



# Optimizing Asset Allocation

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Seeking Portfolio Optimization with Hedged Equity

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## REVISIONS

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A. **Initial Release**  
November 30, 2014  
Micah Wakefield, AAMS®, AWMA®  
Director of Research and Product Development  
Swan Global Investments

B. **Second Release**  
January 14, 2015  
Micah Wakefield, AAMS®, AWMA®  
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C. **Third Release**  
January 31, 2016  
Micah Wakefield, CAIA®, AAMS®, AWMA®  
Director of Research and Product Development  
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D. **Fourth Release**  
January 31, 2017  
Micah Wakefield, CAIA®, AAMS®, AWMA®  
Director of Research and Product Development  
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E. **Fifth Release**  
January 31, 2018  
Micah Wakefield, CAIA®, AAMS®, AWMA®  
Director of Research and Product Development  
Swan Global Investments

# INTRODUCTION

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Swan's Defined Risk Strategy (DRS) was specifically built to compensate for some of the inherent weaknesses in stock selection, market timing, and asset allocation (including buy-and-hold investing). Swan's investment philosophy is based on the belief that stock selection or market timing is difficult if not impossible and that asset allocation is not sufficient by itself to protect against market risk. Swan also believes that diversification across asset classes has limitations in growing and protecting investor's wealth and that wealth is best created and preserved by mitigating systematic risk (market risk) within a portfolio.

Based on this belief, Swan holds that market risk (as occurred in 2000-2002 and 2008-2009) cannot be addressed by Modern Portfolio Theory or diversification alone. Market risk can only be truly solved by exiting the market or by hedging. Since Swan strongly believes that no one can accurately predict or time the market in the long run, this removes or severely diminishes exiting the market as an option. This leaves hedging as the only viable solution to managing market risk. The DRS accomplishes this by using options to hedge an underlying position and by using shorter-term market-neutral option strategies to seek to generate income to help pay for the cost of hedging.

The goal of this study is to show how hedged equity, through an investment vehicle such as the DRS, can be superior to traditional asset allocation or help enhance it.

In Summary:

- The DRS was created to achieve the same goals of increased returns and reduced risks sought by a diversified MPT portfolio. However, Swan DRS seeks to achieve these goals in a much simpler manner; one with

more quantifiable risks and with less moving parts.

- The DRS seeks to directly and explicitly manage market risk. Traditional asset allocation takes an indirect and not-always effective approach in attempting to mitigate risk.
- The DRS seeks to provide favorable absolute and risk adjusted returns compared to almost any asset class or diversified portfolio over an entire investment cycle.
- Portfolio allocations to the Swan DRS may be beneficial to investors and advisors in a diversified portfolio over an entire investment cycle.

This does not mean, however, that there are not noticeable benefits to buy-and-hold investing and asset allocation. Asset allocation provides diversification of specific risk (unsystematic risk), reduction in volatility, and at times increased return through non-correlated assets. Furthermore, diversification can have some additional benefit by providing a simple roadmap to investors that can help to minimize emotions impacting investment decisions.

Because of some of these benefits, many investors today have portfolios built around asset allocation strategies. Some are extremely customized and distinct, while many are only slight variations from well-known, standard asset allocation models. Many notable investment managers and scholars have published their "ideal" asset allocation strategies, and in many cases, investors have sought to follow these models in pursuit of higher returns and lower risk.

This document seeks to highlight 13 popular, well-known asset allocation strategies and illustrate how an allocation to the DRS could offer favorable absolute and risk adjusted returns.

# MODERN PORTFOLIO THEORY

## BUILDING BLOCK OF ASSET ALLOCATION PORTFOLIOS

Modern portfolio theory (MPT) can be defined as a theory of finance that attempts to maximize portfolio expected return for a given amount of portfolio risk, or equivalently minimize risk for a given level of expected return, by carefully choosing the proportions of various assets (Source: Wikipedia).

This chart visualizes the concept of MPT and asset allocation, showing how an asset allocation portfolio (the light gray-colored cells labeled “AA”) smoothed out returns over this fourteen year time

period. Notice how the AA approach isn’t never in the top two or bottom two performing assets. In its simplest form, an investor implementing an asset allocation approach is willing to forego gains in order to mitigate losses. This is mostly because many will readily admit that it is impossible (or at least very difficult) to predict which will be the best (or worst) performing asset classes in advance. Thus, asset allocation seeks to diversify and eliminate the necessity of picking the best performers. It is important to note, however, the two main

### ASSET CLASS RETURNS

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EM 56.3%	REIT 31.6%	EM 34.5%	REIT 35.1%	EM 39.8%	HG Bnd 5.2%	EM 79.0%	REIT 28.0%	REIT 8.3%	REIT 19.7%	Sm Cap 38.8%	REIT 28.0%	REIT 2.8%	Sm Cap 21.3%	EM 37.8%
Sm Cap 47.3%	EM 26.0%	Int'l Stk 14.0%	EM 32.6%	Int'l Stk 11.6%	Cash 1.4%	HY Bnd 57.5%	Sm Cap 26.9%	HG Bnd 7.8%	EM 18.6%	Lg Cap 32.4%	Lg Cap 13.7%	Lg Cap 1.4%	HY Bnd 17.5%	Int'l Stk 25.6%
Int'l Stk 38.2%	Int'l Stk 20.7%	REIT 12.2%	Int'l Stk 26.9%	AA 7.6%	AA -22.4%	Int'l Stk 32.5%	EM 19.2%	HY Bnd 4.4%	Int'l Stk 23.3%	Int'l Stk 23.3%	AA 6.9%	HG Bnd 0.6%	Lg Cap 12.0%	Lg Cap 21.8%
REIT 37.1%	Sm Cap 18.3%	AA 8.9%	Sm Cap 18.4%	HG Bnd 7.0%	HY Bnd -26.4%	REIT 28.0%	HY Bnd 15.2%	Lg Cap 2.1%	Sm Cap 16.4%	AA 11.5%	HG Bnd 6.0%	Cash 0.1%	EM 11.6%	Sm Cap 14.7%
Lg Cap 28.7%	AA 14.1%	Lg Cap 4.9%	AA 16.7%	Lg Cap 5.5%	Sm Cap -33.8%	Sm Cap 27.2%	Lg Cap 15.1%	AA 0.3%	Lg Cap 16.0%	HY Bnd 7.4%	Sm Cap 4.9%	Int'l Stk -0.4%	REIT 8.6%	AA 14.6%
HY Bnd 28.2%	Lg Cap 10.9%	Sm Cap 4.6%	Lg Cap 15.8%	Cash 4.4%	Lg Cap -37.0%	Lg Cap 26.5%	AA 13.5%	Cash 0.1%	HY Bnd 15.6%	REIT 2.9%	HY Bnd 2.5%	AA -1.3%	AA 7.2%	REIT 8.7%
AA 25.9%	HY Bnd 10.9%	Cash 3.2%	HY Bnd 11.8%	HY Bnd 2.2%	REIT -37.7%	AA 24.6%	Int'l Stk 8.2%	Sm Cap -4.2%	AA 12.2%	Cash 0.1%	Cash 0.0%	Sm Cap -4.4%	HG Bnd 2.7%	HY Bnd 7.5%
HG Bnd 4.1%	HG Bnd 4.3%	HY Bnd 2.7%	Cash 4.7%	Sm Cap -1.6%	Int'l Stk -43.1%	HG Bnd 5.9%	HG Bnd 6.5%	Int'l Stk -11.7%	HG Bnd 4.2%	HG Bnd -2.0%	EM -1.8%	HY Bnd -4.6%	Int'l Stk 1.5%	HG Bnd 3.5%
Cash 1.0%	Cash 1.4%	HG Bnd 2.4%	HG Bnd 4.3%	REIT -15.7%	EM -53.2%	Cash 0.2%	Cash 0.2%	EM -18.2%	Cash 0.1%	EM -2.3%	Int'l Stk -4.5%	EM -14.6%	Cash 0.3%	Cash 1.0%

Abbr.	Asset Class - Index	Annual	Best	Worst
Lg Cap	Large Caps Stocks - S&P 500 Index	10.15%	32.4%	-37.0%
Sm Cap	Small Cap Stocks - Russell 2000 Index	11.17%	47.3%	-33.8%
Int'l Stk	International Developed Stocks - MSCI EAFE Index	8.60%	39.2%	-43.1%
EM	Emerging Market Stocks - MSCI Emerging Markets Index	12.68%	79.0%	-53.2%
REIT	REITs - FTSE NAREIT All Equity Index	11.13%	37.1%	-37.7%
HG Bnd	High Grade Bonds - Barclay's U.S. Aggregate Bond Index	4.14%	7.84%	-2.0%
HY Bnd	High Yield Bonds - BofAML US High Yield Master II Index	9.08%	57.5%	-26.4%
Cash	Cash - 3 Month Treasury Bill Rate	1.18%	4.7%	0.0%
AA	Asset Allocation Portfolio*	8.74%	25.9%	-22.4%

Past performance does not guarantee future returns. The historical performance shows changes in market trends across several asset classes over the past fifteen years. Returns represent total annual returns (reinvestment of all distributions) and does not include fees and expenses. The investments you choose should reflect your financial goals and risk tolerance. For assistance, talk to a financial professional. All data are as of 12/31/17.

\*Asset Allocation Portfolio is made up of 15% large cap stocks, 15% International stocks, 10% small cap stocks, 10% emerging market stocks, 10% REITs, 40% high-grade bonds, and annual rebalancing.

Exhibit 1: (Source: Novelinvestor.com)

shortcomings of MPT:

1. Current and future allocations are driven by historical or assumed relationships as communicated through the oft-repeated disclaimer for the investment community, “Past performance is no guarantee of future results.” This was most readily apparent in the last few major market corrections as correlation and historical relationship can change greatly during times of market crisis.

2. Lack of true protection from market risk. As highlighted in the last few major market corrections, asset allocation does not diversify away systematic market risk. Although an asset allocation portfolio can minimize volatility, most still have large allocations to assets that have seen multiple drawdowns greater than 50% (Source: Credit Suisse, Global Returns Yearbook, 2011).

Randy Swan, founder and CEO of Swan Global Investments, explained these shortcomings well in 1997:

“The great claim of asset allocation is that risk can be reduced by diversifying over several broad asset classes (i.e., stocks, bonds, cash and real estate) without a similar reduction in return. This risk reduction is, however, strictly theoretical (typically based upon relationships that existed over a particular period). There is no guarantee that these same relationships will continue in the future. This is the crux of where asset allocation or modern portfolio theory breaks down. Risk is not defined; instead it is merely expressed in historical standards.”<sup>1</sup>

## COMMONLY USED ASSET ALLOCATION STRATEGIES

For those wanting to implement buy-and-hold asset allocation strategies, there are numerous well-known and widely publicized model portfolios available. Many advisors have built their investment models around some of these strategies and some of the more popular “robo-advisors” have built their investment platforms around these or very similar strategies. For example, two of the largest robo-advisor platforms are based on MPT asset allocation.

(source:<http://investorjunkie.com/36355/betterment-wealthfront-compare/>, October, 2014).

The following 13 asset allocation portfolios cover a wide variety of MPT followers and range from simplistic to complex. All were constructed using widely publicized information and each portfolio was rebalanced at the beginning of each year. Composition of each portfolio is as follows:

Traditional 60/40	60/20/20 (Alts)	Permanent Portfolio
60% = US Stocks (Russell 3k)	60% = US Stocks (Russell 3k)	25% = Gold (GLD)
15% = US 10+Yr Govt Bonds	20% = US 7-10 Yr Govt Bonds	25% = US 7-10 Yr Govt Bonds
15% = US 7-10 Yr Govt Bonds	20% = HFRI Fund Weighted Index	25% = Cash
10% = Citigroup Corporate Bond		25% = US Equities (Russell 3k)

Ivy Portfolio	Risk Parity	David Swensen
20% = US Stocks (Russell 3k)	7.5% = US Stocks (Russell 3k)	10% = Energy (Dow Americas Oil & Gas All Cap and VDE)
20% = Foreign Developed (MSCI EAFE)	7.5% = Foreign Developed (MSCI EAFE)	10% = Real Estate (MSCI US REIT)
20% = US 7-10 Yr Govt Bonds	35% = US 7-10 Yr Govt Bonds	15% = US 7-10 Yr Govt Bonds
20% = Commodities (S&P GSCI)	35% = US Corp. Grade Investment Bonds	15% = US TIPS
20% = Real Estate (DJ US REIT Index)	5% = Commodities (S&P GSCI)	30% = US Stocks (Russell 3k)
	5% = Gold London PM Fixing	20% = Foreign Developed (MSCI EAFE)
	5% = Real Estate (DJ US REIT)	

Mohammad El-Erian	Rob Arnott	Scott Burns/Andrew Tobias
21% = US Stocks (Russell 3k)	10% = US Stocks (Russell 3k)	33.34% = US Stocks (Vanguard Total Stock Market Index)
15% = Foreign Developed (MSCI EAFE)	10% = Foreign (MSCI EAFE)	33.33% = US TIPS
12% = Emerging Stocks (MSCI EM)	20% = BOFA USD Emerging Markets Sovereign Debt Plus	33.33% = Foreign (Vanguard Total Intl Stock Market Index)
7% = Private Equity (Proshares Global Listed Private Equity and Carlyle Group)	10% = US Corporate High Yield	
5% = US 7-10 Yr Govt Bonds	10% = US 7-10 Yr Govt Bonds	
9% = International Bonds (BOFA Fixed Income)	10% = Barclay's US Corporate Inv Grade Bonds	
3% = Real Estate (DJ US REIT)	10% = Commodities (S&P GSCI)	
7% = Commodities (S&P GSCI)	10% = Real Estate (DJ US REIT)	
8% = Infrastructure (MS Global Infrastructure and MSCI World Infrastructure)	10% = US TIPS	
8% = Special Situations (HFN)		

William Bernstein ("Smart Money")	Rick Ferri/Core Four	Frank Armstrong's Ideal Index
40% = Short Term Investment Grade Bonds (VFSTX)	25% = Vanguard Total Bond Market	7% = Vanguard 500 Index Inv
15% = Total Stock Market (VFTSX)	25% = Vanguard Total Stock Market	7% = Vanguard Value Index Inv
12% = Emerging Stocks (MSCI EM)	25% = Vanguard Total Stock Index	9% = US Small Growth (S&P Small Cap 600 Growth Index and Vanguard Small Cap Growth Index Inv)
10% = Small Cap Value (VISVX)	25% = Vanguard REIT Index	9% = US Small Value (S&P Small Cap 600 Value Index and Vanguard Small Cap Value Index Inv)
10% = Vanguard Value Index (VIVAX)		30% = Vanguard Total International Stock Index Inv
5% = Emerging (VEU)		8% = Vanguard REIT Index Inv
5% = European Equities (VEURX)		30% = Vanguard Short-Term Bond Index Inv
5% = Pacific Equities (VPACX)		7% = Vanguard Value Index Inv
5% = REIT's (VGSIX)		
5% = S&P Small Cap 600		



All Seasons (Ray Dalio)	60/20/20 w Swan DRS	Swan DRS
7% = Commodities (S&P GSCI)	60% = US Stocks (Russell 3k)	100% = Swan Defined Risk Strategy Select Composite, Net of Fees
8% = Gold London PM Fixing	20% = US 7-10 Yr Govt Bonds	
21% = US Stocks (Russell 3k)	20% = Swan Defined Risk Strategy Select Composite, Net of Fees	
9% = Foreign Developed (MSCI EAFE)		
40% = US Long-Term Bonds		
15% = US 7-10 Yr Govt Bonds		

Sources: Mebane Faber, Zephyr StyleAdvisor, and [http://www.bogleheads.org/wiki/Lazy\\_portfolios](http://www.bogleheads.org/wiki/Lazy_portfolios)

One cannot invest directly in an index; thus, expenses would be higher to invest similar to any portfolio that includes an index for an allocation.

Below in Exhibit 2 are the returns and portfolio statistics for the above asset allocation strategies since July of 1997 (the DRS's inception date), as well as the S&P 500. Wherever possible, the most widely available or readily accepted indexes, mutual funds, or ETFs were used to calculate

performance. No management fees, taxes, or trading expenses were included in the results (except for the Swan DRS, which is net of fees and trading expenses). Thus, actual returns for the asset allocation models would have been lower.

Portfolio Statistics: July 1, 1997 through December 31, 2017	Annualized Returns	Cumulative Return	Population Standard Deviation	Sharpe Ratio	Worst Period Return	Maximum Drawdown	Alpha vs. Market	Beta vs. Market
S&P 500 Total Return	7.54%	343.80%	14.90%	0.37	-16.79%	-50.95%	0.00%	1.00
60% Equity/40% Bonds	7.95%	380.10%	8.79%	0.67	-11.11%	-28.70%	3.46%	0.55
60/20/20 (Alts)	7.65%	353.47%	9.77%	0.57	-11.56%	-33.69%	2.51%	0.64
Permanent Portfolio	6.28%	248.41%	6.03%	0.70	-8.63%	-12.78%	4.53%	0.22
Ivy Portfolio	6.65%	274.14%	11.04%	0.42	-19.87%	-46.28%	2.14%	0.59
Risk Parity	6.49%	262.91%	5.43%	0.82	-9.06%	-15.11%	5.04%	0.18
David Swensen	7.29%	322.91%	10.08%	0.52	-16.03%	-37.61%	2.37%	0.62
El Erian	6.77%	283.14%	11.65%	0.40	-16.99%	-42.04%	1.48%	0.69
Rob Arnott	7.34%	327.39%	8.28%	0.64	-16.31%	-29.40%	4.00%	0.42
Scott Burns/Andrew Tobias	6.77%	283.01%	10.66%	0.44	-15.67%	-38.54%	1.60%	0.66
Bernstein "Smart Money"	6.80%	285.06%	9.28%	0.51	-13.02%	-34.92%	2.16%	0.58
Core Four Portfolio	7.44%	335.58%	11.50%	0.47	-18.14%	-44.92%	2.19%	0.68
Ideal Index	6.65%	274.27%	10.60%	0.43	-14.42%	-39.07%	1.53%	0.65
All Seasons (Ray Dalio)	7.39%	330.93%	6.65%	0.80	-9.67%	-14.42%	5.65%	0.22
60/20/20 (Swan DRS at 20)	8.08%	391.65%	9.72%	0.62	-11.91%	-30.88%	3.01%	0.63
Swan Defined Risk Strategy (Net of Fees)	8.64%	446.89%	9.40%	0.70	-16.15%	-18.56%	6.44%	0.30

Exhibit 2 (Sources: Zephyr StyleAdvisor, Morningstar, Mebane Faber, and Swan Global Investments)

Worst period return equals worst one month return over the time period. No management fees are included except for the Swan DRS, based on the Swan DRS Select Composite, which is net of fees. One cannot invest directly in an index. Where indexes were used, expense ratios of acquired fund fees would be present if represented by actual investments seeking to track the indexes; thus investment returns would be lower for those portfolios. It is important to note that expense ratios would likely have been higher in prior years. 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.

## Annualized Returns from July 1997 - 2017

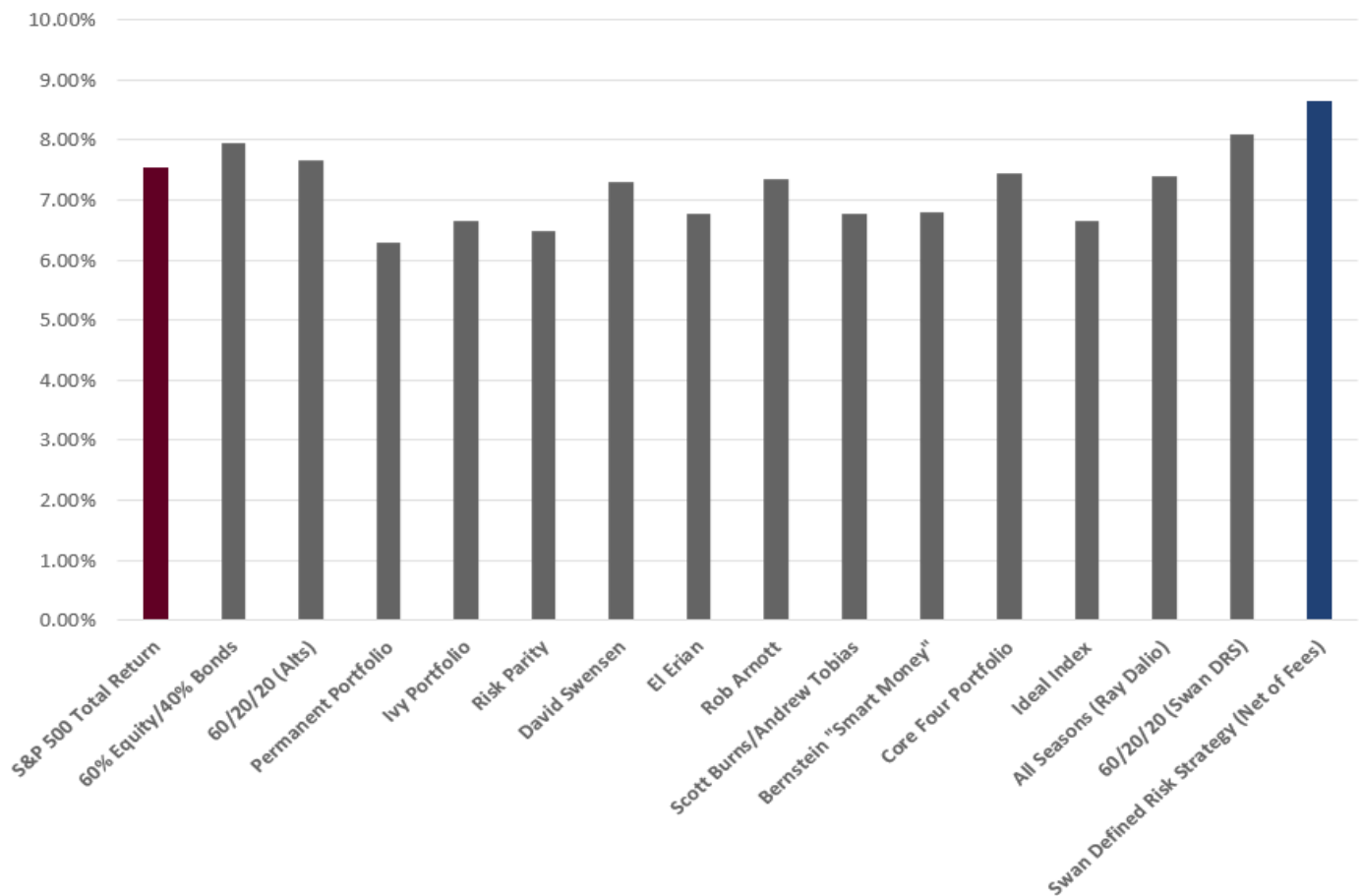


Exhibit 3 (Sources: Zephyr StyleAdvisor, Morningstar, and Swan Global Investments)

No management fees are included except for the Swan DRS based on the DRS Select Composite, which is net of all fees. One cannot invest directly in an index. Where indexes were used, expense ratios of acquired fund fees would be present if represented by actual investments seeking to track the indexes; thus investment returns would be lower for those portfolios. It is important to note that expense ratios would likely have been higher in prior years. 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.

This 20 year period incorporates three equity bull markets and two bear markets. There are some interesting conclusions from looking at the long-term returns of these models. First, nine of the thirteen model portfolios fall within 95 basis points of each other from 6.39% to 7.30%. The three model portfolios that do not fall within this range represent the two best and worst performing portfolios, but all of the models fall within 167 basis points! Second, most model portfolios ended up with a standard deviation between 9% and 11%. In other words, the long-

term results of most asset allocation models built by some of the most well-known, brightest, and respected leaders within investment management are scarcely distinguishable. This is most easily seen with a correlation matrix, showing how highly correlated most asset allocation models are to each other and to the S&P 500. Correlation measures how closely two different investments move in conjunction with one another; if one is seeking to diversify an investment portfolio, lower correlations or negative correlations are desired. This highlights in particular why asset allocation

on its own does not mitigate systematic risk; assets can all go down together, and usually do in corrections especially for those highly correlated.

In Exhibit 4, red indicates a correlation between 0.70 and 1.00, with the darker shade of red indicating a correlation higher than 0.90. It is

easily apparent from this matrix that Swan's DRS is unique from all the other asset allocation models from a correlation standpoint, and also has the lowest correlation to the S&P 500 at 0.47.

The similar characteristics and returns of these asset allocation portfolios begs the question

Correlation Matrix: July 1, 1997 through December 31, 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1) S&P 500 TR	1	0.94	0.98	0.54	0.8	0.5	0.92	0.88	0.76	0.92	0.93	0.88	0.92	0.49	0.47
2) 60%/40%	0.94	1	0.98	0.67	0.82	0.71	0.93	0.88	0.83	0.93	0.92	0.9	0.91	0.73	0.49
3) 60/20/20 (Alts)	0.98	0.98	1	0.63	0.84	0.61	0.95	0.92	0.82	0.95	0.96	0.91	0.95	0.61	0.5
4) Permanent Port.	0.54	0.67	0.63	1	0.65	0.79	0.68	0.67	0.7	0.67	0.62	0.63	0.63	0.8	0.33
5) Ivy Portfolio	0.8	0.82	0.84	0.65	1	0.76	0.93	0.93	0.94	0.9	0.89	0.92	0.9	0.68	0.47
6) Risk Parity	0.5	0.71	0.61	0.79	0.76	1	0.72	0.7	0.84	0.69	0.63	0.7	0.65	0.94	0.36
7) David Swensen	0.92	0.93	0.95	0.68	0.93	0.72	1	0.96	0.91	0.98	0.97	0.97	0.98	0.67	0.49
8) El Erian	0.88	0.88	0.92	0.67	0.93	0.7	0.96	1	0.92	0.97	0.95	0.92	0.96	0.65	0.48
9) Rob Arnott	0.76	0.83	0.82	0.7	0.94	0.84	0.91	0.92	1	0.89	0.88	0.9	0.88	0.75	0.48
10) Burns/Tobias	0.92	0.93	0.95	0.67	0.9	0.69	0.98	0.97	0.89	1	0.96	0.94	0.97	0.65	0.48
11) Bernstein	0.93	0.92	0.96	0.62	0.89	0.63	0.97	0.95	0.88	0.96	1	0.96	0.99	0.57	0.5
12) Core Four	0.88	0.9	0.91	0.63	0.92	0.7	0.97	0.92	0.9	0.94	0.96	1	0.97	0.62	0.48
13) Ideal Index	0.92	0.91	0.95	0.63	0.9	0.65	0.98	0.96	0.88	0.97	0.99	0.97	1	0.59	0.48
14) All Seasons	0.49	0.73	0.61	0.8	0.68	0.94	0.67	0.65	0.75	0.65	0.57	0.62	0.59	1	0.31
15) Swan DRS	0.47	0.49	0.5	0.33	0.47	0.36	0.49	0.48	0.48	0.48	0.5	0.48	0.48	0.31	1

Exhibit 4 (Source: Zephyr StyleAdvisor)

The Swan DRS Select Composite is net of fees; no fees have been included for all other models. 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.

whether a simpler and more direct method of investment might achieve the same, if not better, outcome. Of course, with investing there is no such thing as a one-size-fits-all model portfolio. Each investor has various goals and circumstances and unique risk tolerances. Variations of these models can be created depending on the investor's risk tolerance, time horizon, and return goals and more specific asset classes can be used to further differentiate. For this study, however, most of the asset allocation models included would be considered moderate or conservative in nature. Granted, most of these asset allocation models did outperform the S&P 500 while also lowering

volatility (and in some cases, drastically). It is apparent why these model portfolios are popular and the basis for so many investors' portfolios, even if they were impacted by the benefit of hindsight (past historical returns could have impacted the choice of the asset classes by those building the models).

However, it is important to note that these portfolios have an average allocation of 35.54% to fixed income. Exhibit 3 displays the fact that, U.S. fixed income had a very strong bull market during almost the entire 20 year time period tested for these portfolios. Interest rates have been falling over the past 35 years from 20 percent down to

almost zero. It seems very unlikely that this 30+ year bond bull market can continue to provide similar returns going forward. Due to the heavy allocation to bonds in all of these model portfolios (ranging from a low of 14% to a high of 60%, with only two portfolios having less than 25% in fixed income), the possibility for a repeated large contribution from fixed income in the next 15-20 years is likely very low, if not impossible.

Consider a different scenario, if all of the fixed income positions were removed from the asset allocation models, the results and risk metrics show some interesting changes. This scenario is more of an apple to apples approach when comparing to the DRS since it is 100% equity-based. For all the asset allocation models, standard deviation changes to a range of 12-17% instead of 6-12%, a huge increase caused by the removal of the lower standard deviation positions

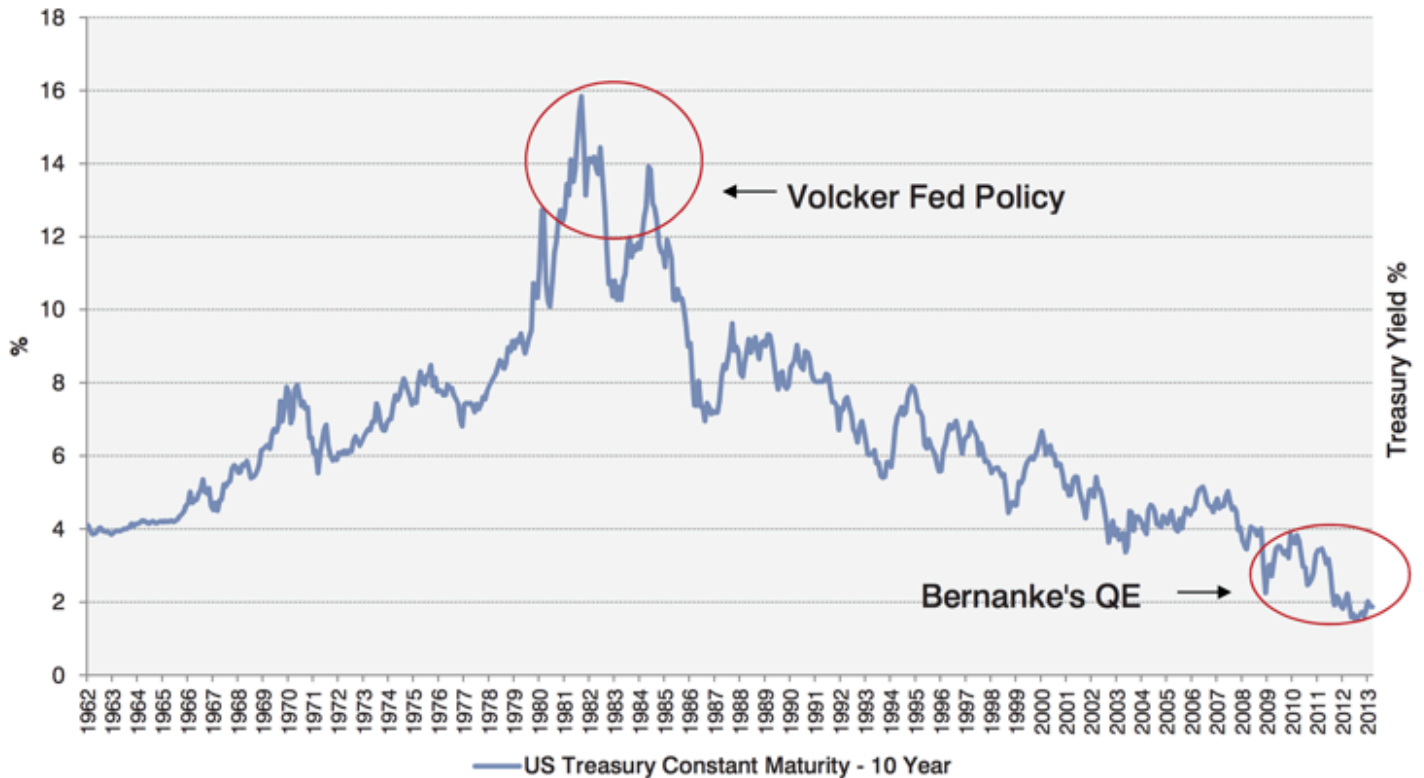


Exhibit 5 (Source: Cook and Blongastainer, Boston Company Asset Management, May, 2013 and FactSet)

of fixed income. Max drawdown increases greatly for all portfolios, with the lowest now at -25% and the second lowest at -43%, quite a change from -13% and -14% with fixed income. In addition, the Sharpe ratios for the asset allocation models drop drastically, with only one scoring greater than .50 (whereas previously, 8 models had a sharpe ratio greater than .50). On the other hand, if a portfolio consisted of 65% Swan DRS and 35% fixed income, standard deviation would have lowered to 6.28% (from 9.40%) and the Sharpe ratio would have increased from 0.70 to 0.87.

In summary, it is important to note the following:

- The current bull market is nine years

old, much longer than historical averages. A bear market is necessary to complete a full market cycle.

- Currently both equity markets and fixed income markets carry substantial downside risk.
- There is risk of equity and fixed income being in a bear market at the same time.
- Swan's DRS has better returns than all of the popular model portfolios and lower standard deviation than most while also taking a simpler, more direct approach to risk.

All of these portfolios depend heavily on fixed income and many investors continue to shy away from the risk and growth potential of equities, well aware of the ever present market risk associated with the stock market. With this in mind then,

how can one improve on asset allocation going forward?

## ENHANCING ASSET ALLOCATION

Based off of the results above, one might conclude that it would be easier to just allocate a portfolio 100% to the DRS: set it and forget it (especially in light of the state of fixed income and equity valuations). Of course, it is unlikely that any advisor is going to allocate 100% to the DRS. However, it is important to note that adding

increments of the DRS to the portfolio may improve returns. Regardless, with a viable hedged equity alternative such as Swan's DRS, investors can take advantage of traditional equity exposure without potentially increasing risk. In Exhibit 6, the results shown are from adding various allocations of the Swan DRS to an average return of all 13 of

Statistics: July 1, 1997 through December 31, 2017	Annualized Returns	Cumulative Return	Population Standard Deviation	Sharpe Ratio	Worst Period Return	Maximum Drawdown	Alpha vs. Market	Beta vs. Market
S&P 500 Total Return	7.54%	343.80%	14.90%	0.37	-16.79%	-50.95%	0.00%	1.00
Asset Allocation Average	7.14%	311.11%	8.50%	0.60	-13.80%	-30.97%	3.02%	0.51
Asset Allocation Average w 20% Swan	7.48%	338.85%	7.89%	0.69	-11.87%	-26.62%	3.68%	0.47
Asset Allocation Average w 40% Swan	7.80%	366.43%	7.68%	0.75	-11.22%	-22.88%	4.35%	0.42
Asset Allocation Average w 60% Swan	8.10%	393.73%	7.90%	0.76	-12.85%	-19.11%	5.04%	0.38
Asset Allocation Average w 80% Swan	8.38%	420.59%	8.50%	0.74	-14.50%	-16.68%	5.74%	0.34
Swan Defined Risk Strategy (Net of Fees)	8.64%	446.89%	9.40%	0.70	-16.15%	-18.56%	6.44%	0.30

Exhibit 6 (Sources: Zephyr StyleAdvisor, Morningstar, Mebane Faber, and Swan Global Investments)

No management fees are included except for the Swan DRS, based on the DRS Select Composite, which is net of all fees. One cannot invest directly in an index. Where indexes were used, expense ratios of acquired fund fees would be present if represented by actual investments seeking to track the indexes; thus investment returns would be lower for those portfolios. It is important to note that expense ratios would likely have been higher in prior years. 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.

the model portfolios listed above.

Integrating alternative strategies such as the DRS into a portfolio's equity and fixed income allocations should help diversify the risk exposures of that portfolio, potentially enabling it to be better positioned to face various market environments, especially those that have occurred since the late '90s. By adding the DRS as a major component in a portfolio, an investor can maintain equity exposure but limit its downside risk, thus being

less dependent on fixed income. In fact, since inception of the DRS in 1997, all of the asset allocation strategies in this study could have increased return by adding an allocation to Swan's DRS—the greater the allocation, the greater the return.

Even over a shorter time frame from 2007 through 2015 with the market returning 7.05% a year, the DRS returned more on an annual basis than all of the portfolios but 60/40 and All Seasons

(8.03% and 7.76%), returning 7.47%. The rest of the portfolios ranged mainly from 5-6% annually with an average of approximately 5.94%, with the Ivy Portfolio clocking in at the lowest at 3.82%. It is important to note that both of these time frames (July 1997-2015 and 2007-2015) cover a longer-term investment cycle and include two bear markets and one bear market respectively, which favors the DRS due to the nature of the strategy always maintaining a full notional hedge. During a strong bull market, the DRS will tend to underperform, such as in a shorter strong bull period like 2012-2013. Although, the DRS still returned 11.64% annualized compared to the S&P 500's 23.92% and an average of 11.75% for the 13 model portfolios over the 2012-2013 time frame.

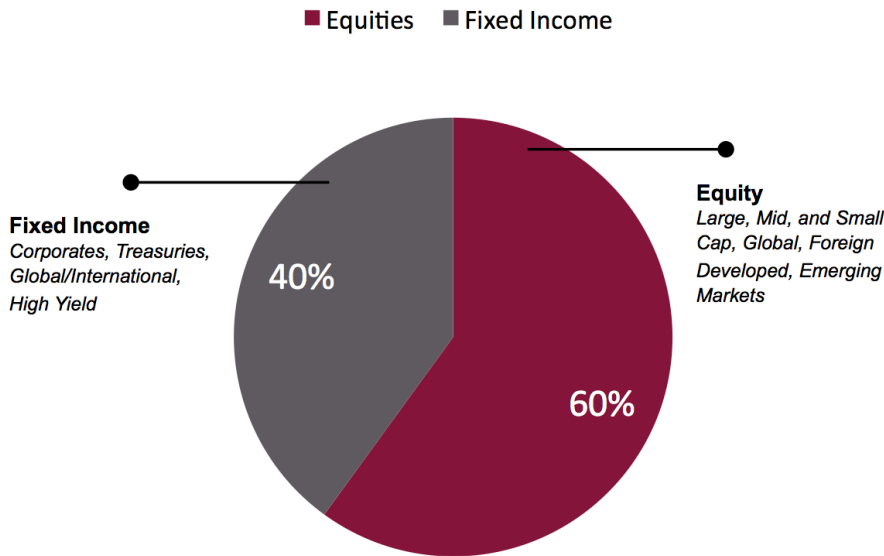
In essence, the DRS does what asset allocation is intended to do, except more efficiently and consistently. The DRS is a simpler solution than asset allocation, providing the same benefits of diversification (smoothing out returns, lowering volatility, improving returns, etc.). It is a simpler and easier solution to implement in that it generally requires less advisor/client analysis and effort, less trading and turnover cost, and potential improvement in tax impact. The DRS does this without depending on correlation assumptions, large exposures to fixed income, or complete exposure to systematic market risk.

This is due to the non-correlated movement of the

long-term option puts used to hedge the equity portion of the DRS portfolio. Asset allocation seeks to “hedge” by diversifying into numerous positions that have historically over a long timeframe been non-correlated. The DRS seeks to hedge based on how the market operates (the fact that the market sometimes goes up and sometimes goes down), not based on past or future correlations. Swan believes that the true definition of hedging should be “purchasing a second investment that you know will perform in the opposite direction of your first investment—and the ability to define how much you want to hedge.” Hedging with options provides this framework of defined risk—something that other claimed forms of hedging (e.g., diversification) do not provide.

Because of this, an investor can potentially improve on asset allocation by repositioning some assets into a hedged equity product like the DRS as seen in Exhibit 6. The adjustments show the impact the DRS can have on a well-balanced asset allocation portfolio. Even something as simple as a 60/20/20 model with 60% to traditional equities, 20% to traditional fixed income, and 20% in the DRS provides improvement over all of the 13 model portfolios (see Exhibit 2). This hypothetical portfolio below (Exhibit 7) shows how an investor could take a traditional 60/40 portfolio and increase equity exposure (and lower fixed income exposure) while enhancing returns and lowering risk.

## Traditional Asset Allocation



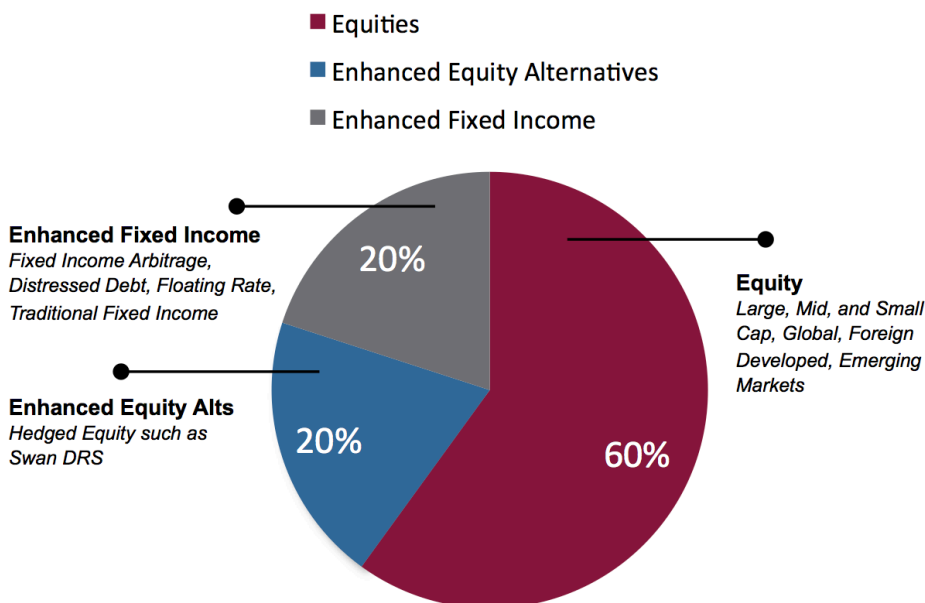
### Traditional Portfolio Focus

- Diversification through asset class
- Benchmark oriented

### Shortfalls of Traditional Portfolio Construction

- Market correlations are high
- May underestimate current or future market environment
- Backward-looking in construction
- Relies heavily on a fixed income bull market – Interest Rate Risk

## Enhanced Asset Allocation



### Enhanced Portfolio Focus

- Diversification through asset class and from traditional equity/ fixed income
- Asset allocations less dependent on market movements

### Consider the Benefits

- More resilient to inflation
- Diversifies risk exposure
- Considers multiple risk factors
- Does not rely heavily on a fixed income bull market
- Lowers volatility; increases return (historically)

Exhibit 7 (Source: Swan Global Investments)

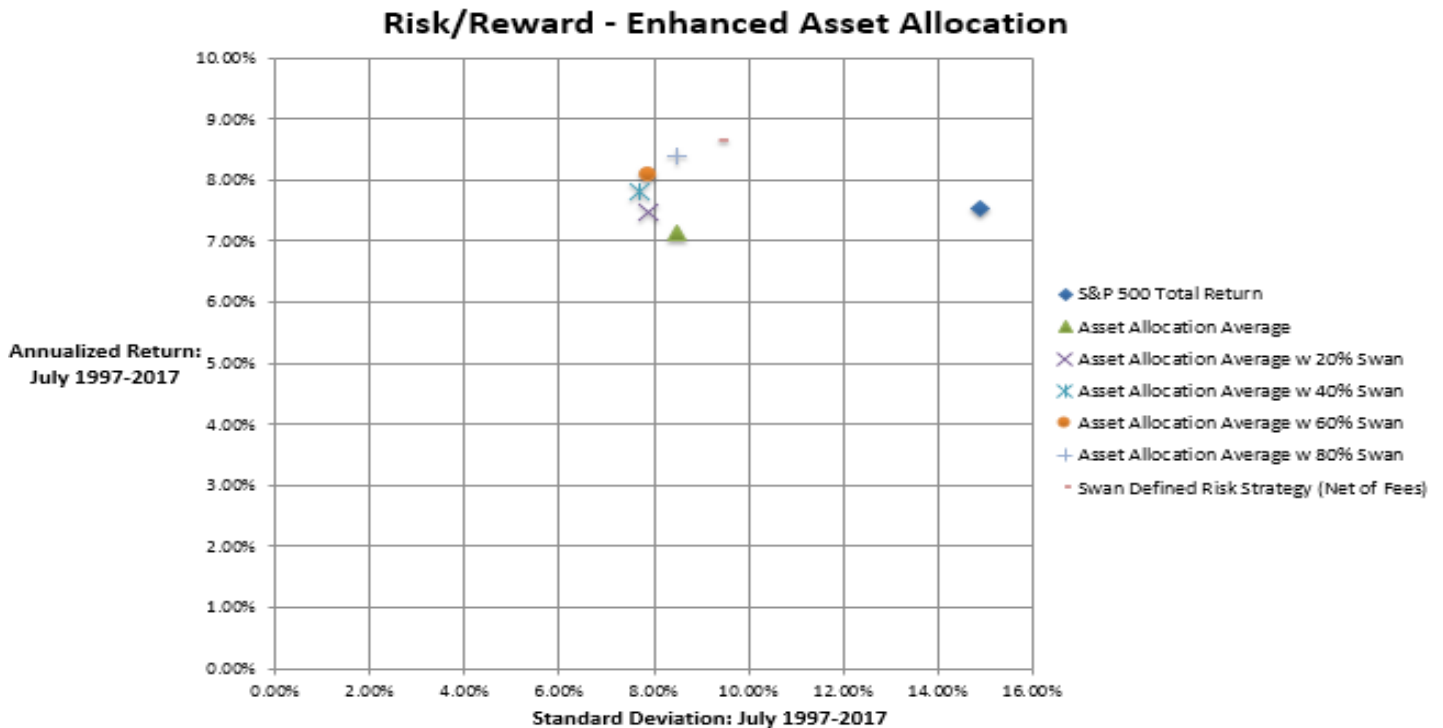


Exhibit 8 (Sources: Zephyr StyleAdvisor, Morningstar, Mebane Faber, and Swan Global Investments)

No management fees are included except for the Swan DRS, based on the DRS Select Composite, which is net of all fees. One cannot invest directly in an index. Where indexes were used, expense ratios of acquired fund fees would be present if represented by actual investments seeking to track the indexes; thus investment returns would be lower for those portfolios. It is important to note that expense ratios would likely have been higher in prior years. 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.

## CONCLUSION

The information and analysis in this study is especially useful to investors and financial advisors that have built their portfolios around an MPT/asset allocation approach. With Swan's DRS, investors can increase traditional equity exposure to potentially optimize return without increasing risk. Furthermore, less of the portfolio will be dependent on historical correlations and open to systematic market risk. By potentially stabilizing returns and volatility, advisors can seek to increase traditional equity exposure for their clients. There are five key factors that make the DRS compelling (besides risk and return metrics) as compared to asset allocation models:

- Direct protection against market risk through put options vs indirect protection through diversification
- Minimal interest rate risk
- Transaction efficiency

- Tax efficiency
- Simplicity

It is vitally important for investors to consider the significance of systematic risk to long-term portfolio returns. Swan believes the only sure way to fully guard against systematic risk and potential significant losses is through hedging with carefully constructed, rules-based options strategies. Swan believes that the DRS can mitigate risk, improve long-term returns, and lower volatility through its investment vehicles. Through the use of long-term puts combined with option income strategies to reduce hedging costs and increase upside participation, Swan seeks to provide one of the most compelling ways available to investors today to address the important matter of systematic risk, one that all asset allocators should consider as a potential enhancement to their portfolio.



## FOOTNOTES

### Important Disclosures:

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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, 2016. 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 nonqualified 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. 106-SGI-022618

## 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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