Learning From History

Market Mistakes and Potential Solutions

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Although we are more than five years removed from the depths of the financial crisis of 2007-08, investors remain justifiably scarred by the calamity. However, the passage of time also offers the opportunity to assess what went wrong and how to avoid repeating past mistakes.

Many investors thought they were well positioned by following the rules widely preached throughout the financial industry prior to the crisis. In an effort to minimize risks, they invested in portfolios diversified across asset classes and styles. However, when markets started to unravel in 2008, the scope and severity of the losses were much worse than what most people anticipated under their worst-case scenario projections.

The causes and blame for the financial crisis and subsequent Great Recession have been hotly debated and lie beyond the realm of this paper. The intent of this paper is to address the misconceptions and missteps that intelligent, rational investors made prior to the crisis and that resulted in significant losses of wealth. Three misconceptions stand out:

1. Extreme market corrections, or “black swans”, are rare and happen within a predictable level of (in)frequency
2. A well-diversified portfolio is the best way to minimize risk
3. Risk is defined as volatility

This paper closes with a description of the Swan Defined Risk Strategy, which was designed to address all three of these fatal flaws.

Black Swans

The terms used to describe extreme market events – black swans, thousand-year storms, tail events, et cetera – imply that these types of markets should be few and far between. Sadly, the last two decades have seen more than their fair share of crises. The “Asian contagion” of 1997, the Russian default and Long-Term Capital Management crisis in 1998, the dot-com bust in 2000, the September 11th attacks in 2001, the credit crisis of 2008, and the euro crisis in 2011 all contradict the idea that market meltdowns are rare events. Where did this misconception come from?

The answer to this this question can be traced back to the concept of a "normal" distribution. First pioneered by the brilliant German mathematician Carl Friedrich Gauss in the early 1800s, the normal, bell-shaped curve proved to have many attractive properties that fostered its use across a wide variety of disciplines. If a set of data fits a normal distribution, then all kinds of predictions and assumptions can be made about future events with a high degree of accuracy. Many market participants were seduced by the simplicity and elegance of the “normal” distribution.

The key phrase above, however, is "***if*** a set of data fits a normal distribution..." Unfortunately, the data indicate that markets do not fit the nice, simple paradigm of a normal distribution. Consider Table 1 below, which contains 25 years of historical distribution information of major asset classes:

Asset Class Distributions: January 1990 - December 2014					
	Index	**Return**	**Standard Deviation**	**Skewness**	**Kurtosis**
Large Cap US Stocks	S&P 500	9.62%	14.64%	-0.62	1.25
Small Cap US Stocks	Russell 2000	9.75%	19.21%	-0.54	1.02
International Stocks	MSCI EAFE	4.69%	17.30%	-0.45	1.10
Emerging Markets	MSCI Emerging Mkts	8.83%	23.28%	-0.68	1.83
Invst Grade US Bonds	Barclays U.S. Aggregate	6.49%	3.67%	-0.26	0.78
High Yield US Bonds	Barclays U.S. Corp HY	8.76%	9.00%	-0.94	8.49
Commodities	S&P GSCI	2.17%	21.23%	-0.14	2.03
Real Estate	FTSE NAREIT All REITs	10.60%	18.08%	-0.89	7.88

Table 1 (Source: Zephyr StyleADVISOR)

Most people are familiar with the first two measures, or "moments", of the distribution: mean return and standard deviation (volatility). If the distribution is indeed normal, the values for skewness and kurtosis are zero[1] and you only need to worry about the first two. However, the fact that the skewness values are all negative indicates that the worst of the bad months are more extreme than the best of the good months. Also, a higher-than-expected portion of each market's volatility is produced by those extreme outlier events, a condition known as excess kurtosis.

Both skewness and kurtosis are sophisticated, mathematically complex measures. A plain English way of understanding skewness and kurtosis can be found in the old saying, "when it rains, it pours." Table 2 below illustrates this point by displaying the three best and worst months of the 25-year period from January 1990 to December 2014 for each major asset class.

Asset Class/Index	Worst Months		Best Months	
Large Cap US Stocks *S&P 500*	Oct-08	-16.80%	Dec-91	11.44%
	Aug-98	-14.46%	Oct-11	10.93%
	Sep-02	-10.87%	Mar-00	9.78%
Small Cap US Stocks *Russell 2000*	Oct-08	-20.80%	Feb-00	16.51%
	Aug-98	-19.42%	Apr-09	15.46%
	Jul-02	-15.10%	Oct-11	15.14%
International Stocks *MSCI EAFE*	Oct-08	-20.17%	Oct-90	15.61%
	Sep-08	-14.42%	Apr-09	12.96%
	Sep-90	-13.91%	May-09	12.01%
Emerging Markets *MSCI Emerging Markets*	Aug-98	-28.91%	May-09	17.15%
	Oct-08	-27.35%	Apr-09	16.66%

[1] The baseline value for kurtosis is 3.0. However, 3.0 is an odd number to use as a baseline so kurtosis is often rescaled so that 0.0 is the neutral kurtosis value. For an in-depth discussion of skewness and kurtosis, see http://www.styleadvisor.com/sites/default/files/article/zephyr_concepts_skewness_and_kurtosis_pdf_37270.pdf

	Sep-08	-17.49%	Dec-93	16.53%
Invst Grade US Bonds *Barclays U.S. Aggregate*	Jul-03	-3.36%	May-95	3.87%
	Apr-04	-2.60%	Dec-08	3.73%
	Mar-94	-2.47%	Nov-08	3.25%
High Yield US Bonds *Barclays U.S. Corp High Yield*	Oct-08	-15.91%	Apr-09	12.11%
	Nov-08	-9.31%	Feb-91	10.94%
	Sep-08	-7.98%	Dec-08	7.68%
Commodities *S&P GSCI*	Oct-08	-28.20%	Sep-90	22.94%
	Nov-08	-14.84%	May-09	19.67%
	Mar-03	-14.41%	Mar-99	16.89%
Real Estate *FTSE NAREIT All REIT*	Oct-08	-30.23%	Apr-09	27.98%
	Nov-08	-21.51%	Dec-08	15.88%
	Feb-09	-19.46%	Oct-11	13.31%

Table 2 (Source: Zephyr StyleADVISOR)

Negative skewness and excess kurtosis make it dangerous to make "worst-case" assumptions about the market based upon Gaussian principles, yet that is exactly what many people did and continue to do so.

Takeaway #1: So-called "black swans" are more frequent and more extreme than many people expect.

Accepting the idea that black swans are more frequent and more extreme than predicted by standard, basic models, the bigger question remains: "How does one deal with them? How does one invest in order to protect oneself if this is the reality of most markets?" The next section addresses these questions by taking a closer look at the misconceptions associated with diversification.

Diversification

Prior to the 2008 crisis, the financial industry espoused diversification as the preferred risk-mitigation technique. While theoretically appealing, many diversification strategies performed poorly during the crisis. In the immediate aftermath of the credit crisis, a lot of vitriol was directed towards diversification, claiming it had "failed" and that the mathematical underpinnings of diversification were unsound. Despite these claims, sound arguments for the value of diversification remain. More often than not diversification's "failure" was due to poor implementation rather than being a flawed theory.

In order to provide risk protection, diversification requires investment in assets whose returns are truly different. Unfortunately, many investors pursued "false diversification". One widely followed form of false diversification was to slice up the market in to smaller and smaller pieces, while failing to neglect to move the eggs out of the proverbial basket.

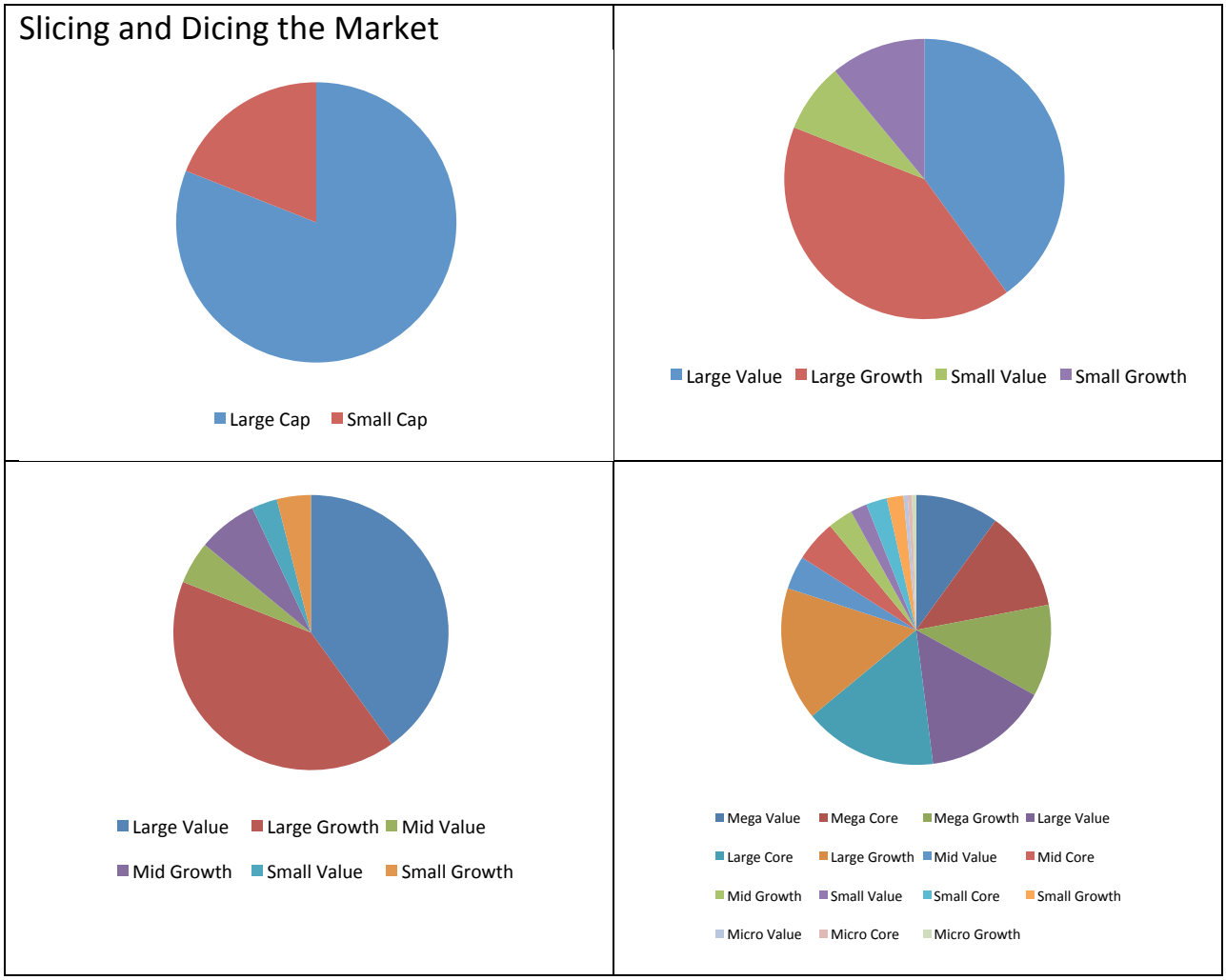

Chart 1

As Chart 1 above displays, initially investors divided equity markets into large cap and small cap. Next, a value and growth distinction was made. Eventually the concepts of mid cap and core were added. Splitting the hairs even further, concepts like mega-cap, micro-cap, "SMID"-cap, deep value, relative value, growth-at-a-reasonable-price, and momentum-growth were all incorporated into the concept of diversification. However, none of these styles were truly new assets: *they were simply smaller slices of the same pie*.

Table 3 below shows how highly correlated all of these styles are to each other. Correlations between +0.80 and +0.90 are highlighted in yellow, between +0.90 and +0.95 in orange and above +0.95 in red. No two styles have correlations less than +0.80, severely limiting the diversification potential of these investments.

Style Correlations

January 2005 - December 2014

	1	2	3	4	5	6	7	8	9	10	11	12
1) Russell Top 200	1.00	0.97	0.98	0.94	0.92	0.94	0.90	0.88	0.89	0.88	0.85	0.86
2) Russell Top 200 Growth	0.97	1.00	0.90	0.93	0.94	0.90	0.87	0.88	0.84	0.85	0.85	0.81
3) Russell Top 200 Value	0.98	0.90	1.00	0.91	0.86	0.93	0.88	0.84	0.89	0.86	0.82	0.87
4) Russell Midcap	0.94	0.93	0.91	1.00	0.99	0.99	0.95	0.95	0.93	0.93	0.92	0.91
5) Russell Midcap Growth	0.92	0.94	0.86	0.99	1.00	0.95	0.94	0.95	0.89	0.91	0.92	0.87
6) Russell Midcap Value	0.94	0.90	0.93	0.99	0.95	1.00	0.95	0.93	0.95	0.93	0.90	0.93
7) Russell 2000	0.90	0.87	0.88	0.95	0.94	0.95	1.00	0.99	0.99	0.99	0.96	0.97
8) Russell 2000 Growth	0.88	0.88	0.84	0.95	0.95	0.93	0.99	1.00	0.95	0.97	0.98	0.94
9) Russell 2000 Value	0.89	0.84	0.89	0.93	0.89	0.95	0.99	0.95	1.00	0.97	0.93	0.99
10) Russell Microcap	0.88	0.85	0.86	0.93	0.91	0.93	0.99	0.97	0.97	1.00	0.98	0.98
11) Russell Microcap Growth	0.85	0.85	0.82	0.92	0.92	0.90	0.96	0.98	0.93	0.98	1.00	0.93
12) Russell Microcap Value	0.86	0.81	0.87	0.91	0.87	0.93	0.97	0.94	0.99	0.98	0.93	1.00

Between 0.80 and 0.90

Between 0.90 and 0.95

Over 0.95

Table 3 (Source: Zephyr StyleADVISOR)

Investors with assets across each of these "styles" felt great when markets were going up and probably assumed diversification was working as advertised. But the simple and neglected truth was that if everything was going up at the same time, they would very likely all go down at the same time. And of course, that's exactly what happened.

Even investors who moved into other asset classes like international stocks, emerging market stocks, high yield bonds, real estate, and commodities saw those investments plunge in lock-step with their US equity investments during the 2008 crisis. When diversification was needed most, the correlations spiked. The two tables below display how correlations shifted from their long-term averages during the crisis of 2008:

Long-Term Correlation Matrix: January 1988 - July 2007

	1	2	3	4	5	6
1) Russell 3000	1.00	0.62	0.61	0.52	0.41	-0.08
2) MSCI EAFE Index	0.62	1.00	0.58	0.35	0.25	0.01
3) MSCI Emerging Markets	0.61	0.58	1.00	0.43	0.30	0.04
4) Barclays U.S. Corp High Yield	0.52	0.35	0.43	1.00	0.44	-0.11
5) FTSE Nareit All REITs	0.41	0.25	0.30	0.44	1.00	-0.10
6) S&P GSCI	-0.08	0.01	0.04	-0.11	-0.10	1.00

Crisis Correlation Matrix: August 2007 - February 2009

	1	2	3	4	5	6
1) Russell 3000	1.00	0.92	0.83	0.75	0.86	0.59
2) MSCI EAFE Index	0.92	1.00	0.94	0.73	0.74	0.63
3) MSCI Emerging Markets	0.83	0.94	1.00	0.75	0.62	0.69
4) Barclays U.S. Corp High Yield	0.75	0.73	0.75	1.00	0.70	0.50
5) FTSE Nareit All REITs	0.86	0.74	0.62	0.70	1.00	0.41
6) S&P GSCI	0.59	0.63	0.69	0.50	0.41	1.00

Less than 0.50
Between 0.50 and 0.70
Between 0.70 and 0.80
Between 0.80 and 0.90
Over 0.90

Table 4 (Source: Zephyr StyleADVISOR)

TAKEAWAY #2: Diversification only works if the return patterns are truly different.

The dampening of a portfolio's overall volatility is only possible if the constituents of a portfolio have low or, ideally, negative correlations. A well-constructed diversification plan should have losses in one portion of the portfolio offset by gains in another.

One way of achieving true diversification in a portfolio is via put options. Put options provide an ideal diversifier because the more the market goes down, the more such options increase in value. Put options can act like insurance to a portfolio, where an up-front premium provides insurance against the possibility of a catastrophic loss.

In addition, options have return patterns that are described as "asymmetric". Unlike traditional asset classes where the investor has a 1:1 participation to every dollar lost or gained in the investment, options allow investors to define and target specific portions of the return spectrum. A long position in a put or a call option allows the investor to target very specific outcomes. Profit and loss scenarios are well-defined under the terms of an option contract. The practical effect of a well-designed option strategy is to hedge market movements by eliminating the tails of a return distribution.

Call and put options have radically different return distributions as compared to traditional asset classes. Long option positions allow the investor to define the profit/loss scenario with a high degree of certainty. Short option positions allow the investor to generate premium income. Intelligently combining long and short option positions provide an ideal way of diversifying away market risk and generating income. This is especially true when risk is framed in terms of minimizing losses. This leads us to the third and final misstep, which is how people defined risk prior to the crisis.

Volatility vs. Capital Preservation

Historically, investors quantified risk in terms of standard deviation, more commonly referred to as volatility. Standard deviation is the most widely used measure of risk in the investing world. The omnipresent Sharpe ratio, which quantifies the risk-vs.-return trade-off, uses standard deviation as its measure of risk. However, using volatility as the sole definition of risk holds a number of flaws.

By definition, standard deviation measures the volatility of individual returns around a mean return. Unfortunately standard deviation makes no distinction between the “good” observations that fall above the mean and the “bad” returns that fall below the mean. Most investors would not punish a manager with a high standard deviation if a good portion of the volatility was upside volatility.

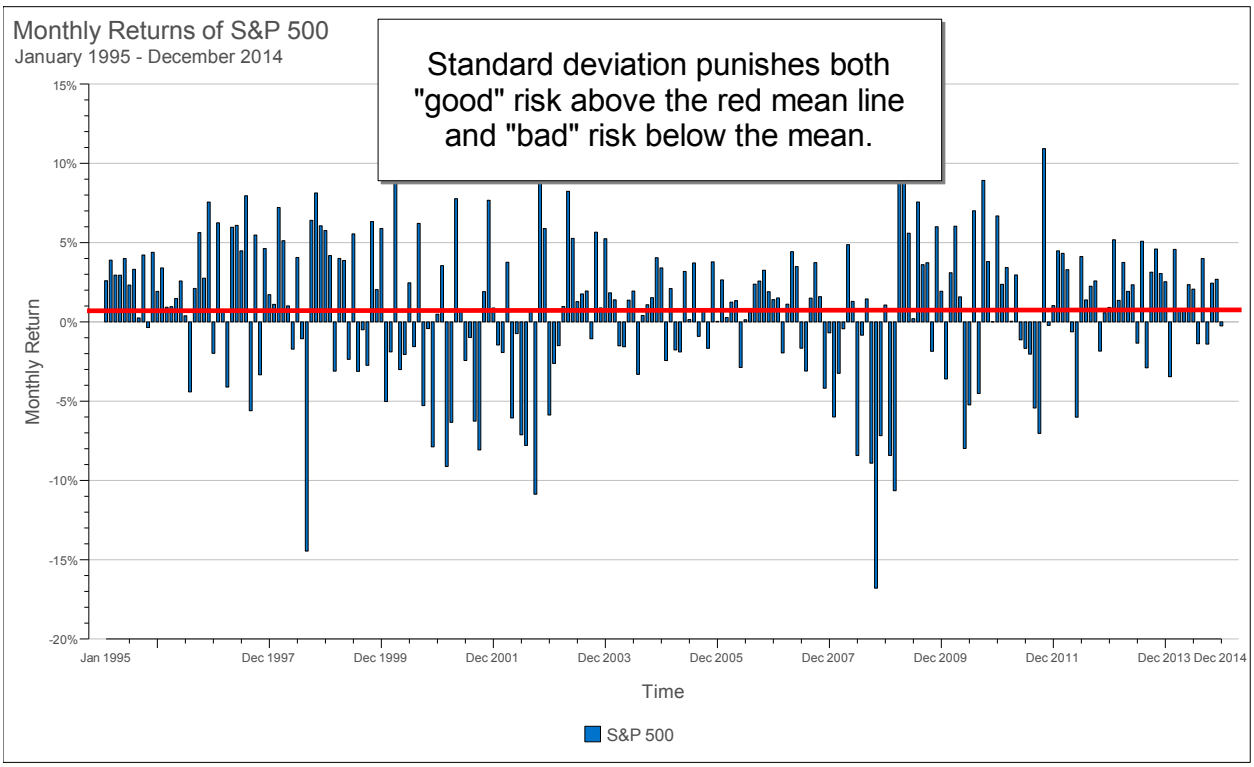

Chart 2 (Source: Zephyr StyleADVISOR)

In Chart 2 above the blue bars represent the individual monthly returns and the red line is the mean over the entire period. Standard deviation measures how much, on average, the individual months deviate from the long-term mean. However, no distinction is made between the observations above the mean and those below the mean.

The more significant failing of standard deviation is that it does not account for the *timing* of the negative returns. If, for example, a decade has half a dozen exceptionally bad months, standard deviation cannot differentiate whether or not these bad observations were randomly scattered

throughout the decade or if they were all concentrated within a narrow time frame. Should the investor care about this flaw in standard deviation?

Looking at the data, the answer is yes. Table 5 to the right displays 25 years of monthly returns, for a total of 300 observations, sorted from worst to best. Highlighted in red are the months that occurred during the financial crisis from July 2007 to February 2009. Seven of the worst months in the entire 25 year range happened within this short span of less than two years. Highlighted in bright blue are those losses associated with the bursting of the dot-com bubble and subsequent bear market at the start of the new millennium. A further twelve of the worst months of the last 25 years occurred during this time.

Logically, this makes sense. In the midst of a crisis, the markets don't hit a "reset button" and start afresh just because everyone flips the calendar ahead to a new month. A crisis will play out independent of a calendar, taking however long it will take. In the case of the S&P 500, compounding month after month of epic losses resulted in a maximum drawdown of over 50% between August 2007 and February 2009. And yet standard deviation treats those months as independent observations, each one distinct from the next.

This leads to the third critique of volatility. Simply put, most investors don't think of risk in terms of standard deviation. Most investors think of risk in terms of capital preservation. One would doubt that many financial advisors field calls from angry clients asking "What was my volatility last month?" It's likely most angry calls are phrased, "How much money did I lose?" Standard deviation is a classroom concept; capital preservation is a real-world issue.

S&P 500 Monthly Returns: 1990-2014		
Rank	Month	Return
300	10/31/2008	-16.80%
299	8/31/1998	-14.46%
298	9/30/2002	-10.87%
297	2/28/2009	-10.65%
296	2/28/2001	-9.12%
295	8/31/1990	-9.04%
294	9/30/2008	-8.91%
293	6/30/2008	-8.43%
292	1/31/2009	-8.43%
291	9/30/2001	-8.08%
290	5/31/2010	-7.99%
289	11/30/2000	-7.88%
288	7/31/2002	-7.79%
287	11/30/2008	-7.18%
286	6/30/2002	-7.12%
285	9/30/2011	-7.03%
284	1/31/1990	-6.71%
283	3/31/2001	-6.34%
282	8/31/2001	-6.26%
281	4/30/2002	-6.06%
280	5/31/2012	-6.01%
279	1/31/2008	-6.00%
278	12/31/2002	-5.87%
277	8/31/1997	-5.60%
276	8/31/2011	-5.43%
275	9/30/2000	-5.28%
274	6/30/2010	-5.23%
273	1/31/2000	-5.02%
272	9/30/1990	-4.87%
271	6/30/1991	-4.58%
5	4/30/2009	9.57%
4	5/31/1990	9.75%
3	3/31/2000	9.78%
2	10/31/2011	10.93%
1	12/31/1991	11.44%

Table 5 (Source: Zephyr StyleADVISOR)

TAKEAWAY # 3: Capital preservation is a better way of defining risk.

If capital preservation is the primary concern of an investor, other metrics provide a better measure of risk than standard deviation. One of the most effective alternative measures of risk is the *pain index*. The pain index measures the depth, duration, and frequency of losses.

Developed by Dr. Thomas Becker and Aaron Moore of Zephyr Associates[2], the pain index is a fresh, alternative way of viewing risk. The drawdown graph below (Chart 3) provides a visual representation of the pain index. The black line represents the S&P 500, and the blue line represents Swan Global Investments' Defined Risk Strategy.

One can easily see the depth of the losses: a peak-to-trough loss of -44.73% for the S&P 500 during the dot-com bust, followed by a peak-to-trough loss of -50.95% during the credit crisis. Furthermore, one can also see the duration of the losses: it took six years and two months for the S&P 500 to recover its losses during the dot-com bust and four years and five months for it to recover to its pre-credit crisis highs. The smaller, secondary losses are also easily visible.

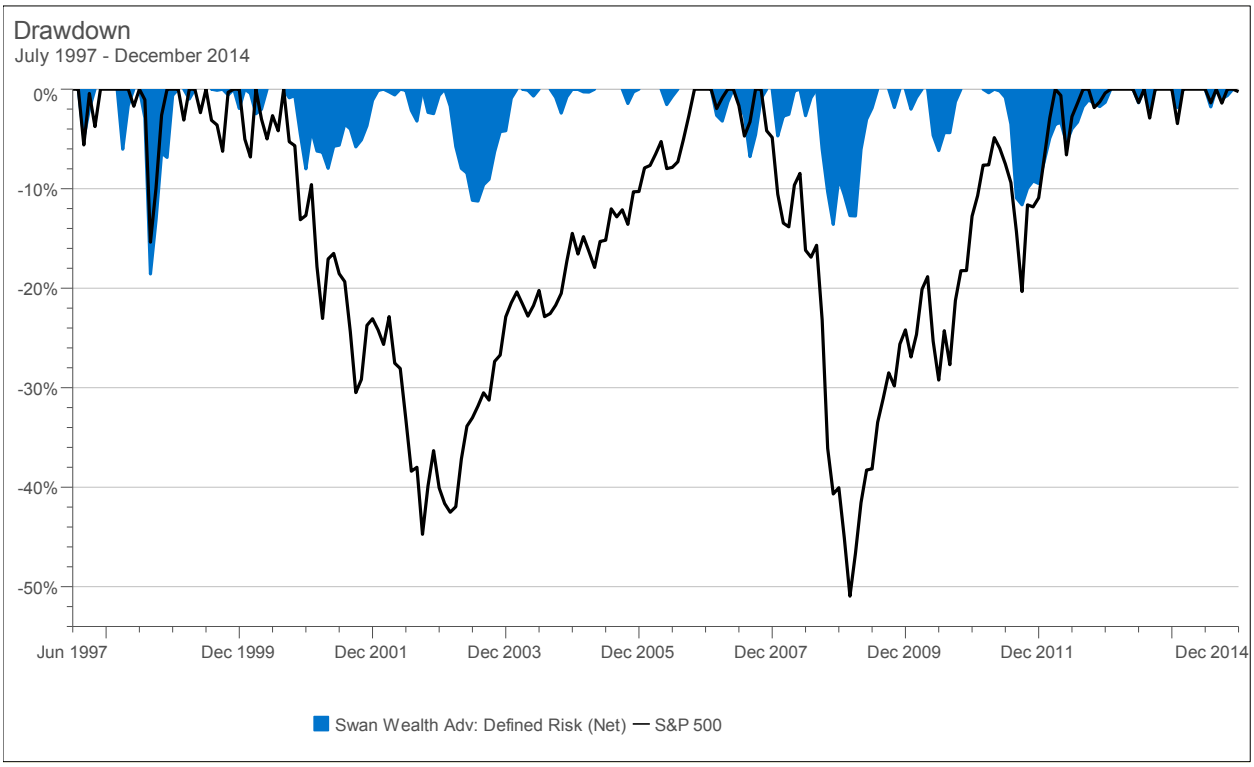

Chart 3 (Source: Zephyr StyleADVISOR)

The pain index quantifies the depth, duration and frequency of losses into a single number. If one were to fill in all the area between the jagged, loss line and the flat, break-even line at the top of the graph, that area represents the "pain" area. It's the area where an investor is taking a loss and feeling pain. Ideally this area would be as small as possible. The S&P 500's pain index from July 1997 to December 2014 is 13.21%. The Swan pain index is 2.37% over the same time period. In other words, the depth, duration and frequency of losses for Swan is about one-sixth that of the S&P 500 since its inception in mid-1997.

The pain index addresses the three shortcomings of volatility mentioned previously. It does not "punish" a manager for upside risk. It addresses the timing issue of when the bad events occur, because if all of

[2] http://www.styleadvisor.com/sites/default/files/article/zephyr_concepts_pain_ratio_and_pain_index_pdf_18774.pdf

the bad months happen consecutively it puts the manager in a big hole. Finally, the pain index approaches risk like most investors view risk- in terms of money lost.

The drawdown graph in Chart 3 clearly illustrates the value of hedging a portfolio with put options. The Swan Defined Risk Strategy utilized protective puts on the downside to hedge a long position in S&P 500 or sector ETFs. As the market collapsed, the value of the put option hedge increased in value. The strategy was truly diversified and lost only a fraction of the value of the broad market.

Conclusion

The Swan Defined Risk Strategy was designed to address the three fatal flaws in mainstream portfolio thinking. Recognizing that 1) traumatic events do occur with alarming frequency, 2) a truly different type of return is needed to diversify risk, and 3) risk should not be solely defined by volatility, the Swan Defined Risk Strategy was built to provide capital preservation during periods of market turmoil. In addition, the Swan's Defined Risk Strategy was designed to capture a good portion of up markets as well.

The Defined Risk Strategy is comprised of two elements. The first provides long exposure to the S&P 500 ETF or S&P Sector ETFs, with a long-term put option superimposed over the position for downside protection against extreme negative events. The second is income-generating elements provided by writing short-term puts and calls. With a GIPS®-compliant track record stretching back to July 1997, the Swan Defined Risk Strategy has successfully weathered two exceptionally painful bear markets. Table 6 below presents summary metrics:

July 1997- December 2014	Swan DRS (Inception 1997)	S&P 500
Return, Annualized	9.16%	6.89%
Return, Cumulative	363.84%	220.92%
Standard Deviation	9.98%	15.63%
Beta	0.29	1.00
Pain Index	2.37%	13.21%
Up Capture	41.46%	100.00%
Down Capture	18.19%	100.00%

Table 6 (Source: Swan Global Investments and Zephyr StyleADVISOR)

To find out more about Swan, please visit www.swanglobalinvestments.com. As the old saying goes, "Those who do not learn from history are doomed to repeat it."

Marc Odo, CFA, CAIA, CIPM, CFP, formerly the Director of Research for Zephyr Associates, is a portfolio consultant that assists advisors in portfolio management and analysis. Working with Zephyr since 2003, Marc had been instrumental in developing and promoting Zephyr's next-generation post-MPT statistics measuring capital preservation and tail risk. Marc was contracted by Swan to write this white paper as an independent author. Zephyr Associates and Informa Investment Solutions do not promote or endorse any particular investment product or strategy.

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Definition of Indices

S&P 500- 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.

Russell 3000- The Russell 3000 is a market cap weighted index of the 3,000 largest companies in the U.S. equity markets. It is one of the broadest measures of U.S. equity market performance, representing approximately 98% of the market capitalization of the U.S. equity market. The Russell 3000 is subdivided in to the Russell 200 (large caps), Russell Mid Cap (mid caps), and Russell 2000 (small caps). The Russell Microcap are those stocks too small to be incorporated in to the Russell 3000. Each of the Russell indices is further subdivided in to "value" and "growth" halves.

Russell 2000- The Russell 2000 is a market cap weighted index of 2,000 companies representing the small cap segment of the U.S. equity market. The index is composed of the 1,001st to 3,000th largest stocks in the U.S. market.

MSCI EAFE- The MSCI EAFE Index measures international equity performance. It comprises the MSCI country indexes that represent developed markets outside of North America: Europe, Australasia and the Far East. With 909 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

MSCI Emerging Markets- The MSCI Emerging Markets Index captures large and mid cap representation across 21 Emerging Markets (EM) countries. With 822 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

Barclays U.S. Aggregate- The Barclays U.S. Aggregate Bond Index covers the USD-denominated, investment-grade (rated Baa3 or above by Moody's), fixed-rate, and taxable areas of the bond market. This is the broadest measure of the taxable U.S. bond market, including most Treasury, agency, corporate, mortgage-backed, asset-backed, and international dollar-denominated issues, all with maturities of 1 year or more.

Barclays U.S. Corporate High Yield- The Barclays U.S. Corporate High Yield index measures the market of USD-denominated, non-investment grade, fixed-rate, taxable corporate bonds. Securities are classified as high yield if the middle rating of Moody's, Fitch, and S&P is Ba1/BB+/BB+ or below.

FTSE NAREIT All REIT- The FTSE NAREIT All REITs Index is a market capitalization-weighted index that includes all tax-qualified real estate investment trusts (REITs) that are listed on the New York Stock Exchange, the American Stock Exchange or the NASDAQ National Market List. The Index is not free float adjusted and constituents are not required to meet minimum size and liquidity criteria.

S&P GSCI- The S&P GSCI is a composite index of commodity sector returns which represents a broadly diversified, unleveraged, long-only position in commodity futures.

Definition of Statistics

Beta	Beta measures the sensitivity of the manager to movements in an underlying benchmark. Conservative investors prefer a beta less than 1.0, suggesting the investment moves less than the market. Aggressive investors prefer a beta greater than 1.0, which are more sensitive to market movements.
Correlation	Correlation measure how closely two different investments move in conjunction with one another. It contains a directional aspect. If one is seeking to diversify an investment portfolio, lower correlations or negative correlations are desired. A zero correlation suggests an investment's movement is independent of the other. A negative correlation suggests an investment's movement is the opposite direction of the other.
Down Capture	Down capture measures the percentage of market losses endured by a manager when markets are down. Down capture should be less than 100%, meaning a manager experiences less than the full market downswing.
Kurtosis	Kurtosis identifies where the volatility risk came from in a distribution of returns. Kurtosis improves one's understanding of volatility risk. Generally investors like to see kurtosis numbers close to zero or even negative. The larger the kurtosis, the more of an investment's risk lies in the tails of the distribution.

Pain Index	The pain index quantifies the capital preservation tendencies of a manager or index. It measures the depth, duration, and frequency of periods of losses. The lower the pain index the better. A pain index of 0% indicates the investment has never lost value. A pain index should be compared against a benchmark or peer group in order to understand context.
Sharpe Ratio	The most famous return-versus-risk measurement, the Sharpe ratio represents the added value over the risk-free rate per unit of volatility risk. Generally, the higher the better. A manager's Sharpe ratio should be higher than index or higher than a universe average.
Skewness	Skewness measures to what direction and degree a set of returns is tilted or “skewed” by its extreme outlier occurrences. Generally speaking investors prefer a positive skewness rather than a negative skewness. However, in the real world it is difficult to find investments with a positive skew.
Standard Deviation	Standard deviation measures how closely returns track their long term average. Standard deviation measures volatility risk. Generally, the lower the better. A manager's standard deviation should be lower than index or lower than a universe average.
Up Capture	Up capture measures the percentage of market gains captured by a manager when markets are up. Ideally up capture will be greater than 100%, meaning the manager does better than the market when markets are up. The larger the up capture the better.