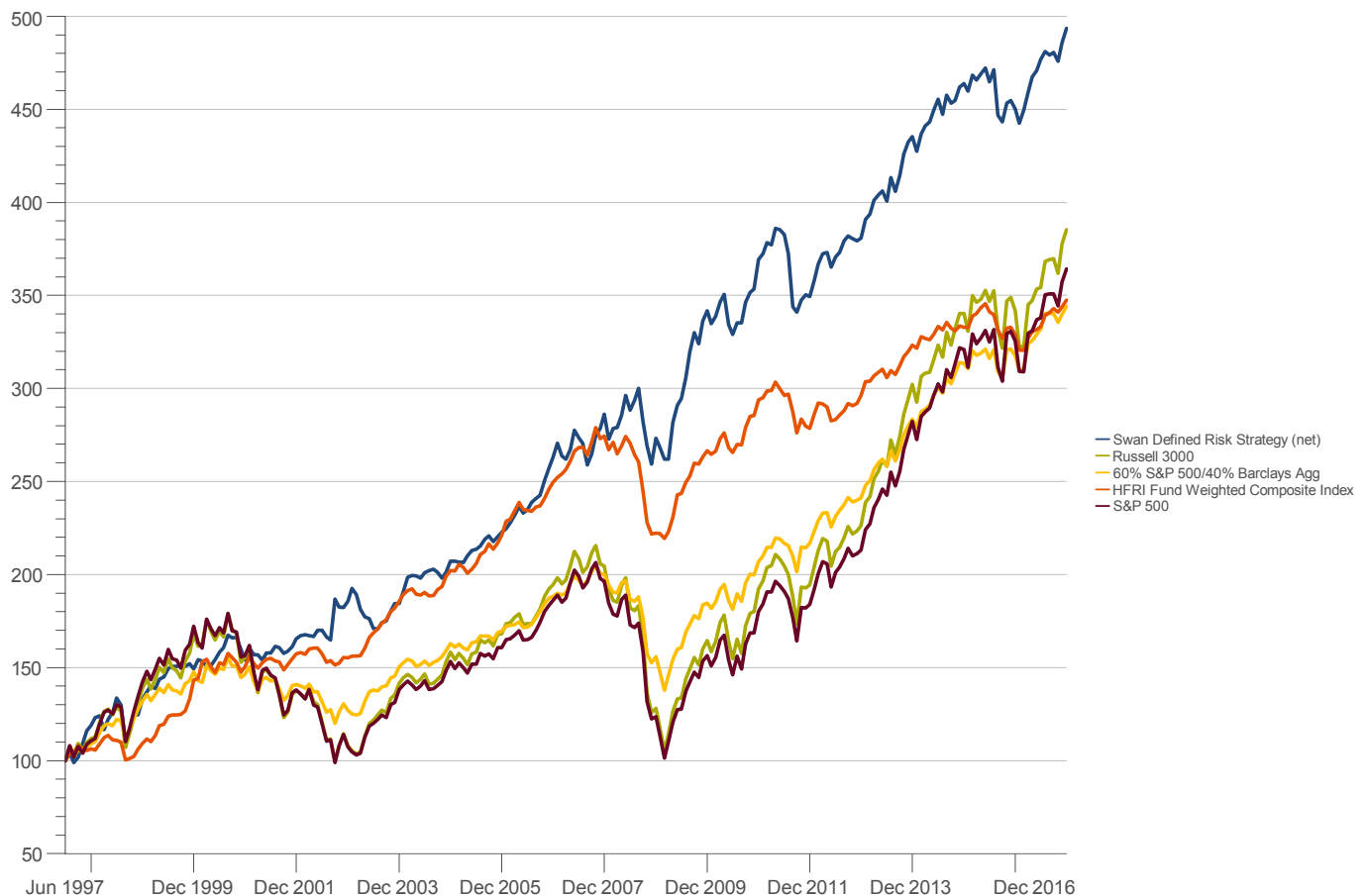


Chart 9

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All Swan DRS data based on historical performance of the Swan DRS Select Composite. Prior performance is not a guarantee of future results.

Our motto is: “Always invested, always hedged.” At Swan we do not attempt to time the market by trying to call market tops and bottoms. The majority of the DRS assets are always invested in the markets. However, we also always hedge our portfolio by placing downside protection on our equity holdings via long-dated put options. When markets sell off massively like they did in 2000-02 or 2007-08, the hedge protects on the downside and provides a smoother return.

Put options, given their very nature, are inversely correlated to the market. While historically bonds have had low or negative correlations to the equity market there is no guarantee the equity and fixed income markets can’t both enter bear territory simultaneously.

## TWO CURVEBALLS: WITHDRAWALS AND TIMING

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Whenever one sees investment performance reported in the financial industry, it is always presented in a bit of a sterile environment. Assumptions are made that remove certain variables from the analysis. One assumption is that once the investment is made, no additional monies come in or out of the investment. It is a one-time buy-and-hold purchase, and no contributions or withdrawals occur over the entire date range. The other variable often ignored is the timing of the initial investment. The timing of when someone makes an initial purchase can have an extreme

impact upon the final value of the investment.

Both the withdrawals and timing impact are removed from the equation in order to make accurate apples-to-apples performance between investment managers. However, in the real world retirees will most likely be taking money out of their investment portfolios and will retire at different points in time. In this section we explore the impact of overlaying real world conditions upon standard investment performance.

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## WITHDRAWALS

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In the first example let us examine the impact of withdrawals. One typically sees examples, like the one below, where an initial investment is made, the investment is allowed to grow over the years, returns compound upon each other, and at the end of the analysis a final value is given. In the example below we examine three data series over the span 1998-2017: Swan's DRS, the S&P 500, and the Morningstar category average for

funds in the Target Date 2000-2010 range. The Morningstar Target Date 2000-2010 average was selected because in theory such a portfolio should be suitable for an investor near or entering retirement in the time frame analyzed.

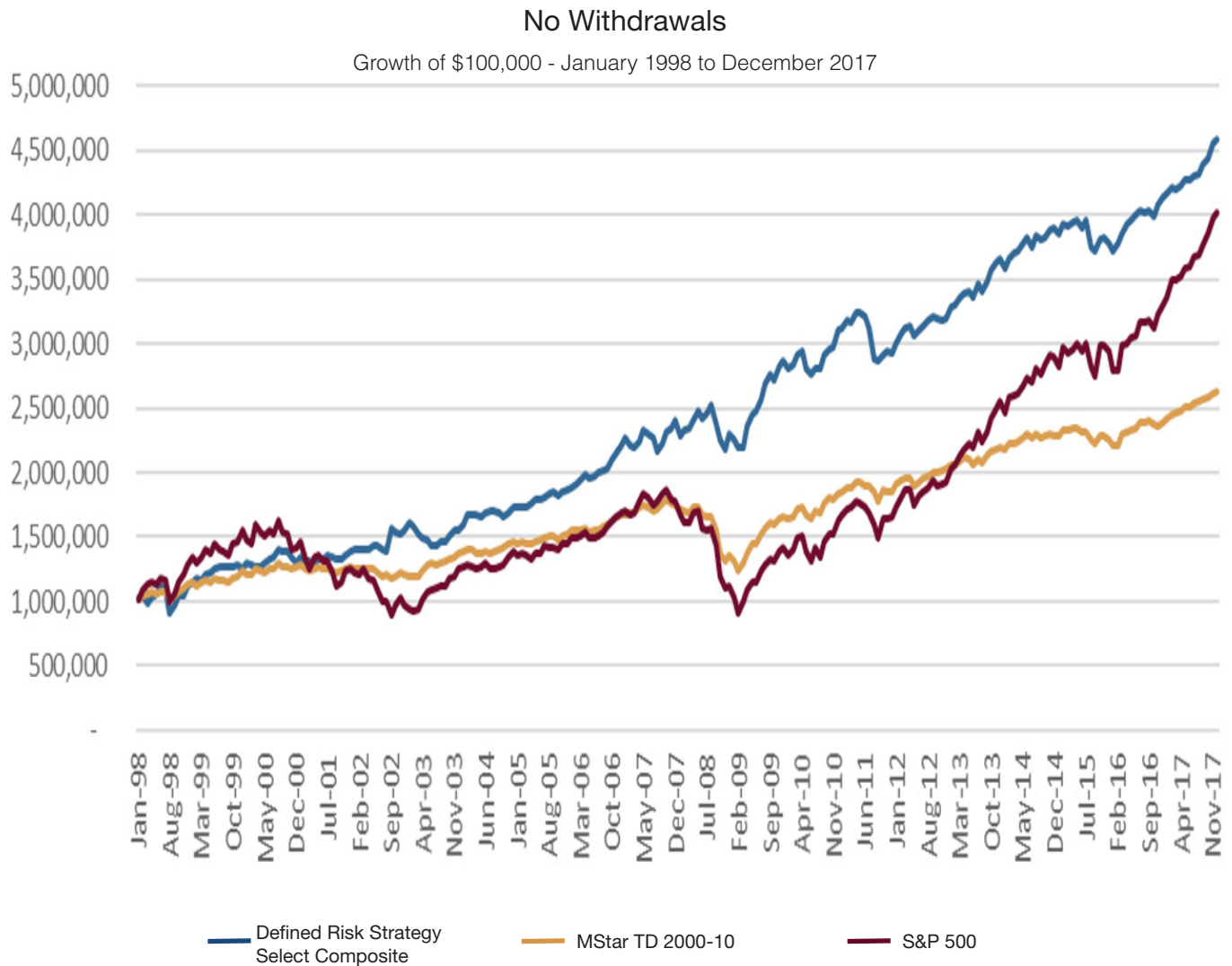


Chart 10

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, MStar TD 2000-10, and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

	Initial Value	Withdrawals	Ending Value
Swan DRS	\$1,000,000	No withdrawals	\$4,588,913
MStar TD 2000-10	\$1,000,000	No withdrawals	\$2,629,029
S&P 500	\$1,000,000	No withdrawals	\$4,013,468

Table 6

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, MStar TD 2000-10, and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

In the above case, because all have positive average annual returns over the 20 years and no withdrawals are taken, the ending value of the investment is significantly higher than the initial investment. But what if the

investor is retired and in the distribution stage? What if the investor takes out \$60,000 at the end of every year and grows that by 2% a year to account for inflation? What impact would that have on the investment?

### With Withdrawals

Growth of \$100,000 - January 1998 to December 2017

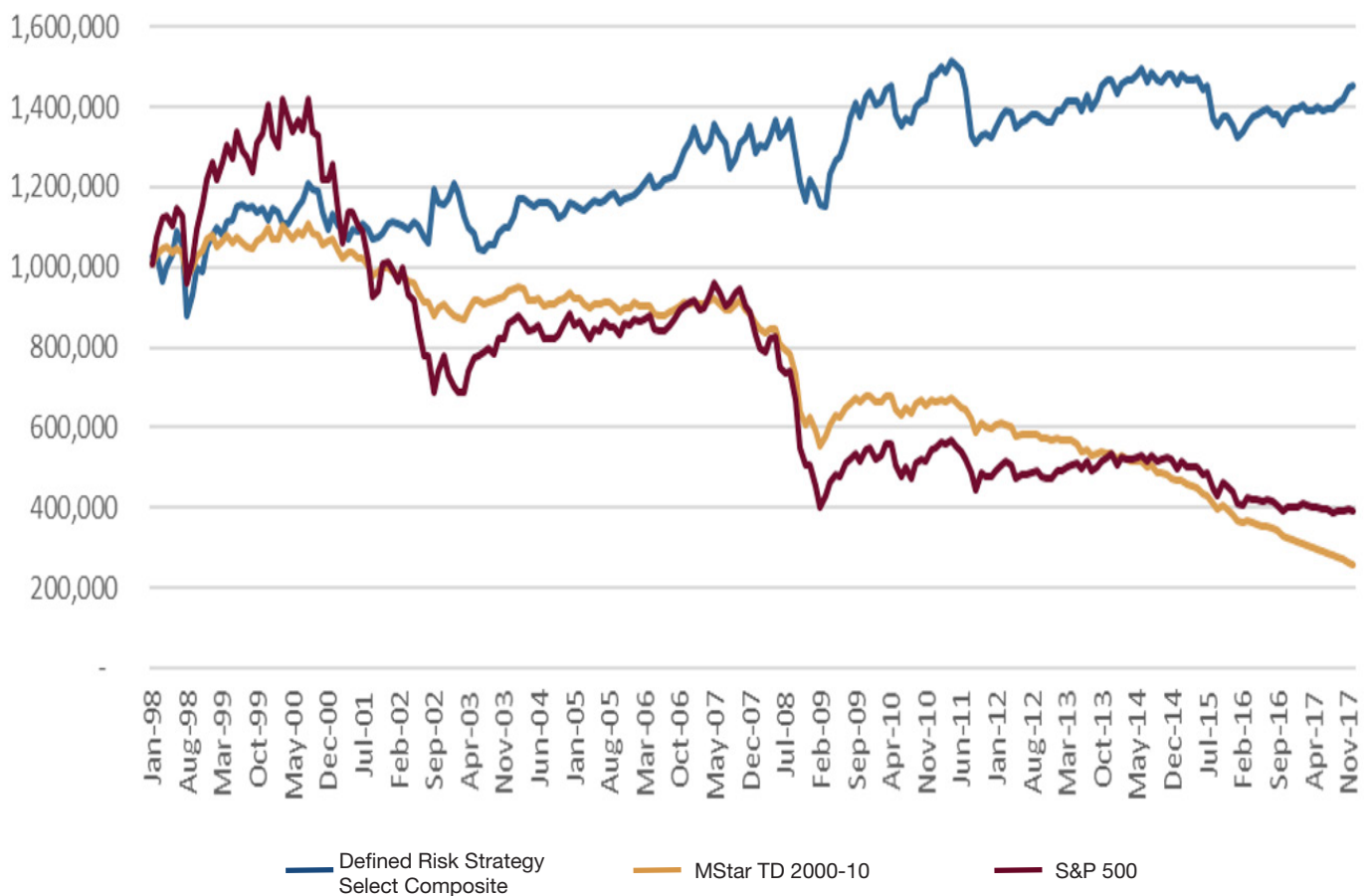


Chart 11

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, MStar TD 2000-10, and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.



	Initial Value	Cumulative Withdrawals	Ending Value
Swan DRS	\$1,000,000	\$1,457,842	\$1,452,335
MStar TD 2000-10	\$1,000,000	\$1,457,842	\$ 259,614
S&P 500	\$1,000,000	\$1,457,842	\$393,447

Table 7  
Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, MStar TD 2000-10 and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

As one can see here, this can have an extreme impact on the value of an investment. Why? For the retiree, bear markets are no longer a golden buying opportunity. An investor in the distribution stage of their life cycle is forced to liquidate holdings at a market low. If the market sells off 45% over the course of three years, like it did in 2000-2002, the principal left to make a recovery will be much diminished if the investor was taking out an additional 5% each year to meet living expenses. In other words, withdrawing funds in a bear market just makes the hole deeper. This is can be thought of as the opposite of “the miracle of compounding returns.”

By design, the DRS was meant to minimize losses. One of the core beliefs of Swan Global Investments is that the best way to make money is to not lose it in the first place. This is especially important for those investors in the retirement stage, drawing down their accounts to fund living expenses. That is why the DRS always hedges the portfolio against catastrophic market losses.

## TIMING

The other large variable often ignored in standard analysis is the timing of an initial investment. A year or two's difference when it comes to the timing of an initial investment can have an extreme impact on the longer-term results.

Below are various ten-year results for the S&P 500. Each period starts at the beginning of a calendar year and extends out for a decade. The first stretches from January 1998 to December 2007; the last one runs from January 2008 to December 2017.

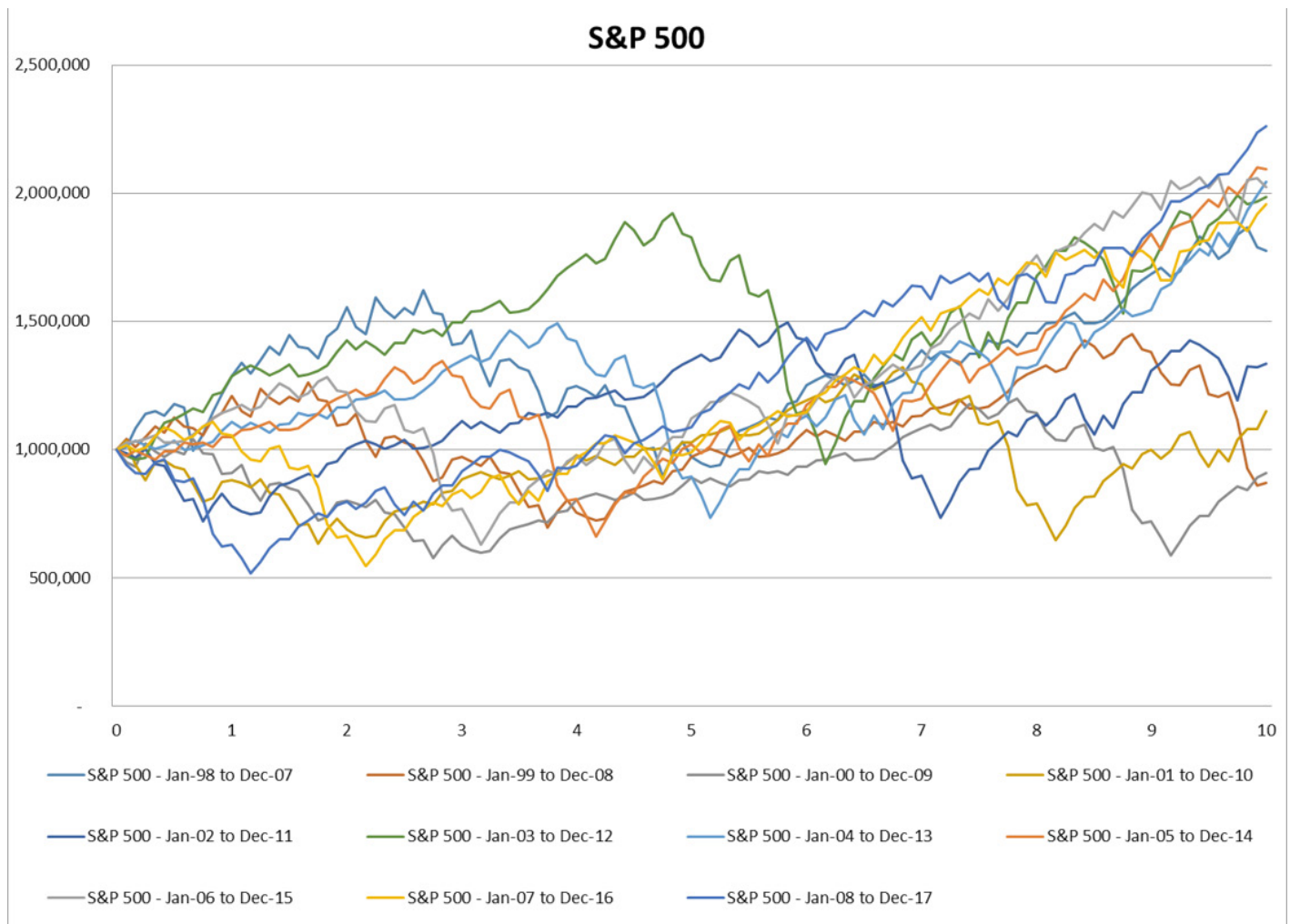


Chart 12

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index. An investment cannot be made directly in an index or some of these benchmarks. Prior performance is not a guarantee of future results.

As you can plainly see, there is a wide degree of variation in ten-year returns. The best decade is the most recent one, ending December 2017. The annualized return for that period is 8.50% and includes all of the incredible bull market initiated in early March 2009. Conversely, the worst decade runs from January 1999 to December 2008 and includes both the dot-com bear market and the credit crisis bear market. The unlucky investor in that date range would have lost an average of 1.38% per year and ended up with a portfolio worth almost 13% less than when he started - truly a "lost decade." A hypothetical \$1,000,000 investment on January 1st over these periods ranged from a high of \$2,260,276 to a low of \$870,063. Certainly, one might conclude that timing is indeed everything.

Even someone invested in the average Target Date 2000-2010 fund would be susceptible to wide swings in returns, as illustrated in the chart below. Although these portfolios are designed for someone who retired in the first ten years of the new millennium, there is a fair amount of uncertainty depending upon just which year an initial investment was made. The best-case scenario and worst-case scenarios were separated by \$500,000, but only one year. A \$1,000,000 investment in the Morningstar Target Date 2000-2010 on January 1st, 1998 was worth \$1,753,733 after ten years. If the starting date was delayed just one year to January 1st, 1999 the investment was only worth \$1,201,075.

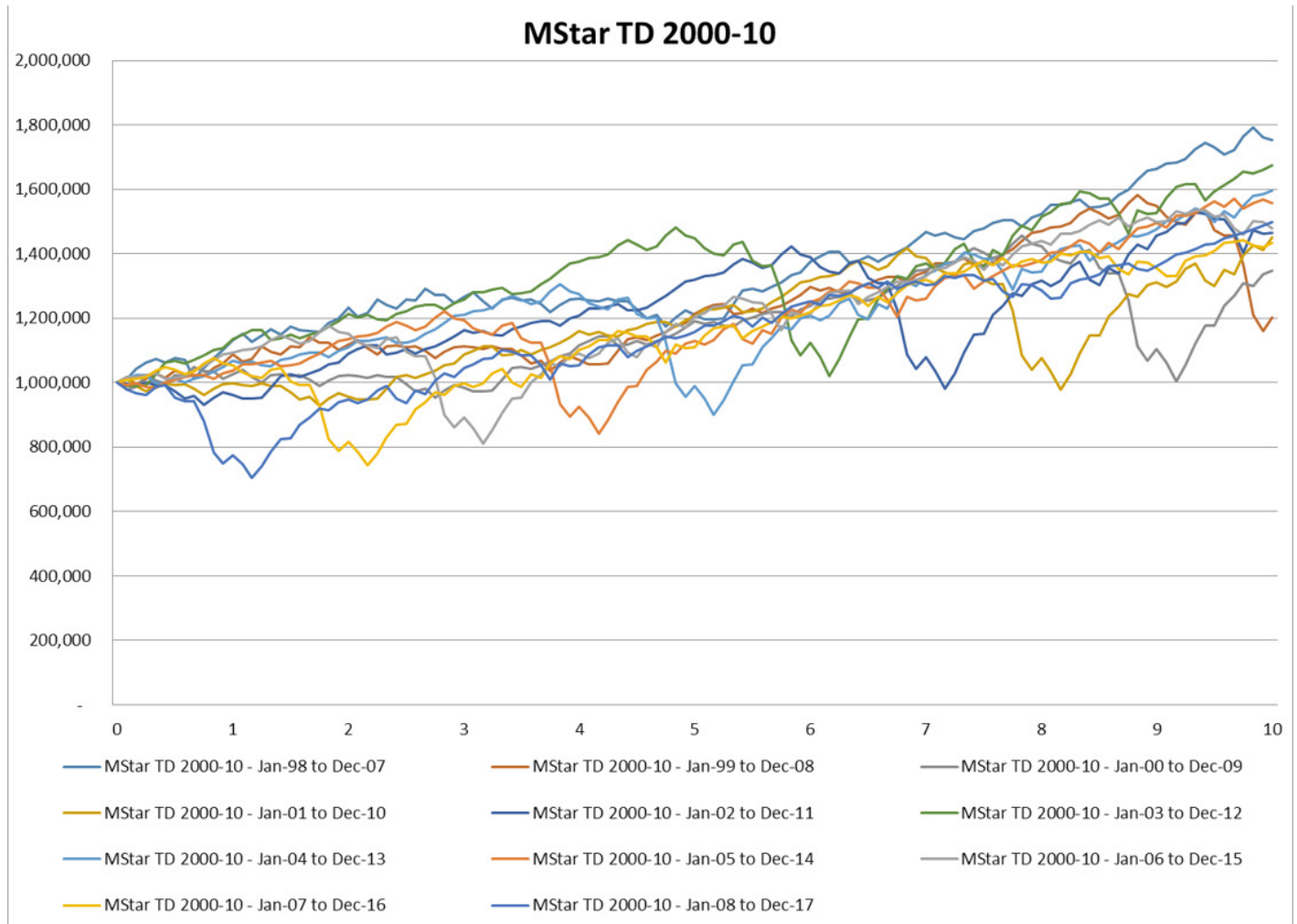


Chart 13

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the MS Target Date 2000-2010. Prior performance is not a guarantee of future results.

So how does one solve this problem? At Swan, we would argue that the best solution to the timing issue is consistency. If one can decrease volatility by providing consistent returns, the importance of timing fades away.

Below we see the same eleven ten-year investment periods for the DRS:

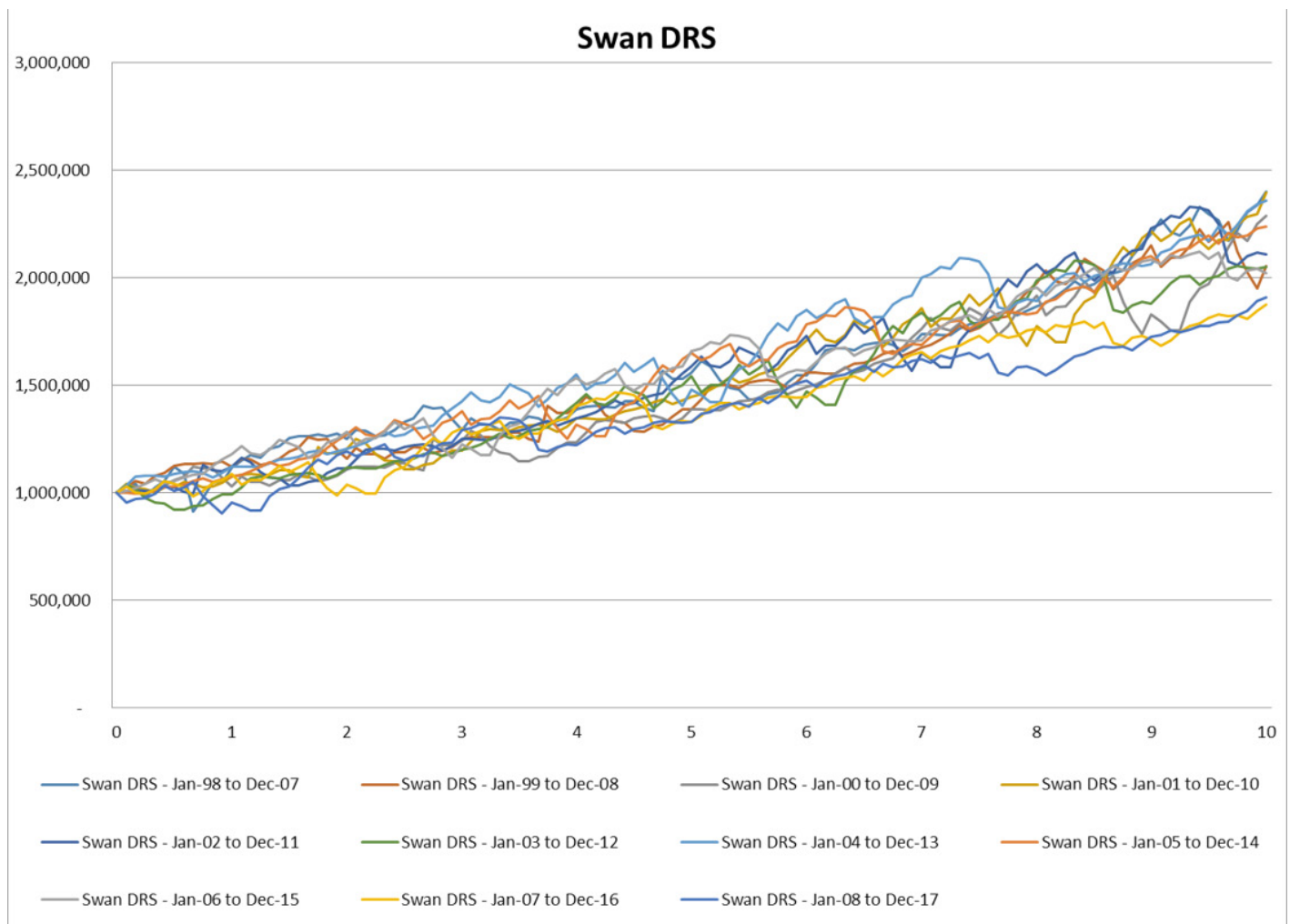


Chart 14

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

The DRS returns display a remarkable degree of long-term consistency. The worst of these eleven decades was 6.50%; the best was 9.15%. The range of outcomes on an initial \$1,000,000 investment is a low of \$1,876,438 to a high of \$2,401,063. It is also important to note that the above decades include not only the major bear markets of 2000-02 and 2007-08, but also numerous short-term corrections like the Russian default/LTCM crisis of 1998, the “flash crash” in May 2010, and the US debt downgrade in August 2011. The DRS has successfully weathered such events and has historically provided very smooth returns.

The table below summarizes and compares the results of the Swan Defined Risk Strategy, the S&P 500, and the Morningstar Target Date 2000-2010 category average. Highlighted in green and red are the best and worst results for each investment, respectively.

While either of these factors can have a serious adverse effect on the wealth of a retiree, what if they were to happen simultaneously? What if someone was forced to take a 5% withdrawal and had to endure one or two bear markets over the span of a decade? What would that person's wealth look like then?

Decade	DRS	S&P 500	MS TD 2000-10
1998-2007	\$2,401,102	\$1,775,654	\$1,753,733
1999-2008	\$2,055,621	\$870,063	\$1,201,075
2000-2009	\$2,289,005	\$909,017	\$1,347,458
2001-2010	\$2,398,235	\$1,150,724	\$1,450,446
2002-2011	\$2,111,499	\$1,333,506	\$1,465,842
2003-2012	\$2,051,058	\$1,985,779	\$1,674,001
2004-2013	\$2,360,403	\$2,042,931	\$1,596,778
2005-2014	\$2,239,321	\$2,094,637	\$1,556,158
2006-2015	\$2,022,732	\$2,024,199	\$1,479,663
2007-2016	\$1,876,379	\$1,957,171	\$1,433,429
2008-2017	\$1,911,231	\$2,260,276	\$1,499,105
	Swan Defined Risk Strategy (net)	S&P 500	Morningstar Target Date 2000-2010
Return	8.64%	7.54%	5.14%
Cumulative Return	446.89%	343.80%	179.24%
Standard Deviation	9.42%	14.94%	7.05%
Sharpe Ratio	0.7	0.37	0.44

Table 8

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, MStar TD 2000-10 and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

# MULTIPLIER EFFECT: BAD TIMING COMBINED WITH WITHDRAWALS AND INFLATION

In the chart and table below, we repeat the exercise of calculating results on a \$1,000,000 investment over various ten-year periods. However, we also incorporate the impact of withdrawing \$60,000 in the first year and compound that by a 2% inflation rate. The results for the Swan DRS, the S&P 500 and the Morningstar Target Date 2000-2010 category average are as follows:

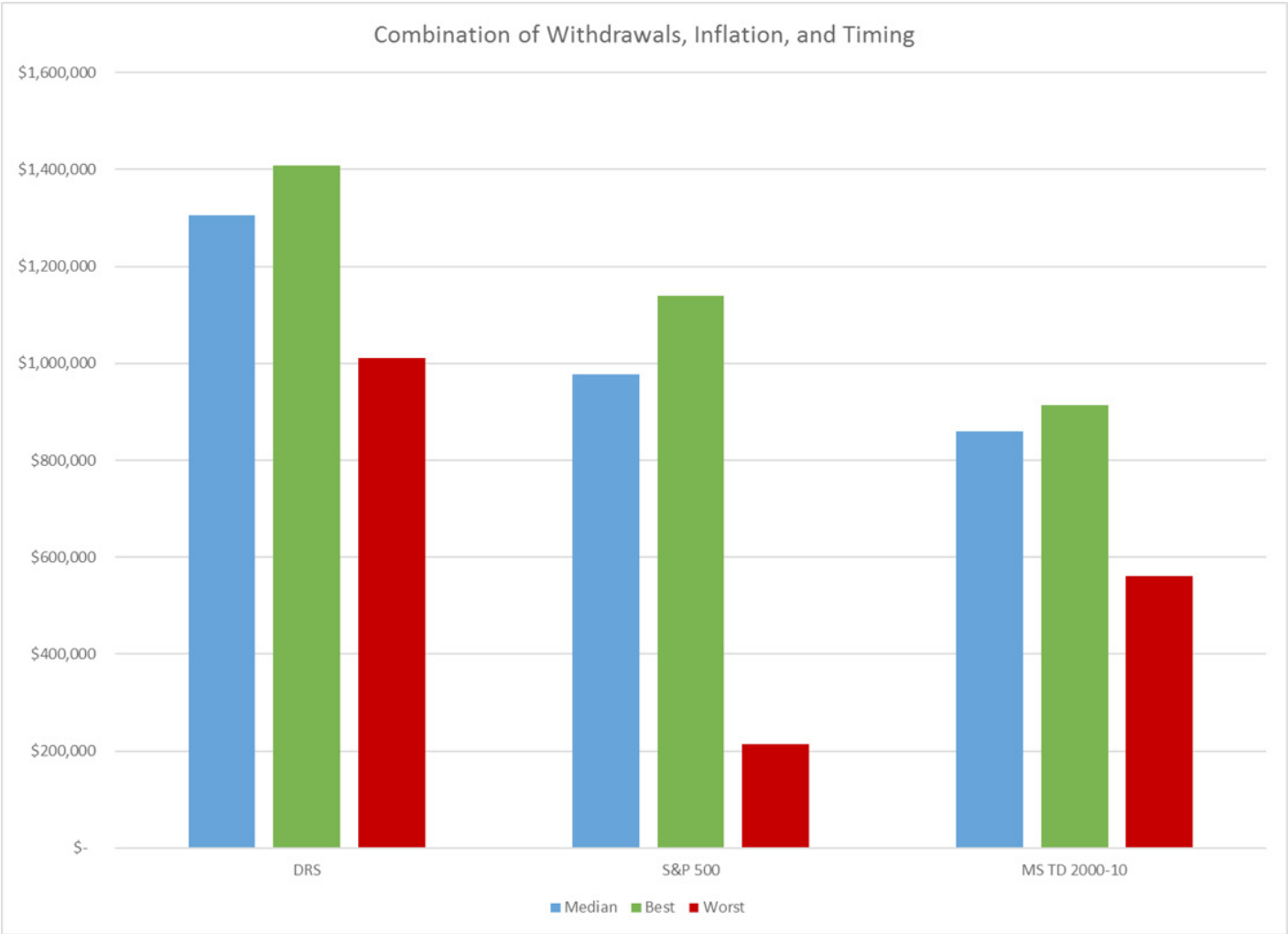


Chart 15  
Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, the MS Target Date 2000-2010, and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

Decade	DRS	S&P 500	MS TD 2000-10
1998-2007	\$1,395,498	\$924,363	\$914,169
1999-2008	\$1,163,294	\$323,724	\$561,747
2000-2009	\$1,258,396	\$213,408	\$590,041
2001-2010	\$1,375,400	\$362,010	\$643,146
2002-2011	\$1,215,208	\$550,666	\$682,952
2003-2012	\$1,142,151	\$1,140,569	\$859,178
2004-2013	\$1,408,721	\$994,381	\$754,038
2005-2014	\$1,305,458	\$977,438	\$715,996
2006-2015	\$1,181,247	\$961,113	\$682,065
2007-2016	\$1,010,950	\$833,700	\$618,660
2008-2017	\$1,011,549	\$979,623	\$635,283
Starting Value	\$ 1,000,000		
Initial withdrawal	\$ 60,000		
Inflation	2.0%		
WD timing	annual		
Cumulative withdrawals	\$ 656,983		

Table 9

Source: Swan Global Investments, LLC and Zephyr StyleADVISOR. All data based on historical performance of the S&P Total Return Index, MStar TD 2000-10 and the Swan DRS Select Composite (net of fees). Prior performance is not a guarantee of future results.

Again we see the importance of minimizing losses during big bear markets. The impact of those variables outside the investor's control can be mitigated.

Keep in mind these variables being analyzed do not take into account the average investor's propensity for panic-selling and deferred-buying that have proved so detrimental to realized performance. This is addressed in the next section.



## THE FINAL STUMBLING BLOCK – INVESTOR PSYCHOLOGY

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Although markets (defined by the S&P 500) are up over 338% since bottoming out in March 2009, it is unclear just how much the average investor participated in this bull market. Many investors were shell-shocked after 2007-08 and kept their money in the most conservative of investments. Dalbar, Inc. regularly compares market performance against average investor performance. According to Dalbar's recent 2014 study, "Quantitative Analysis of Investor Behavior", the average annual return over the last 20 years was 9.85% for the S&P 500. However, the average investor gained only 5.19% during this time frame. By Dalbar's estimation, a full 50% of this underperformance was due to psychological factors. Investors tend to sell after sustaining losses and yet wait until a

market rally is well underway before re-entering the market. Sadly, investors are often their own worst enemy.

The Defined Risk Strategy follows a very strict rules-based process. Emotion does not factor into the way the portfolio is managed. One of its most attractive features is the intra-year re-hedging process. If the market sells off by around 20% or more, the strategy uses the opportunity to realize profits in the hedge and re-invest in the market when the market is at depressed levels. By design, the DRS is meant to "sell high, buy low." By way of contrast, during a bear market many traditional investors are either too frightened to buy into a falling market, or they lack a source of funds or "dry powder" needed to re-invest.

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## CONCLUSION

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As stated in the outset of this paper, the problems facing the baby boomer generation as they enter retirement may seem insurmountable. Market conditions, portfolio construction, and investor psychology are all individually challenging, but together they form a massive, complex knot.

At Swan Global Investments we believe the traditional stock/bond portfolio will not hold up well when the next crisis hits. We believe that traditional asset allocation strategies failed to deliver adequate protection for the average investor in 2000-02 and 2007-08, and there is no reason to believe they will fare any better during the next crisis. In fact, given limited policy tools governments have at their disposal, there is a fair chance the next recession could be worse.

This does not bode well for those currently in or on the brink of retirement, without the time or the means to recover from another 30%, 40%, or 50% drop in the markets. As the financial advice community has moved to a fee only, asset-based business model, another precipitous drop off in market values could also threaten the livelihoods

of those recommending traditional solutions. In an environment where market experts are forecasting 4-6% nominal returns in equities and a worse outlook for fixed income, we believe the traditional 60% equity/40% bond model will fall far short of meeting the needs of this generation of retirees.

Therefore we believe that bold new thinking is required to meet the demands of today's retirees. Bear markets must be addressed head-on, and the Swan Defined Risk Strategy does exactly that. Having employed the same strategy for 20 years, the DRS consistently provided ten-year average annual returns in the 6.5% to 9% range. This was during a period that saw not one but two bear markets of extraordinary severity.

The Gordian Knot was not undone by applying the same failed solutions over and over again. The solution was two-fold: bold action and innovative thinking. Alexander solved the riddle of the Knot by attacking it directly, and using a solution no one else had considered.

## IMPORTANT DISCLOSURES/NOTES:

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Swan Global Investments, LLC is a SEC registered Investment Advisor that specializes in managing money using the proprietary Defined Risk Strategy (“DRS”). SEC registration does not denote any special training or qualification conferred by the SEC. Swan offers and manages the DRS for investors including individuals, institutions and other investment advisor firms. Any historical numbers, awards and recognitions presented are based on the performance of a (GIPS®) composite, Swan’s DRS Select Composite, which includes nonqualified discretionary accounts invested in since inception, July 1997, and are net of fees and expenses. Swan claims compliance with the Global Investment Performance Standards (GIPS®).

All data used herein; including the statistical information, verification and performance reports are available upon request. The S&P 500 Index is a market cap weighted index of 500 widely held stocks often used as a proxy for the overall U.S. equity market. Indexes are unmanaged and have no fees or expenses. An investment cannot be made directly in an index. Swan’s investments may consist of securities which vary significantly from those in the benchmark indexes listed above and performance calculation methods may not be entirely comparable. Accordingly, comparing results shown to those of such indexes may be of limited use. The adviser’s dependence on its DRS process and judgments about the attractiveness, value and potential appreciation of particular ETFs and options

in which the adviser invests or writes may prove to be incorrect and may not produce the desired results. There is no guarantee any investment or the DRS will meet its objectives.

All Swan products utilize the Defined Risk Strategy (“DRS”), but may vary by asset class, regulatory offering type, etc. Accordingly, all Swan DRS product offerings will have different performance results due to offering differences and comparing results among the Swan products and composites may be of limited use. All investments involve the risk of potential investment losses as well as the potential for investment gains. Hypothetical withdrawal performance analysis is not actual performance history. Actual results may materially vary and differ significantly from the suggested hypothetical analysis performance data. The charts and graphs contained herein should not serve as the sole determining factor for making investment decisions. This analysis is not a guarantee or indication of future performance. Prior performance is not a guarantee of future results and there can be no assurance, and investors should not assume, that future performance will be comparable to past performance. All investment strategies have the potential for profit or loss. Further information is available upon request by contacting the company directly at 970.382.8901 or visit [swanglobalinvestments.com](http://swanglobalinvestments.com).

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## ABOUT SWAN GLOBAL INVESTMENTS

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Randy Swan started Swan Global Investments in 1997 looking to supply investment management services that were not available to most investors. Early in his financial career, Randy saw that options provided an opportunity to minimize investment risk.

His innovative solution was the proprietary Swan Defined Risk Strategy, which has provided market leading, risk-adjusted return opportunities through a combination of techniques that seek to hedge the market and generate market-neutral income.



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1099 Main Avenue, Suite 206  
Durango, CO 81301  
Telephone: 970-382-8901