

II. Nature of Risk

Chapter 2. Uncertainties, Choices, & Catalysts

The word “risk” derives from the early Italian “risicare”, which means to “dare”.

... The actions we dare to take, which depends on how free we are to make choices, are what the story of risk is all about.

- Peter Bernstein Against The Gods¹

Key Points

- Quantitatively deduct or intuitively feel?
- Hindsight doesn't tell the full risk story
- Play the odds carefully
- Who do you trust?

Life is a risk! That is a gamble worth taking; but consider both the upside and downside scenarios. Perceptions decide if risk is judged passively as a fate to be accepted or actively as a choice to be pursued. In either case, changes cause risks to happen in life. They may be measured by calculating patterns of past events and used with deductive logic to make decisions. Risks may also be subjectively experienced with inductive reasoning that a key piece of a puzzle is missing and it is time to find it. Risk that is logically assessed through quantitative precision differs from risk that is intuitively felt. Recognize that risks have time varying dimensions. Carefully, the nature of common life risks will be explained and enlarged into illustrations of the nature of investment risks.

Common Life Risks

Tom is a big friendly guy, who liked to rough house with the boys, while growing up. It was fun to lift weights, get strong, and be liked by class mates as a quick offensive lineman on the high school and college gridiron. Yet football is a risky game. In his final college season, he got out of position down field and was clipped from behind by a defensive linebacker. The back of his right knee twisted and severely popped out of place as a sea of humanity fell on him. It was his second serious right knee injury. His football days were over. That is the nature of risk in a contact sport. Most likely Tom didn't calculate or even feel the risk while recovering from the first injury. The injury impact was a non-recoverable hobbled knee.

Jim liked to drive up to his parent's mountain cabin on Friday nights in the late autumn and go

hunting. He was familiar with the road, which sometimes got icy at that time of year. He slowed down, as he approached a blind curve, but Jim startled a deer on the road as he turned the corner. He couldn't stop the SUV quick enough, hit and killed the deer, and damaged the SUV hood and front side. He was not hurt, was able to use his cell phone to find help, and took care of the damages and related responsibilities. Driving on the icy country road was risky. Yet, he was reasonably prepared, handled the consequences of the unexpected event, and in a sense was lucky that the outcome was not worse.

Times change and risks change. Jim told his dad about the accident. In response, his dad reminded Jim about his great, great grand uncle, Jacob. A little over 100 years ago, Jacob was riding his horse on the same country road, prior to it being paved. As he came around that blind curve on a Thanksgiving Day, Jacob was buried by an avalanche. He and his horse could not dig out and he died exposed to the environment. The lack of vehicle protection or a cell phone, and simply different conditions changed the nature of risk to high impact and non recoverable. Jacob was unlucky. The consequences were fatal.

Fate or Choices ?

Risk is only fate for those, who neither have nor sense a capacity to respond to conditions. Tom was in the wrong position in a chosen risky game. Jim had the capacity to recover from an unexpected occurrence, while Jacob did not. The tools for understanding and reducing risks have improved a lot over time. Hurricane weather forecasting has progressed substantially in the past 100 years. Potential personal and property damages can be minimized by responding to risk warnings. Many types of data concerning environmental events, individual specific transactions, or market transactions can be interpreted into meaningful information. The information and related risks can be estimated. Good choices can be made.

Hindsight is not enough.

Risk estimation based on hindsight should use inductive as well as deductive reasoning. Identifying the primary risk factors of a potential event may be difficult or even unlikely. Consider that a large home development may be built on the interior plains of a land mass. Records show a flood took place 50 years ago and damaged 25% of the homes in an older development 2 miles away. However, an

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earthquake rumble was never recorded within 50 miles. The homeowners don't know there may be an earthquake risk. A few property holders purchase flood insurance, but none buy earthquake insurance. Then a major earthquake hits with the epicenter one mile from the homes and structurally damages 10% of them. Earlier records did not detect the earthquake risk. Hindsight was not good enough; no one was covered with the needed earthquake risk compensation insurance.

Dynamic Human Factor Risks

Estimating risk based on past human decisions (transactions) is more difficult than on natural environment events. The need for an adequate sample size to get a complete picture is similar, but establishing the key incentives and motives of human beings is more multifaceted. Investors may study the August 31, 1929 (DJI 381) through July 8, 1932 (DJI 41) 90% stock market crash in order to avoid similar losses. However, a good insight into risks includes understanding fundamental macroeconomic imbalances, as well as government policy processes and decisions to mitigate the issues (risks). In other words, the U.S. Treasury Department and Federal Reserve Board (and Securities & Exchange Commission created by the SEC Act of 1934) leaders are appointed by the President, approved by Congress, and implement vital policy decisions. Their decisions change dynamic economic imbalance factors and the risks. If you trust their judgment, then you may choose to view changing fundamental risks with a degree of assurance. But if you are insecure, then you may avoid stock market or other risks altogether. Total investment risks are even more complex. Businesses not only make fundamental decisions that affect profits, but investors make stock buy and sell decisions based on earnings, asset, and liquidity issues that impact market prices. If the mood of investors is fearful, that may persuade you to be cautious and take on market risk incrementally.

Hindsight is not 20/20

Identifying the key past risks connected to a possible decision may still not be good enough. Hindsight involves painting a picture around a past event. The picture may be missing something. A common investment saying is "Low interest rates are good for stocks". The notion is simple. Low interest rates generally result in lower corporate or individual finance charges. However, there are often other risk

factors, such as competition, taxes, regulations, and unintended action consequences, which impact corporate expected earnings and fundamental valuations, more than finance expenses. Most importantly, the demand (buyers) for stocks may generally be lower than the supply (sellers). Just because interest rates were at very low levels in 2003 and 2004 and stock prices rose, does not mean that future falling interest rates will yield the same appreciating stock outcome. Better hindsight involves both more effort; perhaps a one hundred year interest rate to stock price relationship analysis; as well as added factors analysis.

A wrong or less critical risk factor may be associated with a past event. When a prestigious hedge fund (Long Term Capital Management) failed at the end of September, 1998 after a series of complex, highly leveraged trades, many observers learned that complex trades are risky and did not move in the expected patterns. This was not the most important lesson. Excessive leverage makes any scheme unstable. The Government Supported Enterprises Fannie Mae and Freddie Mac were too leveraged for ten years prior to their bailout and American society was too leveraged with debt prior to the 2008 housing market downturn.

Unknown Risks – An Example of a Swamp

Some risks are currently unknown to anyone. Since they are unknown, the impacts of the risks are also unknown. They are rare in continually progressing society or else they would already be identified. Some risks are partially conceptualized, but not well articulated. Prior to the tragedy of the September 11, 2001 terrorist attack on the New York City World Trade Center and Washington, D.C. Pentagon the idea of hijacking large fully fueled commercial airliners, flying them into landmarks of free society, and killing thousands of innocent people was an unknown risk. The concept of hijacking airliners at take off and turning them into vehicles of tremendous destruction was not thoroughly stated as a risk, although in hindsight many pieces of the puzzle were obtainable. The dots of the risk were not connected.

Unknown risks are sometimes categorized as Acts of God along with known risks, such as wars or force majeure, which are considered too large to plan for or insure against. They usually turn up in frontier areas, which have not been thoroughly analyzed. Explorations at the bottom

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of oceans or the limits of space travel accessible with current technology vehicles may uncover risks in the previously not surveyed environments. The frontier processes may be indirectly observed in space or with limited experiments on earth, such as nuclear fusion. As the materials to contain and sustain the high temperature processes is developed, other presently unknown fusion risks will likely be found. New investment products that are not fully analyzed prior to quickly expanded usage also demonstrate unknown risks.

The credit default swap (CDS) over-the-counter private market for buying and selling security value guarantees is a good example of a new unknown investment product risk. After trading for about 4 years, FRB Chairman Greenspan, Treasury Secretary Rubin, and SEC Chairman Levitt met in the Presidents Working Group on Financial Markets in 1998 with Commodity Futures Trading Commission head Born and others to discuss the growth of the unregulated CDS transactions and other issues. For reasons not completely clear the group of expectedly the brightest and best, ignored Ms. Born's warning of investment risk due to the fast growing CDS product that did not trade on a clearly visible clearinghouse exchange. There were many missed opportunities to recognize unknown impact risk over the following 10 years. Unfortunately, after 16 years this market grew to nearly \$80T (i.e. \$80,000,000,000,000 notional value) without Congress and Agencies, that reported to the President, requiring standard clearinghouse visibility. Grant it that regulating international products is complex. But the CDS market was a new product frontier with unknown leverage and counterparty risks. When the Lehman Bros. bankruptcy and AIG bailout effectively tore it apart, the risks became visible and known. The massive financial leverage bubble abruptly was popped and many speculative bets were quickly paid off or contingent bankruptcies occurred. To paraphrase Warren Buffett, when the water was drained from the CDS swamp, all the players swimming naked were unceremoniously exposed.

Complex risks often include coincident factors that mislead people into a false sense of understanding and security. If there is more than one independent risk factor influencing a decision, it is normal to focus on the easiest to grasp and analyze factor. That is often a deficient approach. The market place of decision

makers usually analyzes the easier factor as well as I do. That is a natural shortcut. The situation or asset evaluation already reflects the obvious. The more difficult coincident factor is tougher to get a handle on. It often provides the more valuable insight because it is the primary risk on which the easier to recognize risk was temporarily riding along with.

Trendy Shoppers

Clothing & Apparel retailers often reveal inconsistent clues about potential longer term investment profitability. Young shoppers are notoriously trend oriented. It is easy to walk through the mall, see bright upbeat stores and crowds of shoppers, as well as a big jump in recent quarter sales. Following shopper trends is risky and may not indicate store net profit margins or cash flows for expansion. The coincident trends of margins, sustainable new store openings, and inventory controls may give a better idea of sustainable growth and long term risks. The current trend is a high risk factor. The coincident operating and expansion risks present better insights into a retailer's ability to survive recession and change of style risks. Scenario analysis is used to line up the risks and estimate their natures and impacts.

The Catalyst – The Big Hit or Last Degree

Conditions change. Catalysts break through thresholds. Meteorites are good examples of game changers. A group of archeologists determined that over 250M years ago about a six mile diameter meteorite hit near what is now the northwest coast of Australia and extinguished an estimated 70% of the land species. A mere 65M years ago, a similar size meteorite is believed to have caused the consequential Yucatan peninsula crater. It is assessed to be the catalyst that demarcated the Permian dinosaur and Triassic periods. Meteorites and volcanoes are the big catalysts for changing life forms and survival risks on earth.

On a more tangible note, changes of state between liquids and gases occur at the boiling point. Water is a simple common example. At sea level, the water BP is about 212 deg. F. But as the surrounding pressure decreases, the boiling temperature decreases. At Mt. Everest, the BP is about 146 deg. F. The change of state takes place due to a catalyst raising the temperature to the BP and the environmental pressure. The change of state risk for a molecule of water at sea level and 211 deg. F. is different

at the water to air surface than in the interior of the pot of water. There are also more mobility and different risks for floating around as a gas molecule in air above 212 deg. F. The temperature at the specified conditions coincides with catalyst that changes the risk characteristics.

Human Catalysts

In everyday ventures changing methods or processes are catalysts that bring out new sets of risks. That is why new executive managers and their strategic plan introductions are carefully considered by financial analysts. Bold innovative strategies entail new risks, which must be identified and evaluated with suitable controls. Similarly a versatile quarterback is normally the necessary ingredient to propel a good team into a Super Bowl contender. His audible call against an out of position defense or high risk high gain end around option pass play may lead to a victory in the crucial game. In either case, they are the catalyst and earn the big bucks for investors and gamblers, if they are successful.

Extrapolating Risks and Returns – Bad Idea

Catalysts for a changed state represent state risks in addition to new condition risks. During an ongoing performing enterprise state, risks are often linearly extrapolated. If corporate revenues are increasing 5% per year and earnings are increasing 8% annually, a shareholder can easily (but perilously) expect an annual 8% growth rate to continue for 5 or 10 years. A simple warning may be that a flat growth rate is expected if a recession occurs. Yet the problem with extrapolating is that catalysts cause inflection points (different trajectory of scenarios) or blow outs (no ongoing enterprise value). The recession catalyst (sharp fall in demand) may completely change enterprise operation risks. An AAA rated business like General Electric may have vast financial operations that can not be fully immunized from a catalyst such as the 2008 credit crisis.

Investors extrapolate because that is simple. Conversely, some professionals use independent risk element matrices of catalysts, as their portfolio risk controls, in addition to specific asset risk reviews. An increase in interest rate spread between Treasury bonds and corporate bonds may be a catalyst. The portfolio weight of equities that have been in business less than 3 years may be another warning risk factor. Generally, the risks noted in mutual funds

prospectuses or Management Discussion & Analysis in SEC financial statement (10K, 10Q, etc.) submittals are a good place to look for specific asset risks. But, catalyst risks usually must be spotted by independent risk analyses, which will be reviewed in later discussions. Remember, company prospectuses and financial reports follow strict rules for their discussions and paradoxically companies take legal risks in giving non required risk information.

Playing with the Odds – Expressing Risk

Risks are often calculated using historical data and setting a probability for a future event. This statistical process frequently gives a poor estimate of risk probabilities. A very large sample of well known events may lead to a normal distribution of a data set, as shown in Fig. 2.1. That is a linear continuous data set. The key statistics are the expected value (mean), the volatility (standard deviation (S.D.)) of the distribution, and sample size. The mean value is expected to occur most often. It is in the middle of the graph at a return value of 10%. In a normal distribution, 68% of the samples occur within +/- 1 S.D. of the mean; i.e. 34% in each S.D. adjacent to the mean. The 2nd S.D.'s to the right and left of the 1st S.D.'s each hold about 13.7% of the samples. For risk estimations, the possible events outlying +/- 2nd S.D.'s are called tail events. The 4.6% tail events in normal distributions and more tail events in some abnormal fat tail distributions are where the critical risks lie. In the normal distribution, a -3rd S.D. event is expected about 2.3% of the samples and using Figure 2.1 the value would be between -10% and -20%.

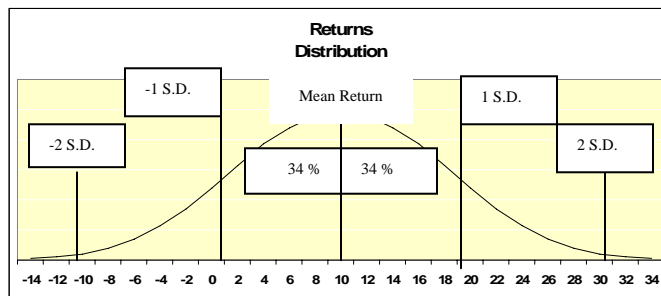


Fig. 2.1 Normal Return/Risk Data Distribution

There is No Normal Risk

An example of what really happens relates to Fig. 2.1, which is an approximate S&P 500 total nominal returns distribution between 1926 and

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2007. Note, a -5th S.D. event or a return between -40% and -50% is expected about 3 out of 100,000 events. In fact, the 1931 S&P 500 nominal return according to Crestmont Research² was -47%. One event out of 82 samples was not expected that far out on the tail. Alternatively, the 1932 S&P 500 recovery 39% return was near the +3rd S.D. marker, which is expected to occur about 1.35 out of 1,000 samples. It is the impact of outliers, especially on the downside, that is critical. In the example, the compounded -47% (1931) and +39% (1932) returns is -26% (.53 X 1.39) and not -8% (-47 + 39). Look at limited sample size distributions very skeptically. Fat tail distributions depict the nature of risk better than normal return/risk distributions. Yet it is most important to understand fundamental factors.

Grimly, the far outlier data represents the high risk high impact condition that is not part of a past normal distribution data set.³ The highest risk condition usually represents a non-linearity or a systemic breakdown due to major catalysts. The meteorite changed the world for dinosaurs attempting to survive, just as the CDS market breakdown changed the world of highly leveraged Investment Bankers and related financial institutions scuffling to survive.

A somewhat technical risk clarification is Value At Risk; i.e. a maximum tolerable loss that could occur with a given probability within a given period of time. Since most thoughtful risk takers calculate an acceptable level of loss, it relates to their idea of the nature of risk. VaR is a market risk management tool most adaptable to assets such as domestic government bonds, which have a fairly simple set of risk factors. It focuses on the threshold or tolerable level of risk, but not the specific risk of loss beyond the threshold.

The key VaR issues are time period when risk of loss may occur, confidence level or probability of exceeding the loss threshold, and maximum tolerable loss based on a normal distribution. The calculations are complex and include such factors as interest rates and volatility. The point is not to review VaR calculations or applications. Instead, simply recognize that the nature of market risks are quantitatively expressed by sophisticated analysts, who still get overwhelmed when the above discussed distributions are exceeded. The so called fat tails and use of excessive leverage increase risk beyond normal expectation.

Who do you trust?

In human interactions, the game of life boils down to “*Who do you trust?*” The nature of risk is set by the persons and institutions chosen for relationships. Our parents and early life conditions may be considered fate; but, with the ability to reason comes the opportunity to choose and prepare for risks. More stable choices generally result in less risk. Yet life is complex; things change. Exploring the Iranian mountains, getting married, or making a mortgage loan contract involve different risks. The tour guide may leave you stranded and the rescuing authorities may question your foreigner motives. More importantly, for most people marriage is intended for life with a spouse, who is fully trusted. A loving trusting marriage decision results in many positive cognitive leverage benefits for life, while the poor marriage decision has high risk consequences. The mortgage contract involves counterparty risks. For economic decisions, those risks became very clear near the end of first decade of the 21st century. If the mortgagee stops making payments and leaves the property for whatever reason, the mortgage holder endures the consequences of a foreclosure sale at normally 20% to 30% below the principal value. The U.S. banking system includes various regulations and guarantees so that the failure of a bank and acquisition of assets by another bank or the U.S. government make counterparty risk of a mortgage holder demanding premature mortgage principal payment virtually non-existent. In investments and business, the counter party or one at the other end of the proverbial hand shake establishes the nature of risk.

If the counter party has the character and capacity to honor their end of the bargain and you have similar capacity and character, the most critical aspect of risk has been dealt with. Thorough research usually reduces the character risk. Long term records, growing activities, and independent reference checks are the nuts and bolts leg work needed to determine character. Capacity at times can be harder to determine. In good times, we tend to get overconfident and linearly extrapolate continued easy progress. Those good times however usually are based on some unsustainable leverage like Fannie Mae loaning more than 50 times its financial capital. The leverage may be stretching competent enterprise personnel too far or exceeding the capacity of the environment. In any case a bubble of supplied goods or services occurs and

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is burst due to some lack of capacity. In larger impersonal markets, it is simple to focus on economic terms such as interest rate risk, credit risk, liquidity risk, industry risk, currency risk, and you get the idea. But it is a little harder to judge if the U.S. Treasury Secretary, FRB Chairman, Corporate CEO, home remodel contractor, broker, or car repairman has the character and capacity to honor their responsibilities. It is even harder to foresee the catalyst, which leaves counter party capacity inadequate.

Understand Risk: A Thinking Man's Game

The complexity of the nature of risk has been discussed. The following chapters will review the evolution of risk with the advancements of human beings and the risks that we create for ourselves simply due to the way we think. Understanding risk requires a great deal of effort, which is worth the endeavor. The focus of wealth development should be first on preserving resources in order to grow them sustainably, in contrast to growing resources first and managing risk as an after thought. The former will tend to keep us out of trouble, while the later will often leave us vulnerable to losing everything, when the rules of the game inevitably change and get us into trouble.

¹Bernstein, Peter L. *Against The Gods The Remarkable Story Of Risk*, 1996

²Mauldin, John *Bull's Eye Investing*, 2004

³Taleb, Nassim *The Black Swan The Impact of the Highly Improbable*, 2007