

Lifetime Wealth Guide
A Resource for Managing Personal Financial Risks

II. Nature of Risk

Chapter 3. Evolution of Homo Sapien and Risk
Taking
Survival, Risks, Luck, Control Tools

*He that would catch Fish,
must venture his Bait.*

- Benjamin Franklin **Wit and Wisdom**
from Poor Richard's Almanack¹

Benjamin Franklin had a timeless way of expressing the essence of risk taking. The rules of daring have advanced as the human species evolved. To realize a goal in a more complex world, one must choose to embark on uncertain, but planned, risky journeys. Broadly speaking, herein the increased sources of risks in evolving societies are first presented. Then the evolution of risk taking ideas, related measurement tools, and risk controls in recent centuries is reviewed. Purposeful risk taking is needed to earn long term wealth.

Surviving and risk taking meant a more difficult life experience for humans at the dawn of recorded history 15,000 years ago according to archeologists, than in the subsequent millennia. Educated guesses were made concerning the life of our pre recorded historic human species. Jared Diamond provides a thoughtful picture of the evolution of human societies². Building on his findings and inferences, an idea of evolving risks and risk taking for current society is developed. Most important are the insights about retained risk taking tendencies to this day.

Improved Food, Metals, and Tools - More risks with more productive leverage

Tools found crudely dating back 50,000 years offer an idea of human processes to shape bones and metals into devices and utensils that were useful for hunting a variety of fish, animals, and fowls. Shapes and sizes of human brains provide an idea of Homo Sapiens' capacity to think, recognize risk, and take risks over time.

Hunting for dangerous beasts gave initial clues about risk taking for higher protein food to survive inclement periods, in contrast to eating seasonal wild berries and grains. Expeditions also provided opportunities for young males to take visible risks to attract the attention of potential female mates in nomadic roving societies. Bringing back the meat for feasts as well as attracting a mate for procreation of children improved the chances for a nomadic band's survival. Risk taking was commonly instinctive, unplanned, and short term focused.

The domestication of crops and animals changed risks and encouraged new types of societal risk taking and risk avoidance (terrain insurance) anchored to the land. Defensible productive valleys, flowing rivers, stable temperate climates, and a hilltop to watch out for marauders proved valuable. Strategies grew based on harnessing and using technologies in food and shelter production, as well as in battling to protect property. Domesticated animal diseases conversely added new risks. Risk mitigation strategies were simple and battles were usually short. Battles ended when supplies were depleted and there were no more willing warriors.

The domestication of food and animals improved societal productivity and was a primary factor in the evolution of the size of stable societies. Naturally, the size of societies influenced the opportunities and risks to its members. Using Diamond's terms, which loosely relate to ancient writings, land anchored societies supported tribes of a few hundred people in a village, where the kin were directly joined in marriages of cousins. Decision making and conflict resolution were informal. The strongest, tallest, or wisest person likely rose to the leadership position without a bureaucracy or enforced tribe discipline. The first tribes apparently lived in the Fertile Crescent area of Eurasia, near Mesopotamia or current day Southern Iraq. The climate was temperate. It required limited shelter and clothing to insure against the risks of seasonal weather extremes. The adventurous tribes moved to new frontiers along the continuous land paths to present day Spain and Algeria in the west and China to the east. Famines and diseases were likely greater risks than changing seasons. Differing terrains presented periods of poor food yields and germ risks that trailblazers were unprepared for. From today's investor viewpoint, common risk taking tendencies among the tribesmen promoted calmness. On the other hand, uniform risk attitudes discouraged good independent decision making. Lack of savings and herd like crowd speculating into and out of popular investments of today's households relate to similar lack of food storage and poorly planned battle strategies weaknesses of yesterday's tribes.

The discovery of metals and processes to construct more effective tools for food and shelter, as well as weapons for protection and attack, added new dimensions of societal risks. When tribes or villages grouped together to defend their property, the rules of life changed. The union of several thousand people evolved into centralized government and bureaucracy for leadership, a monopoly of force, conflict

Lifetime Wealth Guide
A Resource for Managing Personal Financial Risks

resolution, and an army for defense or assault. Labor was divided based on skills. Exchanges of food, clothing, commodities, and services became standardized with primitive recorded agreements. Taxes to support the bureaucracy and defenders were levied. A class system and slavery evolved. When the leadership position was bestowed by inheritance, the government was effectively a kingdom. Organizational complexity added relationship risks concerning individual transactions, enforcement, warrior capacities to defend, and conflicts of leader interests not focused on promoting stable, flourishing kingdoms. The leverage of advanced craftsmen tools and warrior weapons improved the opportunities for secure, stable societies, but set up the risk of unexpected pillaging and enslavement if unprepared for an invasion by envious enemies. Warriors and merchants historically took the largest risks and their opportunities to acquire or develop wealth were also large. Modern day credit and other leverage risks relate to earlier period innovations.

Technology supported an important change in leverage that allowed societies to grow to the size of a city-state; that is over 50,000 people. The advantages of lighter weight, more flexible processed iron tools and weapons over bronze are well documented. Hence, over time and locations, the Stone Age evolved into the Bronze Age, and finally the Iron Age, beginning about the 10th Century B.C. As the states grew larger, the risks and opportunities grew. The economic imbalances or bubbles and therefore risks observed in Bronze Age societies had their origins in the Ur, Babylonian, Mosiac, Hittite, and Sumerian states. Future chapters will show that economic bubbles are a natural consequence of optimistic human behavior and poor societal leadership policies. The divisions of labor skills increased and internal conflicts were more formally resolved by judges interpreting codes of law. Layers of bureaucracy were added, as well as large scale slavery. Redistributive taxes were enforced in economic systems based on commodity weights to support the state. Religions were used to control the lower classes. The city states included the opportunities for upper class bureaucrats to plan community development projects, store critical goods, and entertain or educate the king and his court. The new risks of larger societies were periodic scarcities of critical commodities, such as food and metals, as well as restless reactions of masses of inhabitants fearful of scarcities. Peaceful trade missions or invasions of neighboring societies for food and control of their coveted mines were at times carried out. Trade for needed goods by adventuresome men was encouraged through

compensation for business risks with basic catastrophe payments for failed trade missions based most likely on the Babylonian Code of Hammurabi.

Traveling the Trade Routes - Risks and Opportunities

Knowledge and commerce flourished in a normally peaceful manner over the historic trade routes that set a foundation for mercantile risk taking and complimented city states. The long distance land Eurasian routes sprouted up along with village road way ports and inns, which levied fees for services (or protection). High valued light weight items such as incense, silk, spices, and amber were transported using the most suitable animals. Maritime trade routes also started initially across the Indian Ocean with crude ships. Advantages included larger more economic loads of goods and favorable trade winds at different seasons. The concepts of risk reduction through travel diversification and insurance (bottomry loans to finance a voyage with repayment upon a safe return were first found in the Code of Hammurabi) started to be well documented by the early Romans in the 3rd Century B.C. They also did business with the Egyptians and Indians using their superior ships to travel from the Mediterranean Sea, through the Red Sea, and across the Indian Ocean. Business risks were not actually calculated using early accounting system. Yet, information about various technologies, moral codes, and religion spread along the profitable routes. Intriguing stories were most likely told by the young adventurers, who transported their goods along the Incense, Silk, and Spice routes. The high risks of traveling sellers along various routes into different (unknown) lands with new languages, customs, and currencies were probably similar to their kindred spirits - today's developed country entrepreneurial businessmen or private equity investors venturing to emerging and frontier nations in search of opportunities. The instinctive drive to take high risks to sell innovative goods into new markets with limited plans has not changed over time. Nevertheless, today's entrepreneur has various resources developed over the past three centuries to identify, quantify, and control risks.

Measuring – A Basis for Quantifying Risk

Hindu and Persian records around 800 A.D. first noted the Arabic numeral system, which used 10 symbols, including the significant 0 place holder and decimal point. This numeric system, which is used for most current commerce, offered the benefit of a defined no value state, as well as simplifying calculations over the Roman numeral and other cumbersome Asian accounting systems. This is a major concept. Consider the impact of forecasting

Lifetime Wealth Guide
A Resource for Managing Personal Financial Risks

full depletion (0) of resources – water, food, or shelter inventories. Risks could thus be cognitively considered. Various scientific notations and functions, such as logarithms developed during the late middle ages, added other special characteristic benefits to the use of the Arabic numeral system. Order of magnitude notations let the thinker quickly see if he was in the range of a specific goal.

In addition to a compact numbering system, risk measurement had to conveniently record that a particular party owed a specified amount to another party. A system to measure on-going probabilities was needed to get to the verge of calculating risks. Paccioli addressed the challenges of the merchants of Venice trying efficiently to account business status as well as the European playboys dreaming of gambling fortunes in a comprehensive master work, *Summa de arithmetica, geometria, et portionalita*, in 1494. For the businessmen, the double entry accounting system was a fully documented system. The journal entries listed the transaction, the creditor, and debtor in 2 accounts, hence the term double entry. Therefore, the bookkeeper could clearly post, who owed what to whom on both sides of the transaction. For the gambler, he posed the question “How should the stakes of an uncompleted game be divided?” The question was known as the “problem of the points”³. Asking this probability question provided a focus on the risk and opportunity; that is the expectation of what should happen if the game (any endeavor) resumes.

Pascal’s Insight

The “problem of the points” in an ongoing series of events is straightforward for today’s risk taker in various sports gambling bets. Pascal solved this question in the mid 17th century. An example is a 5 game preliminary round of a championship series. Each game is either won or lost. There are a maximum of $2 \times 2 \times 2 \times 2 \times 2 = 32$ possible outcomes. If one team loses the first game, what is its probability of winning 3 of the remaining possible games and winning the series bet? The answer is $(1+4)/16 = 31.25\%$. Similarly, the competitor, insurance company, or gambler knows how the calculated risks have changed after the outcome of one event.

Pascal, who was a spiritual fellow, was also focused on the consequences of risks, where the outcome is unknown. In that case, the risk is not calculable and reason will not give an answer. Hence, we have *Pascal’s Wager*. It is the historical starting point for ethical risk and decision making. His wager states: God is, or he is not. Which way should we be

inclined? The presumption is that if God is, then there is a possibility of salvation after death for a virtuous life and damnation for an evil life. The probability for the unknown is 50/50. If he bet that God does not exist and he lived an evil life, there are no after death consequences if God does not exist. However, there are serious consequences if God exists. On the other hand, if he bets that God does exist and lives a virtuous life, he was not worse off if God does not exist. Based on the consequences of the risk concerning unknown possibilities, the answer was clear to Pascal.

Statistical Sampling

Peter Bernstein also described the contribution of statistics to the evolution of understanding risk⁴. John Graunt was a 17th century British businessman, who retired and pursued his interest in the birth and death rate of London from 1604 to 1661 and published *Natural and Political Observations made upon the Bills of Mortality*. The book was significant in using sampling methods, calculating probabilities, supporting future risk management methods, and computing accurate insurance actuarial tables. Graunt attracted the attention of the renowned scientists, Sir Isaac Newton and Sir Edmund Halley. Halley’s detailed analysis of Graunt’s data resulted in *Transactions*, a calculation of expected life spans of individuals at different ages used by the governments and life insurance companies to accurately calculate risks in offering annuity contracts. This was an important 17th century contribution to probability theory and risk management.

Diversification

Merchants in the main European trading centers; Amsterdam, Frankfurt, Lyons, and Venice; during the middle ages continually dealt with the risks of getting paid in acceptable currency, not losing everything in a large failed venture, and critically remaining profitable. Bills of exchange reduced currency risk through a form of money portability. The expanded use of project insurance transferred the risk of failure cost under specified conditions. However, the idea of growing a trading company to a critical size meant maintaining multiple ongoing projects, so that the stream of many independent diverse efforts would lead to a steady flow of profits. To this day, diversification of independent yielding assets is considered a free lunch, because it reduces the impact of one catastrophic failure and overall total company portfolio risk.

The Petersburg Paradox

*Utility resulting from any small increase in wealth
will be inversely proportionate to the quantity of
good previously owned”*
- Daniel Bernoulli, 1730

Peter Bernstein noted how the idea of subjectivity or personal utility evolved into the idea of risk, which entails more than a universal calculated concept⁵. He based the finding on the thesis of Daniel Bernoulli, while teaching at the University of St. Petersburg. Bernoulli lived in a very rational world near the height of the Renaissance Enlightenment period. Probabilities were being calculated for various scenarios with different impacts for each outcome. An expected value could then be calculated for the set of scenarios. Bernoulli's thesis pointed out that the outcome was still not a sure thing and that choosing the unsure endeavor depended on its subjective utility to the decision maker. Generally, a wealthy man has less desire for a particular expected profit than a less wealthy man. The decision is not as precise as Bernoulli's thesis, but it presented the subjective nature of risk taking for the first time. Other factors include the entrepreneurial nature and human capital of a person. Some entrepreneurs will take a 50/50 bet, even if the expected value of the winning bet equals the losing bet (that is zero expected value.) Most people want the expected value to be positive or they feel “why take the effort for an even money chance to lose”. The young man may also take the zero expected value bet, because he has plenty of human capital. That is the chance for future earnings that are much greater than the possible amount of loss from a losing bet. The foundation for behavioral finance was laid in the notion that individuals take different levels of subjective risk.

Diversification – Twentieth Century Style

Harry Markowitz in his 1952 thesis paper *Portfolio Selection* took the diversification idea of the 18th century trading merchants and gave it the theoretical foundation for passive “non controlling interest” investment asset holders. For each asset, stock, bond, commodity, etc. three data items – expected return, volatility (bouncing around of past asset returns), and correlation (relationship of each asset return to all other asset returns) of returns – are needed. The asset data items are used with the weights or proportions specified for each asset to construct a portfolio with its overall expected return and volatility. Combinations of asset weights are used to calculate portfolio expected returns and volatility. Hence, a curve is formed in graphical two dimensional - return per unit of risk (volatility) -

space. The part of the curve, where added returns are rewarded for added risk (lower returns are received for lower risk), is called the efficient frontier. Underlying conditions change and asset data changes over time so that the portfolio asset return/risk relationships change. Therefore, the concept is not a “Holy Grail” for buying and holding assets forever. The return/risk relationship curve, diversification, and their limitations will be studied and graphically depicted further in a future risk strategies chapter.

The concept of portfolio diversification is as close to a “free lunch” as is possible in the world of the merchants of Venice or portfolio managers of New York City. It relies on the fact that assets behave somewhat independently. If a person owned 5 shares of Google stock, then each share of Google stock could be sold at the same price at the same time, assuming an interested buyer of the 5 shares. The price for each share would change about the same (dependently together) over time. However, if a person owned a share of Google stock and one 10 year Treasury bond, each asset has a different market of potential buyers and sellers. The asset prices usually move independently over time. The amount of asset price independence influences the amount of asset correlations, total portfolio volatility, and thus the potential free lunch of reduced volatility.

Investment Behavior – Beliefs Influence One's Risk Taking Capacity!

Psychologists Daniel Kahneman and Amos Tversky summarized their observations concerning individual personal risks and uncertain outcomes in their 1990 paper *Prospect Theory*. They developed Bernoulli's idea of subjective behaviors through numerous individual experiments. Others built on their findings to further build the important subjective field of behavioral finance. Prospects for an outcome are viewed asymmetrically. People will normally try to hold on and breakeven on a bet or investment decision more so than take an investment profit and walk away. Most people hold the loser and sell the winner. The tendency to want to break even (not admit a mistake) instead of taking a loss is stronger than the inclination to sell a winner and take a gain. Overconfidence is a critical emotional behavior issue today. Our ancestor's confidence (possible overconfidence) helped them survive, while responding to stress. In today's complex environment, the reinforcement of various educational and psychiatric self esteem agents encourage everyone to feel that they are above average in most ventures. The overconfidence in a world that supports unreasonable investment and credit leverage (risk taking) causes unexpected,

Lifetime Wealth Guide
A Resource for Managing Personal Financial Risks

unnecessary losses. Kahneman, Tversky, and associates experimented similarly to the University of Chicago economists. They discovered behavior belief patterns that helped to explain seemingly irrational investment behavior.

Chapter 4 analyzes individual negative and positive behaviors in relationship to investing. The behaviors must first be recognized, because they are often unique risks in the personal analysis and decision making process. Human beings are not rational robots and behaviors change with circumstances and time. Complex, independent thresholds for risk tolerance exist in human beings.

Today's Risk Taking Gone Too Far – Side Bets

The apparent progress in defining risks can also get ahead of understanding, when new risky product usage runs ahead of an established theory. Side bets characterize most derivative trades. In the name of liquid, efficient markets, many traders play in the pits of futures, options, and swaps. Emotions run high. When borrowed money is cheap, various trades seem to make sense. Seemingly conservative strategies are leveraged up 5 times with low cost (interest rate) money. As many hedge funds and traders use the same strategy it becomes less profitable and then more leverage is used. The problem occurs if the trades are not visible and recorded on a regulated exchange. Ultimately the excess trading itself becomes a bubble, where no one knows who owes what to whom. The fuse for an explosion is lit. A drop in asset prices (remember home prices) that are expected to remain within a threshold starts the chain of events. As previously mentioned, the over-the-counter non-clearinghouse CDS market was a prime example of an unstable side bet market doomed to eventually explode. Investors didn't like unexpected losses and redeemed their shares in hedge funds using CDS derivatives. The funds sold their most liquid assets to meet either redemption or margin calls for cash. Suddenly deleveraging or reduced overall liquidity occurs in a few weeks timeframe. It thus causes related asset prices to fall. As counterparties fail, players don't know who has the capacity to honor their obligations. The moral of the story is to understand the risk. Otherwise, stay away. And regulators should set visibility and trading threshold rules (transparency) in order for knowledgeable players to understand the risks of the game.

What Does Luck Have To Do With It?

The idea of luck meant fate historically, as mentioned in the Chapter 2 discussion of the nature of risk and its Italian definition. Luck and risk may or may not

be related. Luck is generally considered as uncertain and unpredictable. In an unpredictable world, many things can not be controlled. In other words, humans either don't have the capacity or knowledge to control the conditions and variables that result in outcomes. Theories do not include luck and physical sciences, such as chemistry, explain the outcome of controlled experiments in 100% of the attempts. Yet, risks can be assigned through probabilities that the experiment is setup correctly. Most human relationships involve the social sciences, such as economics, sociology, psychology, and political science. In human relationships, both luck and risk occurs. The behaviors of humans in response to economic incentives, psychological needs, and complex relationships add a luck factor to forecasting outcomes.

A useful economic distinction between luck and uncertainty is presented by Frank Knight⁶. He clearly defined luck to involve random outcomes and uncertain conditions, in contrast to defining risk as random outcomes and probabilistically defined conditions. In Knight's view, risk is rational and can be quantified with a probability. The challenge is to interpret adequate data correctly so that valuable information results in a good probability function. Nassim Taleb⁷ would argue that defining risk of an expected outcome is very difficult and most people arrive at incorrect conclusions because their probability estimates are based on incomplete analyses and over confident assumptions. Taleb spends his time thinking about the least likely sides (tails) of the probability bet. He prefers to try to bet on the most risky outcome, if he feels the market based probabilities are too optimistic and the impacts are much higher than priced. He considers Knight's view of risk (random and quantifiable) more so than the fateful view of luck (random and uncertain).

In our current risky world, there are other areas where the concept of luck adds to an informative discussion. Most people focus on negative or bad luck. "The uncertain, random event just happened. It was a matter of being in the wrong place at the wrong time. If only one thing or another thing had occurred, then the good outcomes would have happened." The focus often is relative to the seemly better circumstances of others, instead of recognizing bad luck occurs to good individuals. The concentration on bad luck is not healthy. The past is gone and dwelling on possible future bad luck is also usually a mistake. The future includes many potential risks, which can be addressed, separately from bad luck. Owning property or capabilities includes risks, which can be minimized or transferred. Home and auto

Lifetime Wealth Guide
A Resource for Managing Personal Financial Risks

insurance transfer ownership damage or liability risks for a premium to an insurer. Disability and life insurance transfer loss of earnings risk as well. Bad investment risks can be minimized through many strategies, which will be discussed in future chapters.

Most people think about luck differently than Frank Knight. Playing the lottery involves random outcomes and probabilistically defined conditions (for those determined to learn the odds), which Knight defines as risk, but others consider a game of luck. For a thought experiment, consider the odds of winning the lottery prize is 1,000,000 to 1; i.e. 10^{-6} . If a lady had read Knight's book or not slept through his class, she would have an idea of high risks, in contrast to fateful luck. (Frank Knight taught at the University of Chicago, Graduate School of Economics.) Further, consider that after spending \$1,000 on 1,000 tickets over 10 years that she wins the \$1,000,000 jackpot. Does she ever bet again on the lottery? Remember the odds of winning the lottery twice in a row are $10^{-6} \times 10^{-6} = 10^{-12}$. The rare lady would recognize the uniqueness of beating the high risk odds, remain anonymous, never play the lottery again, and purchase a vacation condo in Hawaii.

What about good luck?

A novel thought is to consider good luck. Although it is random and may occur at an uncertain time, good luck is worth considering. John Calvin Coolidge, the 30th U.S. President had something to say about luck in a positive perspective.

*“If we can not control our environment,
We can control ourselves, and our destiny.
The man who is right makes his own luck.”*

Historians consider Coolidge an average president. I have an independent view. He was a humble, educated, principled man and the 1920's between the terms of President Harding and President Hoover was an era, when Americans used their Yankee ingenuity to prepare, and self-reliantly search for opportunity. Sometimes preparation met opportunity and good luck happened.

Another aspect of making good luck is given to us by the beloved American baseball hero, Lawrence Peter “Yogi” Berra, who played on 10 World Series champion New York Yankee teams, and had a way of saying things in a down to earth manner.

“You can learn a lot by just Watching”

Calvin and Yogi showed by their words and actions that good luck comes to those, who prepare for and hit the fat pitch, when the opportunities and probabilities happen to be in their favor.

Evolution of Risk Controls

Why was “putting a man on the moon” important? Complex risk identification tools were needed, inter-related feedback loops were used to keep systems within critical ranges, and after the identified risks were controlled, the no-nonsense smartest guys and gals available had to be ready to possibly use their resources in clever ways to overcome the unexpected scenario. High accuracy systems are needed to bring very difficult missions within range of the goal and good luck is needed avoid the unknown potential bad factor. High risk achievements are inspirational!

Investment risk control systems must be responsive to individual risk tolerances. Proximate goals (next year's college tuition) require lower risk tolerances. Longer term goals (retirement spending) may be able to adjust with moderate risk tolerances. Some risks may be transferred through insurance premiums and annuity purchases (after due diligence confirms that the insurer is long term solvent and liquid). Scenario analyses, a greater understanding of behavior biases, and an appreciation of potential bad luck are needed to take on risk and attempt to achieve goals. Multiple, informed, independent bets should be made, otherwise known as portfolio asset diversification. Similarly, cash flow (spending) budgets are necessary to plan and match related asset payout time diversification (asset/liability matching). Many aspects of risk identification, measurement, and controls will be analyzed in future chapters. We have more sophisticated risk controls today in a far more complex, comfortable world than the cave man!

¹ Franklin, Benjamin *Wit and Wisdom from Poor Richard's Almanack*, 1758

² Diamond, Jared *Guns, Germs, and Steel*, 2005

³ Bernstein, Peter *Against The Gods, The Remarkable Story of Risk*, 1996

⁴Ibid 3, Pg. 57

⁵Ibid 3, Pg. 102

⁶Knight, Frank *Risk, Uncertainty, and Profit*, 1921

⁷Taleb, Nassim *Fooled By Randomness*, 2007