

## VI. Risk Aware Decision Making

### Chapter 12. DIVERSIFICATION

*“My ventures are not in one bottom trusted,  
Nor to one place; nor is my whole estate  
Upon the fortune of this present year:  
Therefore, my merchandise makes me not sad.”*  
Merchant of Venice  
- William Shakespeare

*“Since diversification reduces the risk of an entire  
portfolio being diminished by a single investment's loss,  
it is referred to as the only free lunch in finance.”*  
An Introduction to Investment Theory  
- William Goetzmann<sup>1</sup>

*Avoid Diworseifications*  
*The dedicated diworseifier seeks out merchandise that is*  
*(1) overpriced, and (2) completely beyond his or*  
*her realm of understanding”*  
One Up On Wall Street  
- Peter Lynch<sup>2</sup>

#### Key Points

- Misunderstood multi-dimensional concept
- Returns, costs, cash flows, liquidity, location
- Unstable risk or unknown uncertainty?
- Scenarios change diversification value

#### Overview

Diversification is a big word (15 letters) and a critical wealth concept that means different things to different people. It is the single concept that merits a full chapter and three quotes from dissimilar points of view.

To the imminent philosopher and poet, Shakespeare, *The Merchant of Venice* with its clever character roles, wealth diversification considered relationships, locations, and time. In the end, Antonio qualitatively understood the concept of reducing risk and being at ease by not putting all his eggs in one basket.

From the Yale finance professor, William Goetzmann, we learn the classical quantitative concept of diversification being “the only free lunch in finance”. Based on asset returns, stable volatilities, and correlations in Harry Markowitz’s Modern Portfolio Theory, diversification can lead to an optimum mix of assets.

And then the practical, successful Fidelity Magellan portfolio manager, Peter Lynch, noted that diversifying portfolios of assets without understanding their conceptual weaknesses leads to “diworsification”.

Diversification is a useful concept for attempting to smooth out wealth return variations from one year to the next. The idea is powerful when the objective is to match the availability of wealth cash outflows (distributions) to the need for cash inflows (spending). Some factors, such as costs and desired spending rates, are certain. Other factors, such as the range of future fundamental performance and asset market returns, contain variable risks. Conceptually new and untested assets, like leveraged financial derivative products, may include unknown illiquidity, insolvency, and bankruptcy possibilities. Probabilistic risks and unknown uncertainties should be considered in the portfolio optimization or diversification process.

#### Why should you consider diversifying?

A good deal of effort is needed to diversify. Before asking “why should I diversify?” it is good to understand what diversification is about. The purpose of diversification is to reduce risk in various dimensions. Smoothing out portfolio returns from one year to the next is the most noted purpose. That is why an investment portfolio may include some relatively risk-free Treasury securities and some risky, but possibly higher return, equity securities. The total annual returns of a mixed asset portfolio should be more stable than an all-equity portfolio.

The multi-dimensional aspects of diversification ought to be carefully considered. The aspects are complex, but necessary to comprehend. Time diversification can be used to assure minimum or required future annual cash flows. For example, annuities, pensions, and high quality inflation adjusted bonds may be used to match relatively certain asset cash outflows to relatively certain spending cash inflow needs. The lifetime matching process requires planning and often making irrevocable decisions. Asset location diversification relates to tax payment efficiency. Low or moderately taxed assets should be held in directly taxable accounts, while highly taxed assets should be held in tax deferred accounts. Asset liquidity is an added diversification consideration. Large proportions of assets in illiquid private equity, venture capital, or hedge funds are not advised. The chances are great that illiquid assets will be least available for cash out transactions at the time that redemptions are needed. Shakespeare’s Antonio understood qualitatively that diversification relates to a number of factors to be deliberated to reduce the chances of being saddened by specific item misfortunes.

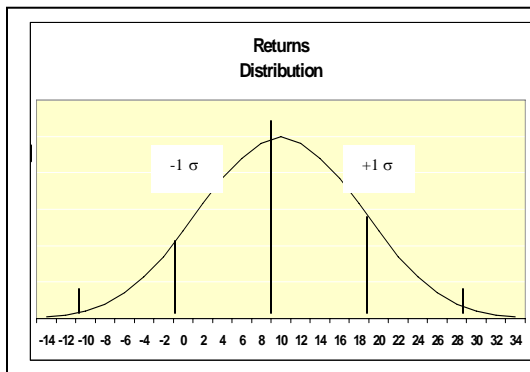
**Thinking Quantitatively – Formal Education**

The academic view of “the only free lunch in finance” is built on the premise that the factors used to diversify and optimize are relatively stable based on historical performance.

Before reviewing the details remember the admonition on all asset security prospectuses. Warning: *Past performance does not guarantee future results. There is risk of losing all or part of an investment.* As stated repeatedly, asset values carry different levels of risk. At this time, United States Treasury Inflation Protected Securities (TIPS) backed by the full faith and credit of the government are as near to risk-free in terms of economic purchasing power as possible. The Full Faith & Credit Clause, U.S. Constitution Article IV Section 1, addresses the duties of states within the United States to other states. The direct result is its broad application to the economic integrity of the U.S. Treasury debt obligations– payment in full.

Each security (asset) traded on a secondary market after initial public offering can be characterized by three historical factors – returns (r) (price changes + derived cash flows), volatility (measured price movements during a specified period), and correlation (asset price movements with respect to other asset price movements). In an ideal world with enough past data, modern portfolio theory (MPT) is based on the premise that asset return distributions are normal (Gaussian). The term “bell shaped” is also used. In Fig. 1 below the Expected Return is 9 and the volatility in terms of a normal standard deviation is about 10.

Figure 1. Normal distribution with expected return of 9 and normal standard deviation of 10.



In a normal distribution +/- 1 standard distribution (S.D. or  $\sigma$ ) of volatility (-1 to 19) includes about 68% of the expected returns distribution. Moving farther from the expected return to +/-2 $\sigma$  of volatility (-11 to +29) includes about 95% of the expected returns distribution. The potential 2½% distributions less than -2 $\sigma$  is what good risk managers must focus on. When in fact more than 2½% of returns occur in the left tail, people talk about fat negative tails. The mathematics or statistical equation to calculate  $\sigma$  is straight forward.  $\sigma = (\sum (x_i - x_{avg})^2 / n - 1)^{1/2}$

Fat tails demonstrate a flaw of accepting MPT blindly. Either markets do not always behave rationally (due to irrational participants) or the data sample size is too small to assume a continuous normal distribution. Thus, people may panic, illiquidity may appear, and an October 19, 1987 stock market crash occurs. That is an event, which is not supposed to happen, based on past historical data. Welcome to the real world! Nevertheless, rational markets with close to normal distributions are a reasonable reference for MPT and wealth portfolio management. They occur during the majority of the distribution of events, when human beings do not panic or when illiquidity does not literally freeze counter parties out of making transactions. Understanding asset expected returns and volatility with respect to historical data is necessary, but not sufficient to optimally diversify investment portfolios (i.e. the lowest expected risk for an expected return.)

The correlation coefficient or expected movement of asset returns between each other (corr. or  $\rho$ ) must also be considered in the quantitative diversification exercise. The range of  $\rho$  is +1 (exact same movement between asset prices) to -1 (exact opposite movement between asset prices). The statistical equation to calculate  $\rho$  is complex.  $\rho = (\sum(x_i - x_{avg})(y_i - y_{avg}) / (\sum(x_i - x_{avg})^2 \sum(y_i - y_{avg})^2)^{1/2}$ . Yet, here the focus remains on the concept and not the calculation. A  $\rho = 0$  is the key practical idea to consider. If an asset movement historically has no relationship to another asset, then the portfolio may potentially be constructed to simply reduce overall portfolio risk through diversification of asset portions. An ideal asset with no correlation to other portfolio assets is generally a low volatility or near risk free asset. Not surprisingly, TIPS and CDs have low, very stable returns. The simplest diversification technique is to add more of these assets or pension cash flows to a portfolio to reduce risk.

A portfolio of assets with different historical asset  $r_i$ ,  $\sigma_i$ ,  $\rho_i$  data values can be summed into a portfolio of expected  $R_{\text{port}}$  and  $\sigma_{\text{port}}$ . The expected portfolio return is calculated as  $E(R_{\text{port}}) = \sum w_i r_i$ , where  $w_i$  = weights of portfolio assets that sum to 1.00 and  $r_i$  = return of each asset. The expected portfolio risk  $\sigma_{\text{port}}$  is also calculated based on asset  $w_i$ ,  $\sigma_i$ , and  $\rho_i$ . Adding assets to the portfolio makes the calculation more complex. The point to notice is that diversification based on MPT can lead to an optimum set of portfolio assets and weights. That is an estimated lowest level of portfolio risk for an expected portfolio return or Professor Goetzmann's only free lunch in finance.

A two asset portfolio including risky equity assets and risk free TIPS provides a good example of simple diversification for portfolio risk reduction. The measures of risk,  $\sigma$ , and asset price correlation,  $\rho$ , vary based on the number of data samples and the particular situation. Assume portfolio equity funds have an optimum expected return  $E(R) = 9.5\%$  and  $\sigma = 12\%$  and a nearly risk free TIPS fund has an  $E(R) = 4\%$ ,  $\sigma = 2\%$ , and  $\rho = 0$  between the TIPS fund and the equity assets portfolio. The investor can cut the  $\sigma_{\text{port}}$  risk from 12% to  $(12\% + 2\%)/2 = 7\%$  and  $E(R_{\text{port}})$  return from 9.5% to  $(9.5\% + 4\%)/2 = 6.75\%$  by changing the portfolio weights from 100% equities to 50% equity and 50% non-correlated TIPS portfolio. That means during 97.5% of samples, the diversified portfolio should have no greater than a -7% return ( $E(R_{\text{port}}) = 6.75\%$ ), instead of an all equity portfolio no greater than -14.5% return ( $E(R_{\text{port}}) = 9.5\%$ ). The investor gave up less than 3% of annual expected returns to avoid an expected extreme loss of more than -7% once every 40 years. MPT allowed the investor to calculate how diversification provides a tradeoff of lower losses with less expected returns.

Diversified portfolio construction is generally more complex, and more uncertain, than shown above. Risky assets with different  $\sigma_i$  and  $\rho_i$  are generally used to diversify and optimize a portfolio. Yet, the  $\sigma_i$  and  $\rho_i$  change with time, so that the diversification is unstable.

Chapter 14 tactics will develop the idea of portfolio risk neutralization with negative  $\rho$  (-1) assets, such as options to sell (puts) or shorted (sold before bought back) assets, to reduce overall risk. Tactics, such as risk neutralization or other insurance options, include their own set of risks of behaving in unexpected ways. Hedge funds use a variety of risk reduction tactics that do not always work.

Conceptually, cash flows may be diversified by including an annuity or pension in the total portfolio analysis. The risk is transferred to the insurer or employer for a life time cash flow in exchange for a lump sum payment or years of labor and pension contributions.

### **Time Diversification usually is most important!**

For most people time diversification provides the focus on cash flows, which are critical to meet retirement spending goals and objectives. If a retired household can reduce retirement spending risks to a very low level for 15 years they increase the probability of not running out of money (reduced standard of living) prior to death. Time diversification is essentially equivalent to the formal idea of asset liability matching. Financial assets, annuities, pensions, and social security payments are economic resources or assets. Retirement spending budgets and gifts (prior to or at death) are liabilities. Matching is the process of turning the resources into certain cash flows to satisfy certain spending plans. If annuities, pensions, and social security payments provide 50% of spending cash flows for life, then remaining financial assets can be managed to provide the other 50% for perhaps 15 years as TIPS or CDs that mature as needed. The remaining financial assets may take equity or alternative asset risks with longer time horizons prior to being cashed in. The concept of multiple factor diversifications will be developed with a few examples in this chapter, Chapter 13 Strategy and Chapter 14 Tactics discussions.

### **Liquidity Diversification – Especially Vital During Unstable Periods**

Poor government policies lead to reduced economic output periods (recessions), unstable currencies (almost always inflation), reduced trade (protectionism), and wars (deaths and asset destruction). Economic depressions always include some break down in trust of the financial credit system. The generally productive global period since World War II is historically unusual and fortunate. Yet, periods of asset price bubbles, general consumer inflation, recessions, and sub normal economic growth (stagflation and high unemployment) have occasionally led to liquidity problems in various asset classes. Liquidity diversification in a household portfolio means holding a rainy day fund for emergencies and a buffer during unstable times to ride out the metaphorical storm. Wage earners and business owners may consider 1 or 2 years of low risk accessible assets based on the risks of their

incomes. Retired households and individuals should generally increase their low risk liquid assets to 5 years horizon of budgeted spending. An alternative quantitative approach is to require that low risk, liquid assets make up 10% to 25% of a portfolio used for cash income streams. Matching liquid assets to budgeted spending periods is easier for most people to comprehend.

Readily tradable, low and moderate risk assets are good candidate stable assets in a diversified portfolio. The low risk assets, such as TIPS, treasury bills, and money market funds generally are suggested for two years worth of highly liquid (redeemable on any day that transactions occur) retirement spending assets. Moderate risk assets such as Treasury and corporate bonds, gold ETFs, and balanced (stock and bond) index funds are suggested for highly liquid assets that have low to moderate risk of price declines for a 3 to 5 year spending need period.

In contrast, real estate should be considered illiquid, even though there are periods of high trading volume, usually associated with easy financing and rising prices. Small capitalization stocks, restricted sale company stocks, partnership shares with minimum prior request periods, private equity and hedge fund shares with lock up periods, and low trading volume assets are also illiquid assets. Many of them carry large spreads between expected asking and offered prices. It is generally suggested to diversify portfolios with no more than 30% illiquid assets and try to achieve steady income flow from those assets that are generally illiquid (a sales transaction requiring more than 60 days).

**Location, Location, Location applies to diversification also.**

The United States and other sovereign countries administer complex, onerous taxing authorities. Households, individuals, and corporations readily select the least burdensome location to conduct income producing and investment business. An interesting observation is the flow of individuals and businesses between countries and states (or other taxing authorities). Since it's founding, individuals generally immigrated to the U. S. for opportunities and relatively lower combined taxes and regulations. Similarly, as taxes have generally increased in most societies, people also voted with their feet within countries. Hence, retirees have a significant economic advantage to move from New York City to Florida. There is little that NYC can

do to force retirees to remain in their location to pay uncompetitive, high income taxes, instead of little or no income taxes.

Other than state and local tax considerations, a U.S. citizen must understand Internal Revenue Service (IRS) laws conceptually and use competent tax preparers (advisers) to locate assets efficiently. Taxes are a certainty. Generally taxes should be deferred, if related assets can earn real returns prior to tax payments. Specifically, other considerations may include potentially higher future tax rates or marginal income tax brackets. Retirees may consider tax deferred account required minimum distributions (RMDs). It may be rational to withdraw tax deferred account (IRAs, 401K, etc.) assets prior to the RMD age to limit overall multi year tax payments. Governments have complicated the tax codes with various tax credits to push tax payers toward social engineering directions. Historically, they have made the tax codes incrementally more progressive, until private economic outputs slow down noticeably. Then a disturbed electorate eventually notices and votes for new political leaders, who enacts lower tax codes that create incentives to increase economic output rates. The taxpayer challenge is to plan the location of investment assets based on expected future taxes. Since no one can accurately anticipate new tax rules, hedging or diversification of asset locations occurs.

Generally, lower taxed or low expected return assets should be located in taxable accounts. Normally (not always in the past) capital gains rates are lower than normal IRS income tax rates. In that scenario, low turnover, low dividend payout index equity mutual funds and low return low risk money market are acceptable for taxable accounts. Dividends are more complex considerations. They sometimes (less often than capital gains) are subjected to lower than normal IRS income tax rates. Thus qualified dividend stocks or index funds may be held in taxable accounts. Specific alternative assets may also be held in taxable accounts due to tax deferred account limitations.

Bonds and Real Estate Investment Trusts (REITs) are prime tax deferred account candidates since they receive no (or limited) favorable income tax rates. Equity funds that turnover (buy and sell) assets at high rates (greater than 50% annually) and make frequent distributions are also candidates for tax deferred accounts. Qualified partnerships are held in tax deferred accounts when permitted to allow returns to grow prior to withdrawals.

In addition to the general rules, asset location diversification should consider flexibility. A rigid rule to avoid taxes until the last legal moment can lead to a frustrating game with the IRS. Tax laws are complex and the IRS is very focused on the largest sources of taxable assets. The net costs of detailed investment strategies and a team of an accountant, adviser, and lawyer are often not greater than the tax payments avoided for all but the wealthy (greater than \$5M investable assets.) The flexible investment strategy diversifies assets in taxable (general, pension, and annuity) accounts and tax deferred accounts. There will be times that an account will suggest selling assets from taxable accounts to match or harvest capital losses. The most important consideration will normally be the planned spending or gifting budget. Location applies to more than real estate!

### **Strategy Diversification**

Wealth management is a competitive effort in a dynamic world. It is natural for circumstances to change and some level of competition to exist.

Investment strategies must be able to cope with changing circumstances. Similar to asset, time, liquidity, and location diversification, learning and using more than one investment strategy reduces risks and smoothes out year to year returns. A balanced attack seeks strategies, which are not correlated. That often means a stable, steady strategy paired with a dynamic strategy.

Stable strategies usually include high quality government bonds, CDs, and blue chip dividend paying equity holdings. The equity positions may be in stocks, such as IBM, mutual funds, such as the S&P 500 dividend growth index, individual steady income properties with low debt burdens, or infrastructure toll roads, such as gas pipelines or transmission lines. These steady cash flow approaches are often called value strategies. The investment assets are normally held to maturity or to the end of a long term contract. Normally, there is limited hedging or active tactics involved.

Dynamic strategies usually rely on asset price momentum patterns. Although other qualifying factors may specify asset underlying fundamental quality, momentum strategies are generally based on reasoning that markets are informed and asset prices follow a path to gradually reflect all material information. The gradual reflection is what momentum speculators count on to take positions prior to the rest of the market participants. Momentum strategies are usually fast paced and

most successful, when long term trends develop. Good discipline is needed “to cut losses short, and let profits run up”. More active hedge and mutual fund managers practice momentum strategies than value strategies. However, it is not clear that their clients earn as much from the strategies as the active managers do through their fees.

Dull, value strategies paired with active momentum strategies are good diversification approaches. Knowledge is needed to implement the strategies and adjustment tactics. They are generally not significantly positively ( $\rho = 1.0$ ) or negatively ( $\rho = -1.0$ ) correlated. Treasury bonds, CDs, and good long term contracts usually maintain value during economic recessions. Their volatility ( $\sigma$ ) is low and their correlation to many asset classes is often low ( $-0.5 < \rho < +0.5$ ). Momentum related growth assets or active hedging activities experience volatile earnings and emotional expectation changes during recessions (and other expected calamities.) Their related returns are riskier and volatile. Even equity growth and value stocks have periods when they briefly move up together at different rates. That is, value stocks may advance faster than growth stocks or growth stocks may advance, while value stocks are trendless. An exception to the merit of a strategy diversification approach occurs in the rare occasion that financial system trust completely breaks down. Contracts, financing, or the willingness to make new transactions then fail. Wars or financial credit dislocations are causes of contract, financing, or potential new transaction failures.

Some mutual funds actually use diversified strategies. They usually work within a universe of assets, such as small capitalization stocks or corporate bonds. Two or three strategies may be included in an approach, which looks for both long term growth potential, as well as recovery of out of favor (fallen angels) quality assets. Read a prospectus carefully and check longer term (5 years minimum) performance carefully to decide if the fund has a strategy and supporting record to achieve above normal returns for the active management risk. These rare jewels should provide multiple diversification benefits.

### **Maintaining diversification may be tricky**

Investment assets and cash flows diversification may be difficult to maintain during transitions from calm to volatility asset markets. During calm or secular bull markets, such as the 1950's and early 1960's, as well as 1982 through 1999, the volatilities and relationships between asset classes

did not change significantly. In that period, simple rebalancing of assets at selected intervals (e.g. quarterly or annually) and thresholds (e.g. portfolio asset weight +/-4% total portfolio value) from plan would generally maintain desired diversification.

A rebalancing example during secularly productive economies (the good times!) may include a pension (40% of retirement spending cash flows); social security (20%), Treasury bonds (20%), and an S&P 500 equity stock fund (20%). A declining stock market may reduce the S&P 500 fund value by 25% at year end. If all other assets maintained their future cash flow values, then the S&P 500 fund would drop from 20% to 15.8% of the total portfolio (95% of initial) value. The diversifier would consider stocks to be on sale and recognize that the Treasury bonds are the only other saleable assets. Hence, Treasury bonds would be sold and the S&P 500 fund would be bought, so that their portfolio weights would be rebalanced and equal. Conversely, if the S&P 500 fund increased 30% while other assets maintained their values, then it would equal 24.5% of the total portfolio (106% of initial) value. The diversifier would consider stocks to be over priced, sell S&P 500 fund shares, and buy Treasury bonds, so that their portfolio weights would again be equal. Rebalancing attempts to diversify back to the desired risk level through purchasing undervalued assets and selling generally overvalued assets.

#### **Unstable Risks and Unknown Uncertainties – Tsunami Waves and Black Swans**

Asset price volatility may change dramatically from historical data distributions for many reasons. It is good to be aware of the number of samples used to approximate a recent period  $\sigma$ . If the calculation is done with the most recent 30 days of daily market closing price data, it will differ from calculations using the most recent 36 months of month end market (or mutual fund Net Asset Value) closing price data. Based on trading volumes (liquidity) for various assets, shorter or longer periods of data are more appropriate. The goal is to select a measurement of  $\sigma$ , which reasonably captures meaningful changes in  $\sigma$  so that appropriate portfolios can be constructed to meet client risk tolerances.

Unstable risks can create tsunami waves similar to sub marine earthquakes or other disturbances that cause big changes in asset values. They are not predicted with long range accuracy, but increased daily volatility indicates that major negative impact (2½%) disturbances are more likely. Nassim

Taleb's<sup>3</sup> *Black Swan* or unknown uncertainty is a more difficult issue to grasp because it has not ever occurred. The uncertainty must be comprehended without precedent. The toxic financial derivative assets of 2005 vintage were an example of new product potential problems that were too complex for full analysis. The time period to do full due diligence scenario analysis exceeded the capacity of greedy speculators and investors. The black swan is an overwhelming uncertainty that no one comprehends, until asset values decline and dominos fall. Diversification must be flexible to partially cope with unstable risks and uncertainties.

#### **When is a free lunch too expensive?**

Diversification changes from a portfolio benefit to a liability when asset correlations increase (often along with volatility and decreasing valuations). A reduction in available asset financing (and forced sales) can result in equity and debt assets declining in value at the same time. Portfolio diversification then becomes a liability for the normally lower volatility assets, as they (bonds) decline in value along with the more volatile assets (stocks). The only effective risk reduction response is to sell assets and hold cash equivalents (treasury bills or U.S. government guaranteed money market funds.)

During stagnant secular markets with multiple large declines, such as the 1970's and 2000's decades or depressions (1930's), asset markets fell more than 20% and asset correlations changed dramatically. In those 10 to 15 year periods, investors often found it difficult to preserve investment capital and cash flows as purchasing power fell (inflation) or effective tax rates rose. Volatilities ( $\sigma$ ) and correlations ( $\rho$ ) exceeded normal levels.

Rebalancing does not work well to maintain diversification benefits with  $\rho > 0.7$  between most asset classes. A better approach is to focus on holding assets with relatively low  $\sigma$  and price stability (deflation or inflation effects). If deflation exists, such as in the 1930s, then equally weighted good quality corporate and Treasury bonds may provide modest returns with limited risk of losses. If inflation exists, such as in the 1970s, then TIPS and blue chip dividend paying stocks may maintain purchasing power with modest returns. Risks are higher during inflationary periods due to inventory, accounts payable, and accounts receivable uncertainties, relatively higher taxes on phantom inflation related equity profits, and relatively lower real returns on non TIPS bonds.

Note that stagnant asset return markets usually come with an overall economy (Gross Domestic Product) that is operating below normal (3% real annual growth) for an extended number of years. High unemployment (above 5%) is the factor that is felt most by society. The suggested diversified lower volatility strategies will likely preserve capital better than either normal diversified or all TIPS portfolios during stagnant economies.

### **Diworsification**

A partially understood concept can be worse than simple ignorance. The concept of diversification is dangerous, when both volatilities and correlations are changing and investors (speculators) try to soup up or turbo charge portfolio returns. Leverage is the tool for using other people's loans to increase expected returns. Concentration is a portfolio asset over weight bet that reduces an optimum diversified portfolio construction.

For many people, purchasing a house is a simple example of leverage and concentration. Purchasing a home with a 3½% down payment guaranteed by the Federal Housing Administration (FHA) is risky. Sale transaction costs are usually 6% to 8%. The buyer has a negative unrealized loss (negative equity) due to certain future sale costs at the day that the purchase transaction is closed. That results in initial infinite leverage sponsored by the U.S. government. (It is assumed that inflation will increase home prices and positive equity will develop and grow.) During 2007 and 2008, U.S. home prices declined and the FHA guarantee created extreme leverage that added to property foreclosures. The borrower at times had no other investment assets and concentrated limited savings into a single purchase. That is the effect of socially engineered unstable fiscal policy that encourages leverage and concentration or diworsification, in quest of providing households increased opportunities and risks of home purchases.

Many investors do not consider the full effect of leverage on an otherwise diversified portfolio. MPT teaches that leverage can be added to earn higher expected returns with higher risks. However, the costs of borrowing are certainties that are either fully defined for fixed rate loans or generally disclosed in floating rate loans. The costs must be paid for the loan periods regardless of the risk level of the diversified portfolio. The combination of risky portfolios and certain loan costs increase the effective portfolio risk above what rational MPT captures in portfolio expected return per risk calculations. Raw speculator greed

or investor ignorance leads to leverage, which often results in more risk taking than expected.

Financial and emotional capacity should be considered, when selecting a diversified portfolio. Personal circumstances, as well as economic market scenarios change. More often new scenarios involve unexpected expenses, instead of windfall gifts. For a completely rational individual or firm, reserve funds should be part of the diversification consideration to deal with unexpected cash flow needs. In fact, normal emotional human beings should generally increase the rational reserves to recognize that delays usually occur in making decisions to adjust to changing circumstances and scenarios. The idea is to maintain a long term wealth plan through unexpected hard times. A 5% or 10% risk-less tilt in an otherwise diversified asset portfolio may be the difference between maintaining and relinquishing a wealth plan during tough times.

### **Dedicated Diworsification**

The dedicated diworseifier seeks out new assets with promises of above normal returns and little knowledge of how to manage the operation or purchase/sale transactions. A successful Texas residential apartment building owner is at a disadvantage when initially purchasing apartment buildings in Las Vegas. Operating apartment buildings may be a general skill, but varying vacancy factors and local law enforcement may be different specific issues. If high leverage and low reserves are used, Las Vegas property ownership results may differ from Texas successes. Purchasing and selling a building for the best realistic prices is a more difficult skill in different markets.

The successful attorney or physician is also at a disadvantage, when dealing with hedge fund and venture capital salesmen. There are some (about 10%) hedge funds and venture capital firms that provide good client returns (after expenses). However, they are exceptions who seek out David Swenson and other large endowment Chief Investment Officers before looking for smaller clients. The remaining 90% of funds may attempt to sell their products to the successful professional. Most lawyers and doctors simply do not have the time or make the effort to purchase potentially profitable investments related to their needs in a diversified plan.

Operating asset managers, such as conglomerate corporations or mutual funds, may collect assets

without a good methodology for earning consistent cash flow returns. They diversify out of their area of expertise without a thorough strategy focused on synergies (diversification risk reduction effects). Their skill edge is often not transferable. Thus risks increase without the expected benefit of a transferable methodology. A few value oriented diversifiers, such as Warren Buffett's Berkshire Hathaway, are more successful than peers. Concentration and quick decisions make them unique. However, the growth oriented diversifiers are usually chasing momentum and fads that can not sustain their recent meteoric rise. The problem is compounded by loss reduction tactics, which are not fully understood. Diversification without a proven strategy can not be corrected by tactics, which must be nimble to adjust to dynamic competitive environments.

#### **Diworsification biases exist**

Diversification is difficult and requires curiosity to notice when opportunities and risks change. It is unglamorous and demands self discipline. Most individuals prefer to experiment without analyzing mistakes and thus increase risk to their economic and emotional lives. Adding risks through poorly thought out investment transactions is the antithesis of diversification. Bragging about doubling up on momentum asset bets feels good at the Christmas party. However, if fundamental operating cash flows are not supporting the increased market prices, risks are being added. Other human tendencies also add to portfolio risks. That is why diworsification often occurs in the pursuit of diversification benefits.

#### **Analyzing Diversification Examples**

Martinez and Merton Household Financial Scenarios were presented in Chapter 6: *Wealth Flow Factors: Multi-Dimensional Wealth Planning*.

**The Martinez household** plans to retire in 8 years with nominal total annual Social Security payments of \$47,000 and Anita's \$15,000 pension. That is constant purchasing power \$62,000 near risk-free and moderately inflation adjusted federal and local government **cash inflows (69%) available** for a \$90,000 annual desired spending budget. Robert's balanced (50% equity and 50% bond mutual funds) 401K is estimated to grow to \$400,000 at retirement based on a moderate return (3% above annual inflation). A 4½% withdrawal rate (\$18,000 inflation adjusted annual cash inflows) over a 30 year expected life horizon is suggested. The Martinez household has a solid time diversified

plan with 69% nearly risk less cash inflow. Their conservative asset class diversification includes low risk SSA and pension cash inflows (69% desired spending) and a moderate risk balanced 401K asset (about a 5% probability of a -10% losses in a single year).

There is a limited risk that they will not be able to maintain their desired withdrawal rate. Liquidity diversification is excellent. Their tax bracket is in the middle class range. No home state (Texas) income taxes result in any asset location issues. The Martinez family is diversified on multiple dimensions. Their expected cash inflow represents \$80,000 of their desired \$90,000 annual spending rate. If they plan to spend at the desired stable purchasing power rate for 30 years, then the simplest alternative is to work for 3 more years in order to increase Social Security, pension, and 401K withdrawal cash inflows. An alternative is to retire at age 65, withdraw \$28,000 inflation adjusted funds from the 401K plan for 10 years to meet their desired \$90,000 annual spending rate for their most active (age 65 to 75) years of retirement. Thereafter their total annual spending and 401K withdrawal rate would be reduced to below the suggested real \$80,000 annual spending rate. The Martinez household retirement plan is sound and superior to the majority of U.S. households.

**The Merton household** wealth diversification plan is complex due to Terrance and Carolyn being 35 years old, young children, Sarah (5) and Peter (3), and objectives of both retirement spending and an intergenerational wealth legacy bequeathed to Sarah and Peter through the mechanical products business. The objectives are **difficult to achieve**.

The Merton wealth plan will develop over time. Similar to many small businesses, it will likely be concentrated, instead of diversified, during the next 10 years of a 30 year time horizon as Terrance focuses his human capital skills and resources to grow the business with Carolyn business administrative support. Key considerations are household liquidity and growing some investment assets outside of the business in case hard times result in a bankruptcy. Tax deferred savings vehicles, such as IRA or 401K plans, should be used in addition to the home, as non business investment assets. Based on 30 years of expected human capital related savings, a 10% savings rate with 4% contribution (tax deferred plan) matches, a long term 3½% inflationary environment, and primarily diversified equity fund holdings, non business investments may be expected to grow to

nominally \$7,000,000 at age 65, as discussed in Chapter 6. The Mertons live in Tucson, AZ and can be expected to own a home nominally valued in 30 years at \$1,000,000. Terrance's primary focus is growing the business. Carolyn nurtures the children and keeps the business books updated during the initial business development phase.

The corporate structure of the mechanical products business was not specified. Incorporation would give Terrance flexibility of greater access to equity and debt financing than a privately held sole proprietorship. A partial cash out of the business and transfer of shares from Terrance and Carolyn to Sarah, Peter, or others would be more liquid with equity interests valued through public market trading. In either case steady capital spending and sales growth are expected to result in 8% annual long term profit growth and a business market nominal value of \$12,000,000 at Terrance's retirement in 30 years.

Terrance and Carolyn live within their means. The ideal scenario is for Peter or Sarah to succeed and run the business. Otherwise, the goal of Terrance and Carolyn is to accumulate total diversified net wealth valued at \$20,000,000 (nominally) at retirement, withdraw 2% annually (\$400,000), and bequeath \$20,000,000 purchasing power to Peter and Sarah after Terrance and Carolyn die (expected age 95.) Finally, the ideal scenario expects that half of Peter and Sarah's wealth is held in shares of the business.

Intergenerational loans for education, homes, and other items add details to the flow of human and economic wealth between Merton generations. The Mertons envision wealth and diversification issues differently than the Martinez household. They are providing Sarah and Peter the means to develop legacy wealth. That requires a controlling interest in an income generating entity. The Martinez household simply plans for a secure source of retirement spending income during their lifetime.

The dimensions of diversified wealth are more in the control of the Mertons. Diversifying income producing assets between controlled business assets and independent passive assets is a qualitative, as well as quantitative, hedge. A businessman's risk tolerance is often more entrepreneurial and aggressive than a passive investor. He understands in his gut that 20% after tax profits and one year full capital project expense pay backs occur in some years; but no profits occur

with 25% sale declines in other years. The key is to have business cash flows and lines of credit for necessary liquidity to keep the lights on during tough times. Terrance and Carolyn would be wise to designate Terrance as responsible for business assets, liabilities, net income, and cash flows. Carolyn may otherwise be responsible for the steady administrative growth of passive investment values. Prior to retirement, business and personal spending can be expected to be closely aligned. If business liquidity is adequate, then personal spending and investment liquidity should be acceptable. Overall levels of business and investment risk taking should moderate as both sources of economic wealth increase and the Mertons approach retirement. Human capital is steadily converted to financial capital and wealth accumulation changes to wealth distribution.

The business controlling interests and relatively low Merton retirement spending rate reduces personal liquidity issues. Intergenerational time horizons are clearly longer than retirement spending time horizons. The Merton's tendency will be to hold a diversified mix of moderate dividend paying and growth equity assets, instead of low risk defined maturity CD's and TIPS. Finally, the Mertons are unlikely to diversify retirement cash flows into annuities since their goal is to leave remainder assets to the children. They have the option of using some of the potential bequeathed assets for emergency spending, so that time diversification and SSA payments are unlikely to be issues.

Be aware that example calculations are based on a moderate long term 3½% inflation rate, which reduces purchasing power by 50% in 20 years. If 1970's near runaway annual inflation (8%) occurs, then purchasing power is reduced by 50% in 9 years.

#### **Summary**

- Consider diversification dimensions before calculating portfolio risk
- History provides limited expectation insights
- Time and liquidity diversification are the critical issues for most households
- Maintaining desired diversification is tricky

#### **References**

- <sup>1</sup>Goetzmann, William *An Introduction to Investment Theory*, 2005  
<sup>2</sup>Lynch, Peter, *One Up On Wall Street*, 1989  
<sup>3</sup>Taleb, Nassim, *The Black Swan*, 2007