

# Risk and Light

David Ingram, CERA, FRM, PRM

Copyright 2009 by David N. Ingram. All rights reserved. Permission is granted to make brief excerpts for a published review. Permission is also granted to make limited numbers of copies of items in this monograph for personal, internal, classroom or other instructional use, on condition that the foregoing copyright notice is used so as to give reasonable notice of the copyright. This consent for free limited copying without prior consent does not extend to making copies for general distribution, for advertising or promotional purposes, for inclusion in new collective works or for resale.

## **Abstract**

“In the Kingdom of the Blind, the One Eyed Man is King” — Erasmus

It is widely reported that markets are made because different market participants have different views of the opportunities in the market. For every transaction, there may be an agreement on price, but an inevitable complete disagreement on direction of the next move in price. This article examines one source of those differences of opinion in the market: the view of risk of the various market participants. Based on some popular theoretical approaches to risk, a possible range of types of approach to risk is posited that is tied to some popular theoretical approaches to risk. The impact of these views of risk on the types of transactions chosen is extrapolated from groupings of risk views along that range. Finally, the interaction in the market of those varying points of view is illustrated with a simplified example; extension to a fully realistic real world situation is discussed. Simply stated, the article shows how market participants' view of risk impacts not just their own choices, but also how they impact on everyone else's choices as well.

Picture a person who walks all day in the desert. He is constantly on the lookout for risks of the road. He is frequently shifting his view from straight ahead, to the right, to the left and once in a while behind him. Suddenly, an unseen, unexpected risk strikes him and he is severely injured and eventually dies of exposure. What happened is that he walked right off a cliff! He failed to look down. Throughout the day, he frequently made corrections to his path to avoid potential problems that he had seen. He was safe from all the risks of the road, save the risk that there was no longer a road.

## 1. Different Views of Risk

Market participant views of risks can be seen in a paradigm that fits well with the walker. Some risk-takers insist on keeping their eyes shut. They firmly believe that real rewards come only to those who take risks blindly, and that caution, preparation and analysis will generally result in avoiding those opportunities that have the best payoffs. A student of risk and risk management might think that this is an absolutely insane point of view, but there is a constant stream of evidence that suggests that Eyes-Shut is a common risk view. The upper levels of corporations are highly populated with managers with this Eyes-Shut point of view. Many successful entrepreneurs share this Eyes-Shut view. They are often the visionaries who stick to their vision in the face of all the naysayers who are trying to tell them that they are totally unrealistic. They are the corporate winners who have forced through the crazy projects by force of personality rather than by careful planning and execution. They have all worked miracles.

These miracle workers are generally lionized in the business press, in the corporate culture and often in the business schools. But few realize that there is an immense survivor bias at work in these living legends. If there are 100 entrepreneurs with crazy ideas and one enjoys a wild success, is that one a genius or merely a result of statistics at work (Taleb, 2001)? The 99 losers are quickly forgotten, if they are ever known, while the one successful person makes the cover of every magazine.

As already mentioned, the Eyes-Shut risk view results in very high or very low rewards for the risks taken.

“All you need in this life is ignorance and confidence, and then success is sure.”  
—Mark Twain

At the opposite end of the risk-taking spectrum are those individuals who take a very Quick-Look at an opportunity. If they see something that they have seen before, they immediately begin working their tried and true path of risk selection. If the risk is something new, then they will usually reject the risk, most often without further thought or analysis. The reward for the Quick-Look risk view is often relatively low, but the risk is generally low also. These market participants are very much like the Egalitarians (Thompson et al., 1990).

Moving along to more quantitatively oriented risk views, the first is the One-Eye view. There are several different One-Eye views. They all favor some specific sort of quantitative analysis of risk and reward. Usually the One-Eye risk view is completely sure that there is a single definition of risk. One example is the One-Eye risk view that risk is equal to volatility

(Markowitz, 1952). This is the classical financial economics view of risk. Nobel Prizes have been awarded to proponents of the view that risk is represented by volatility. Modern portfolio theory and the Black-Scholes-Merton model (1979) are based on that One-Eye view of risk as volatility as well. In the insurance world, the Miccolis (1977) pricing model also defines the risk margin as a function of standard deviation.

Another One-Eye risk view that has been widely used in insurance company valuations in company sale situations and some insurer pricing models for many years is now being pushed forward as the true representation of a market value margin in a fair value construct. This is the ruin theory or cost of risk capital approach (CRO Forum, 2008). In this One-Eye risk view, risk is a particular function of the loss potential in an extremely remote situation. This remote loss is also proposed as the amount of capital that should be held by an insurer for prudent protection of its customer's interests. The RAROC systems employed in some banks might be the same sort of One-Eye view (or they might be volatility views depending on the point on the loss distribution where the capital is determined). Ruin was also the key risk when looking at credit risk as well (Altman, 1984).

Minor variations on these two themes exist. There are several different methods that are used to develop the "right" value of the risk capital. The volatility approach might be executed using a somewhat different risk metric that might be defined to fall somewhere between volatility (or regular losses) and ruinous (or extreme losses) such as "earnings at risk." The models used for these calculations might be calibrated based on real historical experience, or they might be calibrated to current market conditions or else to some view of potential future conditions. The risk view might be formed over a very short time frame or over one that is very long.

As another example, some hedge fund managers may have a One-Eye ruin risk view. Their success depends upon taking margin for volatility while trying to insist that their investors ignore that volatility when it is unfavorable and give the manager credit when it is favorable. The hedge fund manager may go so far as to say that volatility is not even risk and that they are managing the "real risk" of ruin. This point of view is ultimately the same as the Martingale betting strategy where the bettor doubles down whenever she loses a bet.

In the opposite direction, hedge funds as originally defined, with offsetting long and short positions, were usually constructed to drastically reduce volatility. These hedge fund managers may not have even had ruin risk in their radar.

Modern Portfolio Theory investors focus on another One-Eye risk measure: beta (Sharp, 1964).

In most of the cases of One-Eye risk views it is unclear whether any of the proponents of the One-Eye risk metric actually believed that they were fully capturing risk with that one metric. Alternatively, their position might be that they are describing a heuristic for capturing the most important component of risk in an overly complex world.

The Two-Eye risk manager has a blended view of risk. He wants to get paid both for volatility and for ruin, or at the least he seeks to operate in markets where he can avoid the extremes of one or the other aspect of risk. If risk can be fully represented by a two-factor model, then he is able to fully control and exploit his risks. A two-eyed view of risk that includes volatility and skewness is described as necessary for firms with significant amounts of highly skewed insurance catastrophe risk (Kozik and Larson, 2001).

Then there are the risk-takers who have a Multidimensional view of risk. This means that the risk managers look in all directions for their risks. They are looking at volatility and ruin and everything in between. They look at risk from a historical, market and future point of view. The degree of uncertainty of a risk will also be a consideration. The way that the risk develops over time is another consideration. Discussions of a broader view of risk include Cumulative Prospect Theory, which corrected the One-Eye view of the original Prospect Theory (Tversky and Kahneman, 1992); for insurance capital allocation (Mango, 2005) and for insurance pricing (Wang, 2000).

The following is a partial listing of the risks that might be examined:

- Type A Risk—Short-Term Volatility of cash flows in 1 year
- Type B Risk—Short -Term Tail Risk of cash flows in 1 year
- Type C Risk—Uncertainty Risk (also known as parameter risk)
- Type D Risk—Inexperience Risk relative to full multiple market cycles
- Type E Risk—Correlation to a top 10
- Type F Risk—Market value volatility in 1 year
- Type G Risk—Execution Risk regarding difficulty of controlling operational losses
- Type H Risk—Long-Term Volatility of cash flows over 5 or more years
- Type J Risk—Long-Term Tail Risk of cash flows over 5 years or more
- Type K Risk—Pricing Risk (cycle risk)
- Type L Risk—Market Liquidity Risk
- Type M Risk—Instability Risk regarding the degree that the risk parameters are stable

A true Multidimensional view of risk would be looking at all of these various risk types and others.

The choice of the best risk view is not immediately obvious. There are several strengths and weaknesses to each approach that are summarized in the following table.

<b>Risk View</b>	<b>Strength</b>	<b>Weakness</b>
Eyes-Shut	Low cost. High reward. Fame.	Low predictability. High failure rate.
Quick Look	Reliable. Proven. It works.	Declining returns or returns that fluctuate due to forces outside of field of view. May miss some non-traditional risks.
One Eye	Can readily develop and explain risk reward trade-offs.	Expensive. Choices will eventually tend toward aspects of risk that are not covered by the single view.
Two Eyes	Two views of risk just might take care of most of the risk.	Which two views will be the most important?
360 View	Never have to say you are sorry.	Very expensive. Can tend toward finding a reason not to do everything.

## 2. Transcendentally Talented

Perhaps this judgment is too hasty. Some of the most successful businesses were founded and run by people who seem to fall into the Eyes-Shut category. Isn't this just an argument for enforced mediocrity? Think about Microsoft, Berkshire Hathaway, Virgin, Tata and Google. These are not all just lucky survivors. Some or even most of the individuals behind these companies are doubtless great risk managers. And everyone has seen people in their career who seem to take the corporate ladder two or three steps at a time.

It is possible that many or even most of these successes are a result of luck. But there is another possibility. Recently, in an interview published in *Newsweek*, Gary Kasparov, who was the reigning world chess champ for 22 years, said, "You have to rely on your intuition. My intuition was wrong very few times." (*Newsweek*, 2008)

Possibly Kasparov, and perhaps some of the others who are extremely successful, fall into a category of transcendentally talented. Luck could not have led to 22 years as world chess champ. It is hard to imagine, given the immense complexity of chess, that luck was a major factor in almost any of the games where Kasparov was defending his title. But however complicated chess is, it lacks several key factors that differentiate it from the world. Chess is complicated, but it is a fully constrained system. The real world is unconstrained as there are game-changing turning points. In chess terms, the number of pieces and layout of the board and the rules for moving the pieces may change without notice. Many of those who have been extremely successful in business have successfully anticipated those changes and been able to exploit the vacuum that exists at each such inflection point. Some may have been lucky. Those who are sure that the world is going to change drastically might seem to be geniuses if it does change and fools or mad if it does not. On the other hand, there are doubtless some people who are such masters of their domain that their expertise has passed into their unconscious. George Soros has said that he feels physically uncomfortable when the markets that he is following are in the sort of flux where there are large fortunes to be made.

So perhaps it would make sense to subdivide the Eyes-Shut into two groups. Those with convictions that may have faint basis, but happen by luck to be correct and those who have a transcendental talent. A child might win every argument by saying something like: "Oh yeah, you say that is impossible, but I know that Superman could do it!" This discussion will proceed without answering the Superman argument, under the assumption that there are too few transcendentally talented to worry about.

### **3. Risk and Light**

The various risk views—Eyes-Shut, Quick-Look, One-Eye, Two-Eye and Multidimensional—will be shown to have profound impact on choices made by market participants. That idea will be examined, first in a market where the participants are alone with their choices, then in a market where they and their counterparty might have different or the same views and finally in a market where participants with different views compete for risk opportunities.

These situations will be shown to follow two laws. The Law of Risk and Light and Gresham’s Law of Risk.

#### **3.1 The Law of Risk & Light**

*Risks in the light shrink, Risks in the dark grow*

*Return for Risks in the light shrinks faster than risk*

*Return for Risks in the dark does not grow as fast as risk*

What this means is that risks that are visible to the market (in the light) will be managed by the market. The degree of uncertainty around the risk will shrink. With decreased uncertainty, the risk premium will shrink. With broad comfort, demand will rise; with increased demand, risk premium will shrink further.

Risks in the dark are risks that are not visible or known to the market. If the market charges little or nothing for a risk, then those who are aware of the risk will bring more and more of that risk to market. And if the market continues to be unaware of a risk, then more and more extreme versions of the risk will be brought to market, the risk will grow. As the risks grow and grow, that growth might be noticed faintly by the market as a shadow of a risk. Some market participants are canny enough to know that if someone really wants to do a transaction, then a higher price for that transaction is probably in order, even if they do not fully understand the underlying reasons.

#### **3.2 Gresham’s Law of Risk**

*Those who do not see a risk will drive those who see the risk out of the market.*

Gresham’s Law is, of course, “bad money will drive out good.” Its application to risk can be stated as the above and is well known to many market participants even though they might not have named it. Many business managers will blame their lack of success in a market on fools who are inappropriately undercutting their price and losing money doing so. For the most part, in most markets, participants are price takers, not price makers. And if someone comes into a market and wants to take a risk at half the going rate, then there is a new going rate. Market participants who do see the risk can take the new going price or withdraw.

## **4. Stand-Alone Decisions**

Some financial market theory is developed by looking at market participants and the market as the only two elements in their discussion. The market participants are not seen to have any influence on the market and are faced with the task of deciding whether to choose something that the market offers or not. For each risk view, the approach to making risk choices will be examined.

### **4.1 Eyes-Shut**

Eyes-Shut risk-takers most likely have strong visceral reactions to risks. They will feel right or they will feel wrong. The acceptability of the compensation for the risk will also be subject to intuition. The intuition will be formed based on prior experiences. In some situations the intuition will resemble very closely one of the One-Eye views—the One-Eye view that defines risk as volatility. That is because the intuition will be formed as much of human intuition is, from experience. Bad risks will have produced losses in the past. Good risks will not have produced losses. The Eyes-Shut intuitional risk manager may actually be operating an expert system where the expert is taking many, many characteristics of the risk into account and comparing them to the expert's recollection of prior bad risks. This expert system will be broadly equivalent to the model One-Eye volatility risk manager.

Given that approach to risks, some Eyes-Shut risk managers will be likely to choose risks with characteristics that are familiar. They may not even notice new risk characteristics or may demand little or no compensation for the new risk characteristics. This might mean that they could show up in a market that has been seen to be fairly compensated for risks and undercut the going rate for accepting risks, and they may be just as likely to avoid a market because it has some of the characteristics of prior bad risks.

Alternatively, some One-Eye risk managers may choose to take risks that they have no experience with based upon nothing more than a hunch that the new risk is a “good” risk.

### **4.2 Quick-Look**

While the Eyes-Shut risk manager may unconsciously choose risks that have similar risks to prior good experiences, the Quick-Look risk manager will deliberately consciously choose risks with which he is familiar. The risk margins offered for these risks may decrease over time as the risks become better and better known by the market. The Quick-Look risk manager might, for example, have developed very good skills to choose among investment grade corporate public credit opportunities. He can quickly see when a credit is flawed and avoid that. However, the market has developed new tools that make the underwriting skill potentially less valuable. As more and more light comes to the public credit market, uncertainty premiums shrink, and spreads will shrink along with them. The Quick-Look risk manager may or may not notice deterioration of risk quality and he may ignore new aspects of risk and convince himself that this is the same old risk at a slightly better price. Because these Quick-Look risk managers do not have a reason for the excess price, they will willingly accept it if it is large or even if it is small. In extreme

situations, they may become prey to sophisticated counterparties or intermediaries who take advantage of their blind spots.

### 4.3 One-Eye

There are two common One-Eye views: volatility and ruin. Those who concentrate on volatility will tend to favor choices that have higher risk premiums in proportion to volatility. Those who favor ruin as their view of risk will tend to look for risks where the risk premium is higher in proportion to the ruin potential of the risk. Choices with identical amounts of volatility but very different ruin potentials will be seen as identical to the volatility player. Risks with different levels of volatility but similar ruin potential will be seen as similar to the ruin player. This will work out fine if the volatility player generally avoids risk with high ruin potential and the ruin player stays away from high volatility opportunities. But there is a catch to that strategy. Each One-Eye risk manager has highly developed tools to measure risk in the manner that he sees risk, then he may or may not recognize or even look for risk of the other sort when opportunities are presented to him. So a volatility player may be willing to take ever-increasing amounts of ruin risk. This is one way of looking at the actions of the banks and brokers in the recent subprime market. It could also be the way that some property (re)insurers failed to notice excessive concentrations of wind risk accumulating in the pre-2005 underwriting years. Since in both cases, they were primarily looking at volatility as risk, they missed the poorly compensated aggregations of ruin risk. The ruin risk that was in the dark grew and grew, and the risk-takers were not properly compensated for it. Likewise, the same sort of drift can be posited for the One-Eye ruin risk managers. Since volatility is not seen as a risk to them, it seems likely that they will tend to see opportunities with higher volatility but lower ruin risk as favorable. And they are predisposed to take additional volatility without any significant additional risk premium. (In this case and throughout, the risk premium is meant here to mean the compensation for the volatility and uncertainty of a risk, not the amount that is paid to compensate for expected losses.)

Looking at those choices another way, if all risks had the same shaped loss distribution, then there would be a fairly predictable relationship between volatility and ruin. The use of either measure to form a view of acceptable risk margins would result in very similar, possibly identical decisions. If the ruin statistic is always three times the volatility statistic, then a risk margin might be found to generally be at the market if it is 1.5 times volatility or 50 percent of ruin for example. But if risks are actually found to have different distributions, the relationship between volatility and ruin will vary. And if hedging or reinsurance is used to carve up the loss distributions, then the relationship between volatility and ruin could be even less predictable.

In the case where a market full of One-Eye risk managers has lurched into severe trouble because of the drift into other risk elements, a shift of risk view to concentration on the other risk element will seem to be the solution. If a volatility player has taken on too much ruin risk, then a shift to a ruin focus for risk management will be seen as the way to go. For risks with standard relationships between volatility and ruin, this shift will make no difference. For those risks the pricing will need to shift very little.

#### **4.4 Two-Eye**

If you imagine a regression approach to analyzing risk and risk premiums, then a set of elements will be found that coincides with the formation of market risk premium. If that analysis reveals that a single component can be seen to be the driver and explain a very high percentage of the risk premium, then the One-Eye risk view would be appropriate. This idea is not suggested as a part of the discussion of One-Eye risk managers, because rarely if ever have they performed such analysis to determine their one true view of risk. More likely, their view of risk is chosen because it solves some prior problem.

The Two-Eye risk managers are not likely to have performed such analysis either. They are looking at two elements of risk because they have been at the analytical One-Eye risk management approach long enough to find out that neither popular One-Eye view works all of the time for the exact reasons mentioned above. Most commonly, the Two-Eye risk manager works primarily with one of risk view and uses the other view as a constraint, as described above where the risk manager concentrating on ruin avoids the opportunities with higher volatility.

However, there might be other characteristics of risk. Just in the way that the darkness around the volatility might swallow up the ruin risk manager, the other aspects of risk might overwhelm even the Two-Eye risk manager.

#### **4.5 Multidimensional View**

The Multidimensional risk view attempts to account for all possible aspects of risk. The additional aspects of risk might be such things as uncertainty, where the risk has an unknown or even possibly unknowable loss distribution. This is the risk that the Quick-Look risk manager avoids at all costs. Because analysts are trained to give their best analytical view of every risk that they encounter, it is possible that some of the One-Eye or even the Two-Eye risk managers are using models where they are comparing risk analyses with totally different levels of certainty around the analytical estimate of risk without recognition of that distinction. This becomes a blind spot in the analysis, a dark spot under the law of risk and light. The dark spot will attract more and more risk that is not fully compensated. The risk manager will find that there is little risk in an instrument that is based solely on subprime mortgages, even though prior experience in subprime mortgages at the level of issuance really takes the market into new uncharted and uncertain territory. The risk analysis might ignore the oft-proven uncertainty in long-tailed casualty insurance lines like directors and officers insurance and not demand enough risk premium for that risk. The choices that have risk characteristics that are outside of the model will always look more attractive. Another aspect of risk that is falling outside of more and more models is related to uncertainty in many cases: an extended time element. As insurers with very long-term contracts shift into one-year risk models, risks that are more prominent with a longer time view will seem to be more and more attractive and choices may well shift in that direction.

A simple example of this general phenomenon can be remembered by those who lived through the development of asset-liability management (ALM) programs. When ALM was first developed, it seemed like a great victory when durations of all assets and liabilities were known and duration mismatches could therefore be managed to the desired levels. But as that hurdle was

passed, the market presented opportunities with exceptionally high convexity. The convexity aspect of risk was in the dark, and some market participants took on massive amounts of convexity. This turned into an expensive lesson in risk analysis when jumps in interest rates provided a tutorial of the meaning of convexity.

Managers of interest rate risk learned that it could not be adequately measured by a single factor. Eventually, the two-factor approach was found to have limited utility and best practice migrated to use of a range of key rate durations.

Likewise this is true for hedging programs. Simple delta hedging only works sometimes, so practice migrated to including many greeks and more recently cross greeks.

In fact, on reflection, it seems odd to even propose that risk could be adequately captured by a single factor. Only very simple phenomena can be adequately measured by a single metric. And risk is anything but simple.

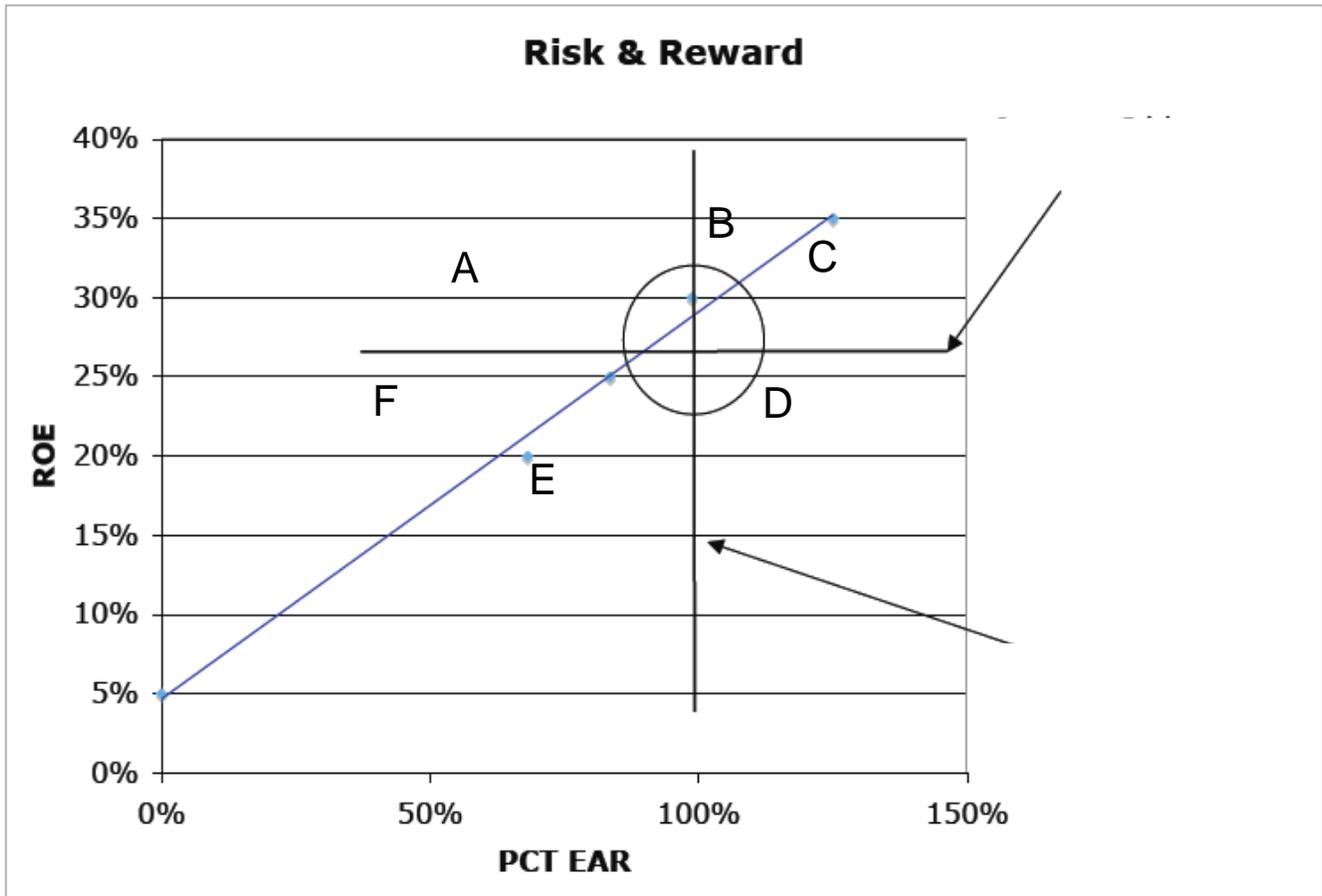
The Multidimensional risk manager attempts to look at all aspects of risk. She considers multiple points on a loss distribution over multiple time frames and also incorporates uncertainty and perhaps liquidity into the risk analysis. (It is quite possible that those who do not incorporate liquidity into their risk analysis are doing that because they know or strongly suspect that they will have to stop some activities that have been seen to be highly profitable. They are seen to be profitable because they are ignoring assigning a value to liquidity risk. That puts liquidity risk into the dark and subject to the forces of the law of risk and light. Any risk premium seems to be acceptable for a risk that is in the dark, so more and more risk is taken and less and less risk premium is received.)

One likely regulatory response going forward to the current financial crisis is the restriction of liquidity risk. Requiring that liquidity risk be analyzed and incorporated into risk margins is another alternative that seems to have been dismissed. In part, this may be because liquidity risk does not easily fit into the One-Eye risk view. However, because of the Law of Risk and Light, if liquidity risk is driven into the dark, but restrictions are thought to keep it in check, it is likely that it will somehow creep back into the system in another form, again without adequate measurement and again with risk margins that are reported as pure profits. The only other alternative that will work would be to shut down all innovation and force everyone into the Quick-Look risk view and reject any possibilities that have more than a minimum amount of liquidity risk.

Once an uncertainty component of risk is introduced, the Quick-Look risk managers can be reclassified as having zero tolerance for uncertainty risk. They will take ruin or volatility risks, but not uncertainty. There are some volatility risk managers who have a zero tolerance for ruin risk but who will take plenty of uncertainty risk in a fashion that they consider to be controlled.

## 5. Market Effects

There are interesting side effects from the varying risk views that impact on the types of transactions that are likely between counterparties with different risk views. Since five risk views were defined, there are 20 counterparty pairs that can be formed in a two-way transaction. A few examples of the counterparty effects will be given. For the examples, three views are chosen: One-Eye (volatility), One-Eye (ruin) and Two-Eye.



Think of the graph above\* as representing the space of all risk and reward choices that are possible to these three market participants. The vertical axis shows the expected reward as a percentage of the ruin estimate. The horizontal axis represents the expected reward as a percentage of volatility. The vertical line at the 100 percent mark represents a hypothetical minimum target for the One-Eye (volatility) risk manager and the horizontal line slightly above the 25 percent mark is a hypothetical minimum target for a One-Eye (ruin) risk manager. The diagonal line represents a very hypothetical target for the Two-Eye risk view.

\*This graph was developed by Ellen Lamale and her staff at Principal Financial. All misinterpretations presented here are my own. The entire Risk and Light discussion was in fact inspired by this graph.

With these three lines, the hypothetical two-dimensional risk universe is divided up into six regions, labeled A through F. The One-Eye (volatility) risk view favors risks that are in areas B, C and D. The One-Eye (ruin) risk view favors risks in areas A, B and C. The Two-Eye risk view favors risks in areas F, A, and B. It is easy to imagine that different Two-Eye risk managers might put different weights on the volatility versus the ruin based on the other elements of their risk profile and/or their general risk preferences.

These three market participants find a common view of risk and price for risk that can be easily seen on this graph. Since the ruin and volatility risk views overlap in areas B and C, then that is where they are likely to find agreements as counterparties. Those are the opportunities that have both higher risk premiums compared to either volatility or ruin. The Two-Eye risk manager finds agreement when risks are in A and B with the One-Eye (ruin) risk manager and only in area B with the One-Eye (volatility) player.

So in this case all of the counterparty agreements will take place in areas A, B and C. The One-Eye (ruin) risk view will be able to find counterparties for any transactions in their acceptable range. The Two-Eye risk manager will need to find another Two-Eye risk manager or one of the risk views that do not even look at this chart to find a counterparty for a transaction in area F. The One-Eye (volatility) risk manager will likewise find limited counterparties willing to accept risks in area D. On the other hand, they will find many opportunities to buy those risks from any of the others since in all cases they value those areas higher than the others.

## 6. Competition

As mentioned earlier, financial market theories often assume that the market is completely immune to any influence of the participants. In some situations, that is just not the case for risk transactions. The participants often do seem to affect the market and diverse risk views might play a major role. Again using the graph, the evolution of the market and the working of Gresham's law of risk can be seen to operate, in much the same way that there is a natural progression of types of trees in a forest.

For example, consider a market where long positions are dominated by the Two-Eye risk manager. Only risks that are priced to fall into areas F, A and B will be taken up. A risk holder who wishes to exit its positions will need to pay enough risk premium to put the risk into F, A or B. The risk premium is seen here to be a function of both volatility and ruin. Now a One-Eye (volatility) risk manager finds this market. He will find it acceptable to take on the risks in areas C and D that look to be inadequately priced to the Two-Eye risk manager. Pretty soon he has taken up any risks with lower volatility and had the absolutely best closing rate on transactions in area D, because the Two-Eye player might temporarily follow him into area C; area D is clearly outside his standards. And since D is the area furthest away from the competition, this may well seem like the path of least resistance for the One-Eye (volatility) risk manager. So the One-Eye (volatility) players have changed a significant part of the market. They have split the market with the Two-Eye player and lowered the cost of risk to the part of the market with lower volatility and higher ruin. That is the example of Gresham's Law of Risk. The volatility risk view does not see ruin so they drive the Two-Eye player out of the ruin concentrated part of the market. It also follows the Law of Risk and Light. Since ruin risk is in the dark for the One-Eye (volatility) player, his share of that risk grows. Since he is not asking to be paid for it, the implied spread for ruin risk in the market shrinks and shrinks.

When you look at a market where the two participants are the One-Eye (volatility) and One-Eye (ruin) risk views, the result is stark. The One-Eye (volatility) view looks for risks in areas B, C, and D, and the One-Eye (ruin) view looks for A, B and C. Prices for deals with more volatility and less ruin risk will be bid by the One-Eye (volatility) view down to area C where the One-Eye (ruin) view would not take them; deals with more ruin and less volatility would be bid by the One-Eye (ruin) view down to area A where the One-Eye (volatility) view would shun them. This is great for the risk sellers, but this guarantees that the two One-Eye players will be subject to a maximum dose of the Law of Risk and Light.

One defense against this situation that has been used by the newer converts to the One-Eye (ruin) view is to seek to convert the One-Eye (volatility) viewer to the One-Eye (ruin) view. If they are successful in converting a significant portion of the market to join them, then they are more likely to get a spread of deals with moderate and even lower volatility, after the remaining volatility viewers have exhausted their risk-taking capacity. Looking into the future, if they are successful in converting everyone to the ruin risk view, then competition for deals will shift from a competition between risk views to a competition on the basis of other elements cost advantages (like size). Further into the future, the regime of a pure ruin view would come to an end when one of the losers in the competition on other factors will "discover" the One-Eye (volatility) view

of risk and start to easily find a large target market that is “mis-priced” by the One-Eye (ruin) viewers.

And so these men of Hindustan  
Disputed loud and long,  
Each in his own opinion  
Exceeding stiff and strong,  
Though each was partly in the right  
And all were in the wrong.

— Blind Men and the Elephant, by John Godfrey Saxe

## **7. The Credit Crisis**

The CDO market prior to the credit crisis provides a stark example of the Law of Risk and Light. A group of market participants was clearly operating under a One-Eye view of risk that was focused on volatility and specifically implied volatility with no regard whatsoever for ruin risk. It effectively drove any One-Eye market participants with a ruin focus and any with a Two-Eye market and ruin and all Multidimensional participants completely out of the market. The ruin risk that they were not looking at was in the dark, and as we all now see, it grew and grew and grew. The ruin risk grew as the CDO market came to include more and more subprime mortgages. It was obvious that ruin was not even a concern when the mortgage market participants stopped even trying to collect the information that would allow them to know the loan-to-value or coverage ratio for the mortgagees.

## 8. Solvency 2

The new European insurance prudential regulatory system requires all insurers to focus on their ruin risk. (It might seem that Basel 2 has the same effect, but there must be some definitional misunderstanding by either the bankers or their regulators about what the term “ruin” means.) The insurance markets in which European insurers participate may evidence shifts as described above for One-Eye (ruin)-focused market participants. It would also seem possible that European or other insurers who develop a Two-Eye risk view will be easily able to find opportunities that the vast majority of the One-Eye (ruin) market participants will not be able to discern. Under Solvency 2, since short-term ruin is the accepted definition of risk, that risk is in the light and firms will seek to shrink their exposure to that risk. Other risks that will not register as significant under Solvency 2 may end up in the dark and will therefore grow until they provide an unpleasant surprise.

Future discussion should look at the implications of large-scale shifts in risk views. It is quite possible that some portion of market disruptions can be explained by large scale shifts in risk views such as is likely to happen under Solvency 2.

## **9. Risk Heuristics**

Above it was noted that the One-Eye risk views might just be heuristics. Baumol (1976) suggests that in general business managers apply the law of diminishing returns to develop “good enough” decision-making heuristics. However, Thayer and Tybersky (1998) suggest that risk-related heuristics often fail to maximize results, or even to lead people in the correct direction. This is an important concern to be researched further. Risk heuristics may be more difficult to develop for the same reason that risk models are difficult to parameterize; namely that a very large number of observations are needed to understand lower frequency risks. Business managers need to rely on partial information and may be unwilling to keep revising their heuristics as new information presents itself since only rarely does an observation come along that flatly disproves their working heuristic.

## 10. Final Words

In classical microeconomics, it is suggested that markets are made because buyers and sellers have different utility functions. The person with the powerful car who resents its low fuel efficiency would be best selling to a person who values its acceleration capabilities. Neither person has a right or wrong view; they each just have different preferences. So it seems to be for risk. Some people have a risk view that emphasizes one aspect of risk, some emphasize another. As the discussion showed, markets are made by the interactions of the risk views of the buyers and sellers who come to a market.

However, it is also shown that some of these different views are in fact financially dangerous when those risk preferences involve only limited views of risk; much more dangerous than the unlikely situation that claimed the hiker at the outset of this discussion. The additional danger comes from the risks in the dark that will always grow until they generate large enough losses to demand attention.

## **Acknowledgements**

I have received much help and encouragement from Bill Panning, Max Rudolph, Alice Underwood, Neil Bodoff and Robin Ingram in the preparation of this paper. The final decision on what to do with their excellent advice is all my own.

## References

- Altman, E.I. 1983. *Corporate Financial Distress: A Complete Guide to Predicting, Avoiding and Dealing with Bankruptcy*. New York: John Wiley and Sons.
- Baumol, W.J., and Quandt, R.E. 1976. "Rules of Thumb and Optimally Imperfect Decisions." *Selected Economic Writings of William Baumol*.
- Black, F., and Scholes, M. 1981. "The Pricing of Options and Corporate Liabilities." *Journal of Political Economy* 81: 637–654.
- CRO Forum. 2008. "Market Value of Liabilities for Insurance Firms."
- Kahneman, D., and Tversky, A. 1979. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica* 47: 263–291.
- Kozik, T.J., and Larson, A.M. 2001. "The N-Moment Insurance CAPM." *Proceedings of the Casualty Actuarial Society*.
- Mango, D.F. 2005. "Insurance Capital as a Shared Asset." *ASTIN Bulletin*.
- Markowitz, H.M. 1952. "Portfolio Selection." *Journal of Finance* 7: 77–91.
- Miccolis, R.S. 1977. "On the Theory of Increased Limits and Excess of Loss Pricing." *Proceedings of the Casualty Actuarial Society*.
- Sharp, W.F. 1964. "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk." *Journal of Finance* 19: 425–442.
- Taleb, N.N. 2001. *Fooled By Randomness*.
- Thompson, M., Ellis, R., and Wildavsky, A. 1990. *Cultural Theory*.
- Tversky, A., and Kahneman, D. 1992. "Advances in Prospect Theory: Cumulative Representation of Uncertainty." *Journal of Risk and Uncertainty* 5: 297–323.
- Tversky, A., and Wakker, P. 1995. "Risk Attitudes and Decision Weights." *Econometrica* 63(6): 1255–1280.
- Wang, S.S. 2000. "A Class of Distortion Operators for Pricing Financial and Insurance Risks." *Actuarial Research Clearing House*.

David Ingram, CERA, FRM, PRM, is senior vice president at Willis Re in New York. He can be reached at [Dave.Ingram@willis.com](mailto:Dave.Ingram@willis.com).