RISK AND DIVERSIFICATION ANALYSIS With REASONABLE & PRUDENT DIVERSIFIED ALTERNATIVE

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Report	
Introduction	1-2
Risk-Return Comparison of The Two Portfolios	2-3
What Is Not Addressed by This Analysis	3-4
How We Design the Final Strategic Portfolio in Phase II Part 2	4
Glossary	5-7
Appendices	
Appendix I - KLD Graphs And Explanation	8
Appendix II - Uncompensated Risk Reduction Analysis	9
Appendix III - Compensated Risk Analysis	10
Appendix IV - Comparative Portfolio Metrics	11
Two Experts With 106 Years of Combined CPA Experience	
Stewart Frank, CPA/PFS, AIFA	12
J. Ben Vernazza, CPA/PFS, TEP (UK) emeritus	12

MILTON PHASE II Part 1

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INTRODUCTION

Our assessment of your existing portfolio prepared at the end of 2014 showed that your portfolio was grossly encumbered with uncompensated risk as was shown in the following RISK-O-METER and explained in the assessment report.



Riskometer shows amount of uncompensated risk that was removed by diversification. See also Appendix I.

This report presents a preliminary alternate diversified portfolio that is reasonable and prudent based on not selling any Berkshire Hathaway, selling some of Apple, and having a portfolio of 85% equities and 15% fixed income.

Shown below is the RISK-O-METER results for such a preliminary reasonable portfolio. Note that uncompensated risk has been reduced to an adequate and acceptable level and compensated risk has risen into the green.

The 85/15 allocation is based on taking a little less risk than you are taking now which is 98/2. It is important to realize that in the next step of increasing return with less risk is to use an allocation that reflects your current overall financial planning goals.



Riskometer shows amount of uncompensated risk that was removed by diversification. See also Appendix I. The alternative portfolio and your current portfolio are compared for 2014 as well as for the systemic credit bust period 2008-2009. The period 2008-2009 is especially significant because it covers a period of systemic losses and is further discussed later in this report. There is also an appendix which shows in detail all the information generated for this comparison and there is a glossary for reference purposes.

Reasonable Milton's SECTOR Portfolio Portfolio Financial 3.90% Materials 0.00% **Consumer Descres** 0.00% Ν **Consumer Staples** 0.00% Energy 3.30% 0 Health Care 5.00% Technology 43.30% Т Utilites 0.00% Real estate 0.00% Small Cap 0.00% S Biotech 1.10% **Emerging Markets** 22.00% Η Miners 1.00% Telcommunications 0.00% 0 Gold 0.00% **Corporate Bonds** 0.00% W Junk Bonds 0.00% U.S. Equities 16.40% Ν Transportation 3.00% Cash 1.00%

100.00%

RISK-RETURN COMPARISON OF THE TWO PORTFOLIOS

The table below compares the results of your portfolio and a reasonable portfolio for the year 2014 as well as the significant systemic period April 1, 2008 through March 31, 2009.

Note in the table below that during 2014 your portfolio gained 13.4% (largely due to Apple) with a standard deviation of 11.9%. The reasonable portfolio had a gain of 11% with a 8.9% standard deviation.

100.00%

Most importantly, note the results for the systemic credit bust in 2008-2009. Your portfolio would have declined 33.9% with a standard deviation of 47% while the alternative portfolio would have declined 26.5% with a standard of deviation of 35%. The largest drawdown was 56% for your portfolio and 41% for the reasonable portfolio. The difference doesn't seem great until to you realize that a 56% drop means that in order to recover back to break-even the portfolio needed to increase from the low drawdown point by 127% compared to the reasonable portfolio "only" needing a 69% increase.

Portfolio	Reasonable	Milton's
Metrics	Portfolio	Portfolio
For the Year 2014		
Rate of Return	11.00%	13.40%
Standard Deviation	8.90%	11.90%
Largest Drawdown	-6.00%	-10.00%
For the Systemic Year		
4/1/08 to 3/31/09		
Rate of Return	-26.50%	-33.90%
Standard Deviation	35.00%	47.00%
Largest Drawdown	-41.00%	-56.00%

APPENDICES

For further analysis of how the RISK-0-METER results were calculated please refer to Appendix I – KLD Graphs And Explanation . Appendix II- Uncompensated Risk Reduction Analysis. Appendix III – Compensated Risk Analysis.

The Appendix IV chart and explanation shows two benchmarks to compare with the Melody portfolio and the reasonable portfolio. The benchmarks are the S&P 500 Index and the 85/15 Macro Index which is 85% equities and 15% in fixed income. Note that Melody Portfolio with almost 100% in equities did not achieve the returns that the S&P 500 did, and the standard deviation was much higher.

WHAT IS NOT ADDRESSED BY THIS ANAYLSIS?

We have not addressed the relative allocation between equities and fixed income. We have used 85% / 15% because we believe your current 98/2 allocation is too aggressive under your current financial position. Your situation may call for a different allocation which is partially related to your understanding of the risk aversion level you are willing to assume.

The next steps include fine tuning the reasonable portfolio, choosing sector emphasis, and selecting individual investments within the sectors. But, first you must decide how much risk you really want to take which will determine the overall allocation between equities and fixed income. This fine-tuning will further enhance your return beyond the favorable risk-return scenario of the preliminary portfolio presented herewith.

You need to address systemic risk -- the risk of collapse of an entire financial system or entire market, as opposed to compensated or uncompensated risk associated with any one individual entity, security, or component of a system. We have a strategy that can be wrapped around your final enhanced portfolio to protect against a high probability of systemic risk from the breakdown of confidence central banks including the U.S.

Normally systemic risk is not a great factor, but when it is it becomes a *tsunami* it overruns all other factors in the market place including compensated risk. That is illustrated by the magnitude of difference between the two portfolios maximum drawdowns

during the last systemic event in 2008-2009. Not only is it important to avoid the financial risk but just think back to the mental anguish of 2008, and the knowledge that you need not have to go through that again.

Taking the previous example of the systemic crisis in 2008-2009, a protective strategy against large drawdowns could be established to limit the drawdown to a fixed percentage. For instance, electing to protect the reasonable portfolio so that the drawdown would not exceed 15% would cost $1\frac{1}{2}$ % of the beginning portfolio value for one year protection, but would assure that the gain necessary to come back to even would be only 19% as compared to 127% or 69% as was the case in 2008-2009 for the two portfolios. It would also have the advantage of enjoying further increases if the bubble continues to push asset prices up; and, this has the further advantage of being able to automatically ratchet up the protection to the same 15% drawdown, but at higher levels.

HOW WE DESIGN THE FINAL STRATEGIC PORTFOLIO IN PHASE II Part 2

We will work with your existing investment adviser for his or her input regarding your risk aversion level and their proposed allocation between equities and fixed income investments. Together we may suggest changes in the sector weightings. We can evaluate securities recommended for each sector and as to whether or not they will enhance the diversification already achieved in the reasonable portfolio and by how much. The ultimate objective is to maximize the return at the lowest possible risk level along with the final protection of indemnifying against systemic risk.

If you do not have an investment adviser we can assist in the screening process to help you find the *best from the rest* of registered investment advisers. If you are an experienced investor and manage your own portfolio then we can work directly with you in completing the final enhanced portfolio and continue to have an on-going monitoring program of evaluation for you every six months or whenever there are events where some reevaluation and rebalancing needs to be done immediately.

Either way, we can accomplish your financial goals and move the RISK-\$O\$-METER a few more notches further in the green!

We look forward to meeting with you to discuss the final design and development of a reasonable and prudent diversified portfolio that will have the highest reasonable return with the lowest possible risk of loss and will give you inner peace of mind in the process,

GLOSSARY

<u>Active Return</u> is the excess return of the portfolio relative to an appropriate benchmark. The higher the active return the better the product's performance in comparison to the benchmark.

<u>Alpha</u> is a measure of the difference between a fund's actual returns and its expected performance, given its level of risk (as measured by beta). Alpha grades an investment's return scaled to the return expected by its benchmark. The amount of Alpha delineates the amount by which the investment has outperformed or underperformed its benchmark.

Beta is the measure of an investment's sensitivity to market movements. The beta of the benchmark is 1.00. So a fund with a 1.10 beta is expected to perform 10% better than its benchmark index in up markets and 10% worse in down markets. Conversely, a beta of .85 indicates that the fund is expected to perform 15% worse than the benchmark index in up markets and 15% better in down markets.

Compensated Investment Risk is unavoidable. It is the inherent risk assumed when making any investment. Compensated risk is also known as "undiversifiable risk," "market risk," or "systematic risk" because it affects all investments, and is not limited to a particular investment type, security, industry, etc. and investors expect higher returns when assuming more of it. As a result, every participant in the investment market is exposed to it. This compensated risk is both unpredictable and unavoidable. It cannot be changed or diversified away. It changes only when market conditions change. It is considered to be the "price of admission" paid by everyone who becomes a market participant. Compensated risk is approximately 1/3 of total risk.

Concentration Coefficient (CC) provides a measure of a portfolio concentration and is equal to the number of assets if equally weighted. As concentration increases, the number becomes proportionally less. (E.g. a portfolio with 2 assets, equally weighted at 50% each has a CC of 2; if instead, the weighting changed to 75% and 25%, the CC would be s 1.6). CC is an important diversification metric because of the significance constituent weightings have on a portfolio's diversification. CC is used in combination with the KLD (see below) metric to quantify unsystematic risk removed from a portfolio by diversification. Higher CC values indicate more unsystematic risk removed through diversification.

<u>Correlation</u> compares the direction only (not the amount) of a portfolio's movement in relation to its benchmark. A correlation co-efficient of +1 implies that as a benchmark moves either up or down, the portfolio will move in lockstep, in the same direction. Alternatively, a perfectly negative correlation of -1 means that if either the portfolio or benchmark moves one way the other will move in the opposite direction. If the correlation is 0, the movements of the portfolio and index are said to have no correlation; they are completely random.

Eigenfactor Dimensionality (KLD) is a companion metric of CC used to quantify the amount of unsystematic risk removed from a portfolio by diversification. KLD measures the number of independent diversification elements or intrinsic dimensions present in a portfolio. Each dimension represents an element which has the ability to act or move independently within a portfolio's structure. The larger the number; the greater the ability of each portfolio dimension to perform independently. Because independent performance is the essence of diversification, when CC (see above) is used in combination with KLD, a thorough understanding of unsystematic risk removal is obtained. To eliminate unnecessary noise, Dimensionality is calculated at a confidence level equal to 75% of a portfolio's intrinsic dimensions.

<u>Equity Risk Premium</u> is an extra return that the stock market must provide over the rate on Treasury bills to compensate for market risk.

<u>Fixed-income security</u> is a security that pays an unchanging rate of interest. Fixed-income securities include bonds and money market instruments.

Hedge Funds are investment vehicles that use advanced investment strategies such as leveraged, shorting and derivative positions in both domestic and international markets in addition to investing in traditional investments and as well as other assets. They are most often set up as private investment partnerships that are open to a limited number of investors and require an initial minimum investment.

GLOSSARY (CONTINUED)

Maximum drawdown is a portfolio's peak to trough performance measured from the high point reached prior to the decline's inception until a new high is reached. The drawdown is determined upon completion of the entire cycle, which cannot be known until a new high is reached. Once reached the percentage decline from the old high to the lowest interim point of that cycle is the drawdown. Maximum drawdown is the drawdown having the largest decline during the period examined.

R-Squared (R^2) is the percentage of the portfolio's performance explained by the behavior of the assigned benchmark. R-Squared values range between 0 and 100, where 0 represents the least correlation and 100 represents full correlation. The R-Squared of a portfolio indicates whether the index being used to analyze beta is an appropriate benchmark. If a portfolio's R-Squared value is close to 100, the beta of the investment can be trusted. On the other hand, an R-Squared value that is less than 75 indicates that the beta is not particularly useful because the portfolio is being compared to an inappropriate benchmark.

<u>Real Assets</u> are investments in tangible assets such as real estate, natural resources, precious metals, oil, and gas. These can be both liquid and illiquid. Illiquid real asset funds are not sold on an exchange, and are long-term investment partnerships with lock-up periods that extend for several years. Liquid real asset funds trade on an exchange, and typically have daily liquidity.

<u>**Risk**</u> refers to an investment's vulnerability to fluctuations in value relative to changing economic or market conditions. Risk is used to define all uncertainty relating to the outcome. The level of risk incurred by a fund varies from fund to fund, depending primarily on the types of securities in which a fund invests.

Semideviation is a measure of dispersion for the values of a data set falling below the observed mean or target value. Semideviation is the square root of semivariance, which is found by averaging the deviations of observed values that have a result that is below the mean.

Sharpe Ratio measures the portfolio's excess return over the risk free rate divided by the standard deviation of the excess return. It is a measure of absolute rate of return per one unit of risk. The better an investment's risk adjusted performance has been, the higher its Sharpe ratio will score. A negative Sharpe ratio indicates that a risk-less asset would have performed better than the investment being analyzed.

Standard Deviation is a statistical measure of risk of a portfolio measured by the variability of the portfolio's return around its average over a specific time period. Unlike alpha, beta, and R-squared which are relative to a benchmark index, standard deviation is an absolute measure. In general, the higher the standard deviation, the greater the volatility or risk.

Systemic Risk, In Finance, is the risk of collapse of an entire financial system or entire market, as opposed to risk associated with any one individual entity, group or component of a system that can be contained therein without harming the entire system. It refers to the risks imposed by inter-linkages and inter-dependencies where the failure of a single entity or cluster of entities can cause a cascading failure, which could potentially bankrupt or bring down the entire system or market. Normally systemic risk is not a great factor, but **when it is it becomes a** *tsunami* **it overruns all other factors in the market place.**

Important Note: "systemic" (8 letters) risk is sometimes *erroneously* referred to as "systematic" (10 letters) risk (compensated risk).

Uncompensated Investment Risk is risk that can be eliminated with diversification and unlike compensated or systematic risk, investors cannot expect added return for assuming more uncompensated risk. Uncompensated risk is also referred to as unsystematic risk and can be reduced by methodically re-balancing the portfolio. Uncompensated risk represents approximately 2/3 of total risk.

<u>Volatility</u> is a statistical measure of the dispersion of returns for a given security, a portfolio, or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security, portfolio, or market index. Commonly, the higher the volatility, the riskier the security.

GLOSSARY (CONTINUED)

<u>Weighted Average Intra-portfolio Correlation (IPC)</u> is a stand-alone, holistic metric that measures the entire composition of all interrelationships and weightings in a given portfolio. It quantifies the degree to which the securities in the portfolio are expected to move in the same direction. Its reciprocal is an academically accepted, absolute measure, of systematic risk present in a given portfolio.

Appendix I

KLD Graphs & Explanation For the 1-Year Period Ended December 31, 2014





Instructions for Using & Understanding KLD Graphs

Ambient Dimensions equal the total number of assets in the portfolio.

Spanning Dimensions (KLD Values). - When all redundant information caused by disparate weighting and correlations is removed from the ambient dimensions, the result is spanning dimensions, which contain all of the portfolio's information (much like a .jpeg at 100% quality).

Effective Dimensions. - The spanning dimensions are reduced to a 75% confidence interval, such that it captures 75% the portfolio. Much like the .jpeg at 75% quality, which captures the essence of the image, but requires much less data in doing so. Effective dimensions are highlighted with the blue double arrow.

Horizontal Axis. -The horizontal axis measures the percentage of the portfolio's risk exposure. It is arranged with the most fundamental dimensions on the left, migrating left to right from most to least (fundamental) allowing visualization of the portfolio's entire exposure across all dimensions.

Verticle Axis. - The vertical axis measures the number of spanning dimensions present in the portfolio required to encompass the corresponding percent of the portfolio. Their lowest numbers (i.e. 0,1,2,) explain the systematic exposure and correspond to the lower numbered percentages appearing on the horizontal axis.

Framework. - The primary dimensions give the systematic exposure on the left and integrate it with the idiosyncratic exposures on the right. Each new dimension acts as a source of diversification unto the portfolio. The red diagonal line illustrates what perfect diversification (given the investment quantity) looks like. The portfolio would mimic this line provided each asset were equally weighted and uncorrelated. The more exponential the portfolio graph, the greater the risk, as exponential graphs are indicative of diversification in asset quantity only. This diversification framework provides the user with the measurements of diversification as well as the visualization.

<u>Result.</u> - The number of effective dimensions determines whether or not a portfolio's diversifiication is adequate.

1). A portfolio with a smaller number of effective dimensions is inadequately diversified.

2). A portfolio with a larger number of effective dimensions is adequately diversified.

Appendix II

Uncompensated Risk Analysis For the 1-Year Period Ended December 31, 2014



Comparative Measures of Non-Systematic (Uncompensated) Risk

Total Number of Portfolio Holdings is the total number of individual securities held in a portfolio. It is also known as the ambient dimensions.

<u>Concentration Coefficient (CC)</u> is a measure of portfolio concentration and is equal to the number of assets if equally weighted. As concentration increases, the number becomes proportionally less. (e.g. a portfolio with 2 assets, equally weighted at 50% each has a CC of 2; if instead, the weighting changed to 75% and 25%, the CC would be s 1.6). CC is an important diversification metric because of the significant role constituent weightings play in a portfolio's diversification.

CC is used in combination with KLD (see below) metric to quantify unsystematic risk removed from a portfolio by diversification. Higher CC value's indicate more unsystematic risk eliminated.

Eigenfactor Dimensionality (KLD) is the metric used to quantify the number of independent diversification elements or intrinsic dimensions present in a portfolio. Each dimension identifies an element which has the ability to act or move independently within a portfolio's structure. The larger the number dimensions; the greater the ability of each holding to perform independently and the more broadly diversified the portfolio is. Since behaving independently is the essence of diversification, this metric provides a better understanding of how much unsystematic risk was removed by diversification.

To eliminate unnecessary noise, Dimensionality is calculated at a confidence level equal to 75% of a portfolio's intrinsic dimensions.

Appendix III

Compensated Risk Analysis For the 1-Year Period Ended December 31, 2014



Appendix - IV

Comparative Portfolio Metrics For The 1-Year Period Ended December 31, 2014



Stewart Frank, CPA/PFS, AIFA

Stewart has been a CPA for 52 years, and for the past 12 years has specialized in the field of Prudent Investor compliance evaluation. During this time, Stewart has provided expert opinions in more than 30 breach of fiduciary cases for both plaintiffs and defendants. He is a recognized expert in fiduciary compliance, having recently contributed content for two handbooks on fiduciary best practices, published by fi360. He also served as a Special Consultant on Fiduciary Matters to the Fiduciary Task Force of the American Institute of CPA's (AICPA) Personal Financial Planning Executive Committee during their technical review of the two handbooks. He is a frequent speaker at meetings of judges, attorneys, CPA's, trustees, RIAs, stockbrokers, Certified Financial Planners (CFP), and non-forprofit board members on the subject of fiduciary compliance.

J. Ben Vernazza, CPA/PFS, TEP (UK) emeritus

Ben has been a CPA for 54 years, and an investment adviser for 39 years actively managing family portfolios. From 2000-2012 those family portfolios gained 8.48% per yr. compounded in spite of the dot com and credit crashes. Ben attributes the almost tripling (2.88 x)of an investment made in 2000 to his elimination of systemic & uncompensated risk. Ben has been active around the world in his own businesses and joint ventures for six decades. By 2013 he sold all businesses. In 2014 Ben decided to use his acquired knowledge and experience to assist investors & institutions reduce uncompensated risk & achieve prudent and reasonably diversified portfolios. This is offered on a FEE-ONLY basis (you pay a flat fee to Ben, there are no hidden fees).