

RIVERSIDE ANALYTICS INC

INVESTORS MASTER CLASS
MODULE #2

RIVERSIDE ANALYTICS INC
Tim Koen, P. Eng, President
tim.koen@riversideanalyticsinc.com
www.riversideanalyticsinc.com

Follow us on Social Media!
Facebook - @RiversideAnalyticsInc
Twitter - @RiversideAnalyt



RIVERSIDE'S INVESTOR MASTER CLASS

DISCLAIMER

- All trading / investing comes with risk.
- The insights contained in this presentation do not constitute advice, rather are meant for educational purposes from which you may make more educated decisions taking into account your individual risk profile and needs for return.
- At Riverside, we assess probabilities using systematic quantitative methodology. We do not provide advice. There are no guarantees for positive return. All investing/trading is at your own risk.
- Riverside is about helping active and affluent investors learn how to make better decisions in financial markets.
- All charts shown in this broadcast have been referenced from stockcharts.com, Amibroker or eSignal unless otherwise noted.

Good investing is not an "event" like finding the next growth opportunity or catching the next market turn. Rather, good investing is a disciplined process that converts research and training into a well-tested methodology, and then makes a habit of following that approach day after day.

John P. Hussman, Ph.D
President, Hussman Strategic Advisors

THE PROCESS OF INVESTING

"Good investing is not an "event" like finding the next growth opportunity or catching the next market turn. Rather, good investing is a disciplined process that converts research and training into a well-tested methodology, and then makes a habit of following that approach day after day."

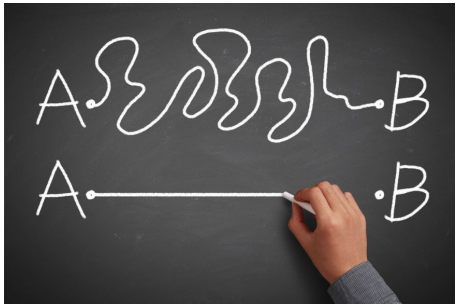
John P. Hussman, Ph.D
President, Hussman Strategic Advisors

INVESTORS MASTER CLASS MODULE #1

KEY TOPICS REVIEWED

- ***EVERY INVESTOR SHOULD BE AWARE THAT THEIR INVESTMENT DECISIONS HAVE BOTH A FINANCIAL AND EMOTIONAL CONSEQUENCE.***
- Understanding your emotions and how they can be used to motivate you into action is extremely important.
- The INFLUENCING FACTORS in the markets will push and pull your emotions on a regular basis;
- The INFLUENCING FACTORS in the markets can and will influence your investment decisions overtime;
- EMOTIONS and INFLUENCING FACTORS have been proven to produce sub-par self directed investor performance – Dahlbar Study;
- **RETAIL TRADERS AND RECREATIONAL INVESTORS ALIKE MUST EMBRACE AND TRADE THE ACTUAL MARKET THEY ARE GIVEN, NOT THE MARKET THEY HOPED FOR OR THE ONE THEY BELIEVE THEY ARE ABOUT TO FIGURE OUT.**





INVESTORS MASTER CLASS MODULE #1

KEY TOPICS REVIEWED

5 PRIMARY ASSET CLASSES



DOMESTIC EQUITIES



FOREIGN EQUITIES



BONDS



REAL ESTATE



COMMODITIES

HISTORICAL PORTFOLIO MODEL THEORY

- Modern Portfolio Theory (MPT);
- Capital Asset Pricing Model (CAPM);
- Efficient Market Hypothesis (EFH);
- Lazy Portfolio's;

INVESTORS MASTER CLASS MODULE #2

PURPOSE

PURPOSE OF MODULE #2

- We are looking to develop a BASELINE for our portfolios;
- Using some simple concepts, we are looking to develop asset buckets based on investor age and risk tolerance;
- Based on the above buckets, we will be reviewing simple asset allocation strategies to aid in managing the assets in the portfolio;
- Following the above we will dive deeper into common Portfolio Metrics and Technicals to better understand common performance and management measures;



INVESTORS MASTER CLASS MODULE #2

KEY CONCEPTS TO BE THINKING ABOUT

AS SELF - DIRECTED INVESTORS WE NEED TO CONSIDER THE FOLLOWING AS A PART OF OUR INVESTMENT PLANS;

- Investment Goals;
- Investor Age;
- Investor Risk Tolerance (Conservative, Moderate, Aggressive);
- Comfort level in managing your own investments;
- How much time do you have to manage your investments?;
- How much time do you want to be spending managing your investments?;
- Do you have to be invested in the markets at all times?
- Would a single asset allocation strategy suit your needs?
- Would a blend of two or more strategies suit your needs?







MISCELLANEOUS

CLASS BREAKS AND REST PERIODS

- We will be taking breaks during the class!
  - 1:00pm – 5min Break
  - 2:00pm – 5min Break
  - 3:00pm – 10min Break
  - 4:00pm – 5min Break
  - Questions and Answers – 30min

QUESTIONS AND ANSWERS

- We have ALOT of material to cover in the class!
- Please hold your questions until the end of the module;
- Please write down your questions when they arise throughout the class;
- We will be holding a 30min Question and Answer Period Following today's session;



ALLOCATIONS AND TIME HORIZON

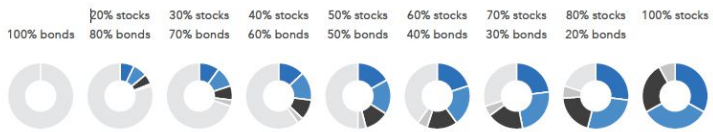
- WHAT TIMEFRAME IS BEST FOR YOU?;
- TIME HORIZON AND INVESTMENT IMPACT;
- YOUNG INVESTORS;
- MIDLIFE INVESTORS;
- EXPERIENCED INVESTORS;

SIMPLE ASSET ALLOCATION TEMPLATES

MODEL ETF PORTFOLIOS

CANADIAN PORTFOLIO MANAGER

Model ETF Portfolios as of June 30, 2017



Scotia iTRADE Commission-Free ETFs

Security Name	Symbol	100% bonds	20% stocks 80% bonds	30% stocks 70% bonds	40% stocks 60% bonds	50% stocks 50% bonds	60% stocks 40% bonds	70% stocks 30% bonds	80% stocks 20% bonds	100% stocks
Horizons S&P/TSX 60 Index ETF	HXT	0.0%	7.0%	10.0%	13.0%	17.0%	20.0%	23.0%	27.0%	33.0%
Horizons S&P 500 Index ETF	HXS	0.0%	7.0%	10.0%	14.0%	17.0%	20.0%	24.0%	27.0%	34.0%
Vanguard FTSE Dev AC ex U.S. Index ETF (CAD-hedged)	VEF	0.0%	5.0%	7.0%	10.0%	12.0%	15.0%	18.0%	20.0%	25.0%
iShares Core MSCI Emerging Markets IMI Index ETF	XEC	0.0%	1.0%	3.0%	3.0%	4.0%	5.0%	5.0%	6.0%	8.0%
iShares High Quality Canadian Bond Index ETF	XQB	100.0%	80.0%	70.0%	60.0%	50.0%	40.0%	30.0%	20.0%	0.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Management Expense Ratio (MER)		0.14%	0.16%	0.16%	0.17%	0.18%	0.19%	0.20%	0.20%	0.22%
Foreign Withholding Tax (Estimated)		0.00%	0.04%	0.06%	0.08%	0.10%	0.12%	0.14%	0.16%	0.20%
Model Performance as of June 30, 2017										
YTD Return		1.76%	2.42%	2.90%	3.22%	3.56%	3.98%	4.31%	4.64%	5.45%
1-Year Return		-0.17%	3.16%	4.91%	6.64%	8.34%	10.14%	11.92%	13.68%	17.37%
3-Year Annualized Return		3.32%	4.59%	5.19%	5.88%	6.45%	7.04%	7.72%	8.29%	9.57%
5-Year Annualized Return		2.72%	5.02%	6.08%	7.29%	8.35%	9.43%	10.62%	11.67%	13.88%
10-Year Annualized Return		4.32%	4.81%	5.01%	5.20%	5.33%	5.41%	5.49%	5.52%	5.48%
20-Year Annualized Return		5.29%	5.75%	5.94%	6.09%	6.23%	6.32%	6.38%	6.43%	6.38%
Lowest 1-Year Return		-2.30%	-3.97%	-8.01%	-11.86%	-15.81%	-19.78%	-23.58%	-27.48%	-35.16%
20-Year Annualized Standard Deviation		3.54%	3.87%	4.65%	5.58%	6.69%	7.87%	9.06%	10.34%	12.97%

Sources: Morningstar Direct, MSCI. S&P Dow Jones, and FTSE TMX Indices courtesy of Dimensional Returns 2.0

This table is published by Justin Bender for your information only. Information on which this table is based is available on request. Particular investments or trading strategies should be evaluated relative to each individual's objectives in consultation with the Investment Advisor. Opinions of Justin Bender constitute his judgment as of the date on this document, and are subject to change without notice. They are provided in good faith but without responsibility for any errors or omissions contained herein. This table is furnished on the basis and understanding that neither Justin Bender nor his employees, agents or information suppliers is to be under any responsibility of liability whatsoever in respect thereof.

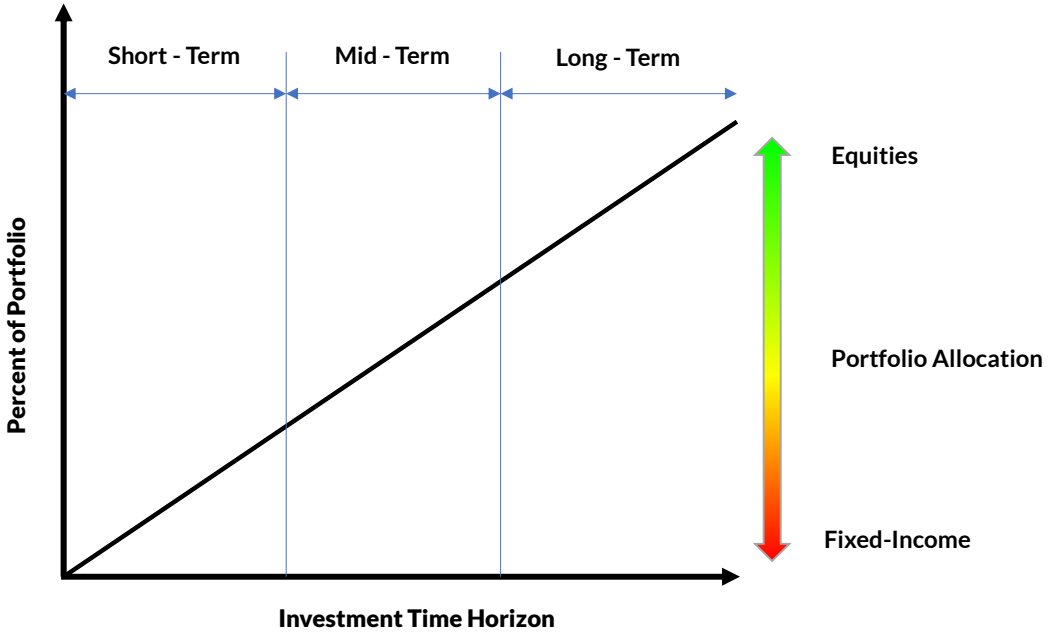
CIPF MEMBER IIROC

While Model Portfolios like this are great for their simplicity they will only get you so far in your investing career;

- **ADVANTAGES – minimal time, minimal effort, acceptable results**
- **DISADVANTAGES – does not take into account investor age, does not protect against Bear Market Crashes**
- **We will discuss further!**

ASSET ALLOCATION TIMELINE

SHORT, MID AND LONGER TERM



THE IMPORTANCE OF TIME

Most investors pay too little attention to time horizon and the important role it plays on their investments.

- Expected rates of Return;
- Expected volatility;
- Expected asset class correlations;

An investors time horizon is the first constraint on a portfolio that should be identified.

Under-estimating or over- estimating these basic concepts can and will significantly impact how you allocate your assets and therefore impact your risk-return profile

YOUNG INVESTORS
LONG TERM ACCUMULATION

PROFILE: investors are typically early in their careers with a long term time horizon. Net worth is small relative to debt. Starting an investment plan at this stage is difficult, however very important.

GOALS: paying down debt, saving for retirement, buying a home, having a family.

RISKS: living a lifestyle they can not afford, incurring significant debt, failing to save for retirement, not establishing a financial plan, spending money on frivolous items, failing to not capitalize on employer retirement matching funds.





YOUNG INVESTORS: LONGER TERM INVESTMENT TIMEFRAME			
Asset Class	**Conservative Investors**	**Moderate Investors**	**Aggressive Investors**
Domestic Equities	30	35	40
Foreign Equities	15	20	25
Real Estate	10	10	10
Commodities	5	5	5
Bonds	40	30	20
Total	**100**	**100**	**100**



YOUNG INVESTORS
EXAMPLE ALLOCATION'S BASED ON RISK TOLERANCE

MID LIFE INVESTORS
GROWTH AND PRESERVATION

PROFILE: investors are in their middle to late working years. Time horizon is still relatively long, need for increased retirement savings and educational savings is high. In this stage income begins to exceed expenses and ability to increase retirement savings goes up. Many folks in this category are in their peak earning years.

GOALS: peaking in their career, putting children through college, increasing contributions for retirement savings, upgrading to a new home, eliminating un-secured debt, deciding when and how best to retire.

RISKS: Failing to increase contributions for retirement savings, spending more money than what is earned, not drafting estate planning documents, failing to no obtain adequate insurance coverage, not giving thought to desired retirement lifestyle and expenses.





MID LIFE INVESTORS: GROWTH AND PRESERVATION			
Asset Class	**Conservative Investors**	**Moderate Investors**	**Aggressive Investors**
Domestic Equities	25	30	35
Foreign Equities	12.5	15	17.5
Real Estate	5	7.5	12.5
Commodities	2.5	5	5
Bonds	55	42.5	30
Total	**100**	**100**	**100**

MID LIFE INVESTORS
EXAMPLE ALLOCATION'S BASED ON RISK TOLERANCE

"EXPERIENCED" INVESTORS

INCOME AND STABILITY

PROFILE: Retired spenders and retired gifter's. People in this group are in one of three stages of retirement early, mid or late. Accordingly, time frames can vary. For many retirees, their expenses will exceed their noninvestment income in retirement. This creates a scenario where retirement expenses will need to be supplemented by investment and retirement income. Having portfolio asset allocation to accommodate this is highly warranted.



GOALS: spending more time with family and friends, taking more vacations, sustaining good health, protecting retirement savings, downsizing their houses and other assets, distributing wealth to family

RISKS: spending more than is appropriate, failing to adjust a financial plan as needed, carrying too much or too little insurance, failing to update wills and trusts, being too conservative so that their portfolio's do not outpace inflation, paying excessive estate taxes due to lack of planning



EXPERIENCED INVESTORS: INCOME AND STABILITY			
Asset Class	**Conservative Investors**	**Moderate Investors**	**Aggressive Investors**
Domestic Equities	15	22.5	30
Foreign Equities	7.5	10	15
Real Estate	5	7.5	10
Commodities	2.5	5	5
Bonds	70	55	40
Total	**100**	**100**	**100**

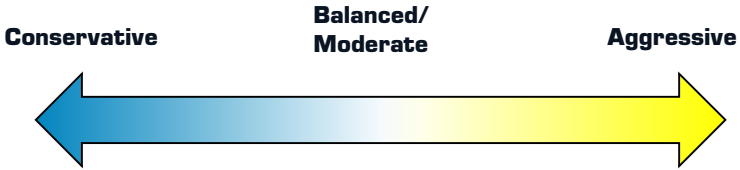
EXPERIENCED INVESTORS
EXAMPLE ASSET ALLOCATION'S BASED ON RISK TOLERANCE

RISK, COMFORT, ALLOCATION PROFILE

KEY CONCEPTS

- Risk aversion is a description of an investor who, when faced with two investments with a similar expected return (but different risks), will prefer the one with the lower risk.
- To avoid an un-necessary risk aversion we need identify our own risk tolerance, comfort levels and investment time horizon;
- Comfort levels often hold sway over most investment decisions;
- We can't predict the future, rather we can make the best decisions now based on the best information we have today;
- We can identify our own comfort levels by completing a Asset Allocation Questionnaire;
- Completing an Asset Allocation Questionnaire, takes minimal time and personal/confidential to you and you only.

COMPLETING AN ASSET ALLOCATION QUESTIONNAIRE IS ONLY A STARTING POINT. MARKET CONDITIONS WILL LIKELY CHANGE YOUR PROFILE MOVING FORWARD!



SAMPLE ONLINE ASSET ALLOCATION SURVEYS

https://www.qualifiedplans.metlife.com/QPlans/pdf/2016_Wilshire_Color_AAQ.pdf

https://www.vanguardcanada.ca/documents/investor-questionnaire.pdf



ALLOCATION TYPES / STRATEGIES

- ASSET ALLOCATION INTRODUCTION;
- STRATEGIC ASSET ALLOCATION (SAA);
- TACTICAL ASSET ALLOCATION (TAA);
- DYNAMIC ASSET ALLOCATION (DAA);

ASSET ALLOCATION EXPLAINED

THE IMPORTANCE OF MPT

WHAT IS ASSET ALLOCATION?

"Asset allocation is an investment strategy that aims to balance risk and reward by apportioning a portfolio's assets according to an individual's goals, risk tolerance and investment horizon. "

https://www.investopedia.com/terms/a/assetallocation.asp

FLASHBACK TO THE MODERN PORTFOLIO THEORY

- Prior to Modern Portfolio Theory (MPT), investment management was a two dimensional process whereby primarily focusing on returns and volatility characteristics of individual securities.
- MPT Changed everything! It added a third dimension.
- MPT examined the interrelationships among asset classes and securities.
- MPT examined the diversification effect on portfolios.
- The Diversification effect refers to the impact that the inclusion of a particular asset or security will have on the volatility or return characteristics of the overall portfolio.



MPT SHIFTED THE FOCUS OF ATTENTION AWAY FROM INDIVIDUAL SECURITIES TO THE OVERALL PORTFOLIO.



DESIGNING A PORTFOLIO

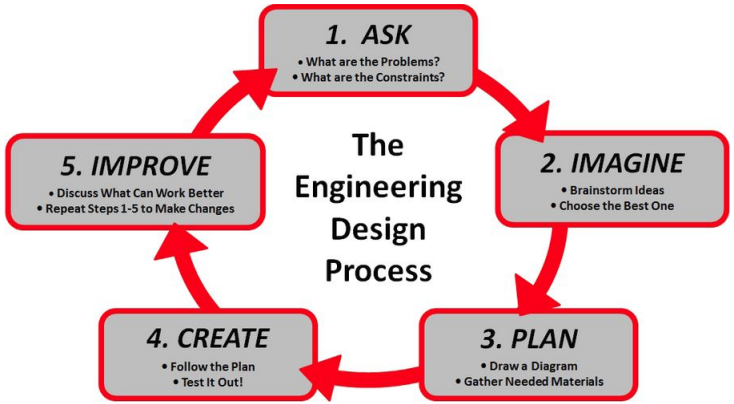
BASIC STEPS

PORTFOLIO DESIGN – 4 KEY COMPONENTS

- Decide which asset classes will be a component in your portfolio;
- Determine the long-term target percentage of the portfolio to allocate to each of these asset classes;
- Specifying a range to which the asset allocation can be altered in an attempt to exploit better performance possibilities in one asset versus another;
- Selecting securities within each of the asset classes;

TO DESIGN YOUR PORTFOLIO, THE FOLLOWING ARE A MUST;

- The above steps are to be completed in accordance with **YOUR** Investment Plan;
- The above steps are to be completed outside of market hours;
- The above steps are to be completed without the current market context in mind;
- The above steps provide a baseline to which we want to construct a portfolio.



THE ASSET CLASSES

IVY PORTFOLIO

5 PRIMARY ASSET CLASSES



DOMESTIC EQUITIES



FOREIGN EQUITIES



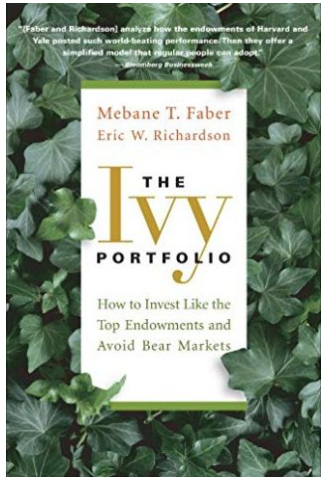
BONDS



REAL ESTATE



COMMODITIES



ALLOCATION STRATEGIES

EXAMPLES

ASSET ALLOCATION STRATEGY EXAMPLES

- Today we will be using timeless strategies as examples;
- These strategies can be transacted in both US and CDN currencies. We will review this in more detail in Module #4.
- Examples shown today are monthly strategies.
- These strategies are simple and easy to follow;
- The strategies discussed today are investment geared and **NOT** trading orientated;
- Investing is **NOT** the same as trading!
- These strategies have been proven to provide consistent returns overtime;
- These strategies are not the only strategies we will be reviewing in the class. More to come in Module #3 and Module #4!!







NEXT DICUSSION TOPICS

- Typical Strategy Performance Metrics – Performance isn't everything!
- Strategic Asset Allocation (SAA) – Example
- Tactical Asset Allocation (TAA) – Example
- Dynamic Asset Allocation (DAA) – Example
- Adaptive Asset Allocation (AAA) – Basic Overview Only
- A Blend of Strategies – the Best of Worlds?
- Strategy Advantages and Dis-Advantages
- Strategy Summary
- Key Takeaways

ALLOCATION STRATEGY METRICS

KEY CONCEPTS

TYPICAL STRATEGY METRICS

Statistic	Strategy	Benchmark	Statistic	Strategy	Benchmark
Annualized Return	9.7%	9.2%	Annualized Volatility	9.7%	9.7%
Sharpe Ratio	0.50	0.46	Sortino Ratio	0.76	0.77
Max Drawdown (EOM)	-42.8% 02/2009	-29.5% 02/2009	Longest Drawdown	34 months	40 months
Ulcer Performance Index	0.78	0.74	% Profitable Months	68.4%	64.0%
Best Month Return	8.4%	10.7%	Worst Month Return	-19.0%	-10.7%
Average Trades per Year	0.1	0.0	Annual Turnover	7.5%	12.1%

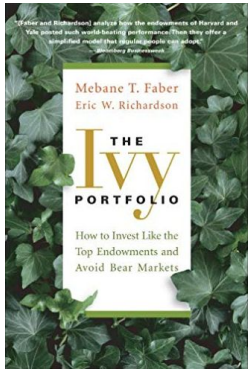
STRATEGIC ASSET ALLOCATION (SAA)

DEFINITION AND BASIC CONCEPT

STRATEGIC ASSET ALLOCATION (SAA)

- Strategic asset allocation starts with a target asset mix based on an investor's expected rate of return, risk tolerance, and the long-term performance of different asset classes.
- SAA makes no attempt to predict the direction or magnitude of short-term market volatility
- Investment portfolios are periodically rebalanced to restore the target asset mix.
- We will discuss re-balancing in more detail later on during the class.
- SAA promotes selling high and buying low.
- Example: Original Ivy Portfolio

ASSET NAME	TARGET ALLOCATION (%)	ETF
Domestic Equities	20	SPY
Foreign Equities	20	EFA
Bonds	20	IEF
Real Estate	20	VNQ
Commodities	20	DBC



KEY TAKEAWAY: The SAA strategy is a strategy whereby asset classes within a portfolio are rebalanced at selected time intervals or allocation thresholds. This not a buy and hold strategy

STRATEGIC ASSET ALLOCATION (SAA)

THE "LAZY PORTFOLIO"

CANADIAN PORTFOLIO MANAGER

Model ETF Portfolios as of June 30, 2017



Scotia iTRADE Commission-Free ETFs

Security Name	Symbol	100% bonds	20% stocks 80% bonds	30% stocks 70% bonds	40% stocks 60% bonds	50% stocks 50% bonds	60% stocks 40% bonds	70% stocks 30% bonds	80% stocks 20% bonds	100% stocks
Horizons S&P/TSX 60 Index ETF	HXT	0.0%	7.0%	10.0%	13.0%	17.0%	20.0%	23.0%	27.0%	33.0%
Horizons S&P 500 Index ETF	HXS	0.0%	7.0%	10.0%	14.0%	17.0%	20.0%	24.0%	27.0%	34.0%
Vanguard FTSE Dev AC ex U.S. Index ETF (CAD-hedged)	VEF	0.0%	5.0%	7.0%	10.0%	12.0%	15.0%	18.0%	20.0%	25.0%
iShares Core MSCI Emerging Markets IMI Index ETF	XEC	0.0%	1.0%	3.0%	3.0%	4.0%	5.0%	5.0%	6.0%	8.0%
iShares High Quality Canadian Bond Index ETF	XQB	100.0%	80.0%	70.0%	60.0%	50.0%	40.0%	30.0%	20.0%	0.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Management Expense Ratio (MER)		0.14%	0.16%	0.16%	0.17%	0.18%	0.19%	0.20%	0.20%	0.22%
Foreign Withholding Tax (Estimated)		0.00%	0.04%	0.06%	0.08%	0.10%	0.12%	0.14%	0.16%	0.20%
Model Performance as of June 30, 2017										
YTD Return		1.76%	2.42%	2.90%	3.22%	3.56%	3.98%	4.31%	4.64%	5.45%
1-Year Return		-0.17%	3.16%	4.91%	6.64%	8.34%	10.14%	11.92%	13.68%	17.37%
3-Year Annualized Return		3.32%	4.59%	5.19%	5.88%	6.45%	7.04%	7.72%	8.29%	9.57%
5-Year Annualized Return		2.72%	5.02%	6.08%	7.29%	8.35%	9.43%	10.62%	11.67%	13.88%
10-Year Annualized Return		4.32%	4.81%	5.01%	5.20%	5.33%	5.41%	5.49%	5.52%	5.48%
20-Year Annualized Return		5.29%	5.75%	5.94%	6.09%	6.23%	6.32%	6.38%	6.43%	6.38%
Lowest 1-Year Return		-2.30%	-3.97%	-8.01%	-11.86%	-15.81%	-19.78%	-23.58%	-27.48%	-35.16%
20-Year Annualized Standard Deviation		3.54%	3.87%	4.65%	5.58%	6.69%	7.87%	9.06%	10.34%	12.97%

Sources: Morningstar Direct, MSCI. S&P Dow Jones, and FTSE TMX Indices courtesy of Dimensional Returns 2.0

This table is published by Justin Bender for your information only. Information on which this table is based is available on request. Particular investments or trading strategies should be evaluated relative to each individual's objectives in consultation with the Investment Advisor. Opinions of Justin Bender constitute his judgment as of the date on this document, and are subject to change without notice. They are provided in good faith but without responsibility for any errors or omissions contained herein. This table is furnished on the basis and understanding that neither Justin Bender nor his employees, agents or information suppliers is to be under any responsibility of liability whatsoever in respect thereof.

CIPF MEMBER IIROC

STRATEGIC ASSET ALLOCATION (SAA)
ADVANTAGES

WHAT ARE THE ADVANTAGES OF STRATEGIC ASSET ALLOCATION??

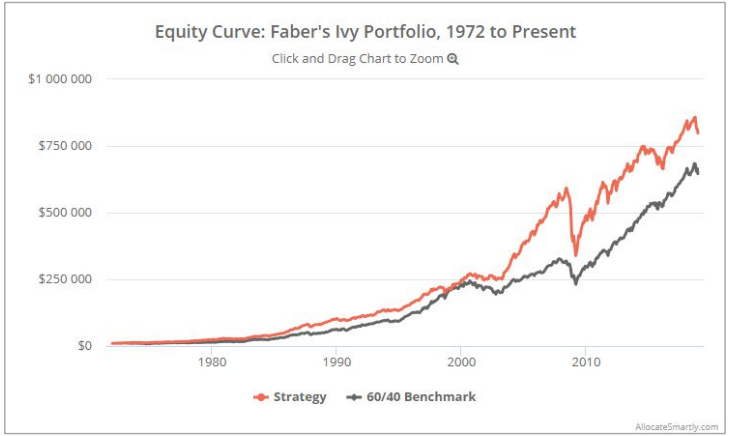
- It's easy to understand and implement;
- It maintains a more consistent portfolio volatility level;
- It preserves the multiple-asset class diversification of the portfolio;
- It provides a strict discipline that prevents the portfolio from becoming overweighed in an asset class at its market top and underweighted at it's market bottom;
- Widely recognised and an accepted methodology to manage portfolio's in the industry

WHAT ABOUT DISADVANTAGES???



STRATEGIC ASSET ALLOCATION (SAA)

IVY PORTFOLIO HISTORICAL PERFORMANCE

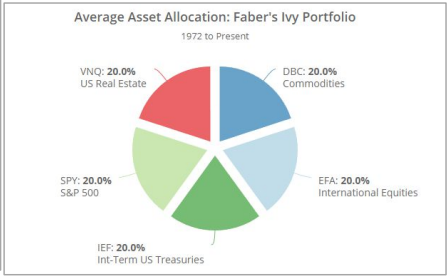


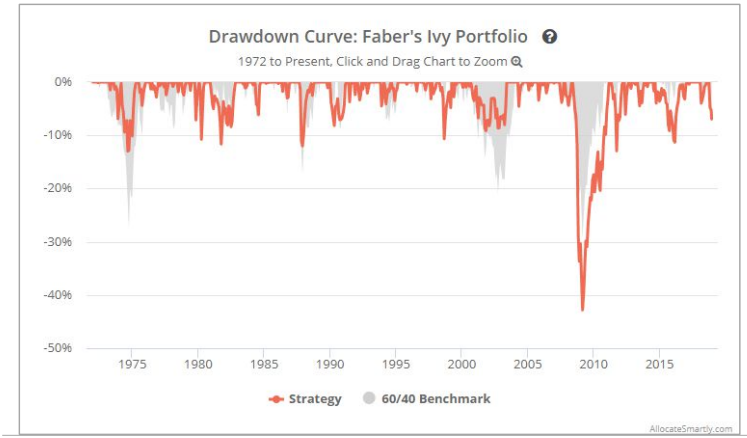
Summary Statistics: Faber's Ivy Portfolio

Based on Month-End Data, 1972 to 11/2018

Statistic	Strategy	Benchmark	Statistic	Strategy	Benchmark
Annualized Return	9.8%	9.4%	Annualized Volatility	9.7%	9.7%
Sharpe Ratio	0.52	0.47	Sortino Ratio	0.78	0.79
Max Drawdown (EOM)	-42.8% 02/2009	-29.5% 02/2009	Longest Drawdown	34 months	40 months
Ulcer Performance Index	0.80	0.76	% Profitable Months	68.6%	64.1%
Best Month Return	8.4%	10.7%	Worst Month Return	-19.0%	-10.7%
Average Trades per Year	0.1	0.0	Annual Turnover	7.5%	12.0%

www.allocatesmartly.com





KEY TAKEAWAY

- ❖ The 2008 Bear Market exposed the major flaw in the Strategic Asset Allocation strategy.
- ❖ Correlations between assets can go to 1.0!!
- ❖ Severe drawdowns can still occur with Strategic Asset Allocation strategies despite a well diversified portfolio

TACTICAL ASSET ALLOCATION (TAA)

DEFINITION AND BASIC CONCEPT

WHAT IS TACTICAL ASSET ALLOCATION (TAA)

- Tactical asset allocation (TAA) is a dynamic investment strategy that actively adjusts a portfolio's asset allocation. The goal of a TAA strategy is to improve the risk-adjusted returns of passive management investing.

- TAA strategies can be either discretionary or systematic.

https://en.wikipedia.org/wiki/Tactical_asset_allocation

ADDITIONAL TAA CONCEPTS

- TAA involves actively looking for short- and intermediate-term undervalued and overvalued assets, and moving between asset classes to take advantage of these market inefficiencies.

- TAA strives to use market timing to achieve stock like returns with bond like volatility.

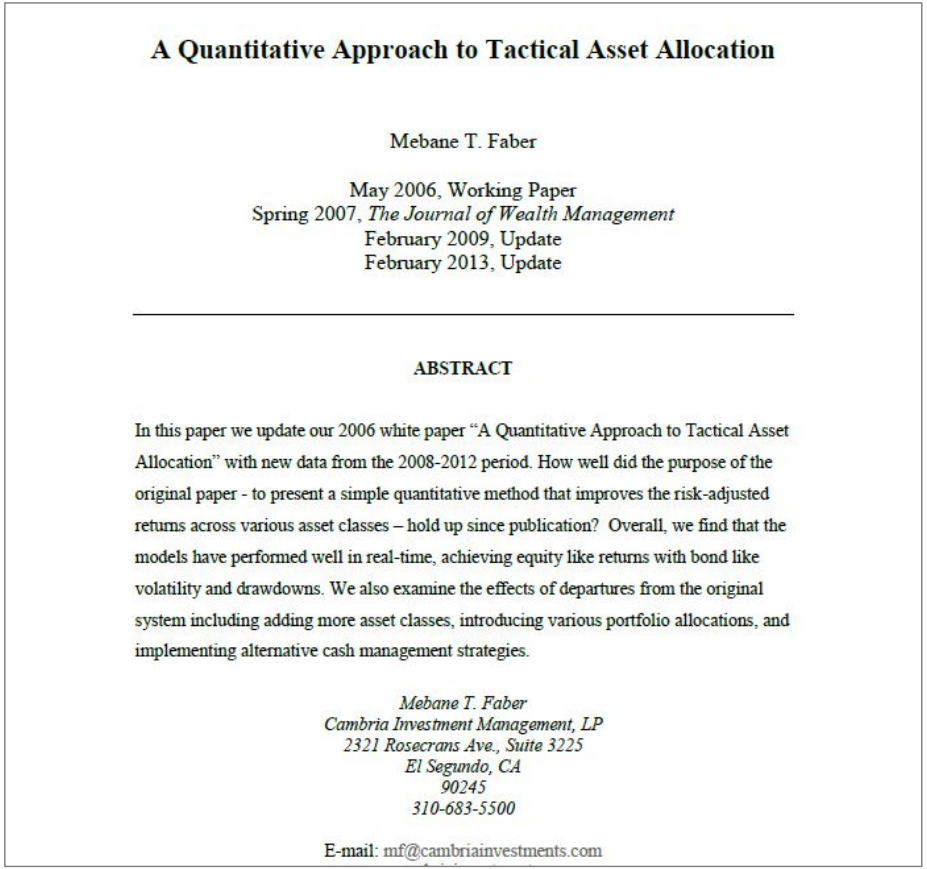
- Example: GTAA_5 (Global Tactical)



TAA is founded on the notion that that market is in some degree inefficient and that a skillful investor can profit from these inefficiencies

TACTICAL ASSET ALLOCATION (TAA)

SUPPORTIVE RESEARCH



A Quantitative Approach to Tactical Asset Allocation

Mebane T. Faber

May 2006, Working Paper
Spring 2007, *The Journal of Wealth Management*
February 2009, Update
February 2013, Update

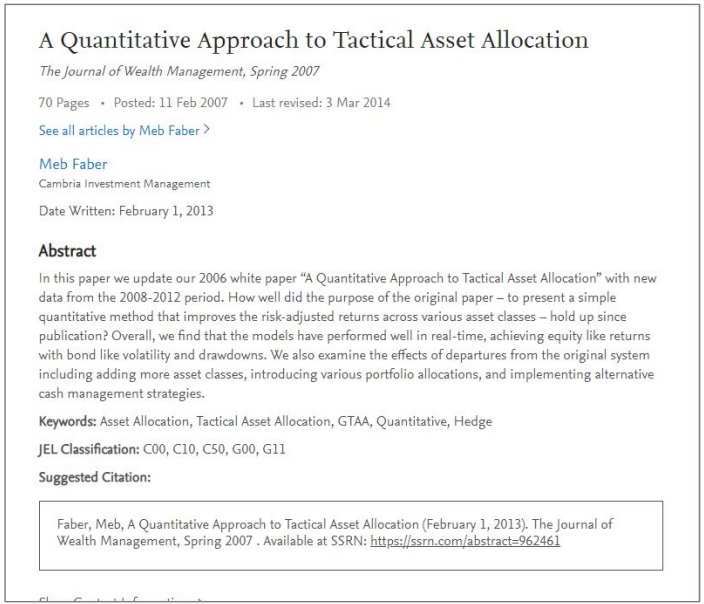
ABSTRACT

In this paper we update our 2006 white paper "A Quantitative Approach to Tactical Asset Allocation" with new data from the 2008-2012 period. How well did the purpose of the original paper - to present a simple quantitative method that improves the risk-adjusted returns across various asset classes – hold up since publication? Overall, we find that the models have performed well in real-time, achieving equity like returns with bond like volatility and drawdowns. We also examine the effects of departures from the original system including adding more asset classes, introducing various portfolio allocations, and implementing alternative cash management strategies.

Mebane T. Faber
Cambria Investment Management, LP
2321 Rosecrans Ave., Suite 3225
El Segundo, CA
90245
310-683-5500

E-mail: mf@cambriainvestments.com





A Quantitative Approach to Tactical Asset Allocation

The Journal of Wealth Management, Spring 2007

70 Pages • Posted: 11 Feb 2007 • Last revised: 3 Mar 2014

See all articles by Meb Faber >

Meb Faber
Cambria Investment Management

Date Written: February 1, 2013

Abstract

In this paper we update our 2006 white paper "A Quantitative Approach to Tactical Asset Allocation" with new data from the 2008-2012 period. How well did the purpose of the original paper – to present a simple quantitative method that improves the risk-adjusted returns across various asset classes – hold up since publication? Overall, we find that the models have performed well in real-time, achieving equity like returns with bond like volatility and drawdowns. We also examine the effects of departures from the original system including adding more asset classes, introducing various portfolio allocations, and implementing alternative cash management strategies.

Keywords: Asset Allocation, Tactical Asset Allocation, GTAA, Quantitative, Hedge

JEL Classification: C00, C10, C50, G00, G11

Suggested Citation:

Faber, Meb, A Quantitative Approach to Tactical Asset Allocation (February 1, 2013). The Journal of Wealth Management, Spring 2007 . Available at SSRN: https://ssrn.com/abstract=962461

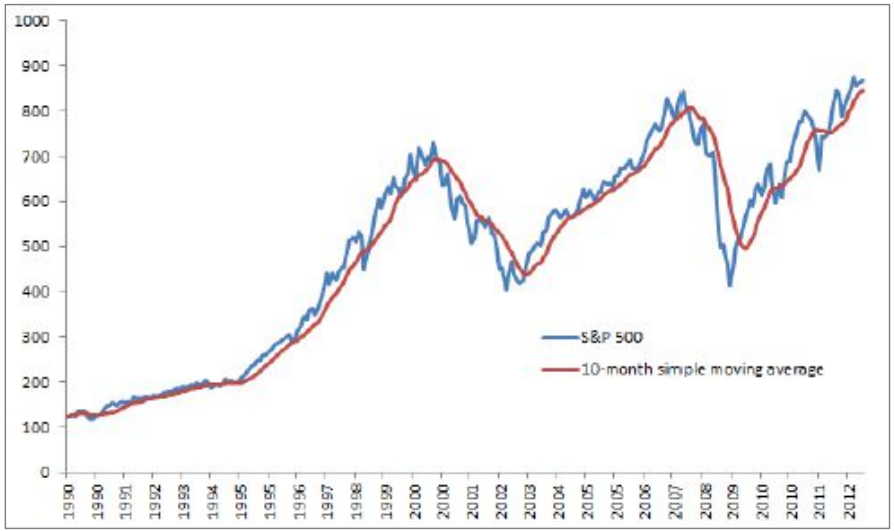
https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=962461

TACTICAL ASSET ALLOCATION (TAA)

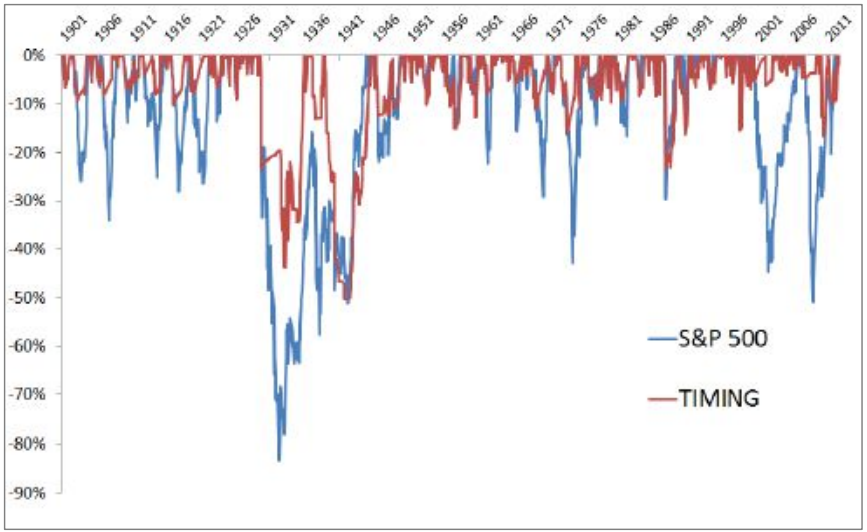
BASIC TIMING MODEL

A Quantitative Approach to Tactical Asset Allocation, Faber, 2013

THE SIMPLE 10-MONTH MOVING AVERAGE



DRAWDOWNS



BUY RULE

Buy when monthly price > 10-month SMA.

SELL RULE

Sell and move to cash when monthly price < 10-month SMA.

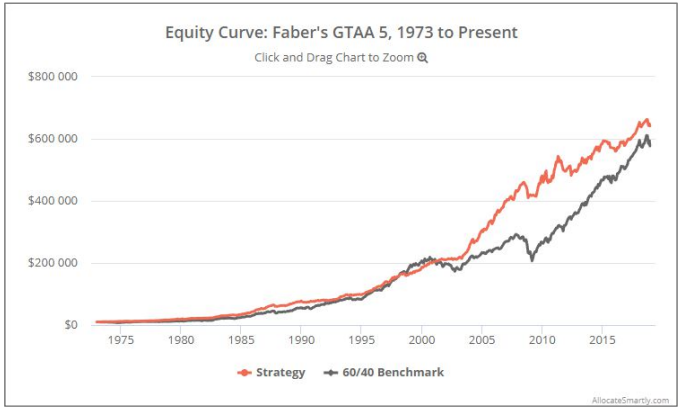
GTAA – 5 ASSET BASKET

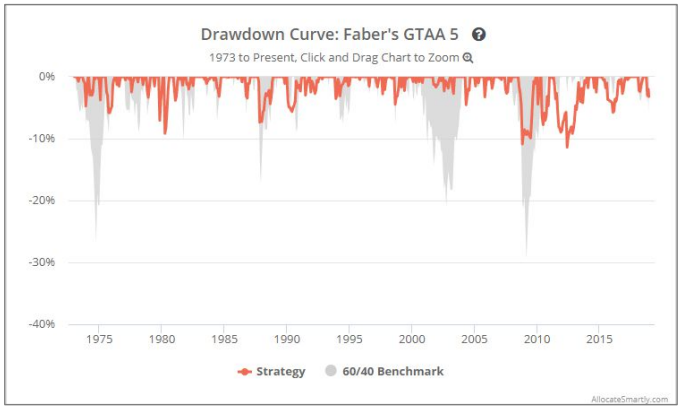
Asset Class (Subgroup)	Index
US Large Cap	S&P 500
Foreign Developed	MSCI EAFE
US 10 Year Government Bonds	GFD
Commodities	Goldman Sachs Commodity Index
Real Estate Investment Trusts	NAREIT Index

GLOBAL TACTICAL ASSET ALLOCATION (GTAA)

(GTAA_5) HISTORICAL PERFORMANCE

GLOBAL TACTICAL ASSET ALLOCATION (GTAA) = IVY PORTFOLIO WITH TIMING (I.E. 10-MONTH SMA RULE)



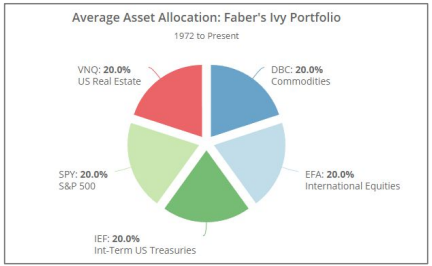


Summary Statistics: Faber's GTAA 5

Based on Month-End Data, 1973 to 11/2018

Statistic	Strategy	Benchmark	Statistic	Strategy	Benchmark
Annualized Return	9.5%	9.3%	Annualized Volatility	6.8%	9.8%
Sharpe Ratio	0.69	0.46	Sortino Ratio	1.14	0.77
Max Drawdown (EOM)	-11.4% 05/2012	-29.5% 02/2009	Longest Drawdown	31 months	40 months
Ulcer Performance Index	1.74	0.74	% Profitable Months	70.1%	63.7%
Best Month Return	7.2%	10.7%	Worst Month Return	-9.2%	-10.7%
Average Trades per Year	7.6	0.0	Annual Turnover	151.3%	12.2%

www.allocatesmartly.com



KEY TAKEAWAY

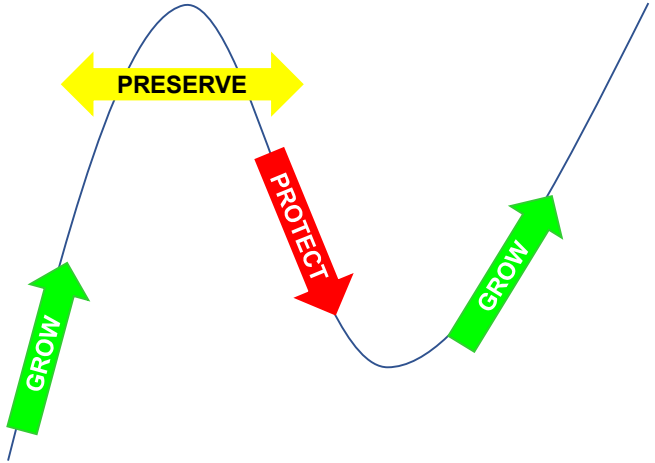
- While the returns from the SAA Ivy Portfolio are similar to the GTAA_5 strategy, the drawdowns using a simple 10-month moving average have been reduced from 42.8% to 11.4%.
- This basic systematic approach to using TAA is very appealing from an investment perspective!
- Its not how much you make, rather, how much you keep that's important!!

DYNAMIC ASSET ALLOCATION (DAA)

KEY CONCEPTS

DYNAMIC ASSET ALLOCATION (DAA)

- Dynamic Asset Allocation uses market timing and relative strength for allocation purposes;
- Dynamic Asset Allocation (DAA) is distinctly different than both Strategic and Tactical Asset Allocation;
- Dynamic asset allocation may involve several portfolio adjustments over the short term to respond to market conditions;
- THERE IS NO TARGET ASSET MIX because portfolio managers can change allocations based on their assessments of current and future market trends;



DAA GENERIC CONCEPT EXAMPLE

- Relative strength is used to identify the top performing assets in a pre-defined list;
- The Top X number of assets are selected for investment consideration;
- Buy signals on the Top X number of assets are permitted if market timing metrics are favorable (i.e. close > 10 month moving average);
- Sell signals on the Top X number of assets are permitted if market timing metrics are un-favorable (i.e. close < 10 month moving average);
- At the “evaluation period”, the above process is repeated to determine the revised asset allocation mix;

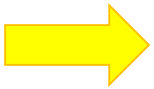


GLOBAL TACTICAL ASSET ALLOCATION (GTAA)

5 TO 13 ASSET CLASSES

GTAA – 5 ASSET BASKET

Asset Class (Subgroup)	Index
US Large Cap	S&P 500
Foreign Developed	MSCI EAFE
US 10 Year Government Bonds	GFD
Commodities	Goldman Sachs Commodity Index
Real Estate Investment Trusts	NAREIT Index



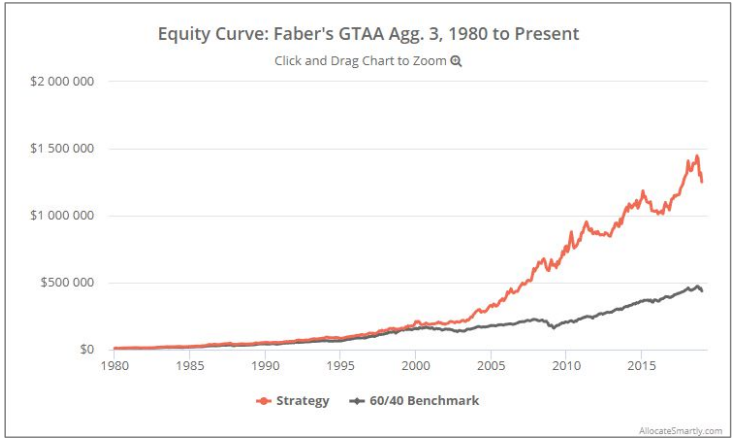
GTAA – 13 ASSET BASKET

Asset Class (Subgroup)	Index
US Large Cap Value	French Fama
US Large Cap Momentum	French Fama
US Small Cap Value	French Fama
US Small Cap Momentum	French Fama
Foreign Developed	MSCI EAFE
Foreign Emerging	MSCI EEM
US 10 Year Government Bonds	GFD
Foreign 10 Year Government Bonds	GFD
US Corporate Bonds	GFD
US 30 Year Government Bonds	GFD
Commodities	Goldman Sachs Commodity Index
Commodities	Gold
Real Estate Investment Trusts	NAREIT Index

A Quantitative Approach to Tactical Asset Allocation, Faber, 2013

DYNAMIC ASSET ALLOCATION (DAA)

(GTAA_AGG.3) HISTORICAL PERFORMANCE

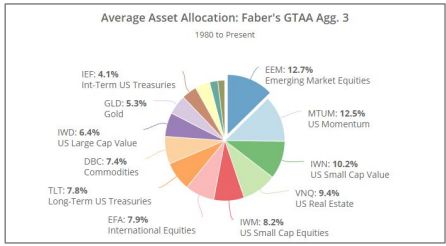


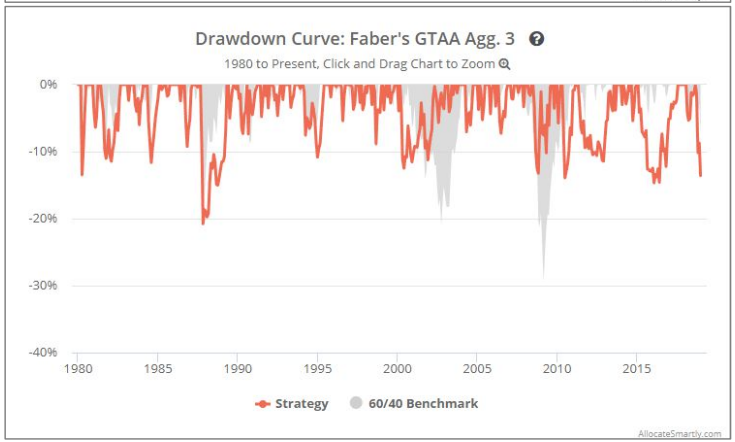
Summary Statistics: Faber's GTAA Agg. 3

Based on Month-End Data, 1980 to 11/2018

Statistic	Strategy	Benchmark	Statistic	Strategy	Benchmark
Annualized Return	13.4%	10.3%	Annualized Volatility	12.6%	9.5%
Sharpe Ratio	0.71	0.62	Sortino Ratio	1.24	1.05
Max Drawdown (EOM)	-20.8% 10/1987	-29.5% 02/2009	Longest Drawdown	33 months	40 months
Ulcer Performance Index	1.54	1.06	% Profitable Months	63.2%	66.0%
Best Month Return	14.8%	9.7%	Worst Month Return	-13.5%	-10.7%
Average Trades per Year	20.2	0.1	Annual Turnover	353.5%	12.6%

www.allocatesmartly.com



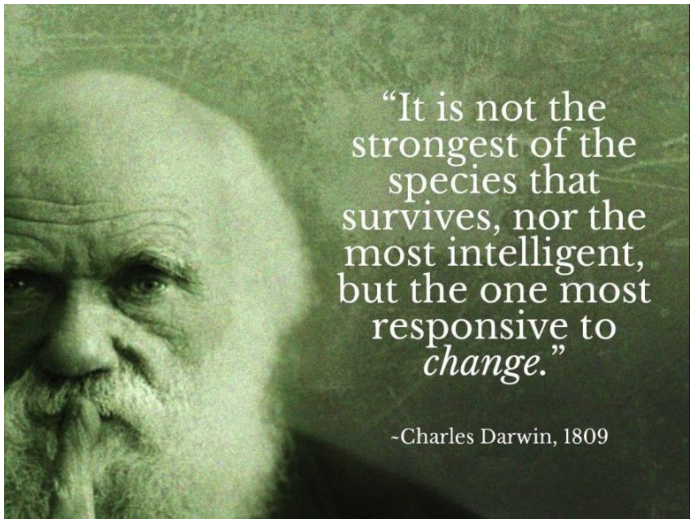


The strategy rules tested here:

- **At the close on the last trading day of the month, calculate the 1, 3, 6, and 12-month returns for each of 13 global asset classes.**
- **Calculate the average of the four values above for each asset class. Go long the 3 asset classes with the highest average value, with 1/3 of the portfolio allocated to each (relative momentum), *unless* that asset will close below its 10-month moving average, in which case that portion of the portfolio is allocated to cash (absolute momentum).**
- **Hold positions until the final trading day of the following month. Rebalance the entire portfolio monthly, regardless of whether there is a change in position.**

ADAPTIVE ASSET ALLOCATION (AAA)

THE NEW KID ON THE BLOCK



ADAPTIVE ASSET ALLOCATION (AAA)

- The "New" Form of Asset Allocation;
- It responds to change quite well!!

ADAPTIVE ASSET ALLOCATION (AAA)

THE NEW KID ON THE BLOCK

ADAPTIVE ASSET ALLOCATION (AAA)

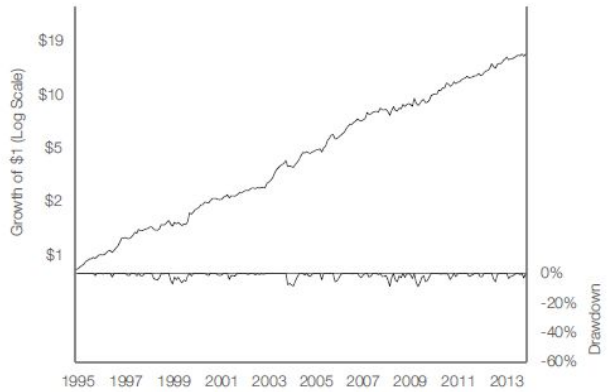
- The "New" Form of Asset Allocation;
- The version of asset allocation uses the methodology of Dynamic Asset Allocation but…
- The weighting of each asset in the portfolio is determined through returns and minimum variance optimization;
- A minimum variance optimization uses a "weighted" covariance matrix calculated based correlations and volatility.

A MINIMUM WHAT?????

- In short……..AAA determines the overall risk of each asset in portfolio relative to each asset in the portfolio and uses this information with price momentum to determine the applicable weight of the asset in the portfolio

" AAA portfolio's are always optimally diversified, which makes them robust to market shocks that critically impair more concentrated portfolios" – Adaptive Asset Allocation, 2016

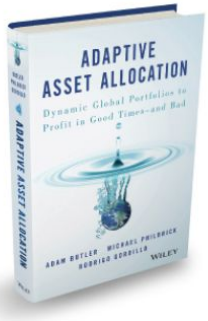
Exhibit 5. 10 Assets, Top 5 By 6-Month Momentum, Minimum Variance, Rebalanced Monthly



Source: ReSolve Asset Management, 2015. Data from CSI. Simulated Performance.
Past results are not necessarily indicative of future results.

Compound Returns	15.0%	Growth of $1	$16.31
Volatility	9.4%	Sharpe Ratio	1.60
Positive Rolling Years	99%	Max Drawdown	-8.8%

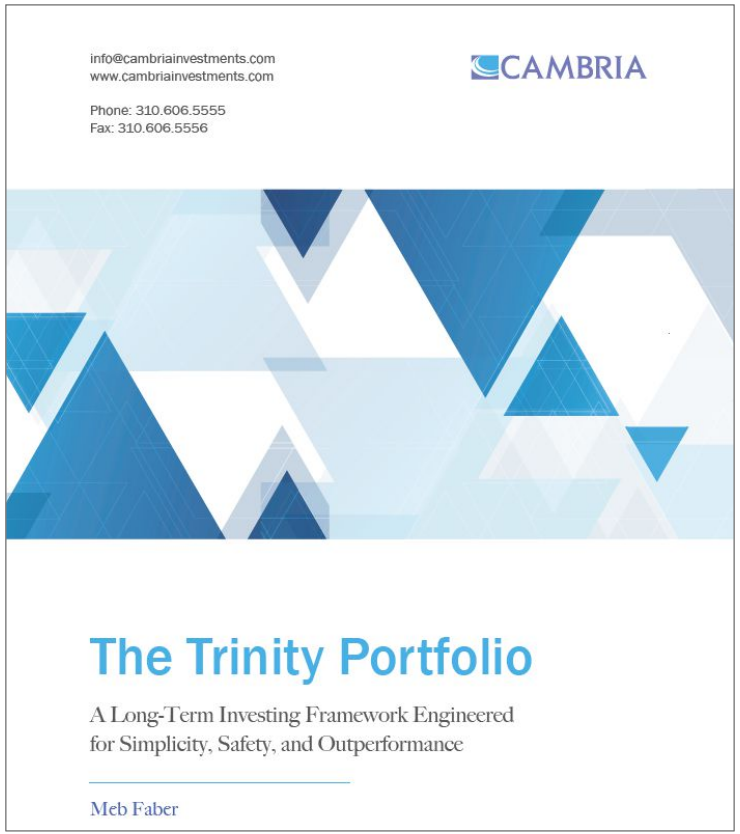
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2328254



"The ReSolve crew at their best… Those enlightened Advisors who understand the power of active asset allocation and risk management should read this book."
Meb Faber,
Cambria Investment Management
November 4, 2015

NOTE: ALTHOUGH AN ATTRACTIVE CONCEPT, THIS ALLOCATION METHOD MAY BE OUT OF REACH FOR MOST SELF DIRECTED INVESTORS

THE TRINITY PORTFOLIO
COMBINING METHODOLOGIES



MEB FABER'S THE TRINITY PORTFOLIO

"Trinity" is a reference to the three core elements of the portfolio:

1) assets diversified across a global investment set,

2) tilts toward investments exhibiting value and momentum traits, and

3) exposure to trend following.

TRINITY PORTFOLIO CONSTRUCTION

- 50% Global Strategic Asset Allocation (SAA)– Buy and Re-Balance;
- 50% Global Dynamic Asset Allocation (DAA)– Similar to methods previously detailed;

THE TRINITY PORTFOLIO
COMBINING METHODOLOGIES

FIGURE 23 - Various Asset Allocations, 1973 – 2015

1973-2015	60% U.S. Stocks 40% U.S. Bonds	60% Global Stocks 40% Global Bonds	Global Asset Allocation	Global Asset Allocation Plus	Global Trend	Trinity
Returns	9.47%	8.77%	9.48%	11.77%	15.53%	13.72%
Volatility	10.05%	10.18%	7.93%	8.41%	9.51%	8.06%
Sharpe Ratio 5.0%	0.44	0.37	0.56	0.80	1.10	1.08
MaxDD	-29.28%	-38.56%	-26.72%	-30.79%	-16.47%	-17.61%
% Positive Months	63.18%	63.57%	66.86%	68.02%	69.38%	69.96%
$100 becomes	$4,941	$3,743	$4,943	$12,079	$50,308	$25,493
Inflation CAGR	4.06%	4.06%	4.06%	4.06%	4.06%	4.06%

Source: Meb Faber, GFD

"Some investors will examine the above table and scratch their heads. If the Global Trend Portfolio has stronger risk adjusted returns than the Trinity Portfolio, why wouldn't we allocate all of our investment to this superior strategy?

"THE REASON IS BECAUSE THE BEST INVESTMENT STRATEGY IS THE ONE THAT YOU'LL BE ABLE TO STICK WITH, YEAR-IN-YEAR OUT."

FIGURE 22 – Timing Strategy vs. Buy and Hold, 1973 - 2015



Source: Meb Faber, GFD

The Trinity Portfolio, with its exposure to both buy-and-hold and trend, reduces the chances you'll jump ship. That's because part of your portfolio will likely be benefitting from either buy-and-hold or trend, or both.

SO, YES, TRINITY HAS SLIGHTLY LOWER RETURNS THAN GLOBAL TREND, BUT IT'S FOR A GOOD REASON: TO SAVE US FROM OURSELVES.

TACTICAL ASSET ALLOCATION (TAA)

STRATEGIC, TACTICAL, DYNAMIC, A BLEND?

STRATEGY SUMMARY RESULTS – 1976 TO 2018

	Benchmark	Strategic Asset Allocation (SAA)	Tactical Asset Allocation (TAA)	Dynamic Asset Allocation (DAA)	Asset Allocation Blend
Statistic	60/40	Ivy Portfolio	GTAA_5	GTAA_13_Agg 3	Trinity Portfolio
Annualized Return	9.20%	9.70%	9.40%	13.20%	11.10%
Annualized Volatility	9.70%	9.70%	6.80%	12.60%	8.00%
Sharpe Ratio	0.46	0.5	0.68	0.69	0.81
Sortino Ratio	0.77	0.76	1.11	1.21	1.37
Ulcer Performance Index	0.74	0.78	1.7	1.5	2.04
Max Drawdown (EOM)	-29.50%	-42.80%	-11.40%	-20.80%	-19.90%
	02/2009	02/2009	05/2012	10/1987	02/2009
Longest Drawdown	40 months	34 months	31 months	33 months	20 months



Minimal Moving Parts — **Transition** — **More Moving Parts**

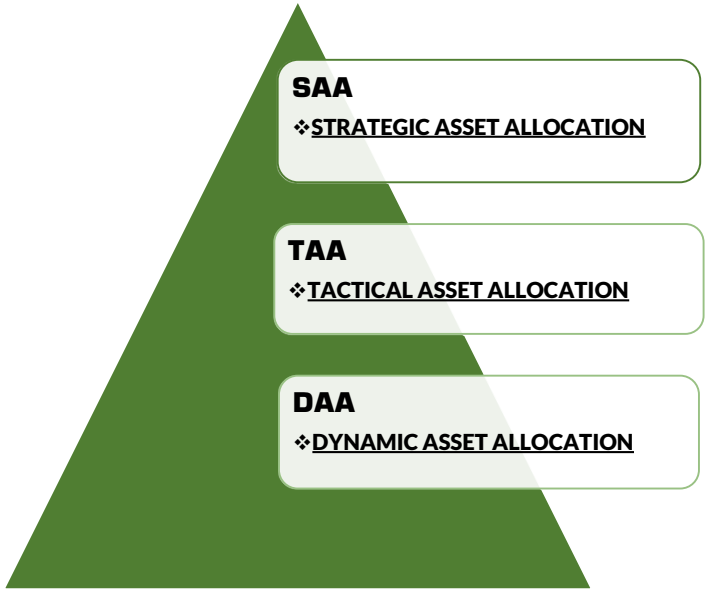




TYPES OF ASSET ALLOCATION

NOT A ONE SIZE FITS ALL

WHAT ASSET ALLOCATION BEST SUITS YOUR NEEDS?

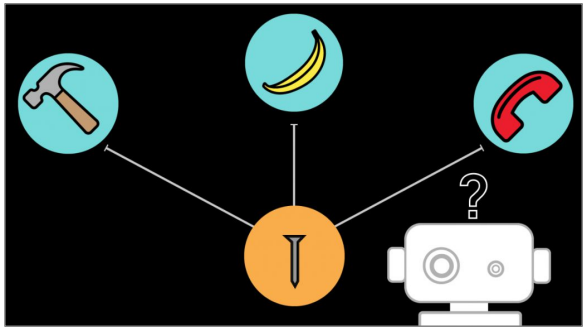


As self-directed investors we need to consider the following as a part of our Investment Plans;

- ❖ Investment Goals;
- ❖ Investor Age;
- ❖ Investor Risk Tolerance (Conservative, Moderate, Aggressive);
- ❖ Comfort level in managing your own investments;
- ❖ How much time do you have to manage your investments?;
- ❖ How much time do you want to be spending managing your investments?;
- ❖ Do you have to be invested in the markets at all times?
- ❖ Would a single asset allocation strategy suit your needs?
- ❖ Would a blend of two or all three strategies suit your needs?

THE ASSET ALLOCATION STRATEGY FOR YOUR PORTFOLIO, NEEDS TO BE DEVELOPED FOR YOU!

COMMON SENSE
GOES A LONG WAY……









ALLOCATION CONCEPTS

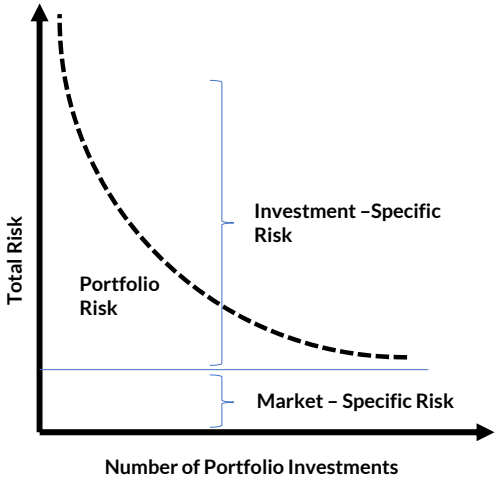
- DIVERSIFICATION VS ALLOCATION;
- RE-BALANCING;
- BENCHMARKS;

ASSET ALLOCATION VS DIVERSIFICATION

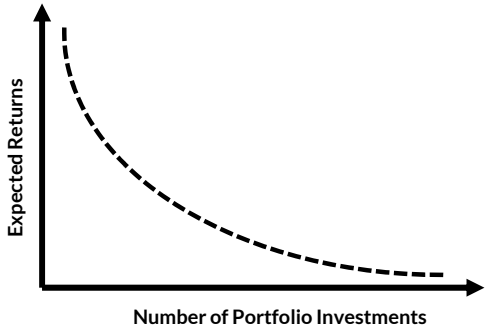
SIMILARITIES AND DIFFERENCES

ASSET ALLOCATION: involves investing in those asset classes which possess a risk and return profile that will achieve objectives despite constraints.

DIVERSIFICATION: involves investing in a significant number of securities within each asset class in order to minimise investment - specific risk. This impact is minimised through the use of ETF's.

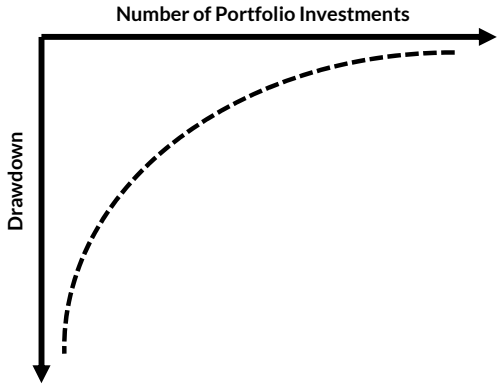


By increasing the number of positions we typically reduce the performance of the strategy…..however….



We can expect drawdowns to be less by increasing the number of positions in the strategy.

We need to find a balance between performance and drawdowns…RISK ADJUSTED RETURNS



PORTFOLIO REBALANCING
DEFINITION AND CONCEPTS

REBALANCING SPECIFICS

- Re-balancing is the task of returning asset classes from the current allocation mix to the optimal asset mix;
- Due to asset class price movements, some asset classes will need to be sold while others need to be purchased;

TYPES OF RE-BALANCING

TACTICAL BANDS (FLOOR VS CEILING)

- Rebalancing may be triggered if allocations move outside of the portfolio allocation ranges;
- Pre-defined allocation ranges help aid when to re-balance your portfolio. These allocation ranges are also called "Tactical Bands"

TIME BASED RE-BALANCING

- Re-balancing at a pre-defined period of time (i.e. monthly, quarterly, yearly)

TACTICAL BANDS - REBALANCE AT FLOORS AND CEILINGS - EXAMPLE

Asset Class	Current Asset Allocation	Target Lower Limit	Optimal Asset Allocation	Target Upper Limit
Domestic Equities	33	25	30	35
Foreign Equities	17	10	15	20
Bonds	39	57	40	23
Real Estate	8	5	10	15
Commodities	3	3	5	7
Total	100	100	100	100

"To many, it Is an unassailable principle: Investors should periodically rebalance their portfolios to their target mix of stocks, bonds, cash and alternatives that best suits their risk tolerance. Doing so is widely considered a best practice for reaching one's long-term financial goals." Powell, 2017



PORTFOLIO REBALANCING

DOES REBALANCING ADD VALUE?

"Based on a number of financial research articles it has been concluded re-balancing does in fact increase the return of a portfolio by up to 2% per year." Source unknown

https://seekingalpha.com/article/4075169-value-tactical-rebalancing

The Value Of Tactical Rebalancing

May 22, 2017 8:08 AM ET | 16 comments | Includes: AAPL, AMZN, FB, JNJ, VBMFX, VFINX



Value/Fundamental Investor Mute

Value, event-driven, macro, Growth

Follow

(405 followers)

- Simple backtest 2000 – 2016
- 60/40 Portfolio
- Starting Equity Value = $1,000,000
- Vanguard 500 Index Inv (MUTF:VFINX)
- Vanguard Bond Index Fund (MUTF:VBMFX)

WITHOUT REBALANCING

"no rebalancing would have an after tax balance of $1,940,335 at the beginning of 2016"



WITH REBALANCING

"With 5% tactical bands on both the equity and fixed income portions of your portfolio, the total return jumps up to $2,317,806 after tax in the beginning of 2016 after the initial investment of $1,000,000 in 2000."

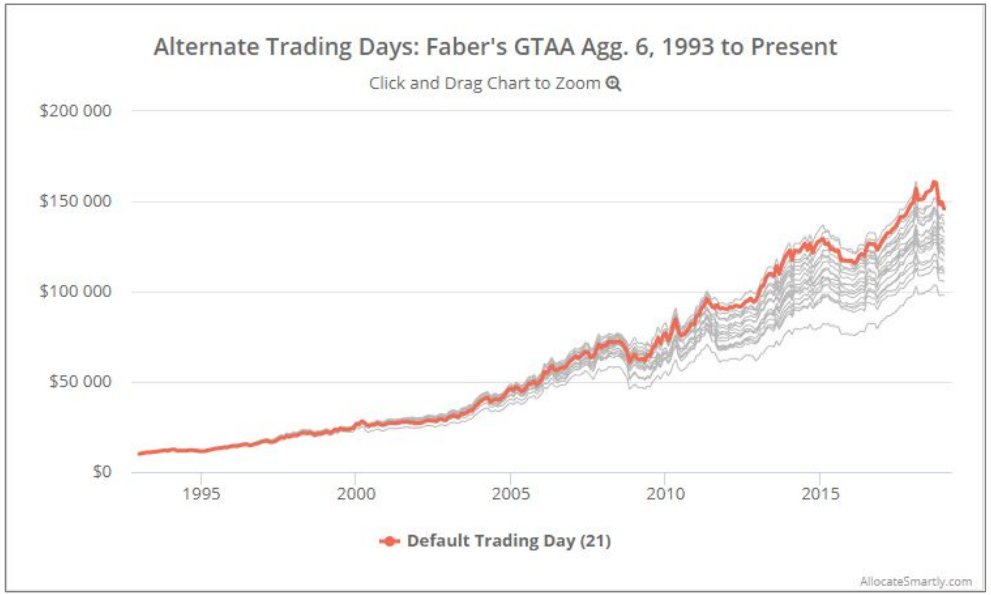


PORTFOLIO REBALANCING
WHEN TO REBALANCE?

WHEN TO RE-BALANCE?

Studies *show that stocks perform best early or end of the month. This is when institutional investors make changes to their portfolios. Prices then are most representative of their true value.*

MEB FABER'S GLOBAL TACTICAL ASSET ALLOCATION – AGG. 6: ALTERNATE TRADING DAYS
www.allocatesmartly.com



Summary Statistics for Alternate Trading Days
Based on Daily Data, 1993 to Present

Day of Month	Annual Return	Sharpe Ratio	Sortino Ratio	Max DD (EOD)	UPI
1	10.5%	0.85	1.59	-18.6%	1.46
2	10.8%	0.91	1.71	-15.1%	1.73
3	10.3%	0.83	1.55	-21.8%	1.59
4	10.3%	0.83	1.55	-16.6%	1.47
5	10.1%	0.81	1.44	-21.7%	1.29
6	9.7%	0.74	1.28	-22.6%	1.12
7	10.0%	0.77	1.35	-19.6%	1.21
8	9.7%	0.75	1.31	-20.9%	1.20
9	9.9%	0.76	1.31	-22.6%	1.23
10	10.2%	0.80	1.51	-19.4%	1.43
11	9.2%	0.67	1.13	-24.7%	1.02
12	10.6%	0.85	1.58	-18.0%	1.62
13	9.7%	0.73	1.28	-22.8%	1.18
14	9.5%	0.71	1.21	-23.8%	1.06
15	10.1%	0.78	1.32	-21.9%	1.22
16	10.5%	0.84	1.49	-16.7%	1.49
17	10.3%	0.82	1.43	-17.6%	1.49
18	10.4%	0.84	1.52	-17.3%	1.58
19	10.8%	0.87	1.52	-19.3%	1.59
20	10.6%	0.87	1.57	-15.2%	1.67
21★	10.9%	0.89	1.58	-21.2%	1.60

PORTFOLIO REBALANCING
A CONTROVERSIAL TOPIC

THE WALL STREET JOURNAL.

U.S. Edition ▾ | January 2, 2019 | Print Edition | Video

Home World U.S. Politics Economy Business Tech **Markets** Opinion Life & Arts Real Estate WSJ. Magazine

MARKETS | YOUR MONEY | JOURNAL REPORTS: FUNDS & ETFS

Portfolio Rebalancing Might Be Overrated

Some investment experts challenge the notion that it's a best practice for reaching long-term financial goals

By Robert Powell
Updated Jan. 9, 2017 11:55 a.m. ET

"Michael Falk, a chartered financial analyst, author and partner at Focus Consulting, says rebalancing makes two false assumptions: One, that all securities are cyclical and regress to a mean. "Some securities fall and can't get back up," Mr. Falk says. And two, that all regressions to the mean take the same amount of time. "Hence, rebalancing cannot be assumed to always add value," he concludes."

https://www.wsj.com/articles/portfolio-rebalancing-might-be-overrated-1483931101

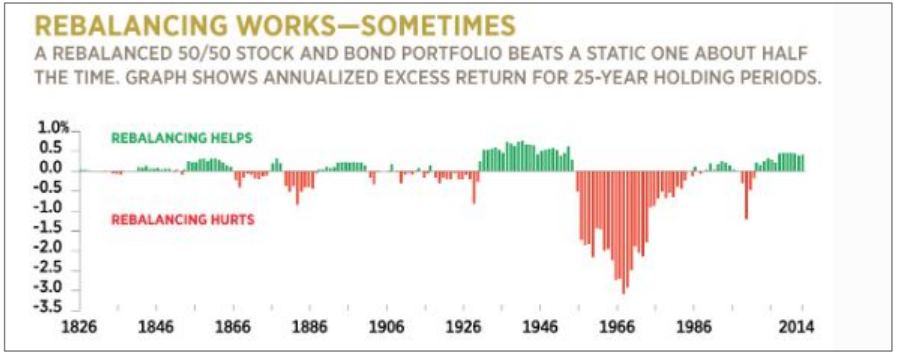
24,273 views | Feb 11, 2015, 08:35pm

Does Rebalancing Boost Returns?



William Baldwin Senior Contributor ⓘ
Taxes

This story appears in the March 2, 2015 issue of Forbes. Subscribe



https://www.forbes.com/sites/baldwin/2015/02/11/does-rebalancing-boost-returns/#21337a965296

PORTFOLIO REBALANCING

SOMETHING TO PONDER

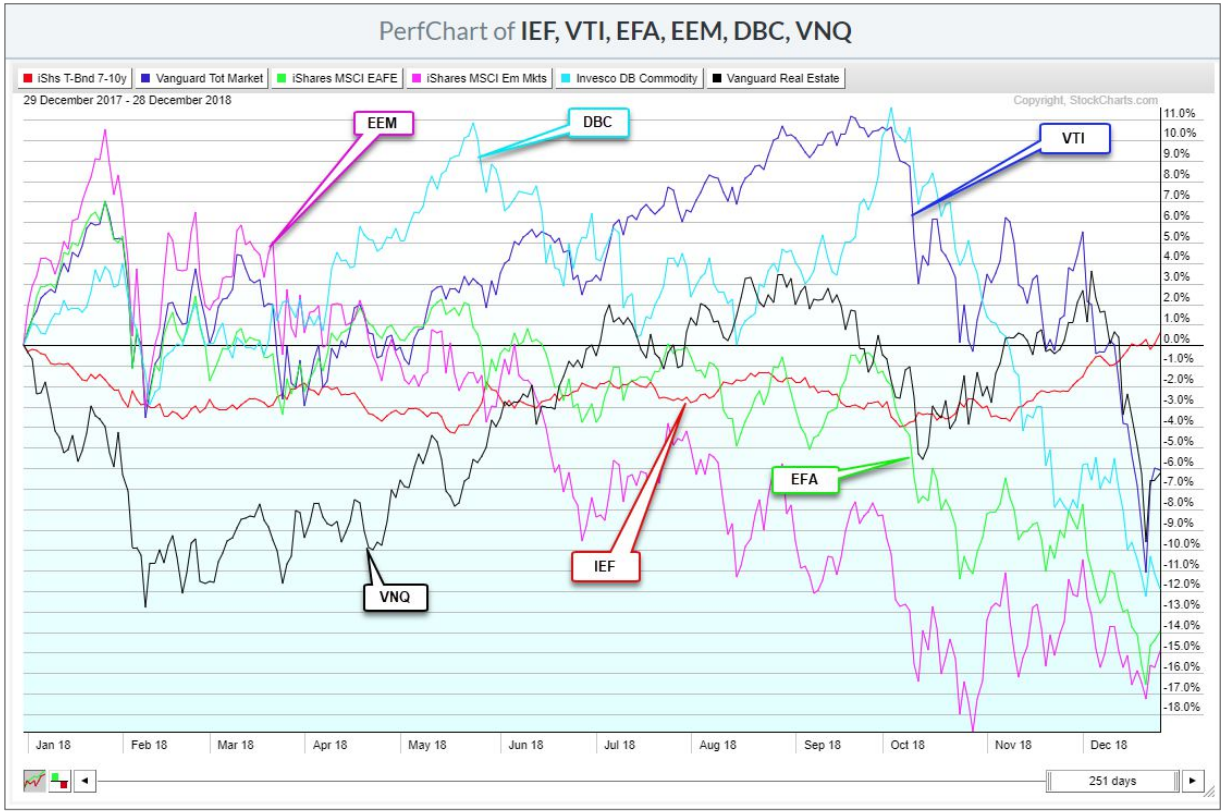
REBALANCING CONCEPT TO CONSIDER

"Rebalancing your portfolio promotes buying low and selling high. The result is capturing the asset allocation benefit of selling potentially overvalued assets that have performed strongly and then buying potentially undervalued assets that have performed poorly"

2018 EXAMPLE – EEM and EFA

- As self directed investors and traders, we don't have buy or hold, unless we choose to.
- If EEM or EFA were holdings in your portfolio in 2018, rebalancing your portfolio would involve buying both of these securities and losses would have taken place.

"THE TREND ISN'T EVERYTHING….IT'S THE ONLY THING"



PORTFOLIO REBALANCING

SCALABILITY / FEE'S AND RETURNS

	50 Stock Portfolio	100 Stock Portfolio	150 Stock Portfolio	200 Stock Portfolio	250 Stock Portfolio	300 Stock Portfolio	500 Stock Universe
1 month hold	17.0%	14.4%	13.6%	12.7%	12.1%	11.5%	9.8%
2 month hold	16.1%	14.2%	13.2%	12.6%	12.0%	11.4%	9.8%
3 month hold	15.2%	13.8%	12.9%	12.3%	11.7%	11.2%	9.8%
4 month hold	14.5%	13.5%	12.8%	12.1%	11.6%	11.2%	9.8%
5 month hold	14.4%	13.3%	12.6%	12.0%	11.6%	11.2%	9.8%
6 month hold	13.9%	13.1%	12.4%	11.9%	11.5%	11.1%	9.8%
7 month hold	13.7%	12.8%	12.1%	11.7%	11.3%	11.0%	9.8%
8 month hold	13.4%	12.6%	11.9%	11.5%	11.2%	10.9%	9.8%
9 month hold	12.9%	12.2%	11.6%	11.2%	11.0%	10.8%	9.8%
10 month hold	12.6%	11.9%	11.4%	11.0%	10.9%	10.7%	9.8%
11 month hold	12.2%	11.6%	11.1%	10.8%	10.7%	10.5%	9.8%
12 month hold	11.8%	11.3%	10.8%	10.6%	10.5%	10.4%	9.8%

Results are hypothetical, and are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Please see disclosures for additional information.

Antonacci (2014)

PORTFOLIO REBALANCING

FEE'S AND RETURNS



Invesco DWA Momentum ETF (PDP)
Expense Ratio 0.63%
Total Assets $1.25B
Returns Since Inception = 109.19%

Applicable Benchmark for PDP based on Morningstar

- Russell Mid Cap Growth

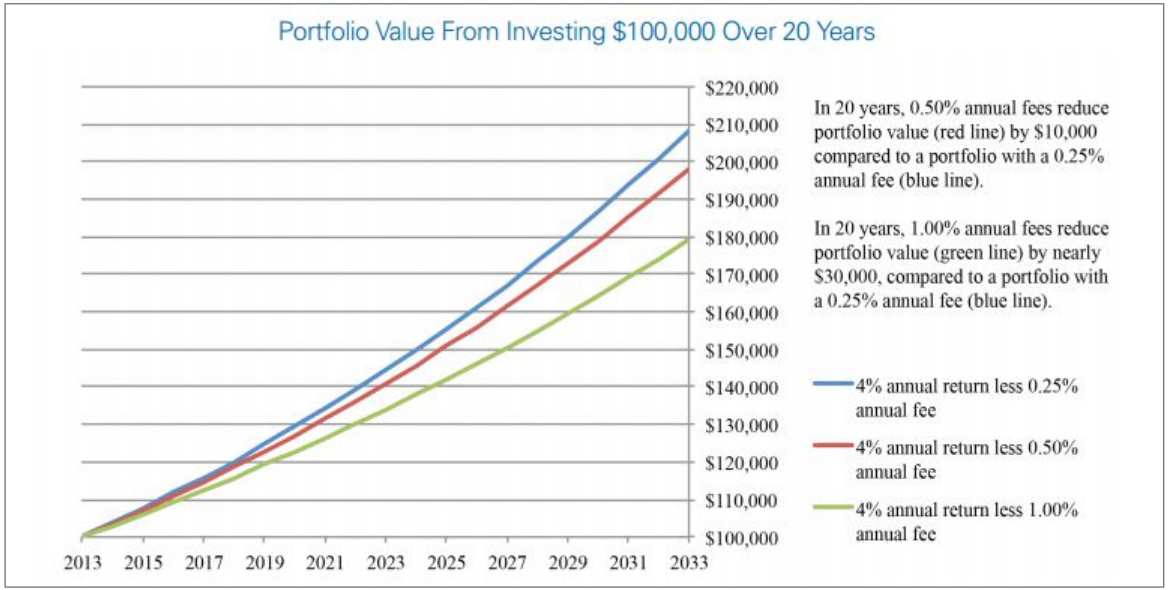
iShares Russell Mid-Cap Growth ETF (IWP)
Expense Ratio 0.25%
Total Assets $9.1B
Returns Since Inception = 140.79%

SHOULD I TAKE THE BLUE PILL OR THE RED PILL?



INVESTMENT FEE'S
LONG TERM IMPACTS

SEC
Office of Investor Education and Advocacy



https://www.sec.gov/investor/alerts/ib_fees_expenses.pdf

BENCHMARKS
BASIC DEFINITION AND CONCEPT

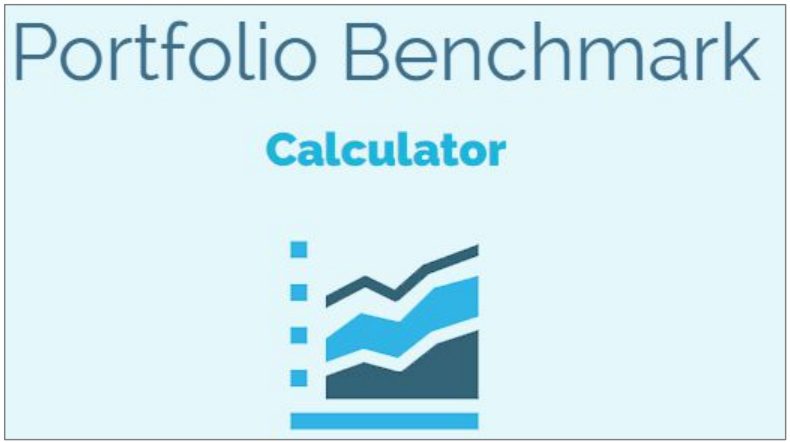
PORTFOLIO BENCHMARK

The following definition of a Benchmark has been referenced directly from the Ontario Securities Commission website;

"A benchmark is a standard against which you can measure the performance of investments. Benchmarks can help you evaluate the performance of a portfolio as a whole rather than focusing on individual investments.

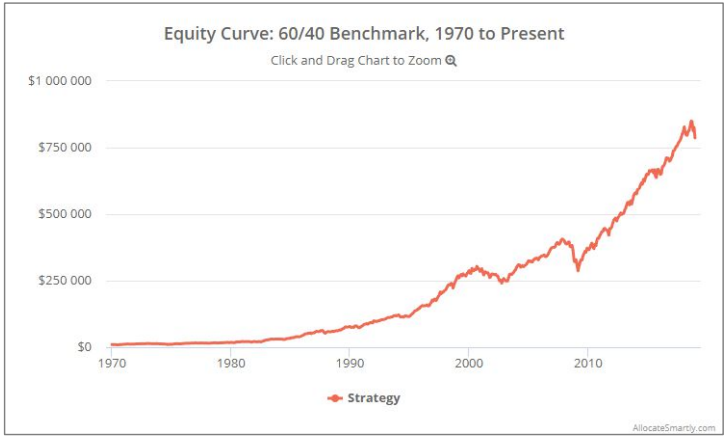
You can use benchmarks to compare a portfolio's performance to a passive investment strategy with a similar level of risk. Active investment strategies try to match or beat the benchmark, and any difference reflects the value of the strategy relative to the benchmark."

https://www.getsmarteraboutmoney.ca/calculators/portfolio-benchmark-calculator/



BENCHMARKS

THE 60/40 SPLIT

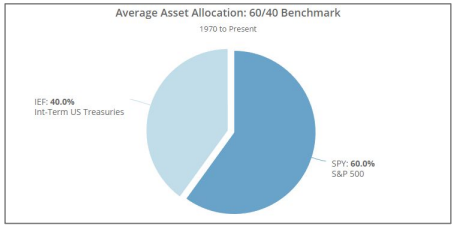


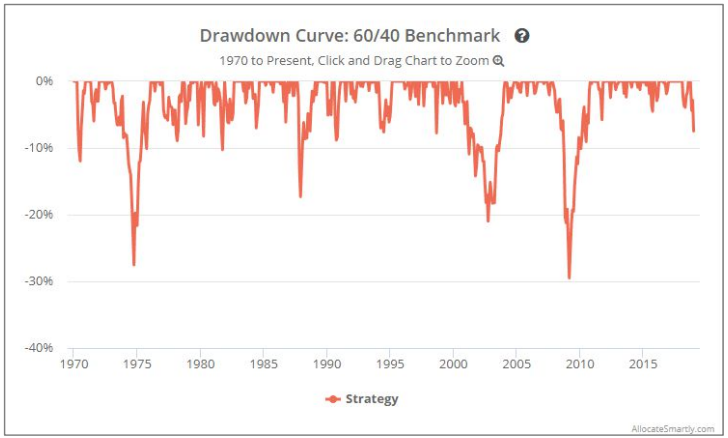
Summary Statistics: 60/40 Benchmark

Based on Month-End Data, 1970 to 11/2018

Statistic	Strategy	Benchmark	Statistic	Strategy	Benchmark
Annualized Return	9.4%	9.4%	Annualized Volatility	9.8%	9.8%
Sharpe Ratio	0.47	0.47	Sortino Ratio	0.79	0.79
Max Drawdown (EOM)	-29.5% 02/2009	-29.5% 02/2009	Longest Drawdown	40 months	40 months
Ulcer Performance Index	0.78	0.78	% Profitable Months	63.9%	63.9%
Best Month Return	10.7%	10.7%	Worst Month Return	-10.7%	-10.7%
Average Trades per Year	0.0	0.0	Annual Turnover	11.9%	11.9%

www.allocatesmartly.com





ABOUT THE STRATEGY;

- 60% investment in SPY (S&P 500);
- 40% investment in IEF (intermediate-term US Treasuries)
- Rebalanced monthly.

BENCHMARKS
THE 60/40 SPLIT

Peter Bernstein interview
He may know more about investing than anyone alive.
October 15, 2004: 4:31 PM EDT
By Jason Zweig, MONEY Magazine

"For institutional investors, the policy portfolio [a rigid allocation like 60% stocks, 40% bonds] had become a way of passing the buck and avoiding decisions. The problem was that institutions had settled on a [mostly stock] asset allocation because in the long run, they concluded, that's the only place to be. And I think the long run ain't what it used to be. Stocks don't have to do well in the future because they did well in the past. In fact, the opposite may be more likely."

https://money.cnn.com/2004/10/11/markets/benstein_bonus_0411/index.htm

For more information on Peter L Bernstein, see the following link;

http://jpm.iijournals.com/peter-bernstein



The essence of risk management lies in maximizing the areas where we have some control over the outcome while minimizing the areas where we have absolutely no control over the outcome.

— Peter L. Bernstein —

AZ QUOTES

BENCHMARKS
A CONTROVERSIAL TOPIC


ETF STRATEGY

Industry News | Equities | Fixed Income | Commodities | Alternatives & Multi-Asset | Countries & Regions | Themes & Strategy

Home | Corporate Info | Follow us on Twitter @ETF_Strategy

Exponential rise in indices spells "death of benchmarking", argues Bernstein

Nov 7th, 2017 | By George Watson | Category: ETF and Index News

https://www.etfstrategy.com/exponential-rise-in-indices-spells-death-of-benchmarking-argues-bernstein-48485/

"The act of passive investing is never truly passive, and Bernstein argues that the importance of asset allocation has been masked by the fact that equity, bond and credit markets have all risen over the past 35 years in an extraordinary process of asset price inflation. A future of low returns would bring asset allocation sharply into focus and expose the myth of purely passive investing.

The report concludes by stating that client outcomes are what matter. Beating a benchmark does not mean that the benchmark was important for the client aim or the weight given to it appropriate. A low return world will thrust asset allocation into the limelight, especially if returns in capital markets fall below growth liabilities in the real world. Bernstein argues it would be more fruitful to pay for allocation and implementation in proportion to how they aid client outcomes, implying new fee structures, different targets for asset managers, and new thinking on the part of asset owners."

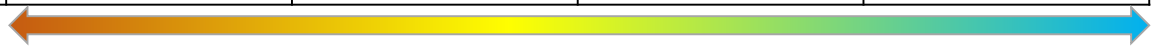
BENCHMARKS

BENCHMARK VS STRATEGY

TIM'S THOUGHTS AND COMMENTS

- The intention of most active portfolio managers is to provide additional "Alpha" with strategies of increased complexity;
  - If you are increasing the complexity of the strategy, the benchmark complexity needs to match the strategy;
  - The example below illustrates the various asset allocation strategies and ideas for "applicable" benchmarks;

	STRATEGIC ASSET ALLOCATION (SAA)	TACTICAL ASSET ALLOCATION (TAA)	DYNAMIC ASSET ALLOCATION (DAA)	"TRINITY" STYLE ASSET ALLOCATION
BENCHMARK	**60/40 Split** (Equities/Bonds)	**Ivy Portfolio** (Buy and Rebalance)	**GTAA_5** (Ivy Portfolio with Market Timing)	50% 60/40 Split (Equities/Bonds) 50%GTAA_5 (Ivy Portfolio with Market Timing)
STRATEGY	**Ivy Portfolio** (Buy and Rebalance)	**GTAA_5** (Ivy Portfolio with Market Timing)	**GTAA_13** (Ivy Portfolio with 13 assets, Market Timing and Relative Strength)	50% Ivy Portfolio (Buy and Rebalance) GTAA_13 (Ivy Portfolio with 13 assets, Market Timing and Relative Strength)



Simplistic Strategy
Simplistic Benchmark

Increased Strategy Complexity
Increased Benchmark Complexity



PORTFOLIO METRICS

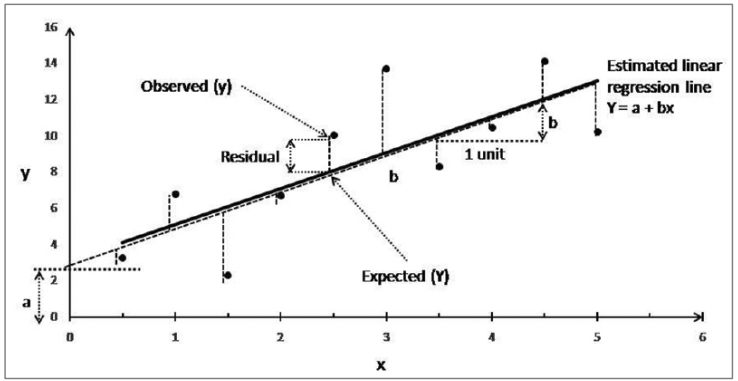
- LINEAR REGRESSION;
- BETA;
- ALPHA
- CORRELATIONS;

CAPITAL ASSET PRICING MODEL

CONCEPTS STILL USED TODAY

CONCEPTS DERIVED FROM THE CAPITAL ASSET PRICING MODEL (CAPM)

- What early CAPM did was a linear regression (method of least squares) between the excess return (return less the risk-free rate) of an asset (or portfolio of assets) and the excess return of the market index;
- A linear regression determines the relationship between two or more variables and provides a measure that allow you to determine the accuracy of that relationship;
- Through this regression analysis….the concepts of both Beta and Alpha were born;





https://medium.com/python-data/capm-analysis-calculating-stock-beta-as-a-regression-in-python-c82d189db536

LINEAR REGRESSION ANALYSIS

LINE OF BEST FIT

The method of least squares involves producing a straight line of best fit price action over a selected period of time. The equation of a straight line is illustrated below;

$$Y = a + bX$$

where;

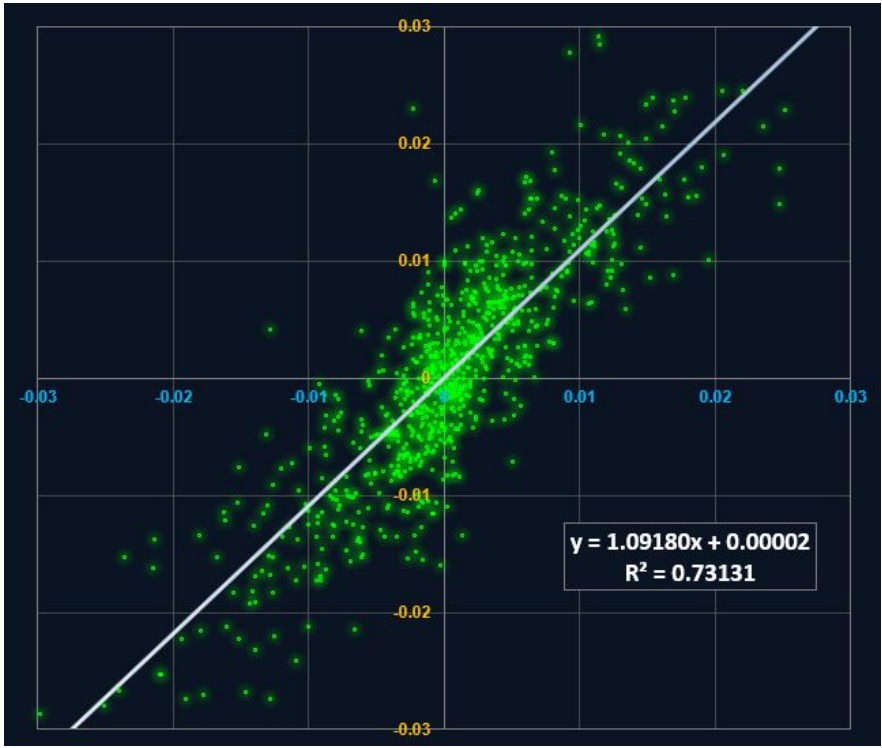
Y = dependent variable. In most cases, we are solving for price over a specified period of time;

b = slope of the line;

a = Y intercept;

X = Independent Variable, representing a sequence number (i.e. hours, days, weeks, etc);

The method of least squares finds the straight line that comes closest to all prices within a given time interval.



LINEAR REGRESSION ANALYSIS

BETA COEFFICIENT

BETA (β) DEFINITION

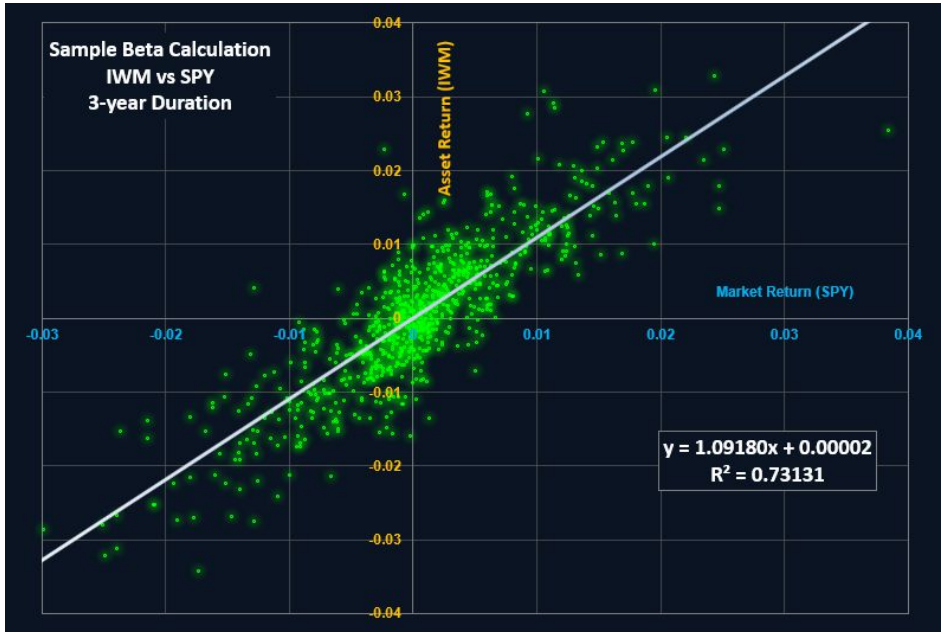
- Measure of volatility or systematic risk of a security or portfolio in comparison to the market or benchmark as a whole.
- We can calculate Beta on multiple timeframes.

EXAMPLE

ishares Russel 2000 Small Cap ETF (IWM) vs S&P 500 Large Cap SPDR (SPY)

- The S&P 500 Large Cap SPDR (SPY) has a Beta of 1.0 as it is the market and applicable benchmark
- IWM has a calculated 3-yr Beta of 1.09
- The calculated Beta of 1.09 indicates that returns and volatility are 9% greater than SPY

ishares Russel 2000 Small Cap ETF (IWM) vs S&P 500 Large Cap SPDR (SPY)



Ticker	Date/Time	Full name	Posture	Close	Beta(1-yr)	Beta(2-yr)	Beta(3-yr)	Beta(5-yr)
IWM	2017-10-27	iShares Russell 2000 ETF	Offensive	149.79	1.35	1.20	1.09	1.11

BETA

OFFENSIVE AND DEFENSIVE ASSET CLASSES

BASIC TICKER INFORMATION				
MARK	Symb	Description	Group	Beta
US	SPHB	POWERSHARES S&P 500 HIGH BETA PORTFOLIO	Dividend and Other ETF's	1.4
INTL	EUFN	ISHARES MSCI EUROPE FINANCIAL SECTOR INDEX FUND	International ETF's	1.3
US	KBE	SPDR S&P BANK ETF	Industry Group ETF's	1.25
INTL	EEM	ISHARES MSCI EMERGING MARKETS ETF	International ETF's	1.16
INTL	FEZ	SPDR EURO STOXX 50 ETF	International ETF's	1.15
US	QQQ	POWERSHARES QQQ TRUST	Broad Index ETF's	1.11
US	IWM	ISHARES RUSSELL 2000 ETF	Broad Index ETF's	1.09
US	IYT	ISHARES TRANSPORTATION AVERAGE ETF	Industry Group ETF's	1.08
US	IJR	ISHARES S&P SMALL-CAP FUND	Broad Index ETF's	1.05
US	USO	UNITED STATES OIL FUND	Commodity ETF's	1.03
US	MDY	SPDR S&P MIDCAP 400 ETF	Broad Index ETF's	1.03
US	RSP	GUGGENHEIM S&P 500 EQUAL WEIGHT ETF	Broad Index ETF's	1.02
US	SPY	SPDR S&P 500 ETF	Broad Index ETF's	1
INTL	EFA	ISHARES MSCI EAFE ETF	International ETF's	1
CDN	XIC-TC	ISHARES CORE S&P/TSX CAP COMPOSITE IDX ETF UN	Broad Index ETF's	0.98
US	DIA	SPDR DOW JONES INDUSTRIAL AVERAGE ETF	Broad Index ETF's	0.94
US	SPLV	POWERSHARES S&P 500 LOW VOLATILITY PORTFOLIO	Dividend and Other ETF's	0.8
US	TBF	PROSHARES SHORT 20+ YEAR TREASURY	Inverse ETF's	0.38
US	JNK	SPDR BLOOMBERG BARCLAYS HIGH YIELD BOND ETF	Bond ETF's	0.37
CDN	FXC	CURRENCYSHARES CANADIAN DOLLAR TRUST	Currency ETF's	0.23
US	UUP	POWERSHARES DB US DOLLAR INDEX BULLISH FUND	Currency ETF's	0.08
US	SHV	ISHARES SHORT TREASURY BOND ETF	Bond ETF's	0
US	AGG	ISHARES CORE U.S. AGGREGATE BOND ETF	Bond ETF's	-0.06
CDN	XBB-TC	ISHARES CORE CDN UNIVERSE BOND INDX ETF TR UN	Bond ETF's	-0.09
INTL	FXE	CURRENCYSHARES EURO TRUST	Currency ETF's	-0.1
US	GLD	SPDR GOLD SHARES	Commodity ETF's	-0.21
INTL	FXY	CURRENCYSHARES JAPANESE YEN TRUST	Currency ETF's	-0.33
US	TLT	ISHARES 20+ YEAR TREASURY BOND ETF	Bond ETF's	-0.39
US	DOG	PROSHARES SHORT DOW 30	Inverse ETF's	-0.93
US	SH	PROSHARES SHORT S&P 500	Inverse ETF's	-0.99
US	RWM	PROSHARES SHORT RUSSEL 2000	Inverse ETF's	-1.08
US	PSQ	PROSHARES SHORT QQQ	Inverse ETF's	-1.09
CDN	HFD-TC	BetaPro S&P/TSX Capped Financials™ -2x Daily Bear ETF 1.15%	Inverse ETF's	-1.7
CDN	HXD-TC	BetaPro S&P/TSX 60™ -2x Daily Bear ETF 1.15%	Inverse ETF's	-2.04
CDN	HED-TC	BetaPro S&P/TSX Capped Energy™ -2x Daily Bear ETF 1.15%	Inverse ETF's	-3.84

BASIC TICKER INFORMATION				
MARKET	Symbol	Description	Group	Beta
1	XOP	SPDR S&P OIL & GAS EXPLORATION & PRODUCTION ETF	Industry Group ETF's	1.57
31	XBI	SPDR S&P BIOTECH ETF	Industry Group ETF's	1.5
30	SPHB	POWERSHARES S&P 500 HIGH BETA PORTFOLIO	Dividend and Other ETF's	1.4
39	XME	SPDR S&P METALS AND MINING ETF	Industry Group ETF's	1.36
27	KBE	SPDR S&P BANK ETF	Industry Group ETF's	1.25
38	XPH	SPDR S&P PHARMACEUTICALS ETF	Industry Group ETF's	1.24
11	XLE	ENERGY SELECT SECTOR SPDR FUND	Sector ETF's	1.21
23	XLF	FINANCIAL SELECT SECTOR SPDR FUND	Sector ETF's	1.15
29	IWO	ISHARES RUSSELL 2000 GROWTH ETF	Stock Style Index ETF's	1.14
6	QQQ	POWERSHARES QQQ TRUST	Broad Index ETF's	1.11
33	IWM	ISHARES RUSSELL 2000 ETF	Broad Index ETF's	1.09
4	XLK	TECHNOLOGY SELECT SECTOR SPDR FUND	Sector ETF's	1.08
25	XLB	MATERIALS SELECT SECTOR SPDR FUND	Sector ETF's	1.08
37	IYT	ISHARES TRANSPORTATION AVERAGE ETF	Industry Group ETF's	1.08
36	IJR	ISHARES S&P SMALL-CAP FUND	Broad Index ETF's	1.05
2	USO	UNITED STATES OIL FUND	Commodity ETF's	1.03
24	MDY	SPDR S&P MIDCAP 400 ETF	Broad Index ETF's	1.03
26	RSP	GUGGENHEIM S&P 500 EQUAL WEIGHT ETF	Broad Index ETF's	1.02
34	XLI	INDUSTRIAL SELECT SECTOR SPDR FUND	Sector ETF's	1.01
3	BNO	UNITED STATES BRENT OIL FUND	Commodity ETF's	1
19	SPY	SPDR S&P 500 ETF	Broad Index ETF's	1
40	IYZ	ISHARES U.S. TELECOMMUNICATIONS ETF	Sector ETF's	0.99
15	XLY	CONSUMER DISCRETIONARY SELECT SECTOR SPDR FUND	Sector ETF's	0.97
35	IYH	ISHARES U.S. HEALTHCARE ETF	Sector ETF's	0.96
18	DIA	SPDR DOW JONES INDUSTRIAL AVERAGE ETF	Broad Index ETF's	0.94
20	SPLV	POWERSHARES S&P 500 LOW VOLATILITY PORTFOLIO	Dividend and Other ETF's	0.8
16	IYR	Real Estate iShares	Industry Group ETF's	0.73
22	XLP	CONSUMER STAPLES SELECT SECTOR SPDR FUND	Sector ETF's	0.7
8	XLU	UTILITIES SELECT SECTOR SPDR FUND	Sector ETF's	0.51
28	TBF	PROSHARES SHORT 20+ YEAR TREASURY	Inverse ETF's	0.38
21	JNK	SPDR BLOOMBERG BARCLAYS HIGH YIELD BOND ETF	Bond ETF's	0.37
9	UUP	POWERSHARES DB US DOLLAR INDEX BULLISH FUND	Currency ETF's	0.08
17	SHV	ISHARES SHORT TREASURY BOND ETF	Bond ETF's	0
14	SHY	ISHARES 1-3 YEAR TREASURY BOND ETF	Bond ETF's	-0.02
12	AGG	ISHARES CORE U.S. AGGREGATE BOND ETF	Bond ETF's	-0.06
7	TLT	ISHARES 20+ YEAR TREASURY BOND ETF	Bond ETF's	-0.39
13	DOG	PROSHARES SHORT DOW 30	Inverse ETF's	-0.93
10	SH	PROSHARES SHORT S&P 500	Inverse ETF's	-0.99
5	RWM	PROSHARES SHORT RUSSEL 2000	Inverse ETF's	-1.08
32	PSQ	PROSHARES SHORT QQQ	Inverse ETF's	-1.09

- The Basic definition of Beta would suggest that assets with a Beta of > 1.0 would be a higher risk than the market itself and therefore would be an Offensive asset.
- However, isn't the market itself an Offensive Asset when compared to say Bonds?
- A visual inspection of the Global and US Sector Risk Ladders reveal that perhaps a threshold of 0.85 is more applicable.
- **OFFENSIVE ASSETS** = Beta > 0.85
- **DEFENSIVE ASSETS** = Beta < 0.85

LINEAR REGRESSION ANALYSIS

ALPHA COEFFICIENT

ALPHA (α) DEFINITION

- A part of asset returns that is independent of market returns;
- Alpha provides a theoretical measure of how a stock or ETF's return is derived from factors unique to the company or ETF group;
- Positive alpha indicates a desirable attribute, excess returns to an asset relative to the amount of risk incurred;
- The equation of a straight line is illustrated below;

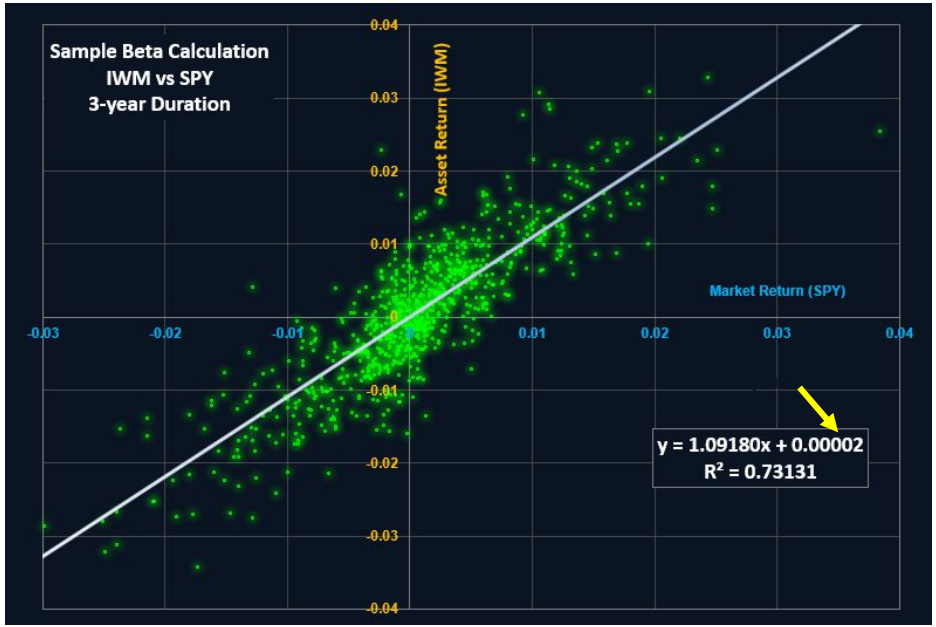
$$Y = mX + b$$

Where
m = slope of the line;
b= Y-intercept;

The slope of the line (m) represents Beta(β). In this case IWM's Beta has been calculated at 1.09.

The Y-intercept (b) represents Alpha(α). In this case IWM's Alpha has been calculated at 2E-05 or 0.00002.

ishares Russel 2000 Small Cap ETF (IWM) vs S&P 500 Large Cap SPDR (SPY)



LINEAR REGRESSION ANALYSIS

COEFF. OF DETERMINATION (R-SQUARED)

Regression Analysis: How Do I Interpret R-squared and Assess the Goodness-of-Fit?

Minitab Blog Editor · 30 May, 2013

R-Squared

- R-squared is a statistical measure of how close the data are to the fitted regression line. It is also known as the coefficient of determination, or the coefficient of multiple determination for multiple regression.

R-squared is always between 0 and 100%:

- An R-Squared value of 0 indicates that the model explains none of the variability of the response data around its mean.
- An R-Squared value of 1 indicates that the model explains all the variability of the response data around its mean.

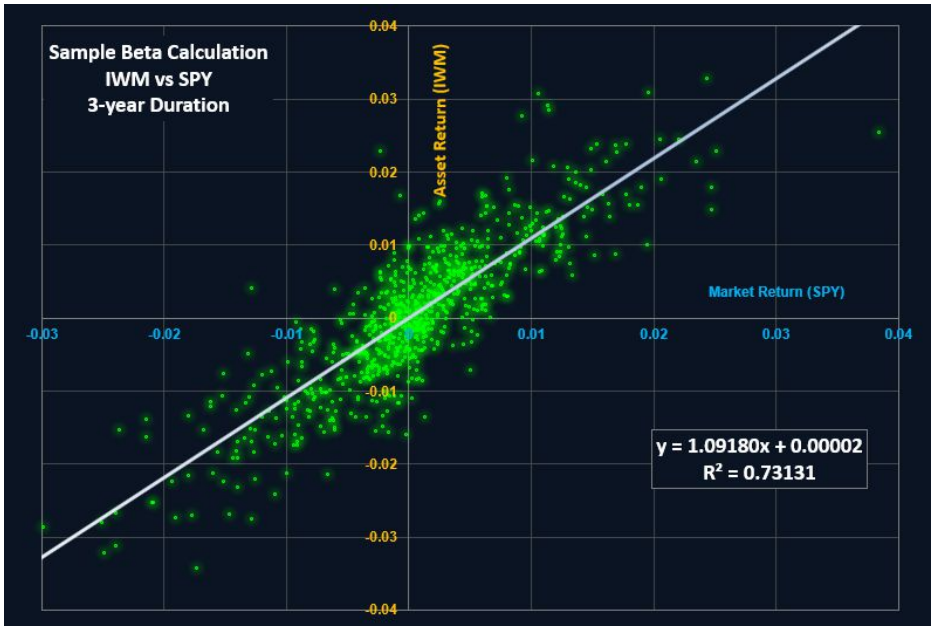
In general, the higher the R-squared, the better the model fits your data.

NOTE:

Any field that attempts to predict human behavior, such as psychology, typically has R-squared values lower than 50%. Humans are simply harder to predict than, say, physical processes.

http://blog.minitab.com/blog/adventures-in-statistics-2/regression-analysis-how-do-i-interpret-r-squared-and-assess-the-goodness-of-fit

ishares Russel 2000 Small Cap ETF (IWM) vs S&P 500 Large Cap SPDR (SPY)



COEFFICIENT OF CORRELATION

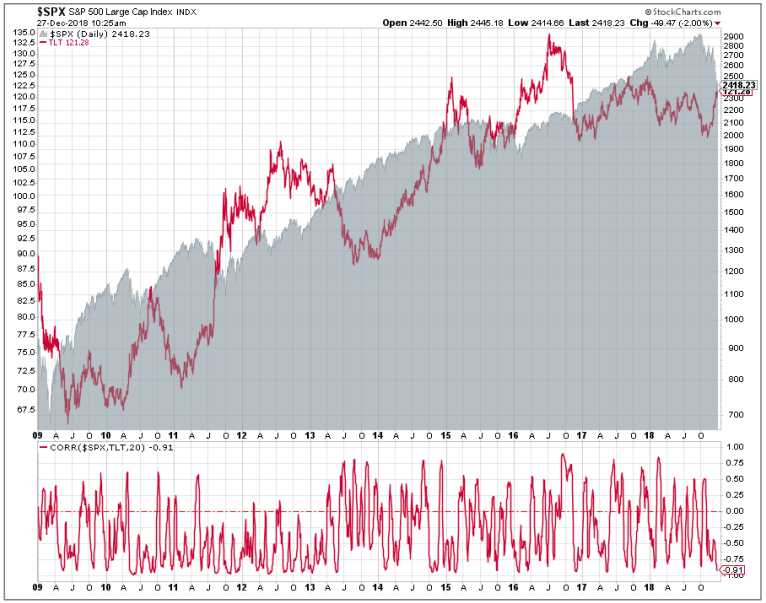
DEFINITION AND CONCEPT

R = CORRELATION: the technical term used to measure and describe how closely the prices of two investments move together over time.

- ❖ Correlations between two assets are expressed on a scale of between -1 to 1;
- ❖ Positively correlated assets move in the same direction (up and down);
- ❖ Negatively correlated assets move in opposite directions;

Value	Correlation Desciption
1	Perfect Positive Correlation
0.5	Positive Correlation (< 0.5 weak positive correlation, > 0.5 strong positive correlation)
0	Not correlated
-0.5	Negative Correlation (> -0.5 weak negative correlation, < - 0.5 strong negative correlation)
-1	Perfect Negative Correlation

	Symbol	Name	Correlation (20 Days)	
	VTV	VTV - Vanguard Value ETF	1.00	
	VUG	VUG - Vanguard Growth ETF	1.00	
	VIOG	VIOG - Vanguard S&P Small-Cap 600 Growth ETF	0.99	
	VIOV	VIOV - Vanguard S&P Small-Cap 600 Value ETF	0.99	
	VEA	VEA - Vanguard FTSE Developed Markets ETF	0.98	
	VNQ	VNQ - Vanguard Real Estate ETF	0.93	
	VWO	VWO - Vanguard FTSE Emerging Markets ETF	0.92	
	PDBC	PDBC - Invesco Optimum Yield Diversified Commodity Strategy No K-1 ETF	0.83	
	VCLT	VCLT - Vanguard Long-Term Corporate Bond ETF	-0.72	
	BNDX	BNDX - Vanguard Total International Bond ETF	-0.87	
	IAU	IAU - iShares Gold Trust	-0.90	
	EDV	EDV - Vanguard Extended Duration Treasury ETF	-0.91	
	VGIT	VGIT - Vanguard Intermediate-Term Government Bond ETF	-0.94	



Example: the correlation between Stock A and Stock B is 0.8. As a result, for every $1 price movement in either stock, the other will move 80 percent in the same direction over the same time period.

REGRESSION ANALYTICS IN INVESTING

BEST FIT MAY NOT BE SUCH A BEST FIT

US Sector Correlations to VTI

Ticker	Date/Time	Full name	VTI
VTI	2019-01-18	Vanguard Total Stock Mar...	1.00
XLK	2019-01-18	Technology Select Sector...	0.96
XLY	2019-01-18	Consumer Discretionary Se...	0.94
IYZ	2019-01-18	iShares U.S. Telecommunic...	0.83
XLI	2019-01-18	Industrial Select Sector S...	0.83
XLE	2019-01-18	Energy Select Sector SPDR...	0.79
XLF	2019-01-18	Financial Select Sector SP...	0.71
VNQ	2019-01-18	Vanguard Real Estate ETF	0.69
XLB	2019-01-18	Materials Select Sector S...	0.68
XLV	2019-01-18	Health Care Select Sector...	0.58
XLP	2019-01-18	Consumer Staples Select ...	0.37
XLU	2019-01-18	Utilities Select Sector SPD...	0.09

US Sector Regression Analytics

Ticker	Date/Time	Full name	Close	Beta(3-yr)	R-Sq	Slope
XLU	2019-01-18	Utilities Select Secto...	53.11	0.24	0.690	0.0122
XLB	2019-01-18	Materials Select Sect...	52.64	1.12	0.578	-0.0420
XLF	2019-01-18	Financial Select Sect...	25.56	1.00	0.526	-0.0169
XLV	2019-01-18	Health Care Select Se...	89.02	0.69	0.354	0.0000
XLI	2019-01-18	Industrial Select Sect...	68.88	0.98	0.328	-0.0432
XLE	2019-01-18	Energy Select Sector ...	62.57	1.39	0.153	-0.0618
VNQ	2019-01-18	Vanguard Real Estate ...	79.16	0.55	0.153	-0.0011
XLY	2019-01-18	Consumer Discretiona...	106.65	0.87	0.018	-0.0005
VTI	2019-01-18	Vanguard Total Stock...	136.63	0.91	0.016	-0.0337
XLP	2019-01-18	Consumer Staples Sel...	52.35	0.44	0.006	-0.0245
IYZ	2019-01-18	iShares U.S. Telecom...	27.71	0.97	0.002	-0.0080
XLK	2019-01-18	Technology Select Se...	64.37	1.01	0.001	-0.0164

US Sector RPR Regression Analytics

Ticker	Date/Time	Full name	Close	Beta(3-yr)	R-Sq	Slope
~Ratio_XLB_VTI	2019-01-18	XLB / VTI	0.39	0.04	0.844	-0.0002
~Ratio_XLF_VTI	2019-01-18	XLF / VTI	0.19	0.10	0.797	-0.0001
~Ratio_XLI_VTI	2019-01-18	XLI / VTI	0.50	0.03	0.727	-0.0002
~Ratio_XLV_VTI	2019-01-18	XLV / VTI	0.65	-0.09	0.675	0.0002
~Ratio_XLU_VTI	2019-01-18	XLU / VTI	0.39	-0.72	0.502	0.0002
~Ratio_XLY_VTI	2019-01-18	XLY / VTI	0.78	0.03	0.492	0.0002
~Ratio_VNQ_VTI	2019-01-18	VNQ / VTI	0.58	-0.41	0.437	0.0001
~Ratio_XLE_VTI	2019-01-18	XLE / VTI	0.46	0.07	0.249	-0.0003
~Ratio_IYZ_VTI	2019-01-18	IYZ / VTI	0.20	-0.06	0.094	-0.0000
~Ratio_XLP_VTI	2019-01-18	XLP / VTI	0.38	-0.43	0.042	-0.0001
~Ratio_XLK_VTI	2019-01-18	XLK / VTI	0.47	0.22	0.027	-0.0000







MEASURES OF RISK

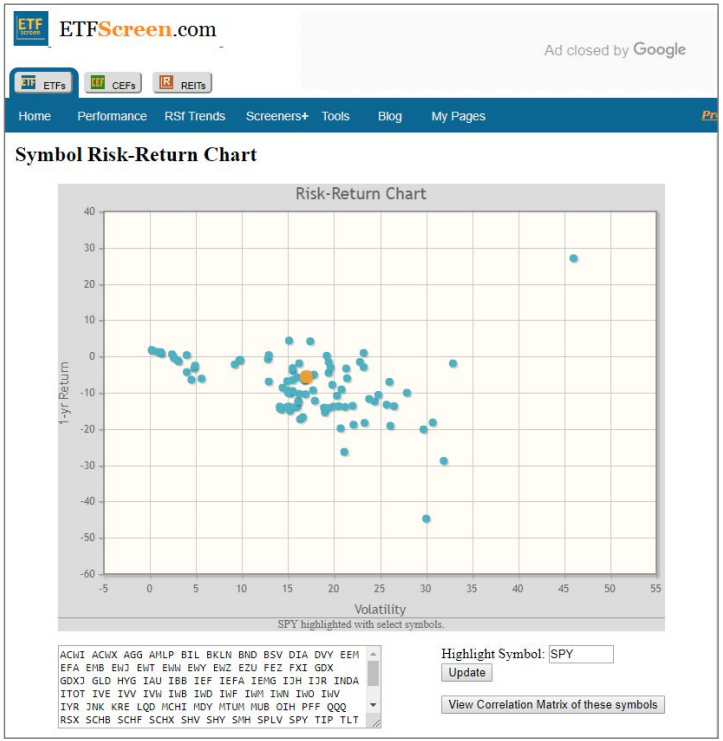
- STANDARD DEVIATION AND STANDARD ERROR;
- SHARPE RATIO;
- SORTINO RATIO;
- NORMAL DISTRIBUTION;
- DEFINING RISK;
- ULCER INDEX;
- ULCER PERFORMANCE INDEX;

VOLATILITY VS RISK
ARE THEY THE SAME THING?

IS VOLATILITY RISK??

Etfscreen.com – Symbol Risk-Return Chart Shown Right





DEFINING RISK

NON-SYSTEMATIC VS SYSTEMATIC

RISK: In one word, risk can be called un-certainty. More specifically, the uncertainty that actual returns will match expected returns

SOURCES OF INVESTMENT RISK

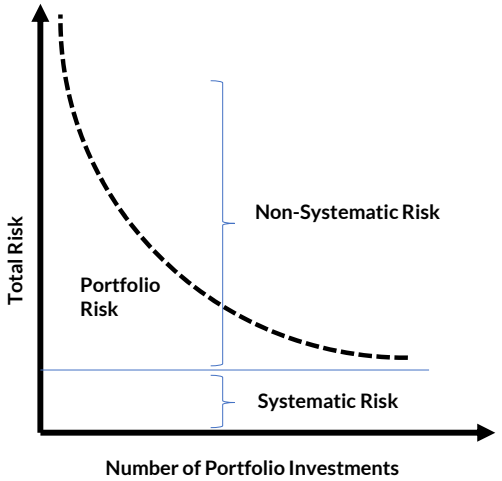
NON - SYSTEMATIC RISK

Risk attributed to the underlying investment and not external factors. Types of non-systematic risk include: Business Risk, Financial Risk, Industry Risk, Liquidity Risk, Call Risk and Regulation Risk. Non-systematic risk is considered un-important because with proper diversification, it would not be an issue. Non - Systematic risk is at the heart of Modern Portfolio Theory, Capital Asset Pricing Model (CAPM) and Efficient Market Hypothesis (EMH).

SYSTEMATIC RISK

Risk associated with relatively un-controllable external factors. Systematic risk results from conditions, events and trends occurring outside the scope of the investment. This type of risk includes; Exchange Rate Risk, Interest Rate Risk, Market Risk, Purchasing Power Risk(inflation).

Beta, Standard Deviation, Volatility are the "standard" market theories for calculating Systematic Market Risk…..before we assume we should be assuming the same, we need to dive deeper and explore. Is drawdown not risk?????



STANDARD DEVIATION
BASIC DEFINITION

STANDARD DEVIATION – BASIC DEFINITION

"Standard deviation is a statistical term that measures the amount of variability or dispersion around an average.

Standard deviation is also a measure of volatility.

Generally speaking, dispersion is the difference between the actual value and the average value.

The larger this dispersion or variability is, the higher the standard deviation. The smaller this dispersion or variability is, the lower the standard deviation.

Chartists can use the standard deviation to measure expected risk and determine the significance of certain price movements."

https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:standard_deviation_volatility



STANDARD DEVIATION
THE DEVIL IN THE DETAILS

STANDARD DEVIATION

The standard deviation of price can be calculated with the following equation;

$$\sigma = \sqrt{\frac{\sum(y - \bar{y})^2}{N - 1}}$$

where;
σ = Standard Deviation
y = Closing Price Data
$\bar{y}$ = Closing Price - Average Price
N = Number of observations in the sample set



THE DEVIL IN THE DETAILS

- In the financial markets, closing price data (y) is used in the calculation of Standard Deviation (y);
- The partial equation $\Sigma(y - \bar{y})^2$ produces price squared;
- We then SUM that (units are still price-squared) and divide by N. N is a dimensionless number so still we are in price-squared;
- Finally we take the square-root of the whole lot which means we take the square-root of price squared which gives us price.;
- Given the left-hand side must have the same units as the right-hand side, it has the units price;
- Thus Standard Deviation (σ) is price in this example.
- In other words, Standard Deviation (σ) is in the same units as the variable (y)
- **THEREFORE STANDARD DEVIATION IS AN ABSOLUTE MEASURE, NOT A RELATIVE MEASURE.**
- **THEREFORE STANDARD DEVIATION IS MEASURED AS PRICE**

STANDARD DEVIATION

THE DEVIL IN THE DETAILS

STANDARD DEVIATION IS AN ABSOLUTE MEASURE, NOT A RELATIVE MEASURE
THEREFORE WE CAN NOT DIRECTLY COMPARE THE STANDARD DEVIATION OF ONE TICKER SYMBOL TO ANOTHER…THIS IS NOT AN APPLES TO APPLES COMPARISON







Risk = (1.58 / 128.90) * 100 = 1.2

Risk = (0.54 / 39.69)*100 = 1.4

THEREFORE, VTI HAS A LOWER RISK AND WOULD BE PREFERRED OVER EEM

LINEAR REGRESSION ANALYSIS
STANDARD DEVIATION VS STANDARD ERROR

STANDARD DEVIATION – a statistical measure of the degree to which actual returns are spread around the mean actual return. Standard Deviation is also a measure of volatility.

STANDARD DEVIATION

The standard deviation of price can be calculated with the following equation;

$$\sigma = \sqrt{\frac{\sum(y - \bar{y})^2}{N - 1}}$$

where;
σ = Standard Deviation
y = Closing Price Data
$\bar{y}$ = Closing Price - Average Price
N = Number of observations in the sample set

We can again utilise the computational capabilities of Excel to simply the calculation using the STDEV function.

STANDARD ERROR

Within the trading and finance realm, the formula for Standard Error has been modified to the following;

$$\mathrm{SE} = \sqrt{\frac{1}{(\mathrm{N} - 2)} \left[\sum(\mathrm{y} - \bar{\mathrm{y}})^2 \frac{[\sum(\mathrm{x} - \bar{\mathrm{x}})(\mathrm{y} - \bar{\mathrm{y}})]^2}{\sum(\mathrm{x} - \bar{\mathrm{x}})^2} \right]}$$

Although the above equation is rather lengthy we can simply our approach by using the STEYX function in Excel. STEYX returns the standard error of the predicted y-value for each x in the regression. The standard error is a measure of the amount of error in the prediction of y for an individual x.

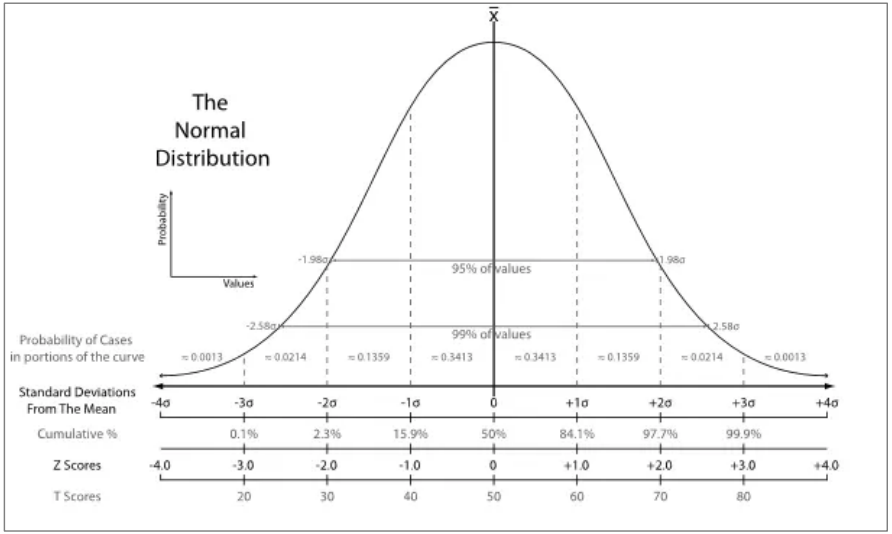
One flaw with using standard deviation is that it accounts for both upside and downside volatility, treating them equally. However, if you are a long-only investor, you are not concerned with upside volatility. In fact, you desire it.

LINEAR REGRESSION ANALYSIS

NORMAL PRICE DISTRIBUTION

- The fundamental assumption of all Linear Regression analytics, starts with assuming that DIRECT PRICE ACTION IS NORMALLY DISTRIBUTED (GUSSIAN).
- Normal price distribution consists of a bell shaped line formed around the mean (average of all data points)
- Bell curve is a general term that's used to describe a graphical depiction of a normal probability distribution.
- The normal probability distribution's underlying standard deviations from the median, or from the highest point on the curve, is what gives it the shape of a curved bell.
- A standard deviation is a measurement used to quantify the variability of data dispersion in a set of values.
- The mean is the average of all data points in the data set or sequence.

THE "BELL CURVE"



WE CAN ASSUME THAT THE BELL CURVE IS REPRESENTATIVE OF BOTH STANDARD DEVIATION AND STANDARD ERROR

NORMAL PRICE DISTRIBUTION

MARKET RETURNS ARE NOT GAUSSIAN

Predicting Stock Market Returns - Lose The Normal And Switch To Laplace

Mar. 21, 2016 11:10 AM ET | 12 comments | 3 Likes | Includes: BXUB, BXUC, EPS, IVV, IWM, PPLC, RSP, RWL-...



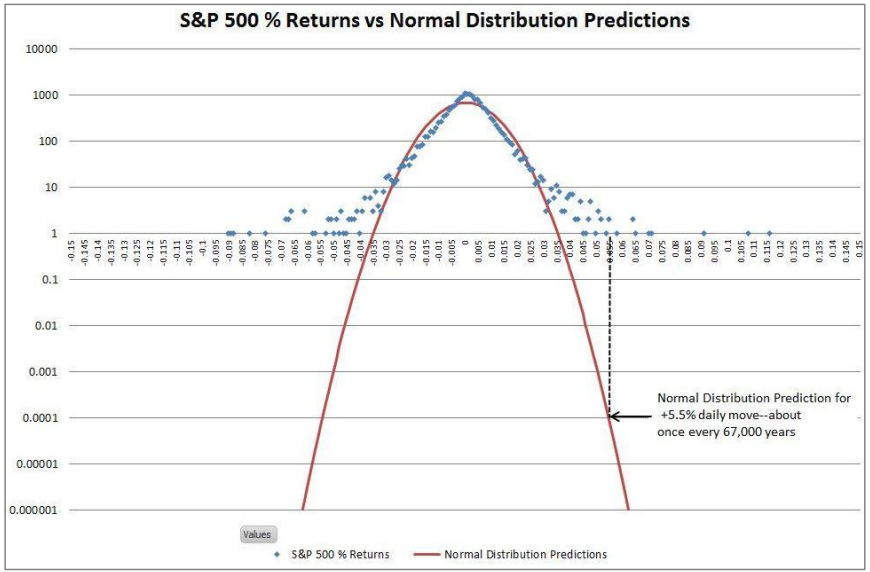
Vance Harwood Mute
Research analyst, ETF investing, volatility
Six Figure Investing
Follow
(778 followers)

Seeking Alpha α

"A well-known problem in financial risk assessment is the failure of the normal distribution (also known as the Gaussian distribution) to correctly predict big up or down days on the stock market. Even though these volatile days are infrequent they can make a big difference in the performance of an investment portfolio."

"The art of science and engineering is using concepts and relationships we know to be not quite true to generate reliable results. For analyzing market risk the normal distribution does not pass the "not quite true" test; it is seriously flawed when used to predict / analyze the more extreme moves of the market that historically happen every couple of years."

1950 – 2015 S&P 500% Returns vs Normal Distribution



https://seekingalpha.com/article/3959933-predicting-stock-market-returns-lose-normal-switch-laplace

THE SHARPE RATIO
DEFINITION AND FORMULA

- The Sharpe Ratio was created by an American economist, William Sharpe;
- William Sharpe was also one of the creators of the Capital Asset Pricing Model (CAPM);
- The ratio is commonly used as a means of calculating the performance of an investment after adjusting for its risk.
- This allows investments of different risk profiles to be compared against each other.
- In the Sharpe Ratio, a higher value means greater returns for the portfolio relative to the inherent risk.
- This also means a better investment.
- Because of the simplicity of the formula, the Sharpe Ratio can be used to evaluated a single stock, or an entirely diversified portfolio;

$$\text{SHARPE RATIO} = \frac{\text{Annualised Returns} - **\text{Risk Free Returns}}{\text{Annualised Risk}}$$

$$\text{SHARPE RATIO} = \frac{\text{Expected Portfolio Return} - **\text{Risk Free Returns}}{\text{Standard Deviation of Asset or Portfolio Return (Volatility)}}$$

- ** Risk Free Returns are typically measured by the return of a Treasury Bill over a specified period of time
- Treasury bills have maturities of a year or less.
- Treasury notes are issued with maturities from two to ten years.
- Treasury bonds are long-term investments that have maturities of 10 to 30 years from their issue date

THE SHARPE RATIO
ISSUES WITH THE RATIO

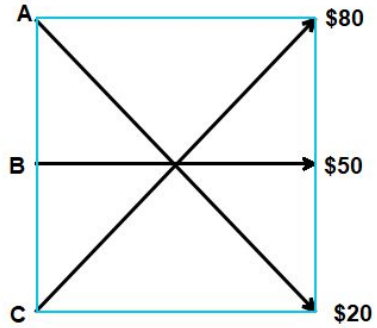
HYPOTHETICAL EXAMPLE OF THREE STOCKS

- Stock C rose from $20 to $80
- Stock B remained flat at $50
- Stock A declined from $80 to $20

WHAT STOCK IS RISKIER?

- Stock A is the most risky because it's declining
- Stock C would be most desirable because it's rising
- Under conventional finance theory, both A and C are riskier than B because they oscillated above or below their average price of $50.
- Stock B would be less risky because it didn't do anything.
- Stock A would be just as risky as Stock C even though it advanced.

FIGURE 1: THREE STOCK PRICE TRENDS



Source; Beat the Markets by Knowing What Investments to Buy and What Stocks to Sell, Kirkpatrick 2009

THE SORTINO RATIO
DEFINITION AND FORMULA

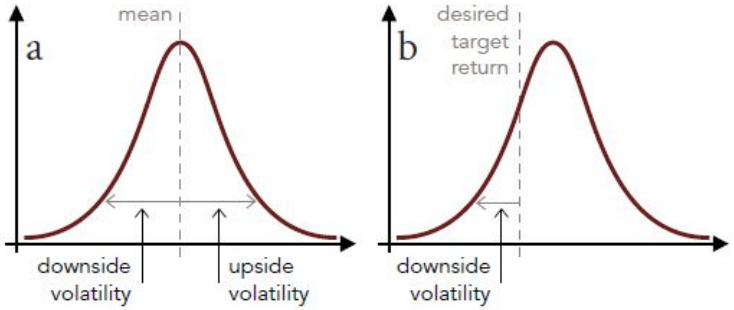
- The Sortino Ratio, named after Frank A. Sortino, measures the risk-adjusted return of an individual asset or a portfolio.
- Unlike the Sharpe ratio, volatility is calculated by taking the standard deviation of the negative returns only (downside volatility).
- The Standard Deviation of positive returns are ignored as they are believed to be positive for portfolio returns (upside volatility).
- By looking the standard deviation of the negative returns only, this is called Semi-deviation.
- A high Sortino Ratio tells there is a low probability of a large loss.

SORTINO RATIO

Sortino ratio can be calculated as follows:

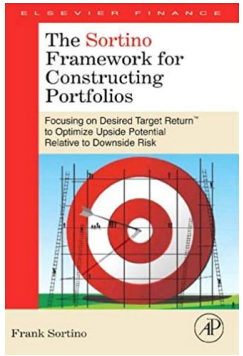
$$\text{SORTINO RATIO} = \frac{Re - Rf}{\sigma d}$$

where;
Re = Expected Return
Rf= The Risk Free Rate of Return
σ = Semi- Deviation



A HIGH SORTINO RATIO TELLS THERE IS A LOW PROBABILITY OF A LARGE LOSS.

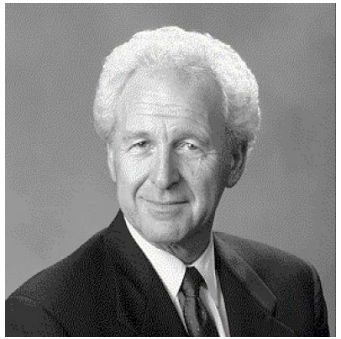
SHARPE AND SORTINO RATIO'S
REFUTED BY SORTINO HIMSELF

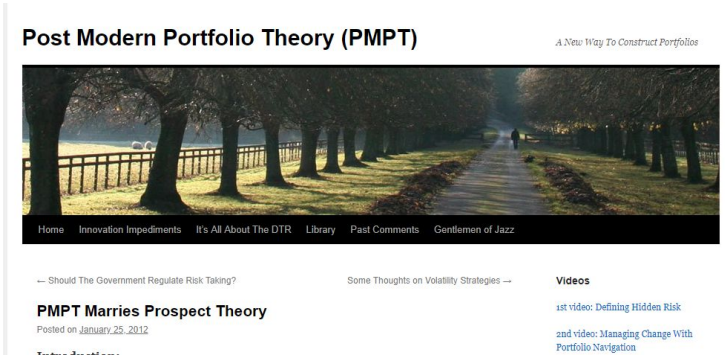


THE SORTINO FRAMEWORK FOR CONSTRUCTING PORTFOLIOS

- Tested both Sharpe and Sortino Ratios;
- Tested both Ratio's on hundred's of Mutual Funds across more than two decades;
- The findings?
- Neither the Sharpe Ratio nor the Sortino Ratio was useful!

FRANK SORTINO





POST MODERN PORTFOLIO THEORY (PMPT)

"There was a time that I believed the Sortino Ratio was the best way to measure performance. When the evidence began to accumulate in the 1990's that I was wrong, I wrote a paper pointing out the flaw and posted it on my website."

https://pmpt.me/2012/01/25/pmpt-marries-prospect-theory/

DEFINING RISK
VOLATILITY VS DRAWDOWN

IN THE SAMPLE INVESTMENT STATEMENT BELOW, WHAT NUMBERS CATCH YOUR EYE FIRST???

SAMPLE INVESTMENT STATEMENT EXAMPLE		
Portfolio Asset Value	2018-01-02	2018-12-15
	$100,000.00	$70,000.00
	Portfolio	**Benchmark**
Sharpe Ratio	0.54	0.69
Max Drawdown	-30%	-15%
Standard Deviation	11.7	8.7

KEY TAKEAWAYS:

- EVEN INVESTORS WHO HAVE NO KNOWLEDGE OF FINANCE OR INVESTMENTS KNOW WHAT RISK IS – IT IS THE LOSS OF CAPITAL.
- RISK IS NOT VOLATILITY; IT IS DRAWDOWN (LOSS OF CAPITAL).
- HOWEVER, IN THE SHORTER TERM, VOLATILITY IS A GOOD PROXY FOR RISK, BUT OVER THE LONGER TERM, DRAWDOWN IS A MUCH BETTER MEASURE OF RISK.
- VOLATILITY DOES CONTRIBUTE TO RISK BUT IT ALSO CONTRIBUTES TO MARKET GAINS.

THE ULCER INDEX
DEFINITION AND FORMULA

"Developed by Peter Martin and Byron McCann in 1987, the Ulcer Index is a volatility indicator that measures downside risk.

The Ulcer Index was first introduced in their 1989 book, *The Investor's Guide to Fidelity Funds*. Originally, the index was designed with mutual funds in mind, which is why it is only focused on downside risk.

Mutual funds are designed to make money by increasing in value. The only risk, therefore, is the drawdown or downside. As its name implies, the Ulcer Index measures the drawdown investors can expect to stomach on any given security.

Many consider the Ulcer Index superior to the standard deviation and other measures of risk."

ULCER INDEX

$$R_i = 100\ x\ \frac{price_i\ -\ maxprice}{\max price}$$

$$\text{Ulcer Index} = \frac{\sum_{i=1}^{N} R_i^2}{N}$$

ULCER INDEX– BASIC FORMULA

Percent-Drawdown = ((Close - 14-period Max Close)/14-period Max Close) x 100
Squared Average = (14-period Sum of Percent-Drawdown Squared)/14
Ulcer Index = Square Root of Squared Average

The ulcer index can replace the SD to make an Ulcer Performance Index (UPI) or Martin ratio;

$$\text{Ulcer Performance Index (UPI)} = \frac{Re - Rf}{Ui}$$

where;
Re = Expected Return
Rf = The Risk Free Rate of Return
Ui = Ulcer Index

NOTE: THE ULCER PERFORMANCE INDEX IS ALSO KNOWN AS THE MARTIN RATIO

UI IS A MEASURE OF THE DEPTH AND DURATION OF DRAWDOWNS IN PRICES FROM EARLIER HIGHS.

For more Information see the link;
https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:ulcer_index

LOOKING INTO THE ULCER INDEX

A CASE STUDY

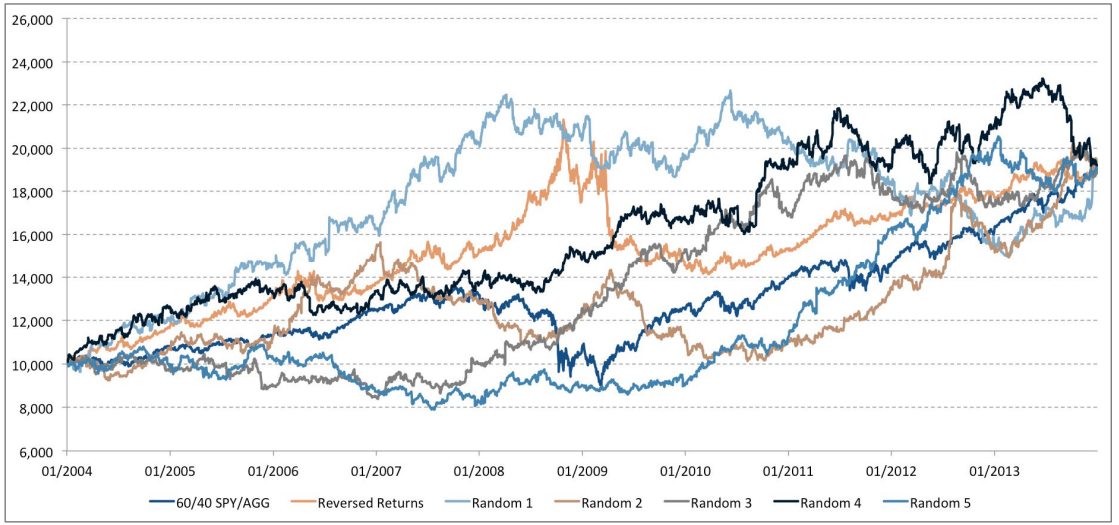
Looking into the Ulcer Index

BY NATHAN FABER / ON APRIL 15, 2014

https://blog.thinknewfound.com/2014/04/looking-into-the-ulcer-index/

"As a case study, the following chart (right) shows the return of a 60/40 portfolio of SPY and AGG rebalanced at the beginning of each year from 01/2004 to 12/2013. Along with the true realized path, I have included the path with the returns reversed and 5 paths with random permutations of the true returns."

"Only the Ulcer index can fully differentiate among these paths. Even in cases where the maximum drawdown is similar (e.g. the true path and Random 1), the Ulcer Index shows a sharp contrast between the strategies."



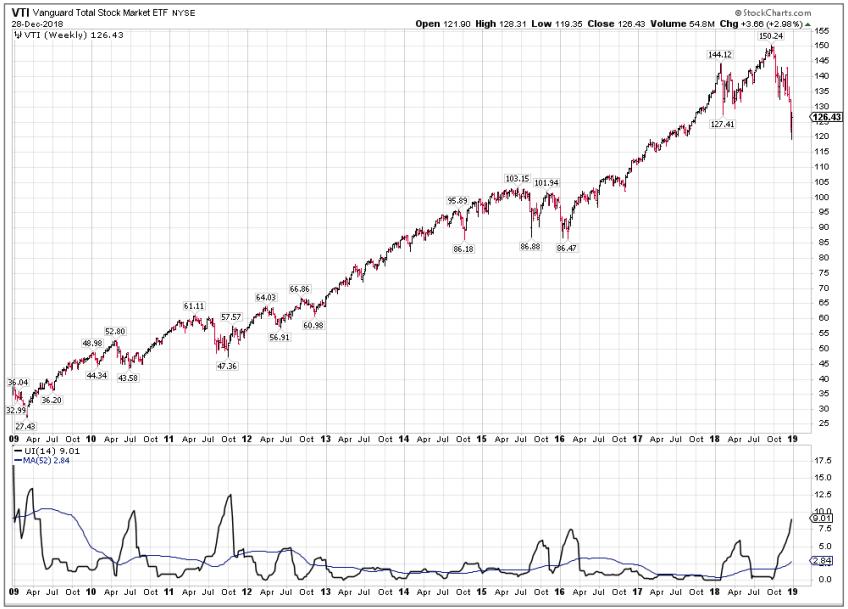
	60/40 SPY/AGG	Reversed Returns	Random 1	Random 2	Random 3	Random 4	Random 5
Annualized Return	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
Annualized Volatility	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
Sharpe Ratio (rf = 0)	56.7%	56.7%	56.7%	56.7%	56.7%	56.7%	56.7%
Maximum Drawdown	33.7%	33.7%	33.8%	35.2%	19.8%	17.6%	27.4%
Ulcer Index	7.9%	16.4%	13.1%	17.8%	7.5%	5.5%	11.7%

THE ULCER INDEX

STOCKCHARTS.COM

Vanguard Total Stock Market ETF (VTI)

Ulcer 52 week MA = 2.94



iShares MSCI Canada ETF (EWC)

Ulcer 52 week MA = 3.30

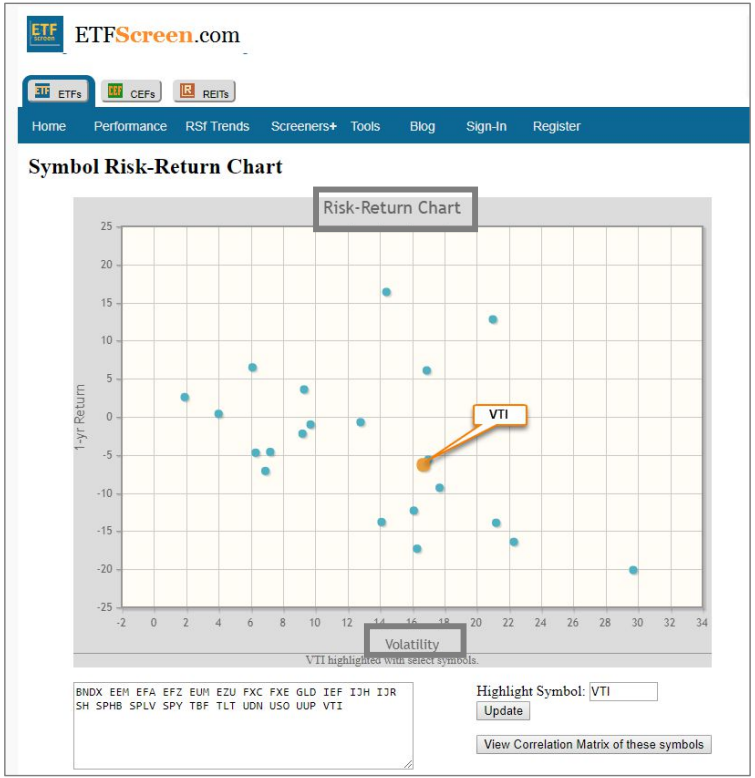


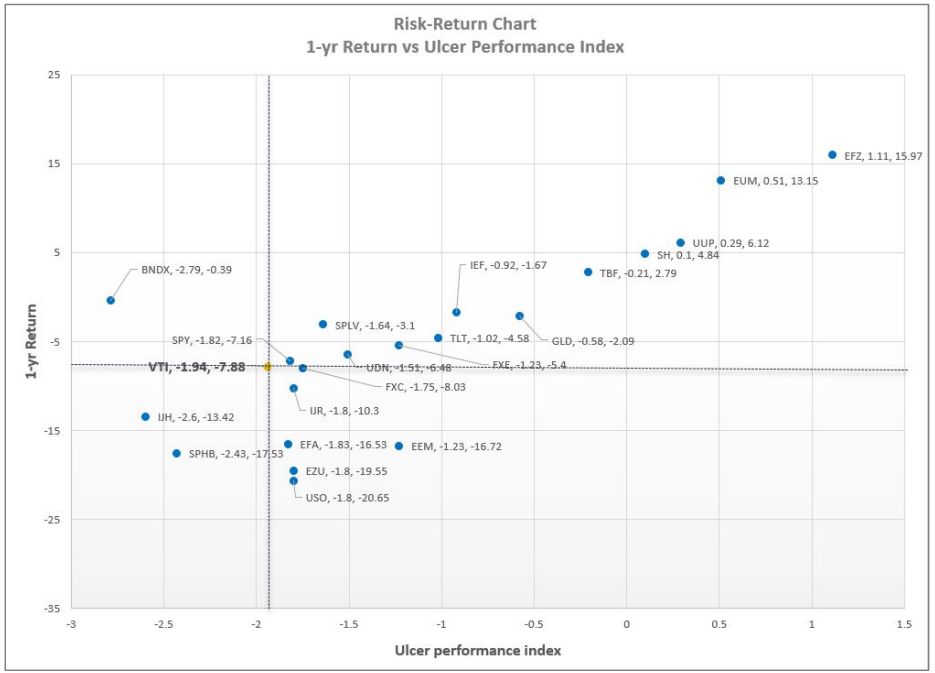
Indicators	Parameters	Position	Reorder	Color	Height	Opacity	Overlay	Parameters
Ulcer Index (UI)	14	Below		- Auto -	- Auto -	- Auto -	Simple Moving Avg	52

VOLATILITY VS RISK

ARE THEY THE SAME THING?

Volatility Metrics may be good for Trading but…the Ulcer Performance Index is an INVESTORS Metric





THAT'S IT FOR TODAY!



RIVERSIDE'S INVESTOR MASTER CLASS

DISCLAIMER

- All trading / investing comes with risk.
- The insights contained within this class do not constitute advice, rather are meant for educational purposes from which you may make more educated decisions taking into account your individual risk profile and needs for return.
- This class does not provide advice. There are no guarantees for positive return. All investing/trading is at your own risk.
- Under no circumstances does the information in this class represent a recommendation to buy, sell, or hold any security.
- This class is about helping active and affluent investors learn how to make better decisions in financial markets.
- You, and you alone, are solely responsible for any investment decisions that you make.
- This document contains proprietary and confidential information. As such, it is for the sole use of the addressee and Riverside Analytics Inc (Riverside), and proprietary information shall not be disclosed, in any manner, to a third party except by the express written permission of Riverside. This document is deemed to be the intellectual property of Riverside in accordance with Canadian copyright law.

Good investing is <u>not</u> an "event" like finding the next growth opportunity or catching the next market turn. Rather, good investing is a disciplined process that converts research and training into a well-tested methodology, and then makes a habit of following that approach day after day.

John P. Hussman, Ph.D
President, Hussman Strategic Advisors