



## Where Does the DRS Fit in a Portfolio?

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The Roles the Swan Defined Risk Strategy Can Serve in a Portfolio

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## WHERE DOES THE DRS FIT IN A PORTFOLIO?

Over the course of many white papers, blog posts, and presentations, Swan Global Investments has made the case for the Defined Risk Strategy (DRS). Engineered to maximize up-market gains and minimize downside losses, the DRS is attracting attention from those seeking innovative solutions. Once one understands and accepts the DRS, the

next logical questions to answer are:

1. How much DRS should I add to an existing portfolio?
2. What role does the DRS play within a portfolio?

Answering these two questions will be the focus of this paper.

## HOW MUCH DRS SHOULD I ADD TO AN EXISTING PORTFOLIO?

Core to the DRS's value proposition is that traditional asset allocation models that rely solely upon diversification for risk management often come up short. It is Swan's opinion that the largest threat to an investor's wealth are large bear markets which can erase 20%, 30%, 40% or more of an investor's net worth. Yet traditional asset allocation states that market risk is a risk that cannot be diversified away. In our opinion, any solution that does not address the biggest risk for investors is incomplete at best and irresponsible at worst.

The Defined Risk Strategy is based upon the premise, "Always Invested, Always Hedged." The majority of the DRS's assets are established as a

buy-and-hold position in a given market. In order to protect against bear markets, long-term put options are bought on the buy-and-hold assets. The put options are inversely correlated with the movements of the long positions and are a way to directly mitigate market risk.

So how does adding the DRS to a traditional strategy change results? We will start by adding 10% increments of the DRS to a traditional 60% S&P 500/40% Barclays U.S. Aggregate portfolio. The relative proportion of 60% equity to 40% bond is kept constant through each variation; the only change from portfolio to portfolio is additional 10% increments of the DRS.

July 1, 1997 – December 31, 2016	Return	Cumulative Return	Standard Deviation (Population)	Beta vs. Market	Excess Return vs. Market	Sharpe Ratio	Maximum Drawdown	Pain Index	Pain Ratio
60% S&P 500/40% Barclays Agg	6.54%	243.99%	9.16%	0.59	-0.31%	0.48	-32.54%	4.46%	0.99
60/40 Portfolio w/ 10% Swan DRS	6.78%	259.53%	8.74%	0.56	-0.07%	0.53	-30.12%	3.88%	1.20
60/40 Portfolio w/ 20% Swan DRS	7.01%	275.09%	8.42%	0.53	0.16%	0.58	-27.62%	3.37%	1.45
60/40 Portfolio w/ 30% Swan DRS	7.24%	290.62%	8.19%	0.51	0.38%	0.62	-25.05%	2.94%	1.75
60/40 Portfolio w/ 40% Swan DRS	7.45%	306.05%	8.08%	0.48	0.60%	0.66	-22.97%	2.61%	2.04
60/40 Portfolio w/ 50% Swan DRS	7.65%	321.33%	<b>8.07%</b>	0.45	0.80%	0.69	-21.16%	2.35%	2.36
60/40 Portfolio w/ 60% Swan DRS	7.85%	336.40%	8.18%	0.42	0.99%	<b>0.70</b>	-19.31%	2.14%	2.68
60/40 Portfolio w/ 70% Swan DRS	8.03%	351.21%	8.40%	0.39	1.18%	<b>0.70</b>	-17.42%	<b>2.08%</b>	2.85
60/40 Portfolio w/ 80% Swan DRS	8.21%	365.69%	8.73%	0.36	1.35%	<b>0.70</b>	<b>-16.59%</b>	2.11%	<b>2.90</b>
60/40 Portfolio w/ 90% Swan DRS	8.37%	379.79%	9.14%	0.33	1.52%	0.68	-17.58%	2.18%	2.87
Swan Defined Risk Strategy (net)	<b>8.53%</b>	<b>393.44%</b>	9.63%	<b>0.30</b>	<b>1.68%</b>	0.67	-18.56%	2.32%	2.77
S&P 500	6.85%	264.27%	15.24%	1.00	0.00%	0.31	-50.95%	12.03%	0.39

Table 1 Source: Zephyr StyleADVISOR

The historical return of the DRS is higher than that of the 60/40 portfolio, so obviously any increase in DRS exposure will increase the overall return. The focus of this exercise is on risk reduction or maximizing the return-risk trade-off. Risk, when measured by standard deviation, is minimized with a 50% allocation to DRS. The Sharpe ratio, which is the most commonly used measure of risk/return trade-off, is maximized with an allocation at around a 70%- 80% to DRS.

Both standard deviation and Sharpe ratio define risk in terms of volatility. There is another school of thought that suggests a better way to measure risk is in terms of capital preservation. Maximum

drawdown, the pain index, and the pain ratio are all ways to quantify risk in terms of losses. With the DRS's emphasis on preventing large losses, it should come as no surprise that the best results for the capital preservation metrics have a DRS allocation in the 70%-80% range.

Although the 60/40 is often used as shorthand for a balanced portfolio, few investors have portfolios consisting of just large cap U.S. stocks and investment-grade bonds. What if we had a portfolio that was better diversified across multiple asset classes and styles? In the next simulation we add 10% increments to the following portfolio:

Asset Class	Index	Weight
U.S. Large Cap Stock	S&P 500	20%
U.S. Small Cap Stock	Russell 2000	10%
Foreign Developed Stock	MSCI EAFE	15%
Foreign Emerging Stock	MSCI Emerging	10%
Real Estate	FTSE Nareit All REITs	5%
Investment Grade Bonds	Barclays U.S. Aggregate	25%
High Yield Bonds	Barclays U.S. Corporate HY Bond	10%
Cash	Citigroup 3mo T-Bill	5%

Table 2

As before, the relative weights within the “asset allocation portfolio” are kept constant as additional 10% increments of DRS are added. How does that change the results?

July 1, 1997 – December 31, 2016	Return	Cumulative Return	Standard Deviation (Population)	Beta vs. Market	Excess Return vs. Market	Sharpe Ratio	Maximum Drawdown	Pain Index	Pain Ratio
Asset Allocation Portfolio	6.42%	236.45%	10.56%	0.64	-0.43%	0.41	-38.14%	4.57%	0.94
Asset Allocation Portfolio w/ 10% Swan DRS	6.68%	252.84%	10.01%	0.61	-0.17%	0.46	-35.33%	3.99%	1.14
Asset Allocation Portfolio w/ 20% Swan DRS	6.93%	269.25%	9.53%	0.57	0.07%	0.50	-32.42%	3.48%	1.39
Asset Allocation Portfolio w/ 30% Swan DRS	7.17%	285.62%	9.15%	0.54	0.31%	0.55	-29.39%	3.05%	1.66
Asset Allocation Portfolio w/ 40% Swan DRS	7.39%	301.88%	8.87%	0.50	0.54%	0.59	-26.71%	2.71%	1.95
Asset Allocation Portfolio w/ 50% Swan DRS	7.61%	317.98%	8.71%	0.47	0.76%	0.63	-24.34%	2.45%	2.24
Asset Allocation Portfolio w/ 60% Swan DRS	7.82%	333.83%	<b>8.66%</b>	0.43	0.96%	0.66	-21.91%	2.30%	2.48
Asset Allocation Portfolio w/ 70% Swan DRS	8.01%	349.37%	8.73%	0.40	1.16%	0.67	-19.42%	2.23%	2.65
Asset Allocation Portfolio w/ 80% Swan DRS	8.19%	364.53%	8.92%	0.37	1.34%	<b>0.68</b>	<b>-17.05%</b>	<b>2.19%</b>	2.77
Asset Allocation Portfolio w/ 90% Swan DRS	8.37%	379.25%	9.23%	0.33	1.51%	<b>0.68</b>	-17.81%	2.24%	<b>2.80</b>
Swan Defined Risk Strategy (net)	<b>8.53%</b>	<b>393.44%</b>	9.63%	<b>0.30</b>	<b>1.68%</b>	0.67	-18.56%	2.32%	2.77
S&P 500	6.85%	264.27%	15.24%	1.00	0.00%	0.31	-50.95%	12.03%	0.39

Table 3 Source: Zephyr StyleADVISOR

The results are largely similar. Adding increments of DRS continues to reduce risk and improve the risk/return trade-off across the spectrum. By most of the measures above, the “optimal” allocation to the DRS is between 70% and 90%.

There is a second, subtler point to be made from this analysis. If we compare the simple 60/40 portfolio against the more broadly diversified “asset allocation” portfolio, we see very little

difference in end results. To the equity portion we added small cap stocks, foreign developed, emerging markets, and real estate. To the bond portion we diversified into high yield bonds and cash. We went from two asset classes to eight, and yet at the end of the day there was little change in return or risk. If anything, the results from the better-diversified portfolio are slightly worse.

July 1, 1997 – December 31, 2016	Return	Cumulative Return	Standard Deviation (Population)	Beta vs. Market	Excess Return vs. Market	Sharpe Ratio	Maximum Drawdown	Pain Index	Pain Ratio
60% S&P 500/40% Barclays Agg	6.54%	243.99%	9.16%	0.59	-0.31%	0.48	-32.54%	4.46%	0.99
Asset Allocation Portfolio	6.42%	236.45%	10.56%	0.64	-0.43%	0.41	-38.14%	4.57%	0.94
S&P 500	6.85%	264.27%	15.24%	1.00	0.00%	0.31	-50.95%	12.03%	0.39

Table 4 Source: Zephyr StyleADVISOR

This table perfectly illustrates the shortcomings of traditional asset allocation. Simply adding more asset classes does not remove systematic, market risk from the equation. The DRS was built on the premise that market risk must be hedged away, since it cannot be diversified away.

That said, we realize most investors are not going to scrap their existing portfolios and move 75% of their assets into the DRS, no matter how good the historical numbers look. In the next section, we will discuss the potential roles the DRS plays within an existing portfolio.

## WHAT ROLE DOES THE DRS PLAY WITHIN A PORTFOLIO?

It is true that the DRS is difficult to classify within a traditional framework. Compared to the vast majority of investments available, the DRS is different. During 2016, Swan has been conducting a series of mini-conferences called “The 10th Box” that has discussed how the DRS does not fall neatly into the nine-box Morningstar hierarchy. We frequently refer to the DRS as a “hedged equity” solution, but that classification does not exist within many investment frameworks. In this paper we will discuss how the DRS can be used in

a variety of roles within a portfolio, namely:

- The DRS as a total portfolio solution
- The DRS as a core equity position
- The DRS as an alternative investment
- The DRS as a distribution vehicle/fixed income surrogate
- The DRS across multiple asset classes

We start with the scenario where the DRS makes up the largest allocation - in this case, 100% of the portfolio.

## THE CASE FOR THE DRS AS A TOTAL PORTFOLIO SOLUTION

When Randy Swan first developed the Defined Risk Strategy in 1997, it was actually designed to be a total portfolio solution. Randy started investing at an early age and tried many of the strategies available: buy-and-hold, market-timing, stock-picking, traditional diversification, etc. Those strategies did not prevent him from feeling the pain of the 1987 “Black Monday” crash or the 1990-1991 recession. It wasn’t until he started working with insurance companies while at KPMG that he struck upon the ideas that would one day become the DRS.

A successful money manager might be in business for decades. Alternatively, successful insurance companies have been around for centuries. Ultimately, an insurance company bears the risk of policy claims and its balance sheet must be strong enough to withstand those claims when they come in. A successful insurance company must invest their assets well, be very cognizant of the probabilities of unfavorable outcomes, and generate sufficient revenue in order to stay in business. Suffice to say, a hit of 30% or more to their balance sheet could be catastrophic.

Many of those insurance principles are seen in the DRS. Exposure to the equity markets is maintained via low-cost ETFs, without any attempt to outsmart the market via stock selection or market timing. Downside risk is mitigated via the holdings in long-term put options. Revenue is generated from the premium collection trades. Viewed top-down and holistically, the three primary building blocks are complimentary and seek to provide a source of returns in just about any market environment.

As illustrated in the previous section, a 100% Swan DRS solution has outperformed both a simple 60% equity/40% bond portfolio and a more diversified portfolio from inception in July 1997 to December 2016. Even though the current bull market is in its eighth year and is the second-longest bull market in U.S. history, the downside protection the DRS generated through the bear markets of 2000-02 and 2007-09 have compensated for its underperformance relative to the S&P 500 during the last several years. Only the most optimistic and foolish investors would argue that bear markets have been banished forever. When the next bear market does arrive, the DRS will be prepared.

## THE CASE FOR THE DRS AS A CORE EQUITY SOLUTION

The DRS solution with its inception in July 1997 is based upon large cap U.S. equity. Although the DRS is now offered upon other asset classes like small cap equity, foreign developed, and emerging markets, the flagship offering has always utilized U.S. large cap ETFs for its equity exposure. Typically, the DRS holds 85%-90% of its positions in ETFs.

One can easily make the case that the DRS is fundamentally a core equity position, but with the hedge and income components overlaid on top of it. If one were to compare the portfolio characteristics of the Swan Defined Risk Strategy Select Composite against the S&P 500 index and the Morningstar category for Large Blend, the DRS is right in-line with other core, large cap equity offerings.

Asset Allocation, 12/31/16	Swan DRS (%net)	S&P 500	Large Blend Cat Avg.
Cash	2.70%	0.00%	2.34%
US Stock	96.87%	99.23%	94.26%
Non US Stock	0.43%	0.77%	3.13%
Bond	0.00%	0.00%	0.05%
Other	0.00%	0.00%	0.22%

Table 5a Source: Morningstar Direct

Market Cap, 12/31/16	Swan DRS (%net)	S&P 500	Large Blend Cat Avg.
Giant	38.24%	67.12%	50.28%
Large	44.46%	14.03%	36.25%
Medium	17.12%	16.25%	13.33%
Small	0.18%	2.39%	0.14%
Micro	0.00%	0.21%	0.00%

Table 5b Source: Morningstar Direct

Valuations, 12/31/16	Swan DRS (%net)	S&P 500	Large Blend Cat Avg.
Price/Prospective Earnings	20.48%	20.32%	20.43%
Price/Book	2.80%	2.79%	2.92%
Price/Sales	1.86%	1.99%	1.97%
Price/Cash Flow	11.66%	12.37%	12.58%
Dividend Yield	2.50%	2.25%	2.25%

Table 5c Source: Morningstar Direct

Given the fact that typically 85% to 90% of the portfolio is held in S&P Select Sector ETFs, these numbers are completely logical. The strategy does, however, pursue more of an equal-weight sector approach to the market. The S&P 500 is a market capitalization-weighted index. The equal-weight sector approach leads to a bit of a tilt to both smaller names and value characteristics, which you see in the market cap and valuation tables, respectively. But there is no doubt that the

portfolio characteristics of the DRS are large cap, core equity.

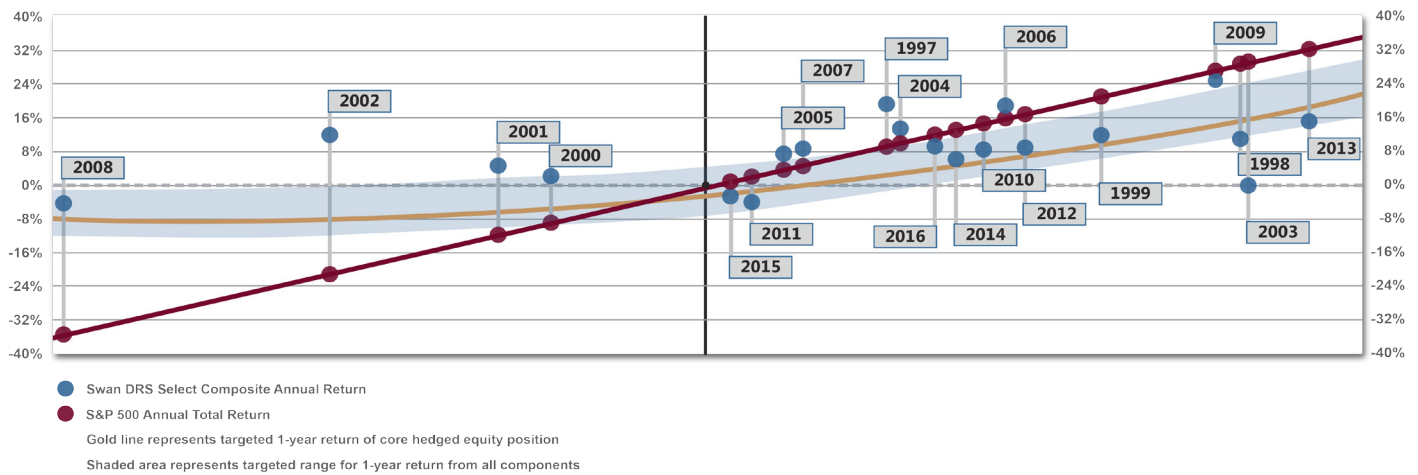
On the other hand, you will certainly see a difference of returns between the DRS and the S&P 500 index or the typical large blend mutual fund. If one were to look at traditional “tracking” metrics like correlation and R-squared, you will see much higher levels of dispersion from the S&P 500 than you would with a traditional large cap core fund.

July 1, 1997 – December 31, 2016	Beta	Tracking Error	R-Squared	Correlation	Up Capture	Down Capture
Swan Defined Risk Strategy (net)	0.30	13.70%	22.10%	0.47	52.7	13.0
Morningstar Large Blend category	0.98	1.58%	98.93%	0.99	94.5	102.6
S&P 500	1.00	0.00%	100.00%	1.00	100	100

Table 6 Source: Zephyr StyleADVISOR

This, of course, is by design. The whole intent of the DRS is to avoid those times when the market is down significantly. The driving idea behind the DRS is that those large bear markets are too painful

to endure, so the DRS is engineered to have a different risk-return profile than a traditional long position. One of the key images we use at Swan to convey this message is the chart below:



**Chart 1** Source: Swan Global Investments. NOTE – this chart is for illustration purposes, not a guarantee of future performance. The charts and graphs contained herein should not serve as the sole determining factor for making investment decisions.

The diagonal red line is the profit-loss diagram for the S&P 500. The curved gold line represents the return profile of the DRS's hedged equity position; that is, the buy-and-hold position in the market combined with the protective elements of the hedge. The gold line lags the S&P 500 in up markets but is still upward sloping. In down markets the hedged equity positions flatten out as the S&P 500 continues to drop. The blue area around the gold curve is the anticipated range of impact from overlaying Swan's short-term premium collection trades over the hedged equity position. It is our goal that returns of the DRS will be within or above the blue shaded area. In 18 of 19 years, they have been.

The one year where the DRS's returns fell outside its targeted return range was 2003. That year Swan stepped outside its normal investment philosophy and overhedged the portfolio, which

exposed it to the risks of taking a directional bet on the market. The primary lesson of 2003 was that the DRS shouldn't take a directional view of the market and should stick to its core investment philosophy of avoiding market timing and stock selection. The secondary lesson of 2003 was that it is much more important to avoid major losses than to capture all of the upside. The DRS's strong performance through the bear market of 2000-02 more than compensated for the lag in 2003's up market.

In our opinion, the DRS allows one to have their cake and eat it too. The investor has large cap, core equity exposure via our large holdings in the S&P Select Sector ETFs. However, the risk-return profile of those holdings has been altered to manage and diminish the impact of bear markets.

## THE CASE FOR THE DRS AS AN ALTERNATIVE SOLUTION

It is this difference in return patterns and the use of options that lead some to classify the Defined Risk Strategy as an “alternative” strategy. The terms “alternative” or “liquid alts” are slippery and hard to define. They seem to be a catch-all category that could just as easily be termed “miscellaneous.” Following the financial crisis of 2007-09 when many traditional equity managers went down in lock-step with the market’s 50% sell-off, there have been a slew of new strategies and products designed to simply behave differently than a traditional stock-picking strategy.

This makes understanding liquid alternatives very difficult. First, there is a very wide dispersion of strategies. Second, many strategies are complex or have unique drivers of returns. For example, some strategies try to short underperforming stocks as well as own outperforming stocks. The drivers of return and risk in long/short strategies are primarily at the individual stock level. Other strategies make top-down decisions and reallocate their portfolios based upon the anticipated relative performance of asset classes. The fate of these tactical asset allocators is driven

by systematic, market factors. Market neutral strategies might try to have very low exposure to market movements, which is difficult to achieve given the rising correlations amongst many of the world’s asset classes. Option-based strategies are influenced by “the Greeks” of option pricing models - i.e., delta, gamma, theta, vega, and rho. The multi-alternative category tries to replicate the “fund of funds” structure employed by hedge funds by rolling many of the above strategies together in one package. I could go on, but the point is that broad definition of “liquid alternatives” encapsulates many different strategies and trying to understand all the factors at play becomes very difficult to manage.

Additionally, most liquid alternatives have not been around very long and have not been battle-tested. The table below shows half a dozen of the more popular Morningstar categories that could be called “liquid alternative,” and breaks them out into funds that weathered the Financial Crisis and those whose inception came after the Crisis (defined as an inception date after March 9, 2009).

Liquid Alts Funds	Pre-Crisis		Post-Crisis		Total
	Count	Percent	Count	Percent	
Long-Short	21	16.5%	106	83.5%	127
Market Neutral	4	7.5%	49	92.5%	53
Managed Futures	17	34.7%	32	65.3%	49
Multi-Alternative	30	21.7%	108	78.3%	138
Option Writing	8	14.5%	47	85.5%	55
Tactical Asset Allocation	32	28.3%	81	71.7%	113
<b>Totals</b>	<b>112</b>	<b>20.9%</b>	<b>423</b>	<b>79.1%</b>	<b>535</b>

Table 7 Source: Morningstar Direct, as of 12/31/2016

As the table plainly shows, the overwhelming majority of the mutual funds in these categories have not been battle-tested through a true bear market. One of the most popular strategies of late, managed futures, only has four funds with an inception prior to March of 2009. How these

newer funds might perform during a market sell-off of 20% or more has yet to be seen.

In all fairness, the mutual fund version of the DRS does have an inception date post-crisis. That said, the mutual fund is based upon the strategy first available as a separately managed account.



Swan does have a GIPS-compliant track record on the SMA composite with a history starting in July 1997. This track record has successfully weathered not only the Financial Crisis of 2007-09 but also the Dot-Com Bust of 2000-03.

Having proved its worth during two bear markets, the problem with classifying the DRS as an alternative is mostly one of allocation size. Most portfolios that have a sleeve dedicated to

alternatives have a minority of their assets in that allocation. The typical portfolio might have 10% to 20% in alternatives, which isn't enough to really impact the risk-return characteristics of the overall portfolio. If we were to revisit table 3 where we introduce 10% increments of the DRS to a well-diversified portfolio, we can see the impact that a 10% or 20% allocation to the DRS has on a portfolio.

July 1, 1997 – December 31, 2016	Return	Cumulative Return	Standard Deviation (Population)	Beta vs. Market	Excess Return vs. Market	Sharpe Ratio	Maximum Drawdown	Pain Index	Pain Ratio
Asset Allocation Portfolio	6.42%	236.45%	10.56%	0.64	-0.43%	0.41	-38.14%	4.57%	0.94
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Asset Allocation Portfolio w/ 40% Swan DRS	7.39%	301.88%	8.87%	0.50	0.54%	0.59	-26.71%	2.71%	1.95
Asset Allocation Portfolio w/ 50% Swan DRS	7.61%	317.98%	8.71%	0.47	0.76%	0.63	-24.34%	2.45%	2.24
Asset Allocation Portfolio w/ 60% Swan DRS	7.82%	333.83%	<b>8.66%</b>	0.43	0.96%	0.66	-21.91%	2.30%	2.48
Asset Allocation Portfolio w/ 70% Swan DRS	8.01%	349.37%	8.73%	0.40	1.16%	0.67	-19.42%	2.23%	2.65
Asset Allocation Portfolio w/ 80% Swan DRS	8.19%	364.53%	8.92%	0.37	1.34%	<b>0.68</b>	<b>-17.05%</b>	<b>2.19%</b>	2.77
Asset Allocation Portfolio w/ 90% Swan DRS	8.37%	379.25%	9.23%	0.33	1.51%	<b>0.68</b>	-17.81%	2.24%	<b>2.80</b>
Swan Defined Risk Strategy (net)	<b>8.53%</b>	<b>393.44%</b>	9.63%	<b>0.30</b>	<b>1.68%</b>	0.67	-18.56%	2.32%	2.77
S&P 500	6.85%	264.27%	15.24%	1.00	0.00%	0.31	-50.95%	12.03%	0.39

Table 3 (revisited) Source: Zephyr StyleADVISOR

At a 20% allocation to Swan, the annualized return has been improved by about 50 basis points and the standard deviation reduced by about a percent. While this is certainly an improvement, there is still a considerable amount of market risk in the portfolio.

Further complicating matters, the typical portfolio with a section carved out for alternatives won't have just one option in that sleeve. They are more likely to have several, covering multiple sub-strategies like perhaps long-short, tactical asset allocation, managed futures or any number of other non-traditional mandates. In a scenario like this, the overall allocation to the DRS might only be 3%-5%, which would really dilute the positive impact the DRS would have on a portfolio. As an

analogy, it really wouldn't make a lot of sense to own an insurance policy on your car that only covered 3%-5% of its replacement value.

Years ago one of my university professors used a humorous analogy to discuss diversification. He asked us if we had ever heard of horse-and-rabbit stew. Obviously, we hadn't. The professor went on to tell us that the recipe for horse-and-rabbit stew was simple: take one horse and one rabbit, throw them both into a big pot and cook 'em up. The problem, however, was that at the end of the day the stew pretty much tastes like horse stew.

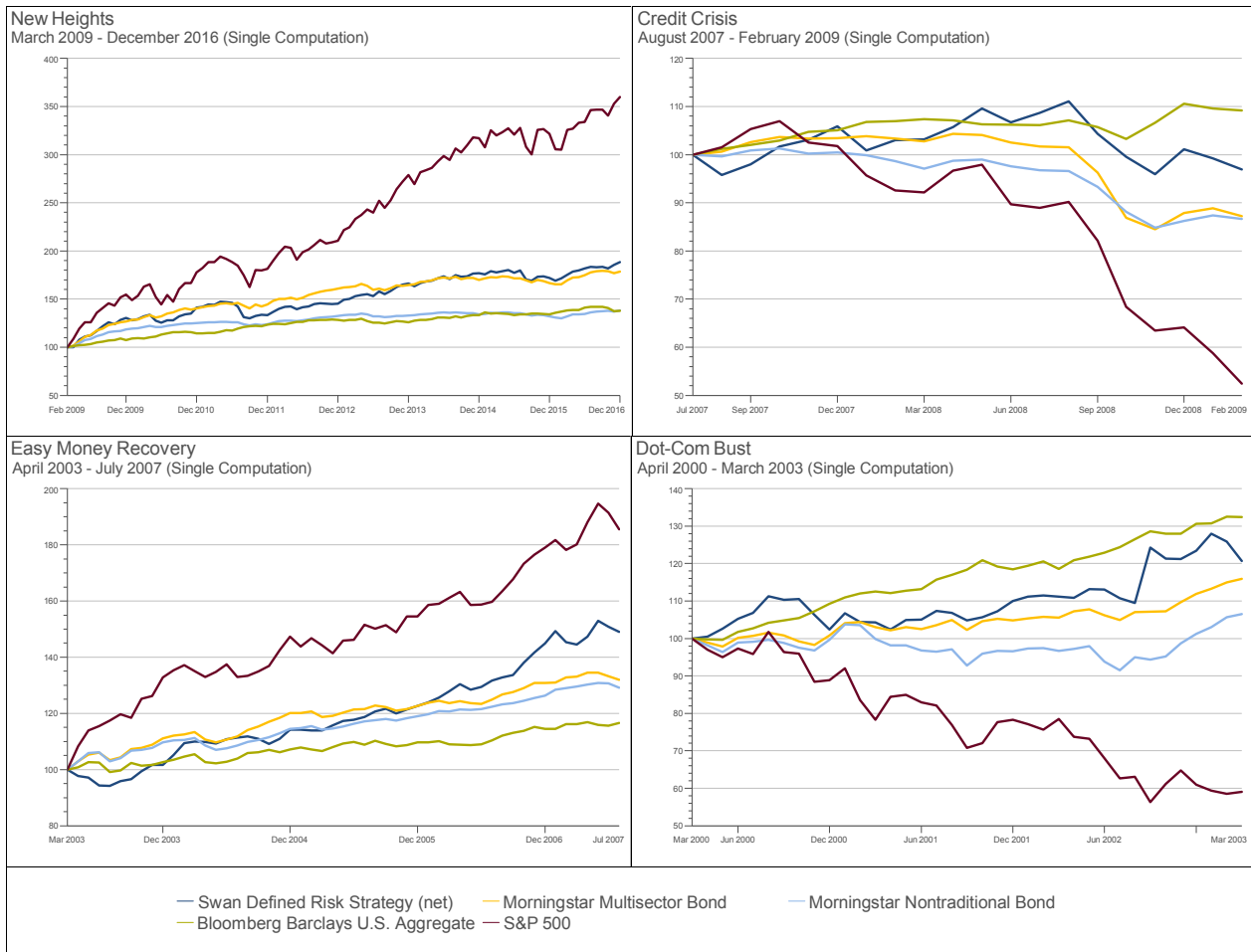
# THE CASE FOR THE DRS AS A DISTRIBUTION VEHICLE OR FIXED INCOME SURROGATE

Across Swan’s client base, there are some who utilize the DRS as an alternative to fixed income. Traditionally, bonds have played two roles within a portfolio: generation of yield and protection of principal. However, the worldwide “new normal” monetary policy of ultra-low or even negative interest rates and massive liquidity injections into the financial system has parched savers of yield. These days savers are forced to choose between yield or protection of principal - they cannot have both.

With its emphasis on not losing big and superior bear market performance, the DRS could seek to fill a capital preservation role in a portfolio and act as a distribution vehicle. The DRS has had more downside risk than traditional investment

grade bonds, but with the lack of yield available in fixed income an increasing number of investors are open to the idea of an allocation to “bond surrogates” or “alternative fixed income.”

Morningstar has two alternative fixed income categories: Multisector bond and Non-traditional bond. Multi-sector bonds have a broad mandate where a strategy can go into high yield, foreign developed, emerging debt, etc. Non-traditional is even broader: it includes the previous, but can also do things like derivatives, interest rate swaps, and credit default swaps. Also, Multi-sector tends to be more strategically allocated whereas Non-traditional tends to be more tactically allocated.



Created with Zephyr StyleADVISOR. Manager returns supplied by Morningstar, Inc.

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Chart 2 Source: Zephyr StyleADVISOR

Against the category averages for Multi-sector Bond and Non-traditional Bond, the DRS performs quite well. In terms of absolute return, DRS outperforms traditional and alternative fixed income by a wide margin. The volatility of

the DRS is certainly higher than any of the bond options, but the DRS's superior Sharpe ratio of 0.67 indicates the additional risk was more than adequately rewarded with additional return.

July 1, 1997 – December 31, 2016	Risk-Return Measures			Tracking Measures		Capital Preservation Measures			
	Return	St Dev	Sharpe Ratio	Beta	Corr	Up Capture	Down Capture	Max DD	Pain Index
Swan Defined Risk Strategy (net)	8.53%	9.65%	0.67	0.30	0.47	52.7	13.0	-18.56%	2.32%
Morningstar Multisector Bond	5.05%	5.32%	0.55	0.21	0.62	29.9	5.90	-18.96%	1.32%
Morningstar Nontraditional Bond	3.59%	5.12%	0.29	0.20	0.59	25.5	13.0	-16.29%	1.99%
Barclays U.S. Aggregate	5.26%	3.46%	0.91	-0.01	-0.06	13.2	-32.3	-3.83%	0.58%
S&P 500	6.85%	15.27%	0.31	1.00	1.00	100	100	-50.95%	12.03%

Table 8 Source: Zephyr StyleADVISOR

The point of this exercise, however, was to see how the DRS might perform in a capital preservation role alongside the alternative fixed income options. The betas of the DRS and the alternative fixed incomes to the S&P 500 index are all low, and the correlation of the DRS to the S&P 500 is actually lower than the alternative fixed categories. The quarterly down market capture of the DRS is almost identical to that of the non-traditional bond category and the maximum drawdowns are similar. Based upon these results, one can make the case that the DRS could be utilized as a fixed income surrogate.

While the above table indicates that traditional investment grade bonds represented by the Barclays U.S. Aggregate are the least correlated to the S&P 500 and offer the best downside protection, that might not always be the case

going forward. It is questionable whether or not investors are truly aware of the magnitude of the risks embedded in traditional investment-grade bonds.

When investors make the decision to move into non-investment grade or alternative fixed income, they are willingly taking on more credit and liquidity risk. But the biggest risk to investment grade bonds is of course interest rate or duration risk. Just like systematic, market risk is the 800 pound gorilla in the equity markets, interest rate risk is the primary driver of bond returns. According to Morningstar, the average durations (i.e., interest rate sensitivities) for different fixed income strategies are in the table below. Given different levels of interest rate rises, the expected losses<sup>1</sup> across these strategies are as follows:

Morningstar Category Averages	Average Eff Duration	Rate Increase			
		12/31/2016	0.5%	1.0%	1.5%
Short-Term Bond	2.25	-1.13%	-2.25%	-3.38%	-4.51%
Intermediate-Term Bond	5.19	-2.60%	-5.19%	-7.79%	-10.39%
Long-Term Bond	10.07	-5.03%	-10.07%	-15.10%	-20.14%
Corporate Bond	6.53	-3.26%	-6.53%	-9.79%	-13.05%
High Yield Bond	3.68	-1.84%	-3.68%	-5.52%	-7.36%
World Bond	5.08	-2.54%	-5.08%	-7.62%	-10.16%
Emerging Markets Bond	5.34	-2.67%	-5.34%	-8.01%	-10.68%

Table 9 Source: Morningstar Direct, 12/31/2016

<sup>1</sup>Numbers are based off of duration information and only take into account changes in interest rates. Convexity is not taken into consideration, nor are other factors such as a widening or tightening of credit spreads.

While negative numbers are seen across the board, the above table of duration and return doesn't truly highlight the magnitude of interest rate risk hanging over the market. According to a recent Bloomberg article, Goldman Sachs estimates that bond holders stand to lose \$1 trillion if rates rise unexpectedly by just 1%.

“Lurking in the bond market is a \$1 trillion reason for the Federal Reserve to go slow on interest-rate increases. That’s how much bondholders stand to lose if Treasury yields rise unexpectedly by 1 percentage point, according to a Goldman Sachs Group Inc. estimate. A hit of that magnitude would exceed the realized losses since the financial crisis on mortgage bonds without government backing, Goldman Sachs analysts Marty Young and Charles Himmelberg wrote.<sup>2</sup>”

Over the last few years, some market watchers have made the joke that investment-grade bonds

were once risk-free return, but today bonds are return-free risk. That statement doesn't seem too far off the mark these days, and is one of the reasons why some practitioners are using the Defined Risk Strategy in place of bonds in their portfolios.

It should be made clear that the DRS does not generate yield, like a traditional bond fund with a monthly distribution. However, the DRS can be used within a systematic withdrawal plan. Because the DRS has historically been limited to single-digit losses in its worst years and has had meaningful up market participation, one could make the case it fulfills the role of a distribution vehicle in a portfolio. Historically, one could have safely liquidated a percentage of their DRS holdings in order to generate cash, and yet not endangered principal. In fact, if someone implemented a systematic withdrawal plan with the DRS at its inception, the principal value of a DRS investment still grew.

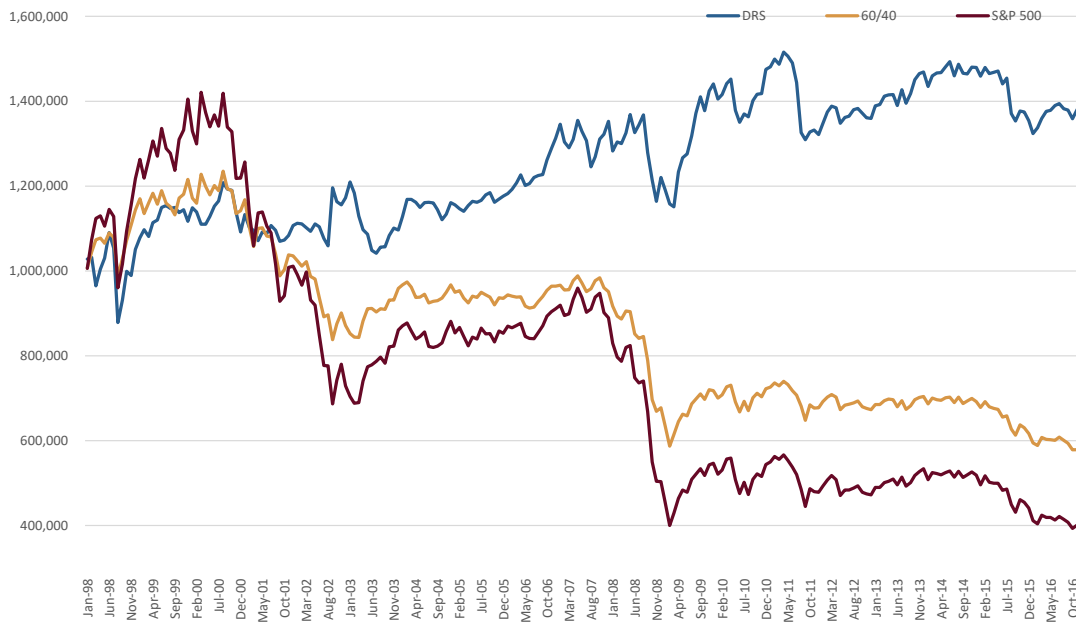


Chart 3 Source: Swan Global Investments

In the above example we started with \$1 million dollars invested in the DRS, the S&P 500, and a traditional 60/40 on January 1st, 1998. We took out \$5,000 on a monthly basis, and compounded that original \$5,000 monthly withdrawal by an annual

inflation rate of 2%. At the end of the simulation on December 31st, 2016, an aggregate \$1,370,434 had been withdrawn from each option. However, the ending values were quite different.

<sup>2</sup><http://www.bloomberg.com/news/articles/2016-06-03/goldman-flags-1-trillion-reason-for-fed-to-go-slow-on-rates>

	Investment Options, 7/1/1998 - 12/31/16	Swan DRS (%net)	S&P 500
DRS		\$1,370,434	\$1,394,173
60/40		\$1,370,434	\$578,967
S&P 500		\$1,370,434	\$401,664

Table 10 Source: Swan Global Investments

Given the low yield of today's current bond offerings and the duration risk going forward, it seems highly unlikely bonds will provide a positive, inflation-adjusted return. In a recent newsletter,

Bill Gross of Janus Capital said that yields would have to drop to -17% in order for bonds to return anything near their historic levels of returns.

## THE CASE FOR THE DRS ACROSS MULTIPLE ASSET CLASSES

This paper has made the case that a sizeable allocation must be made to the Defined Risk Strategy in order to reap its benefits. However, the reality is it's difficult for many portfolio-builders to allocate too much to a single investment. Whether it is compliance reasons, client perception issues, or a general fear of having "too many eggs in one basket," many are reluctant to allocate the lion's share of a portfolio to a single investment, unless it's an index fund.

Swan Global Investments does have an alternative for those who want to increase their exposure to the DRS but have reached their limits on the flagship, U.S. large cap strategy. The DRS is also available for U.S. small cap, foreign developed, and emerging markets.

It is Swan's strong belief that the DRS works just as well, if not better, on these other asset classes. The case for applying the DRS to other asset classes is explored in-depth in the white paper "Portfolio Diversification with the Defined Risk Strategy." In order for the DRS to be effective, three things are necessary:

1. An ETF on the asset class
2. Deep enough liquidity in options on the asset class
3. Enough volatility on the asset class to generate income and profit from occasional bear markets

With these conditions met, Swan has applied the DRS to U.S. small cap stocks, foreign developed stocks, and emerging markets stocks.

How would this look applied to a diversified portfolio?

Let's revisit the "Asset Allocation Portfolio" analyzed early on in this paper. From a broad, strategic perspective, the portfolio looked like this:

Asset Class	Weight
U.S. Large Cap Stock	20%
U.S. Small Cap Stock	10%
Foreign Developed Stock	15%
Foreign Emerging Stock	10%
Real Estate	5%
Investment Grade Bonds	25%
High Yield Bonds	10%
Cash	5%

Table 11

Let's assume that within this strategic allocation the portfolio is comprised with a combination of active and passive options.

By applying the Swan DRS across assets classes, the portfolio might look like this:

		Before		After	
Large Cap Stock		20%		35%	
	Active managers		10%		10%
	Passive managers		10%		0%
	Swan Large Cap		0%		25%
Small Cap Stock		10%		10%	
	Active managers		5%		5%
	Passive managers		5%		0%
	Swan Small Cap		0%		5%
Foreign Developed Stock		15%		15%	
	Active managers		10%		10%
	Passive managers		5%		0%
	Swan Foreign		0%		5%
Foreign Emerging Stock		10%		10%	
	Active managers		10%		5%
	Swan Emerging		0%		5%
Real Estate		5%		5%	
	Active managers		5%		5%
Investment Grade Bonds		25%		15%	
	Active managers		15%		10%
	Passive managers		10%		5%
High Yield Bonds		10%		5%	
	Active managers		10%		5%
Cash		5%	5%	5%	5%
Summary		100%	100%	100%	100%
	Unhedged exposure		100%		60%
	DRS assets		0%		40%

Table 12

Under this scenario, 15% is shifted to the DRS in small cap, foreign, and emerging, each get 5%. Half of the large cap allocation is moved to the flagship, large cap DRS strategy. On top of that, 15% is moved out of fixed income (10% from investment grade, 5% from high yield) and added to the large cap DRS position, giving the

large cap DRS a total portfolio weighting of 25%. The aggregate impact of this would be to protect 40% of the portfolio from the large bear markets that inevitably wreak havoc on an investor's long-term plan.

Of course this is just a theoretical example. There are an infinite number of possible portfolios out there spanning countless asset classes and

weightings. But the above illustration is not too far from the norm and illustrates how and where the DRS can be added to an existing portfolio.

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## CONCLUSION

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I am reminded of the annual conversation I have with my physician. At every check-up she encourages me to eat more vegetables. She says every little bit helps, but the more vegetables I eat, the better. If she had her way, she would probably have me on a 100% vegetarian diet. It's highly unlikely that I will ever get to that point, but compared to where I was ten years ago I have worked an ever-increasing level of green stuff into my diet. The risk of a catastrophic event like a heart attack was simply too high if I did not make a "reallocation" to a healthier diet.

The analogy to investing is pretty straight-forward. There is a tremendous amount of downside risk in a standard stock-bond portfolio. With markets near all-time highs and yields at all-time lows, a major sell-off on either side of the stock-bond equation could be catastrophic. We believe that incorporating a "healthier" option like the Swan Defined Risk Strategy into the plan is a rational, proven way to decrease the downside risk in a portfolio. Whether it is used as a core equity, across multiple asset classes, as an alternative, or as a fixed income surrogate, every little bit helps.

## IMPORTANT DISCLOSURES:

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Swan Global Investments, LLC ("Swan") is an independent Investment Advisory headquartered in Durango, Colo. registered with the U.S. Securities and Exchange Commission under the Investment Advisers Act of 1940. Being an SEC-registered advisor implies no special qualification or training. Swan offers and manages its Defined Risk Strategy to individuals, institutions and other advisory firms. 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.

There are eight DRS Composites offered: 1) The DRS Select Composite which includes non-qualified accounts; 2) The DRS IRA Composite which includes qualified accounts; 3) The DRS Composite which combines the DRS Select and DRS IRA

Composites; 4) The DRS Institutional Composite which includes high net-worth, non-qualified accounts that utilize cash-settled, index-based options held at custodians that allow participation in Clearing Member Trade Agreement (CMTA) trades; 5) The Defined Risk Fund Composite which includes mutual fund accounts invested in the S&P 500; 6) The DRS Emerging Markets Composite which includes mutual fund accounts invested in emerging markets; 7) The DRS Foreign Developed Composite which includes all research and development account(s), and mutual fund accounts invested in foreign developed markets; 8) The DRS U.S. Small Cap Composite which includes all research and development account(s), and mutual fund accounts invested in U.S. small cap issues. Additional information regarding Swan's policies and procedures for calculating and reporting performance returns is available upon request. Swan claims compliance with the Global Investment Performance Standards (GIPS) and has prepared and presented this report in compliance with GIPS standard. Swan's compliance with GIPS has been independently verified from its inception on July 1, 1997 through December 31, 2015. A copy of the verification report is available upon request. To receive copies of the report please call 970.382.8901 or email [operations@swanglobalinvestments.com](mailto:operations@swanglobalinvestments.com). Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

The Defined Risk Strategy Select Composite demonstrates the performance of all non-qualified assets managed by Swan Global Investments, LLC since inception. It includes discretionary individual accounts whose account holders seek the upside potential of owning stock, and the desire to eliminate most of the risk associated with owning stock. The composite relies on LEAPS and other options to manage this risk. Individual accounts own S&P 500 exchange-traded funds, LEAPS associated with the ETFs, as well as option strategies based on other widely traded indices. The Defined Risk Strategy Select Composite includes all non-qualified discretionary accounts which are solely invested in the Defined Risk Strategy. The Defined Risk Strategy was designed to protect investors from substantial market declines, provide income in flat or choppy markets, and to benefit from market appreciation. Stock and options are the primary components of the strategy. The performance benchmark used for the Defined Risk Strategy is the S&P 500 Index comprised of 500 large-capitalization stocks, and which does not charge fees.

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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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