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Investment, Corporate Risk Management and Tail Risk

Frederick J. Sheehan and Joseph Calandro, Jr.
Tel: 617-875-8150; E-mail: fsheehan@Aucontrarian.com.

We specialize in understanding and implementing the analytical and protective measures discussed below.

Our last article in *The Gloom, Boom & Doom Report* ("Catastrophe Insured: Cat bonds," November 1, 2013, pp. 16–19) generated a number of questions about the risk management approach that we described; namely, the cross-hedging of natural catastrophe exposures. We have been asked if this approach could be applied to corporate risk management. The answer to this question is "yes." To explain why, we will first profile what is meant by "risk management" followed by discussions of basic risk management dynamics. We conclude with a discussion of how economical cross-hedging can be practically employed to manage tail risk.

This article is intended to provide basic, overview information to both investors, who can use the information to evaluate corporate risk management activity, and corporate executives who can use the information to more economically mitigate risk.

Risk Management

The unceasing policy of central banks to artificially lift asset prices means that many corporations are incredibly leveraged today. At the time we write this, central banks have thus far averted the inevitable, sharp and unmanageable bouts of market deleveraging, but this trend will not continue indefinitely. As such, corporations must economically manage their risks. While this is obvious to readers of *The GB&D Report* it may not be obvious to others. For example, one of the great fallacies of modern financial economics is the proposition that capital structure doesn't matter. Capital structure, of course, always matters; to understand why, consider the example of Lehman Brothers prior to its historic failure when it was leveraged 44-to-1. According to David Einhorn, "The problem with 44 times leverage is that, if your assets fall in value by only 1 percent, that's half your tangible equity. Remember Lehman only had $15 billion. Multiply that by 44 and you have $660 billion. Drop that by 1 percent and that's $6.6 billion. Right then that 44 times leverage becomes 80 percent. And all confidence is lost."[1]

The effects of leverage, especially asymmetrical effects, have posed risk management challenges across time. For example, fractionally reserved banks continuously faced "run risk" until — generally — the government began insuring their deposits. While the direct effects of deposit insurance were generally positive, its higher order effects were not. For example, deposit insurance reduced the importance of bank risk management and intensified the hunt for yield. This was seen, for instance, leading up to the savings and loan crisis of the 1980s. As Kathleen Day observed in her aptly titled book *S&L Hell*, "Brokerage firms searched for the highest rate, pulling money in and out of institutions with even a quarter of a percentage point change. [William] Isaac [Chairman of the FDIC] worried that the firms pulled these vast sums of brokered money in and out of banks and thrifts without regard to the soundness of the recipient institutions, and why not? The money is federally insured" (p. 154).

Prior to deposit insurance, well-run banks were managed by intensely analyzing what are now known as "enterprise risks." J.P. Morgan himself was an exemplary example of this, even in his early years. According to one biographer, "Drexel and Morgan were as scrupulous in reviewing their own firms' accounts, checking collateral, and monitoring their bills receivable and payable as they were in investigating the assets and liabilities of their clients. [J.P.] Morgan kept close watch over the New York firm's accounts, checking them regularly. Not much escaped his notice. Long after his death his son recalled that his father had a 'most uncanny ability to find mistakes in the books.'"[2]

In the modern leveraged firm, such intense oversight is rarely seen, possibly because of the many complex forms of financial products that are sold, and transactions that are undertaken. The IT systems required to enable enterprise risk analysis are therefore extensive. For example, Goldman Sachs reportedly had the preeminent risk management system in the financial services industry prior to the financial crisis of 2007–2008,[3] and yet it required both a government bailout and a distressed investment by Warren Buffett to survive the volatility of that crisis.

One popular method of managing the complexities of modern exposure analysis is through netting or the cancelling out of counterparty exposures that offset each other. While this may seem efficient, it is analytically suboptimal. As James Rickards explained, "Fundamentally, the risk is in the gross position, not the net. When gross positions increase by 500 percent, the theoretical risk increases by 5,000 percent or more because of the exponential relationship between scale and catastrophic event size." [4]

1 As quoted by Lawrence McDonald and Patrick O'Brien, A Colossal Failure of Common Sense (New York: Crown, 2009), pp. 287–288.
2 Vincent Carosso, The Morgans (Cambridge, MA: Harvard, 1987), p. 145.
3 "Goldman Sachs: On top of the world," The Economist , April 27, 2006, www.economist.com/node/6855910.
4 James Rickards, Currency Wars (New York: Portfolio, 2011), p. 210. Note also 256.

However identified, once significant exposure concentrations have been identified there are three general ways to mitigate them: actively manage them down, diversify away from them, or transfer some of the exposure via insurance or hedging.

Tail Risk

There are two general types of hedges:

• *Direct hedges*, which reduce the risk of specific exposures through the purchase or sale of an offsetting contract; for example, a corn farmer wishing to hedge the risk of crop loss can sell corn futures contracts short; and

• *Cross-hedges*, which are employed when specific offsetting contracts may not be available, and thus similar contracts are used instead. Assume the farmer in our above example did not have access to corn futures and as a result he chose to hedge his corn exposure by selling soybean futures contracts short on a cross-hedge basis.

In our prior article, we proposed the cross-hedging of significant natural catastrophe exposures via the credit derivatives of firms exposed to the catastrophes, so long as those derivatives were economically priced. Our rationale was based on an understanding of both catastrophic insurance exposures and modern credit derivatives:

• The *float* of insurance reserves is a form of credit, and therefore a catastrophic insurance loss will generate financial volatility. A historic example of this is the 1906 San Francisco earthquake, which was a catalyst of the Panic of 1907.

• Credit Default Swaps (CDS) have been compared to life insurance inasmuch as a corporate default is said to be analogous (economically) to human death. This is not exactly correct: while the payout of a CDS is binary like life insurance (it either happens or it doesn't) the market's perception of the probability of that payout can vary widely, unlike life insurance. This is significant, as Nicholas Dunbar observed: "The catastrophic car-debt collision of 2005 showed how sensitive credit derivatives pricing was to a change in mood of just a few market participants."[5]

Given the leverage in the financial system today, significant exposure concentrations should obviously be directly hedged or otherwise mitigated. If a direct hedge is not possible or, in the risk manager's view, costs more than it's worth, a cross-hedge should be considered. On an economical basis, this will help to mitigate the risk of a firm being forced to sell if a market turns volatile **and** to ensure that it is well positioned to buy from forced sellers if it does turn volatile. This is significant, for as Howard Marks has explained, "Since buying from a forced seller is the best thing in the world, being a forced seller is the worst. That means it's essential to arrange your affairs so you'll be able to hold on — and not sell — at the worst of times. This requires both long-term capital and strong psychological resources."[6] It also requires an approach for managing tail risk.

An example will illustrate the utility of our tail risk management approach, but first some preliminaries:

• Given space considerations we are updating the cross-hedge presented in our earlier cat bond article. This is logical given current cat bond yields, which are uneconomically low, and current plans to securitize workers compensation and Directors and Officers (D&O) liability exposures at presumably higher yields in the future.

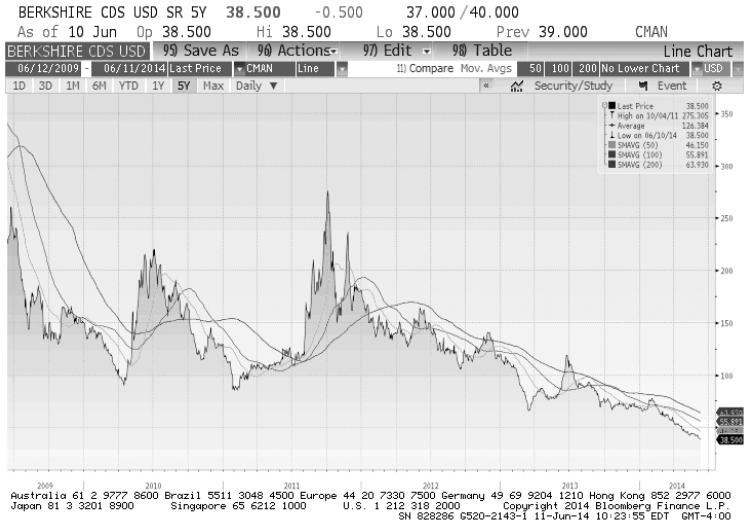
• Our example is basic and therefore can easily be extended to corporate risk management.

• Finally, it is very important to note that our example is a cross-hedge not a short. The firm profiled in our example is financially very strong, which is what makes it a cross-hedge candidate for tail risk management purposes.

Berkshire Hathaway's 5-year CDS recently sold for 38.50 basis points as illustrated in Chart 1.

Insurance companies frequently evaluate catastrophes based on *probable maximum loss*, which is a quantitative measure expressed on a *return period*

Chart 1 **Berkshire Hathaway CDS**



Source:Bloomberg

5 Nicholas Dunbar, The Devil's Derivatives (Boston, MA: HBS, 2011), p. 113.

6 Howard Marks, The Most Impotant Thing (New York: Columbia, 2011), p. 26.

basis. For example, a 1-in-100 return period means that damages at this level should roughly be seen only 1-year out of 100 or 1% of the time. Catastrophe pricing is typically a function of percentage loss plus a risk premium estimated for 1-year at a time. (There are exceptions, but the basic insurance policy has a 1-year duration.) Applied to Berkshire's CDS, the 38.50 basis point market price equates to a return period of 1-in-260. To evaluate this price consider the following:

• Financial crises seem to occur roughly every 10-years (e.g., the 1987 stock market crash, the 1997–1998 financial contagion that caused hedge fund Long-Term Capital Management's failure, and the recent 2007–2008 crisis), and sometimes more frequently, but to be conservative for risk management purposes we will assume a go-forward financial crisis frequency of 1-in-20; meaning, sometime within the next 20-years a financial crisis can reasonably be expected.

• Natural catastrophes of one kind or another seem to be occurring more frequently. We do not know if this is because of climate change or some other phenomenon, but the pattern seems clear to us. Therefore, it also seems reasonable for risk management purposes to expect a significant natural catastrophe sometime within the next 20-years.

• Finally, Mr. Buffett is 83 years old. Government mortality tables reflect the life expectancy of a white 83-year-old male in the U.S. at approximately 7-years.[7] It is widely known that a "Buffett Premium" is reflected in Berkshire's stock price so is it reasonable to assume that Berkshire's CDS could also experience some level of volatility?

To sum up, Berkshire's CDS is currently priced at a 1-in-260 return period, and while this firm arguably has the strongest corporate balance sheet on the planet, its CDS price seems incredibly low; therefore, it has the potential to experience significant volatility as a result of "a change in mood of just a few market participants." But how significant is "significant"?

In early 2009, Berkshire's CDS traded nearly as high as 5%, which is consistent with a 1-in-20 return period.[8] Table 1 analyzes a hypothetical $200 million cross-hedge on this basis noting that future volatility could, of course, be significantly greater.

As the table reflects, the economics of this cross-hedge seem favorable, especially when you compare and contrast the accounting treatment of a hedge with that of speculation. However, perhaps the most advantageous aspect of this cross-hedge is its 5-year duration. There is reason why most insurance policies are underwritten for only 1-year: risk exposures change and therefore risk pricing changes. However, for five years, Mr. Market is offering a highly economical cross-hedge. Not convinced it is economical? Ask yourself how you would react if you lived in a flood zone that reasonably expected a flood every 20-years, but you were able to buy flood insurance priced at a 1-in-260 year expectation. Would you buy it?

Table 1 **Cross-hedge Analysis**

Calculations

(a)	CDS price = 0.3850%
(b) = 1/(a)	Implied Return Period = 1-in- 260
(c)	Nominal Limit = $200,000,000
(d) = (a)*(c)	Yearly Premium = $770,000
(e)	Expected Return Period = 1-in- 20
(f) = 1/(e)	Expected CDS price = 5.00%
(g) = [(f)-(a)]*(c)	Expected Gain = $9,230,000

Some will likely respond "no" because of the yearly premium outlay. "How do you deal with negative carry?" Frankly, this is strange terminology. If you live in a flood zone and you don't buy flood insurance, you are flirting with economic disaster. If you can buy flood insurance cheaply and choose not to, that decision is irrational. Is the logic here materially that much different? Economical tail risk strategies can easily be funded through current earnings, especially when markets are booming (which, by the way, is a reason why the hedges are economical). Executives and investors have said to us that they don't want to reduce EPS (in the case of executives) or annual returns (in the case of investors) by such premium payments. Are such responses consistent with sound risk management?

Conclusion

We specialize in understanding and implementing the analytical and protective measures discussed above. While a complete analysis is obviously exhaustive, investors wishing to assess a firm's risk management capabilities could consider the following questions in framing their analyses:

• Is the firm's balance sheet deteriorating? (Such deterioration, coupled with insider selling, is a classic sign of increasing risk.)

• Does the firm's IT environment enable efficient exposure analyses (where efficient means minimal-to-any manual data intervention)?

• Does the firm understand its gross, net and interactive exposures (where interactive means the dynamics of netting processes)?

7 Data source: www.cdc.gov/nchs/data/dvs/LEWK3_2009.pdf.
8 Sheehan and Carlando (2013), Chart 1 on p. 17.

• How are significant exposure concentrations managed? Does the firm have a rational program of working large concentrations down, identifying and employing diversification strategies and engaging in targeted direct hedging?

• Finally, how does the firm manage tail risk? Are economical cross-hedges considered or even identified? As a young J.P. Morgan once observed in a cable to his father, "'Impossible foresee future'; it was essential to be 'prepared any emergency.'"[9] The actions that Pierpont Morgan took before and after this cable helped his firm withstand the effects of the Panic of 1873. We should all learn from his example.

Interested readers are encouraged to contact us for information on our risk management/risk assessment offerings.

• **Frederick J. Sheehan** is the author of *Panderer to Power: The Untold Story of How Alan Greenspan Enriched Wall Street and Left a Legacy of Recession* (New York: McGraw-Hill, 2009; Chinese translation, 2014), serves on several investment committees, and is the author of speeches, articles, and interviews on his website, AuContrarian.com. He can be contacted at fsheehan@Aucontrarian.com.

• **Joseph Calandro, Jr**., is the author of *Applied Value Investing* (New York: McGraw-Hill, 2009; Korean translation, 2011; Chinese translation, 2014). He can be reached at jtacalandro@yahoo.com

9 Carosso (1987), p. 181.