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# Reducing Portfolio Risk

Steep declines in investment portfolios and gut-wrenching volatility in financial markets have understandably caused many investors to reconsider their risk tolerances. We estimate that the average endowment and foundation declined about 26% in 2008, and 2009 has gotten off to a dreadful start. This will have a significant effect on spending and distributions as lower values roll into trailing market value calculations. A further complication is that some funds have dipped below the “historic dollar value” as outlined in the Uniform Management of Institutional Funds Act (UMIFA), which could further restrict spending amounts. In addition to the operational considerations, the bursting of the credit bubble has made this economic and investment environment unlike any we have witnessed since the Great Depression, and it could take years to return to normal. As a result, there is a viewpoint that the old rules of institutional investing (buy-and-rebalance) are no longer appropriate.

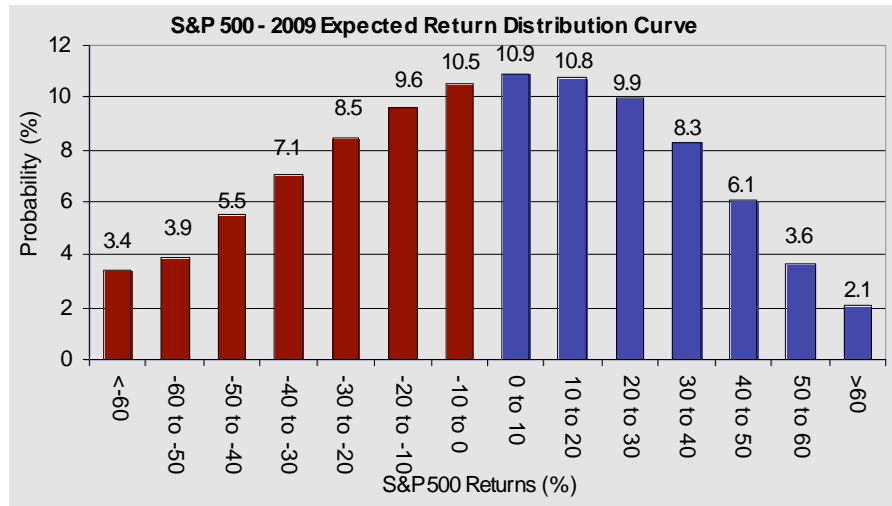
In this article, we will comment on the potential for significant additional losses as implied by the options market. Next, we will outline steps institutions could take to protect a portfolio against significant further losses. We propose a risk averse portfolio that largely divests of equities, yet attempts to provide some upside through credit instruments. We also comment on purchasing portfolio protection through options and implementing a stop-loss program.

The question of whether an institution should look to protect its portfolio comes down to its particular circumstances. In the fall of 2008, we recommended that clients raise enough cash to satisfy one year of spending and capital call needs. For our typical client, we continue to recommend this approach, and suggest that further equity market losses be used as an opportunity to increase equity allocations at the expense of fixed income. We acknowledge that conditions in the economy and credit markets may not return to normal for years. Yet, we believe buyers of risky assets at attractive prices can still perform well over an intermediate-term horizon if they can stomach the volatility. However, we understand that some institutions may not be able to bear further significant losses in their investment portfolio for operational or psychological reasons. For those clients it could make sense to reduce risk. For an institution that cannot sustain further significant losses, we believe the most effective course is to adopt a more conservative asset allocation policy, recognizing that it will mean sacrificing upside when the market eventually rebounds.

### Short-Term Risk Estimates

The volatility statistics presented in our asset allocation model reflect long-term forecasts. Our long-term estimates assume that periods of high volatility will be offset by periods of low volatility. Clearly, we are currently in a very high volatility environment. This means that long-term risk estimates significantly understate the potential portfolio swings over the next twelve months. The implied volatility in S&P 500 options suggests a one-year standard deviation of about 35%, nearly twice our long-term forecast of 17%. This suggests a very wide range of potential returns in 2009. The following chart from our Winter 2009 Research Report shows the range of S&P 500 expected returns based on option prices at the beginning of the year. As the chart indicates, there was about a one-in-four chance of the S&P falling by more than 20% in 2009. (It's higher now since the

index is already down 18% in 2009.) There was about a 15% chance of suffering a loss even worse than the 37% loss of 2008.



To assist clients in quantifying the short-term market risk, we have calculated portfolio-level short-term volatility based on option prices. For this risk forecast, we have also assumed higher correlations among risky assets. The table below details risk statistics for our Research Portfolio. As the table shows, the expected standard deviation based on option prices is more than double the long-term forecasts. The probability of losing 20% or more is less than 1% for the long-term forecasts, but rises to nearly 10% based on option prices.

<b>HA Research Portfolio Risk Statistics</b>		
	L/T Forecasts	Option Implied Forecasts
Standard Deviation (1 Yr.)	±11.7%	±24.4%
Probability of Loss Year	20.2%	34.5%
Probability of 10% or Worse Loss	4.5%	20.4%
Probability of 20% or Worse Loss	0.5%	9.5%
Probability of 30% or Worse Loss	0.0%	3.2%
Lowest Likely Return (1 Yr.)	-17.4%	-41.3%

An institution could take two approaches with this information. One approach would be to ride out this period of high volatility and any further losses. A second approach is to adjust the asset allocation by reducing the equity allocation so that short-term volatility is more acceptable. In the next section, we propose such a portfolio. When volatility declines an institution could consider returning to the old portfolio. An important consideration with this approach is that volatility is negatively correlated with equities. The equity market could rally significantly as volatility declines. Moving back into equities after volatility declines could mean missing a sharp rebound in stocks.

### Reduced Risk Portfolio

The table below shows our research portfolio and a portfolio that sharply cuts the expected short-term volatility by reducing equities. We believe most of our clients are still in a position to maintain equity allocations and even add to equities if markets fall further. However, market value losses have eroded risk tolerance for some institutions. The reduced risk portfolio provides a lower risk alternative. The idea behind the portfolio is not to completely eliminate risk, as the portfolio retains exposure to equities and seeks to capitalize on opportunities in credit markets. The portfolio should have a reasonable

probability of achieving a typical spending requirement, but will not participate much in the eventual rebound. As we have shown in prior research reports, rebounds from bear market troughs are often sharp. An institution must also consider under which circumstances, if any, it returns to a normal asset allocation.<sup>1</sup>

	Research Portfolio	Reduced Risk Portfolio
	A	B
<b>Growth Assets</b>		
US Large Stocks	8%	
US Large Growth Stocks	4%	
US Large Quality Stocks	5%	5%
<i>US Stocks</i>	<i>17%</i>	<i>5%</i>
Intl Large Stocks	17%	5%
Intl Emerging Market Stocks	6%	
<i>Intl Stocks</i>	<i>23%</i>	<i>5%</i>
Private Equity / Special Situations	15%	5%
<b>Total Growth Assets</b>	<b>55%</b>	<b>15%</b>
<b>Risk Reduction Assets</b>		
US / Global Fixed Income	10%	50%
Hedge Funds	20%	10%
<b>Total Risk Reduction Assets</b>	<b>30%</b>	<b>60%</b>
<b>Inflation Protection Assets</b>		
US Inflation Protected Fixed		20%
Real Assets	15%	5%
<b>Total Inflation Protection Assets</b>	<b>15%</b>	<b>25%</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>
<i>Assumes 2.5% inflation</i>		
<b>Return</b>		
L/T Compound Expected Return	9.1%	6.4%
10 Yr. Horizon Expected Return	11.0%	7.3%
<b>Risk (Based on L/T Expectations)</b>		
Standard Deviation (1 Yr.)	±11.7%	±5.6%
Probability of Loss Year	20.2%	11.8%
Probability of 10% or Worse Loss	4.5%	0.1%
Low est Likely Return (1 Yr.)	-17.4%	-6.3%
Sharpe Ratio	0.44	0.44
<b>Risk (Based on Option Implied Volatility)</b>		
Standard Deviation (1 Yr.)	±24.4%	±8.5%
Probability of Loss Year	34.5%	21.9%
Probability of 10% or Worse Loss	20.4%	2.2%
Probability of 20% or Worse Loss	9.5%	<1%
Probability of 30% or Worse Loss	3.2%	<1%
Low est Likely Return (1 Yr.)	-41.3%	-14.2%
Sharpe Ratio	0.35	0.57

<sup>1</sup> Presumably, one would wait until the market shows signs of stabilization and recovery, but that is much easier said than done. If one would have interpreted the 24% surge in the S&P from November 20 to January 2 as an all clear signal, reinvesting would have led to a rapid loss. The longer one waits (30%, 40%, or 50%?), the more of the upside is missed, and there remains the potential of a whipsaw loss. This raises a question—if one is risk averse at an S&P 500 level of 650 or 750, should risk tolerance increase at an S&P level of 900 or 1000? From the perspective of a long-term value investor, the S&P is less risky today than it was twelve months ago.

The reduced risk portfolio slashes the total growth allocation from 55% to 15%. The public equity allocation was cut from 40% to 10% and the private equity from 15% to 5%. Of course, institutions that previously had private equity programs in place with higher targets may not be able to reduce the allocation that much. Within the equity portfolio, we would recommend focusing on high quality growth stocks, which should hold up relatively well if the market continues to decline. New private equity commitments could tilt towards mezzanine and distressed debt and away from buyouts and venture capital to add some degree of defensiveness to the allocation.

The US fixed income allocation increases from 10% to 50% under the reduced risk portfolio. We would suggest roughly 20% to Treasuries, 25% to investment-grade bonds (GSE and corporate) and 5% to senior bank loans or other opportunistic debt. In addition, the allocation to inflation-protected bonds increases from 0% to 20%. The hedge fund allocation declines from 20% to 10%. We are very optimistic about the short-term return potential from hedge funds, but recognize that risk still exists. Of course, an institution already at 20% may not be able to reduce the allocation over the short-term. Finally, the allocation to real assets declines from 15% to 5%. Again, this could be difficult to reach for institutions already invested in private real assets.

Not surprisingly, the reduced risk portfolio sacrifices expected return for lower volatility. Based on our 10-year horizon forecasts, the expected return declines from 11% for the research portfolio to 7% and option-implied volatility tumbles from 24% to 9%. The research portfolio has a one-in-five chance of a 10% or worse loss over one year, and the reduced risk portfolio has only about a one-in-fifty chance. The Research Portfolio has a one-in-ten chance of a 20% loss, while the reduced risk portfolio is very unlikely to fall that much.

Of course, an institution concerned about risk exposure does not have to move all the way to the reduced risk portfolio. Alternatively, an institution that wants to reduce risk even further should hold even more in bonds and cash. In any event, an institution looking to reduce risk must consider their current allocation, especially the allocation to illiquid investments.

### Using Options to Protect the Portfolio

Rather than reducing the equity allocation, an investor could instead elect to purchase puts (portfolio insurance) on the equity portfolio to protect against further declines. The advantage of this approach is that it retains the upside should the market recover. The drawback is that puts are *extraordinarily* expensive due to the high volatility in the market (like insurance premiums during uncertainty). Purchasing at-the-money puts expiring in one year, which would effectively protect an equity allocation against any decline, costs about 15.5%. This means the market would have to decline 15.5% over the course of a year just for a buyer of puts to break even. While a portfolio with protective puts retains the upside, any gains would be reduced by the option premium. One could purchase out-of-the-money puts at a lower cost, but with lower downside protection. It costs about 11% to protect against losses beyond 10% for a breakeven loss of 21%.

Cost of Purchasing Protective Puts on the S&P 500 (as of 2/20/2009)						
Horizon	Protection Beyond Loss of:					
	0.00%	-5%	-10%	-15%	-20%	-30%
1 Year	15.5%	13.4%	11.4%	9.6%	7.9%	5.3%
2 Years	20.5%	18.1%	15.9%	14.0%	12.1%	8.6%

Rather than purchasing a put to provide portfolio protection, one could write (sell) out-of-the-money calls on a portion of the equity portfolio. For instance, selling a call with a strike price 20% above the market price yields premium income of about 6%. This premium would modestly reduce the downside for equities if the market falls further at the cost of sacrificing price return upside beyond 26% (20% strike price + 6% premium). A writer of a

covered call also receives the dividend yield on the underlying securities, which increases the breakeven rate to roughly 29% for the S&P 500. While a covered call program may seem intuitively appealing, it is not without risk. A seller of covered calls is engineering an unfavorable return distribution curve—accepting the left tail of the distribution curve (less the premium received), while sacrificing the right tail. Given the daily news flow, it may seem unimaginable that the stock market could earn more than 29% over the next year. Yet, the sharp decline that we've experienced suggests the rebound from the eventual bottom might be larger than anticipated.

<b>Income from Writing Calls on the S&amp;P 500 (as of 2/20/2009)</b>				
Horizon	Give Up Gains Beyond:			
	10%	15%	20%	25%
1 Year	9.6%	7.7%	6.0%	4.6%
2 Years	14.4%	12.5%	10.7%	9.1%

In most cases, we do not recommend purchasing portfolio protection through options because of their high prices. As such, we would rather be a writer of options. For that reason, writing covered calls is more appealing than purchasing puts, although writing covered calls is far less effective in protecting the downside and limits the upside. An even more intriguing option is writing uncovered (naked) puts—in essence selling the insurance that investors are clamoring for. However, that is beyond the scope of this article because it increases downside risk.

### **Stop-Loss Program**

As an alternative to reducing risk immediately, an institution could establish a dollar threshold beyond which it will reduce or eliminate risk. This approach can help preserve a core asset base if markets get much worse, but there are disadvantages. There will be an implementation lag between the time the threshold is reached and the portfolio is liquidated, during which additional losses could be suffered (and the illiquid investments cannot be sold in the short-term). Further, once the portfolio is liquidated, there is no possibility of recovery. There are some cases where a stop-loss program could make sense, but the implementation would be very complicated. An institution looking to reduce risk is probably best served by altering the asset allocation now, rather than through a stop-loss.

### **Conclusion**

For our typical client, we continue to recommend a long-term perspective and to use further losses as an opportunity to increase equity allocations with attractive prospective returns. However, institutions that are not in a position to bear significant further losses should consider reducing risk. We believe the most effective course is to adopt a more conservative policy asset allocation, recognizing that it will mean sacrificing upside when the market eventually rebounds.

### **Is it Different this Time?**

It is always hazardous to assume a new paradigm as many did in 1999, believing that technology was transformative to the economy and that the internet and associated technological advances would vastly improve productivity and profits. More recently, it had been asserted that financial engineering had reduced economic and financial risk by segmenting risk into unique packets and distributing these parcels to those better able to bear the consequences. So, it is with humility that we consider that the current credit crisis is so massive that undoing the associated problems could take a significant number

of years and that corporate profits worldwide will fall much further than current stock prices imply.

When considering the possibility that this crisis could last ten or more years, numerous commentators point to similarities between our present situation and the Great Depression and Japan's so-called lost decade. In both instances there were credit and asset bubbles and policy responses proved inadequate or counter-productive.

The lead-up to the Great Depression saw a credit bubble and asset bubble, resulting in a financial crisis, similar to what we are experiencing today. GDP contracted 25% in real terms from 1930 to 1933 (and 50% in nominal terms), and the unemployment rate surpassed 20%. The depression wreaked havoc on the stock market, as it plunged 83% from its 1929 peak through June 1932.

In some respects, the current situation is even more daunting than the conditions preceding the Depression. The credit bubble leading up to the Great Depression was smaller than we have today (debt was 230% of GDP in 1929 versus 350% of GDP in 2007), financial balance sheets were far less complex (no SIVs, CDS, etc.), and securitization was non-existent. Yet, there are many factors that argue against a repeat of the Great Depression. Overall, the financial crisis was worse during the Depression because banks were simply allowed to fail, taking deposit holders' life savings with them (there was no deposit insurance in those days). This created a self-reinforcing cycle as spooked depositors withdrew funds from other banks. This, combined with the rising unemployment and the absence of social safety nets (unemployment benefits and Social Security), led to a collapse in spending, leading to further job losses. Policy responses in the early part of the downturn exacerbated it. With the dollar still on the gold standard, the Federal Reserve raised interest rates to keep gold from flowing out of the country. Compounding the error, Congress raised tax rates to balance the budget in the face of declining tax revenues. Finally, the notorious Smoot-Hawley tariff contributed to a collapse in exports as countries around the world retaliated. The Roosevelt administration removed the dollar from the gold standard and the New Deal helped raise employment. However, the Roosevelt administration also made mistakes that arguably extended the depression (price and wage controls, steep tax increases on large businesses and wealthy individuals).

Japan's lost decade is also a sobering comparison. Japan's asset bubbles (real estate and equity) dwarfed what we have experienced. Japan's economy grew only 0.9% annualized from 1992 to 2002. Japanese officials were slow to react to their financial crisis and did not force banks to recognize their losses and reorganize. Corporate Japan also resisted the restructuring necessary to return to profitability. The Bank of Japan eventually cut interest rates to zero and adopted a quantitative easing policy, arguably too slowly. The government embarked on a massive fiscal stimulus plan. Aggressive monetary and fiscal stimulus failed to lift the economy out of its malaise (although it may have prevented matters from getting worse). The Nikkei 225 is still 80% below its all-time high set 20 years ago. The size of Japan's equity bubble and the slowness to restructure contributed to the poor equity returns.

An advantage that we have over Japan is our more ruthless form of capitalism. Corporations in the US react quickly to changing economic conditions, which helps to explain why job cuts have been so high in recent months. While this is a short-term negative for economic conditions, it helps corporations' profitability recover more quickly, which could shorten the cycle. However, Japan had one significant advantage during its lost decade—it had growing foreign economies to export to, which may have prevented Japan from suffering a much worse fate.

Could we see a repeat of either one of these scenarios? Policy makers are going out of their way to avoid the mistakes of the Great Depression and Japan. While there are similarities to both, there are also significant differences, which make outcomes unpredictable. (Further, even with the benefit of hindsight it's far from certain that conventional wisdom of what *should've* been done would have worked.) In spite of the

energetic and seemingly massive current efforts by governments and central banks around the world, there remains a distinct possibility that their intervention will fail, or in fact exacerbate the current crisis. While we don't think that such an unraveling is likely, we must recognize the possibility. (Some might call this a "very" fat left tail event.) Presumably, there would be political or even a military factor to precipitate such an economic calamity – protectionism or other destructive governmental policies, flight from the dollar, or Russian adventurism are possibilities. Should this occur, the metrics we tend to use might fail us. These events are not on the continuum of data normally considered.

Are we in a new paradigm? We don't think so. However, investors should evaluate how likely such an economic spasm might be and what the consequences would be for their organization.

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