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TOPICS OF INTEREST

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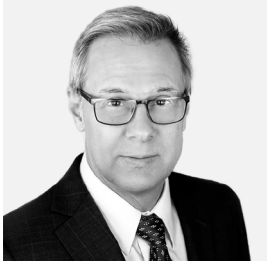
Crisis risk mitigation

September 2019



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Abstract

The stock market offers attractive long-term returns, but occasionally reacts to political or financial crises with sharp and prolonged downturns. We briefly examine strategies which are thought to mitigate these effects and find that some are better than others. Most institutional investors already have an effective program of crisis risk mitigation in the form of a significant allocation to high-quality bonds. For those wishing to construct a dedicated crisis risk allocation, we suggest a roadmap.

Introduction

In order to achieve their long-term objectives, many of our clients are required to bear a significant amount of equity risk. Consequently, they must occasionally endure a sharp and prolonged drop in fund market value due to political or financial crises. These drawdowns are distinct from the steady decline of a cyclical bear market, or the short sharp correction of an overheated bull market. Their proximate cause is not an economic slowdown or short-term profit-taking. They are instead the result of systemic uncertainty. Some part of the global system breaks down, and how it is going to be fixed remains unclear for a time. Because of this, such crises can be particularly challenging for fiduciaries, who may be tempted to cut portfolio risk at precisely the wrong moment, i.e., just before markets recover.

One solution is to address the issue ahead-of-time, by allocating a portion of the fund to assets or strategies which are expected to perform well in

times of crisis. Free lunches being famously hard to come by, we expect that investors will pay for such protection by foregoing some of the long-term return that comes from pure equity risk. Mitigating crisis risk is therefore a matter of managing the trade-off between the expected cost of protection and the amount of protection provided.

Here we provide a thoughtful and evidence-based overview of the subject, starting with a look at basic equity returns, in order to better define the problem.

Defining a crisis

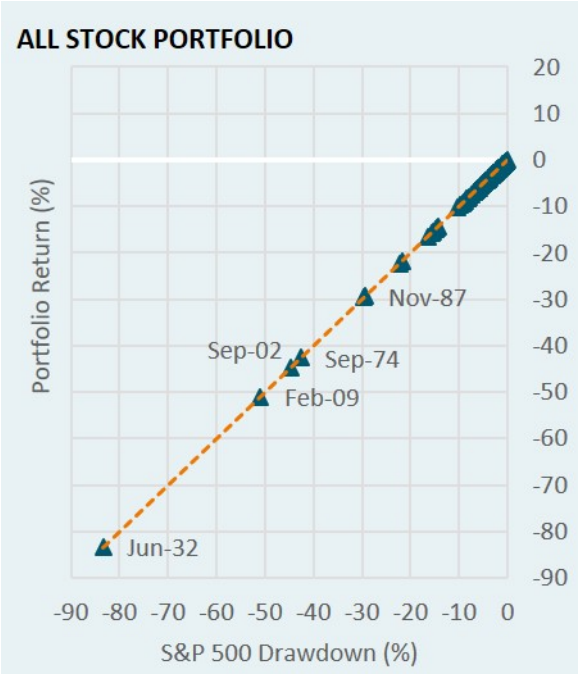
Over the 93-year history of US large cap stock monthly returns, there have been only five times that investors experienced a peak-to-trough drawdown of 30% or more.

		Crisis Return				
93-Year History	**Annual Return**	**Jun-32**	**Feb-09**	**Sep-02**	**Sep-74**	**Nov-87**
All Stock Portfolio	10.1	-83	-51	-45	-43	-30
Crisis Months		34	16	25	21	3

Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019

Taking this as our definition of a crisis, the difficulty of our task is readily apparent. Not only is there a small number of historical examples, but each example is unique. To paraphrase Tolstoy, all happy markets resemble one another, each unhappy market is unhappy in its own way. We proceed by taking an all stock portfolio and making incremental changes to it, comparing the resulting change in long term historical return with how much of those big drawdowns we would have avoided. Because we are dealing with such sparse evidence, we must be particularly mindful that what would have worked in the past may not be what will work in future.

To better see the effect of each modification to the portfolio, we plot the portfolio's return during the S&P 500 drawdown (vertical axis) against the amount of the drawdown (horizontal axis). Drawing a regression line through those points gives us a single indication of the historical effectiveness of each action. The more horizontal we make this line (by committing a portion of the portfolio to crisis mitigation), the more immune the portfolio would have been to equity drawdowns.



Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019

Bonds: The first line of defense

It will come as no surprise to students of portfolio theory that the single most effective thing we could have done to mitigate crisis risk is to have maintained a conventional bond allocation. While we would have given up the outsized long term return of the pure equity portfolio, we would have cut our crisis losses by about one-third.

		Crisis Return				
93-Year History	**Annual Return**	**Jun-32**	**Feb-09**	**Sep-02**	**Sep-74**	**Nov-87**
All Stock Portfolio	10.1	-83	-51	-45	-43	-30
	-1.5	+21	+20	+24	+15	+13
Sixty-Forty Portfolio	8.6	-62	-31	-21	-28	-17

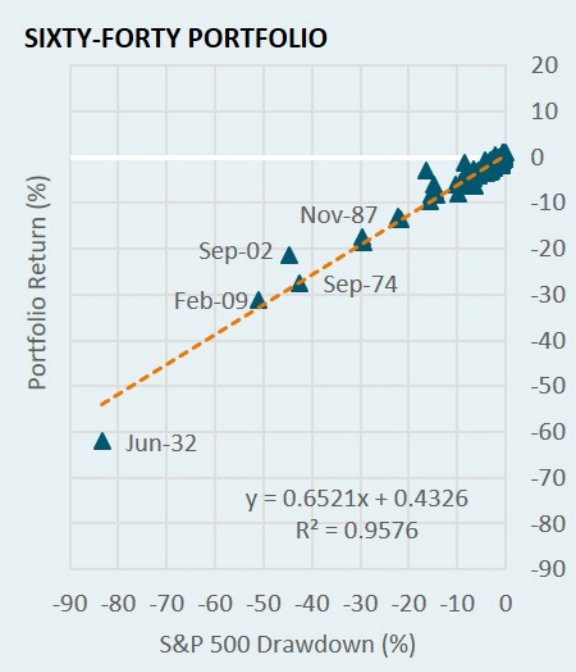
Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019 .

When we plot these results, the slope of our regression line goes from 1.00 to 0.65 (as shown in the equation).

No other action we will consider in this paper would have been more effective than this.

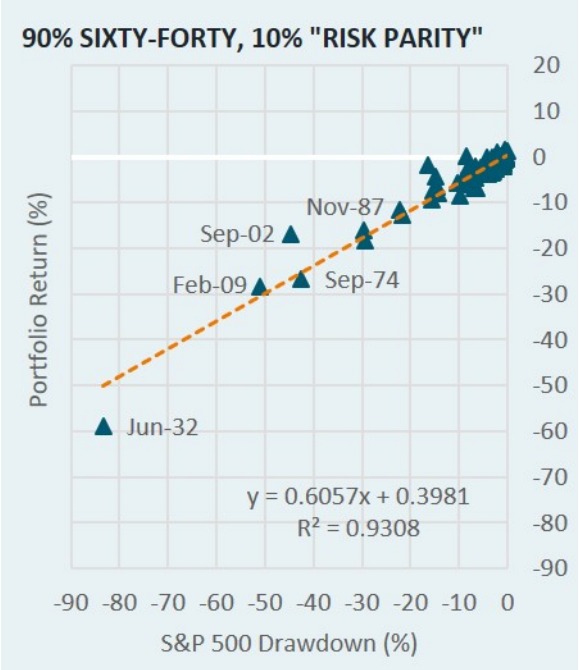
Everything else produces only marginal improvements. Therefore, it may be advantageous to consider a fund's bond allocation to be the foundation of a crisis risk mitigation *program*, and to consider any dedicated *allocation* to crisis risk assets or strategies to be merely an extension of that program.

Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019



Risk parity: More bonds!

There is a strategy now familiar to institutional investors which is specifically designed to exchange equity risk for more interest rate risk. That strategy is Risk Parity. While its actual track record is too short to be helpful here, we can roughly model the long term historical effects of a Risk Parity allocation by simply taking 10% of our sixty-forty portfolio and leveraging part of that to buy more bonds. Unsurprisingly, this would have afforded some additional protection during the crises in which bonds did well. It would even have added a small amount of long term return.



93-Year History	Annual Return	Crisis Return Jun-32	Feb-09	Sep-02	Sep-74	Nov-87
All Stock Portfolio	10.1	-83	-51	-45	-43	-30
	-1.5	+21	+20	+24	+15	+13
Sixty-Forty Portfolio	8.6	-62	-31	-21	-28	-17
	+0.1	+3	+3	+4	+1	+1
90% Sixty-Forty, 10% "Risk Parity"	8.7	-59	-28	-17	-27	-16

Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019

Trend following: Return of the turtles

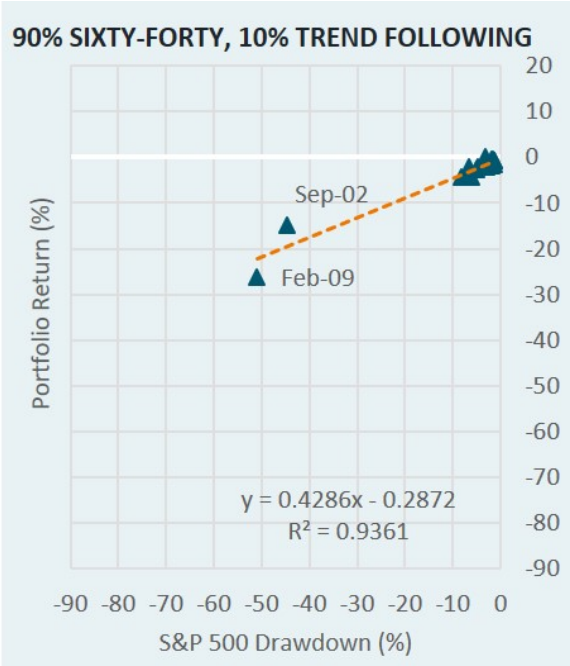
Another existing strategy which can be repurposed for crisis risk mitigation is Trend Following Commodities Trading Advisors (CTA). These managers seek to exploit momentum in the futures markets, including futures on equity indexes.

19-Year History	Annual Return	Crisis Return Feb-09	Sep-02
All Stock Portfolio	5.4	-51	-45
	+0.3	+20	+24
Sixty-Forty Portfolio	5.7	-31	-21
	+0.4	+5	+6
90% Sixty-Forty, 10% Trend Following	6.1	-26	-15

Source: Ibbotson Associates, Standard & Poor's, Eurekahedge, as of 6/30/2019

Unlike the case of Risk Parity, we do have an index of Trend Following funds with just enough history to gauge the strategy's past effectiveness. As one might expect, the Trend Following allocation provided more protection during the long lead-up to the Iraq War than it did during the sharper financial disruptions of 2008. There is not enough data to say how it would have performed during the short shock of 1987. Also, return to equity momentum has been much reduced in recent years. Still, the fact that an allocation to Trend Following managers does not represent an increase in interest rate exposure means it could be a good add-on to a larger crisis risk program.

Source: Ibbotson Associates, Standard & Poor's, Eurekahedge, as of 6/30/2019

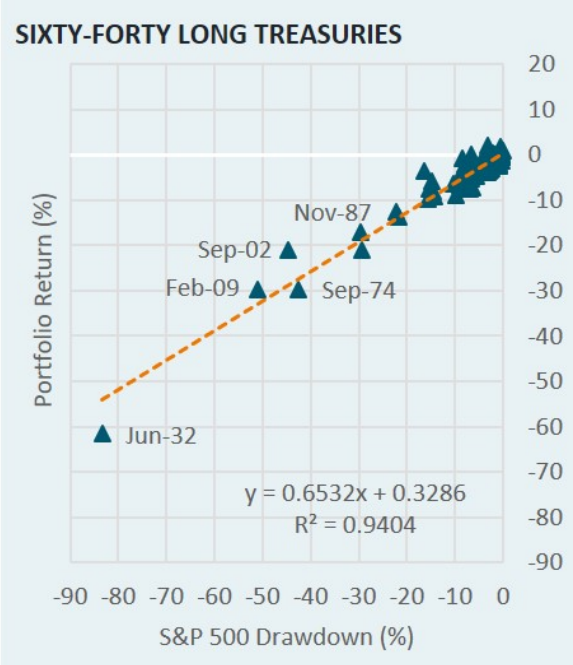


Long treasuries: Full faith and credit

Up to this point we have been roughly modeling a forty percent US Aggregate bond exposure using Ibbotson's Intermediate Term Government and Long Term Corporate Bond indices. As corporate bonds contain equity risk, we now consider the effect of replacing them with long maturity US Treasuries. In fact, to get a measurable effect we shall replace the entire forty percent bond allocation with long Treasuries.

While the data shows that this move would not have provided additional protection, it would have reduced the cost of the protection provided by the original bond allocation.

Source: Ibbotson Associates, Standard & Poor's, Bloomberg Barclays, as of 6/30/2019



93-Year History	Annual Return	Crisis Return Jun-32	Feb-09	Sep-02	Sep-74	Nov-87
All Stock Portfolio	10.1	-83	-51	-45	-43	-30
	-1.5	+21	+20	+24	+15	+13
Sixty-Forty Portfolio	8.6	-62	-31	-21	-28	-17
	+0.2	+0	+1	+0	-2	+0
Sixty-Forty Long Treasuries	8.8	-62	-30	-21	-30	-17

Source: Ibbotson Associates, Standard & Poor's, Bloomberg Barclays, as of 6/30/2019

Here is where we must be careful about projecting past performance. Long-dated Treasuries have performed particularly well in recent years, and it would be reasonable to assume that outperformance will not continue. Therefore, we consider another fixed income asset class with minimal equity risk: Mortgage Backed Securities. High quality pass-throughs of the type which comprise the Bloomberg Barclays MBS index held their value surprisingly well during the crisis of 2008-2009. When we split our bond allocation evenly between MBS and long Treasuries, the long-term historical return is not quite as good as with a pure Treasury allocation, but a comparable level of protection was achieved, albeit over a shorter history, one which covers only three of our original five crisis periods.

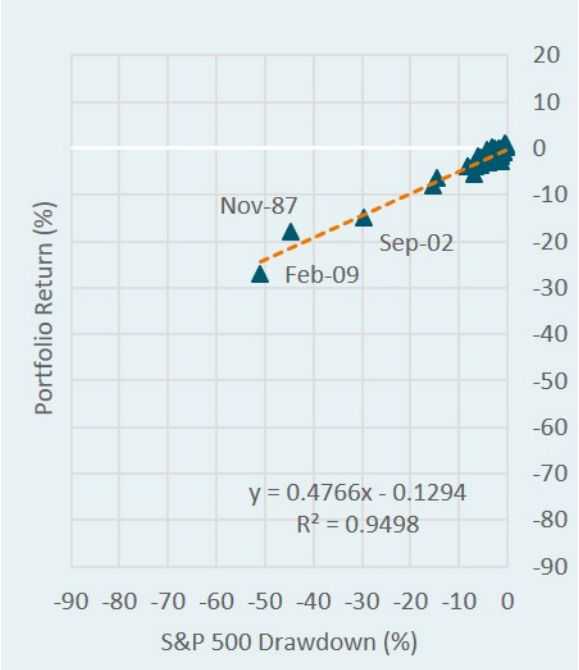
32-Year History	Annual Return	Crisis Return Feb-09	Sep-02	Nov-87
All Stock Portfolio	10.2	-51	-45	-30
	-1.3	+20	+24	+13
Sixty-Forty Portfolio	8.9	-31	-21	-17
	+0.7	+1	+0	+0
Sixty-Forty Long Treasuries	9.6	-30	-21	-17
	-0.3	+0	-1	+0
Sixty-Forty Treasuries + MBS	9.3	-30	-22	-17

Source: Ibbotson Associates, Standard & Poor's, Bloomberg Barclays, as of 6/30/2019

Gold: "The corpse of value"

In times of crisis a good deal of money flees the capital markets altogether for the perceived security of precious metals, primarily gold. Therefore, a diversified investor with an existing allocation to gold can reasonably expect to experience an offset to stock market losses during a crisis.

While the data confirm this, the low long term return from holding gold (4% annualized over 32 years) means that it would have been a rather expensive form of crisis risk mitigation. However, a gold allocation has the virtue of not adding interest rate risk and comes with the side benefit of inflation protection.



Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019

		Crisis Return		
32-Year History	**Annual Return**	**Feb-09**	**Sep-02**	**Nov-87**
All Stock Portfolio	10.2	-51	-45	-30
	-1.3	+20	+24	+13
Sixty-Forty Portfolio	8.9	-31	-21	-17
	-0.3	+4	+3	+2
90% Sixty-Forty, 10% Gold	8.6	-27	-18	-15

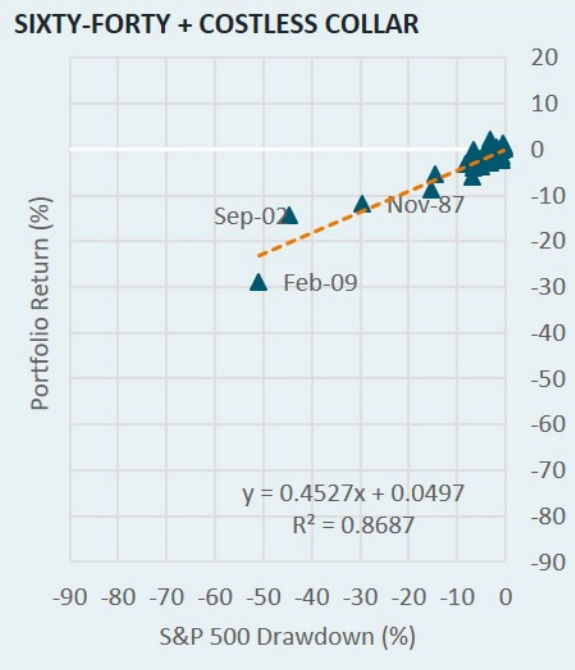
Source: Ibbotson Associates, Standard & Poor's, as of 6/30/2019

Options: The direct approach

Another somewhat effective but expensive strategy is the direct hedging of a portfolio's equity exposure with options. Cboe (formerly the Chicago Board Options Exchange) maintains long-term data on various options strategy indexes. One of these represents a strategy of holding the S&P 500 and each month buying a matching number of 5% out-of-the-money put options. If stocks fall more than 5%, the value of these derivative contracts rises by an offsetting amount. One might expect this to be a perfect hedge against crisis risk.

In practice, however, this "fixed percentage" strategy is not very effective. This is because there is no intra-month adjustment of the options position[1] However, the larger issue is the high cost of these contracts, as evidenced by the significantly lower long-term return from

this strategy versus pure exposure to the S&P 500 index. Put protection can be made more effective if the hedge is adjusted more frequently (the "ratchet" strategy), but the long-term cost of buying these contracts goes even higher[2].



Source: Ibbotson Associates and Cboe, as of 6/30/2019

		Crisis Return		
32-Year History	**Annual Return**	**Feb-09**	**Sep-02**	**Nov-87**
All Stock Portfolio	10.2	-51	-45	-30
	-1.3	+20	+24	+13
Sixty-Forty Portfolio	8.9	-31	-21	-17
	-1.2	+2	+7	+5
Sixty-Forty + Costless Collar	7.7	-29	-14	-12

Source: Ibbotson Associates, Standard & Poor's, Cboe, as of 6/30/2019

The high cost of hedging with options is a well-known and much-studied phenomenon in financial economics. The short explanation is that the investors on the other side of the transaction, i.e., the option sellers, cannot fully hedge the risk of providing such protection, and therefore they must be paid a premium, i.e., a volatility risk premium. There is another Cboe index which represents an attempt to partially defray this cost by implementing a zero-cost put-spread collar strategy, essentially selling off the investor's right to strong S&P 500 returns. However, the cost of the marginal protection provided remains high.

Summary

In this paper we briefly evaluated the most promising components of a successful crisis risk program. We considered both the effects on historical long term return and the amount of historical protection added. Of course, no actual decisions should be made without a more rigorous, forward-looking, analysis. However, if we arrange these elements in order of historical cost-effectiveness and a subjective level of confidence that they will continue to be cost-effective, a roadmap presents itself.

Action	Historical Protection	Historical Return	Confidence	Active Risk
Aggregate Bond Allocation	Large Increase	Significant Decrease	High	Low
Risk Parity Allocation	Significant Increase	Maintained	Moderate	Moderate
Trend Following Allocation	Significant Increase	Maintained	Moderate	Moderate
Agg -> Long Treasuries + MBS	Maintained	Moderate Increase	Moderate	Low
Precious Metals Allocation	Significant Increase	Significant Decrease	High	Low
Options Strategies	Significant Increase	Significant Decrease	High	Low

For most investors, an aggregate bond allocation is all the crisis risk mitigation they need. Those wishing to do more can start with an allocation to Trend-Following managers, and a reclassification or new allocation to Risk Parity managers. The next step would be to reduce or eliminate the equity risk in their bond allocation. Finally, those investors willing to bear the high long term cost will consider a precious metals allocation or options strategies.

In considering such a program, some thought should be given to the additional active risk it will entail. Because they are largely rules-based, it is easy to overlook the active risk embedded in Risk Parity, Trend-Following, and sometimes even options strategies. While they do share a common set of models, managers also use judgement in the application of those models. Because of the power of asset allocation, small differences in assumptions and forecasts can cause big differences in performance. Sufficient resources must be allocated to manager selection and monitoring in order to avoid the kind of disappointments which prevent the long term viability of the program. If the program does not last until the next crisis, it will have failed.

There are additional strategies worth considering, such as low volatility stocks or alternative beta, but because they are typically much more correlated with the equity markets than the strategies shown above, they are likely to provide marginal protection. Therefore, it is probably best to consider them as add-ons to a crisis risk program, rather than core elements.

Finally, it is important to note that not all the potential value of a crisis risk program can be quantified with a backtest. Liquid assets that hold their value in a future crisis can be used as a source of funds for the purchase of assets that have become especially undervalued. Any additional return generated by such discretionary moves can be considered to have offset the cost of protection.

Notes & Disclosures

1. *Israelov, Roni, Pathetic Protection: The Elusive Benefits of Protective Puts (March 17, 2017). Available at SSRN: https://ssrn.com/abstract=2934538*

2. *Stephen Figlewski, N.K. Chidambaran & Scott Kaplan (1993) Evaluating the Performance of the Protective Put Strategy, Financial Analysts Journal, 49:4, 46-56, DOI: 10.2469/faj.v49.n4.46*

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