

A Safety Belt

For Asset Risk Management

By Carl Hess

While many insurance risks are generally predictable, asset and other business risks have traditionally been subject to greater uncertainty. However, recent events suggest that identification and analysis of even the least predictable risks have improved.



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The events of the last two years have demonstrated that risk management in financial services cannot afford to stop at the 99.5 percentile (VaR) and that we need to find ways of factoring in events of low likelihood but high impact (see “Managing Extraordinary Risk,” *Emphasis* 2009/3). By accounting for these in advance, we can formulate rescue plans that can be implemented as soon as necessary to prevent value destruction.

This approach does not come naturally; in fact, it goes against the industry’s history of reacting to events as they occur. Nevertheless, there is substantial merit in developing a robust defense against extreme risks by combining qualitative understanding, quantitative modeling and cost-benefit analyses of possible strategies. This approach starts with the development of qualitative understanding by asking what could cause certain events, whether these causes are plausible and what the consequences could be — followed by a consideration of the investment risks, the impact on asset returns and, in some cases, the effect on liabilities.

We have identified 15 main extreme risks that, while very unlikely, would heavily affect economic growth and asset values and returns should they occur. They are grouped here into three categories: financial, economic and political. There are many other potential extreme risks in categories such as longevity, operations, processes or systems that should also be considered in a similar way.

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Financial

Financial extreme risks revolve around solvency — whether a financial institution will be able to pay its debts with available cash. The interconnected nature of the modern financial system and its high levels of leverage mean that insolvency for one institution can quickly become a systemic problem. The primary triggers for financial risks (solvency) are falling asset prices and falling incomes. Financial risks can be self-generated (falling asset prices) and transmitted to the real economy, as we have recently seen. Alternatively, they can be generated by a recession in the real economy, which reduces incomes (corporate incomes through falling sales and/or household incomes through un- or under-employment) and is thereby transmitted to the financial sector through a default on loans.

Whatever the trigger, financial risks will generally result in declining asset prices as companies sell whatever assets they can to raise cash. A flight to quality ensues, meaning the highest-quality bonds (sovereign) will become more popular than other assets. Historically, gold has been a good hedge against financial turmoil on the belief that if capitalism were to end, gold would probably be more useful in a post-crisis regime than security certificates.

Economic

The economic extreme risks we have identified are less homogeneous than the financial risks and range from a deflationary depression to hyperinflation and a return to a gold standard. A deflationary depression scenario implies that government actions will prove incapable of returning the economy to sustainable growth. This would be a very bad environment for asset prices, and it is likely that there would be a flight to the safety of sovereign (nominal) bonds.

The other economic risks essentially assume that government actions are successful, but at a price. Entities could profit from a currency crisis, for example, by holding unhedged foreign assets, but that action would likely be highly disruptive to domestic asset returns, at least in the short term — assuming that the crisis has been triggered by some form of economic malaise.

Should stimulating the economy require government debt to grow to an unsustainable level, there is the prospect of sovereign default or hyperinflation — either of which would be devastating for asset returns. It is probably best to assume that inflation-linked bonds would be defaulted on in hyperinflation. It is possible, but not certain, that gold could act as a hedge against these risks.

Political and Other

The third category of extreme risks comprises those without financial or economic causes. Most are political, but other scenarios include climate change and killer pandemics. These scenarios are much harder to monitor and predict and, in most cases, would be hard to hedge. For example, hedging the breakup of the euro could involve the use of credit default swap contracts, introducing new risks. Adding food and water exposure to a portfolio may hedge climate change, but as they gain in value, confiscation would become a risk.

Figure 1. Likelihood and impact

		Risk		
Impact		Low	Very low	Very, very low
Financial	High			
	Medium	Excessive leverage	Banking crisis	
	Low		Insurance crisis	
Economic	High	Depression	Hyperinflation	
	Medium	Currency crisis	Sovereign default	
	Low			End of fiat money
Political	High		Climate change	End of capitalism
	Medium	Political crisis	Disunity in Europe	Major war
	Low	Protectionism		Killer pandemic

Key

Risk		Impact	
Low	Could be expected once every 10 years from current conditions	High	Direct and significant impact on most asset and liability values
Very low	Could be expected once every 20 years from current conditions	Medium	Direct and material impact on some asset and liability values
Very, very low	Could be expected once every 100 years from current conditions	Low	Direct impact on few values, variable significance

How Likely? How Bad?

Having identified and categorized the risks, the next challenge is to determine their likelihood and impact — a difficult task at best. Rather than attempt to develop a probability for each risk, a more realistic approach would be to assign each risk to one of three risk categories — low, very low and very, very low — and to categorize them by impact from high to low (Figure 1).



“It is useful to be able to determine how effective the hedge is based on how much loss is acceptable.”

We have also developed a matrix (Figure 2), using the term “association” rather than the mathematical concept of correlation to communicate that this is a qualitative assessment of the likelihood of events occurring together rather than a quantitative assessment of past data. The matrix indicates that financial risks and several of the economic risks are closely associated. A second cluster can be seen between the political and economic risks, indicating that economic well-being will be strongly influenced by political developments. As the matrix indicates, climate change and killer pandemics are truly independent risks. They may be loosely related (a hotter climate being a better breeding ground for germs), but otherwise intersect only with political crisis.

We use a subjective scoring system to derive a ranking of these risks (Figure 3, page 8). The scoring combines the impact and the risk together with the degree of uncertainty in assessing the risk. For example, we are much less confident in assigning a probability to a major war than we are to an insurance crisis. The ranking serves as a priority list for considering the various risks and whether any portfolio hedging activity could be or should be undertaken.

Hedging

The first observations are that not all of these extreme risks are hedgable and that any hedge used is likely to be very imprecise. For example, the outcome of a killer pandemic is highly uncertain, so the impact on assets and liabilities is unknowable. But it is useful to be able to determine how effective the hedge is based on how much loss is acceptable. Naturally, the more loss that is acceptable, the easier it is to hedge smaller proportions of the portfolio, while assuming the other assets become worthless.

More complete hedging increases complexity in a number of ways. The carrying cost of the hedge is likely to be higher. It is almost certain to require the use of derivatives, and therefore thought needs to be given to whether the counterparty would be willing and able to pay out. And, as Keynes warned,

We use the term “association” rather than “correlation” to communicate that this is a qualitative assessment of whether events are likely to occur together (with one perhaps being a minor or major cause of the other) rather than a quantitative assessment of past data. Quantitative assessment of rare events is difficult.

Figure 2. Association matrix

Leverage																		
Bank	H																	
Insurance	H	M																
Depression	H	H	M															
Currency	H	H	L	H														
Default	H	H	M	H	M													
Hyperinflation	L					H	L											
Fiat money		L				M	L	H										
Protection		L				H	M	L										
Political		M	M	H	M	H	H	H	L	H								
Euro	L	H	L	H	H	H	H								H			
End capitalism		L				M	L	L	M					L	H			
Climate															M			
Pandemic															L			
War																L	H	L
	Lev	Bank	Ins	Dep	Ccy	Def	Hyp	Fiat	Prot	Pol	Eur	End	Clim	Pan	War			

Key	
H	High degree of association — could be causality in both directions
M	Medium degree of association — could be causality in one direction
L	Low degree of association — a possible contributing, rather than causal, factor
	No, or very low, association

Top Three Extreme Risks

Depression

The current risk of depression appears to have been reduced through policy action, but it remains an extreme risk because it may not be possible for governments to counteract any future drop in demand, should that occur. There has been an extended period of overconsumption by Western consumers, meaning that businesses have built productive capacity to satisfy a level of demand that is unlikely to be reached for a number of years as Western households increase their savings rate. Spare capacity is likely to mean lower corporate margins, lower employment, lower growth and subdued asset returns. A complicating factor is the level of debt. When debts can no longer be serviced or repaid, lenders experience losses and sell the collateral assets. The sales of collateral assets tend to depress asset values, and the process continues until either the cycle is broken (policy intervention) or asset prices become sufficiently cheap that private capital is once again put at risk.

The current extreme risk is that economic growth will remain anemic, meaning the economy will be vulnerable to any further drop in demand. This is compounded by the fact that debt levels remain too high relative to the ability to service them — and this includes the ability to service government debt.

Hyperinflation

Hyperinflation is inflation that is very high or out of control; prices increase rapidly as money loses its value. Definitions used by the media vary from a cumulative inflation rate over three years approaching 100% to inflation exceeding 50% a month. As a rule of thumb, hyperinflation is often reported for short intervals, often per month.

Although there is debate about the root causes of hyperinflation, it becomes visible when there is an unchecked increase in the money supply or drastic debasement of coinage, usually accompanied by a widespread unwillingness to hold the money for more than the time needed to trade it for something tangible to avoid further loss. Hyperinflation is often associated with wars or their aftermath, economic depressions, and political or social upheavals. The main cause is a massive and rapid increase in the amount of money, which is not supported by growth in the output of goods and services, and which leads to a loss of confidence in the money, similar to a bank run. Hyperinflation wipes out the purchasing power of savings, provokes extreme consumption and hoarding of real assets, causes the monetary base to flee the country and results in a cease in investments.

Enactment of legal tender laws and price controls to prevent discounting the value of paper money relative to gold, hard currency and so on, fails to force acceptance of a paper money that lacks intrinsic value. Often the body responsible for

printing the currency cannot physically print paper currency faster than the rate at which it is devaluing, thus neutralizing attempts to stimulate the economy. Governments sometimes find excessively loose monetary policy attractive because it allows a devaluation of their spending and displacement (or avoidance) of a tax increase to meet their expenses.

Excessive Leverage

The use of leverage is helpful for society because it allows capital-constrained entrepreneurs to bring new products to market and contribute to employment and economic growth. However, it is now clear that there is an optimal level of leverage and that going beyond it implies a social loss. It can be further argued that excessive leverage is a “public bad” and therefore appropriate for governments to regulate.

We suggest that a level of leverage is sustainable when the debt service can be covered by income. We could stipulate a safety margin to allow for shocks to income, for example, if interest rates rose. On this basis, leverage becomes excessive when the debt can no longer be serviced from income or when no safety margin exists. This will typically occur with speculation, when the intention is to repay the debt when the speculative asset has been sold for a higher price. Speculation risk can be latent, in that debt can remain too high, but serviceable, as long as asset prices do not decline. Falling asset prices will trigger a self-reinforcing cycle, and we have seen that it is not automatically possible to reduce leverage even if desired. Some public sectors are increasing their leverage (debt-to-GDP ratios), so we believe the risk of excessive debt will persist for a number of years.

In addition to standard debt, derivatives are another way the system becomes leveraged — typically by allowing a given amount of economic exposure to be gained with a fraction of the amount of capital. While many or most derivative contracts have built-in protection mechanisms (exchange traded, collateral requirements, variation margin and so on), not all do. There has been extensive media coverage of credit default swaps (CDS) in particular, which are not exchange traded (introducing higher counterparty risk) and are a multiple of the value of the physical bonds they are designed to hedge. Therefore, we find it easy to believe that derivatives, whether CDS contracts or another instrument, could be a source of excessive leverage.

As we’ve noted, the consequences of excessive leverage are possible forced asset sales driving down asset prices, causing further forced asset sales in a reinforcing cycle. This would cause the financial markets to stop functioning, triggering a reaction in the real economy similar to the one we have just seen: falling growth, employment and incomes, and the possibility of depression.

“Most asset owners do not spend sufficient time on risk management.”

it is better for one’s reputation to fail conventionally than to succeed unconventionally. If a single institutional investor becomes “super rich” relative to others through successful hedging, there would be a danger of becoming a target for special levies, taxation and/or confiscation. On the positive side, derivatives provide much greater flexibility and the more precise targeting of risks. They also don’t require much up-front capital, therefore leaving the bulk of the portfolio untouched.

Car Crashes: The Belt or the Windshield?

It is clear that there are numerous extreme risks that could interrupt future growth, with assets, and liabilities, faring differently depending on the event. Some events are easier to understand, and the consequences are more predictable than others. Of all of them, public policy issues should be considered above others, as they will both influence the risks identified here and be shaped by the shifting likelihood of the different risks through time. Our future research will look more closely at public policy issues.

While the risks identified here are remote, the impact on portfolios if they did occur would be significant, and the recent crisis has shown that risk management based solely on volatility — such as VaR — is not sufficient. Being aware of extreme risks before they happen can protect value if an organization builds a plan of action that can be implemented as soon as the need arises. Better to have the belt on in a crash than to take one’s chances with the windshield.

Wearing the Safety Belt

It is difficult — and even unpleasant — to spend time contemplating the effects of extreme risks. This is compounded by the fact that most asset owners do not spend sufficient time on risk management in the first place. Nonetheless, we believe that such efforts are certainly merited for long-term investors, because the cumulative probability over a long period of time that some extreme event will occur is not negligible, and the impact of such an event could be severe. But regardless of whether an extreme risk does or does not materialize, we believe that adopting the framework we have set out for the evaluation of such events should lead to a better risk management process.

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Figure 3. Ranking

Risk Ranking* (as of June 30, 2009)			
Rank	Risk	Description	Possible Hedge
1**	Depression	Debt-deflation trap; falling growth and incomes	Globally diversified long-dated sovereign nominal bonds
2	Hyperinflation	Extremely high inflation	Real assets (e.g., gold, globally diversified inflation-linked bonds)
3**	Excessive leverage	Debt burden cannot be serviced from income	Gold; reserve-status currency
4**	Currency crisis	Extreme movement between floating rates	Gold; foreign assets
5**	Banking crisis	Balance sheets can’t absorb another shock	Nominal sovereign bonds (medium duration)
6	Sovereign default	Default by a developed country on its debt	Country insurance (e.g., CDS)
7	Climate change	Diversion of capital to mitigation uses	No general hedge
8	Political crisis	Rise in power of extremist groups	No obvious hedge
9**	Insurance crisis	Insolvency within insurance sector	Nominal sovereign bonds (medium duration) short insurance equity
10	Protectionism	Reversal of movement toward free trade	No general hedge
11	Disunity in Europe	Breakup of the euro	Long Germany (hedged)
12	End of capitalism	Move to socialism and closing of markets	Gold
13	End of fiat money	Return to a gold standard	Gold
14	Major war	Major global conflict	Long neutral countries
15	Killer pandemic	Contagious disease with very high mortality	Long pharmaceutical equities, short airline equities

* This is our subjective measure, based on the impact, risk and degree of uncertainty in assessing the risk level.

** We are more confident in being able to attach a probability to these events.