SESSION TWO

Investment Options: Governmental Securities

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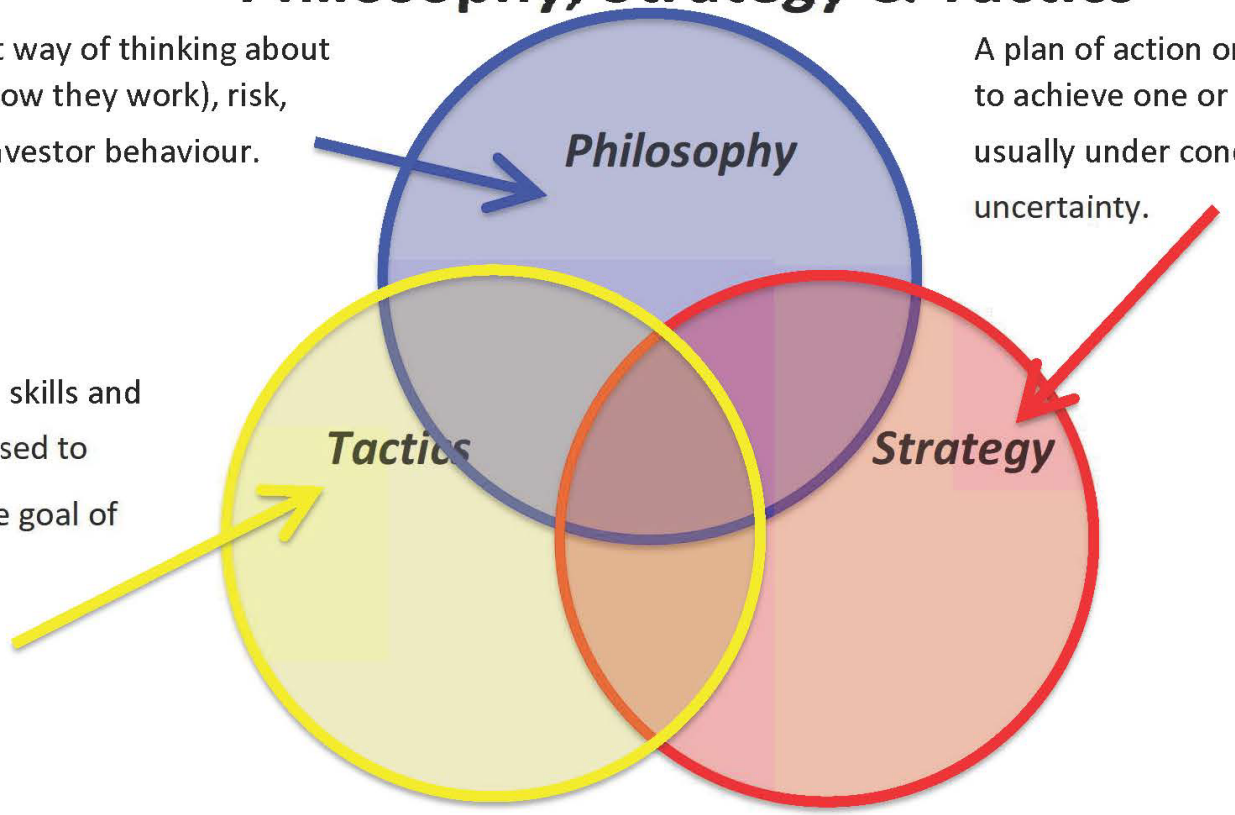
Philosophy, Strategy & Tactics

A coherent way of thinking about markets (how they work), risk, return & investor behaviour.

A plan of action or policy designed to achieve one or more goals usually under conditions of uncertainty.

Resources, skills and methods used to achieve the goal of a strategy.



The difference between Strategy and Tactics: Strategy is done above the shoulders and Tactics is done below the shoulders.

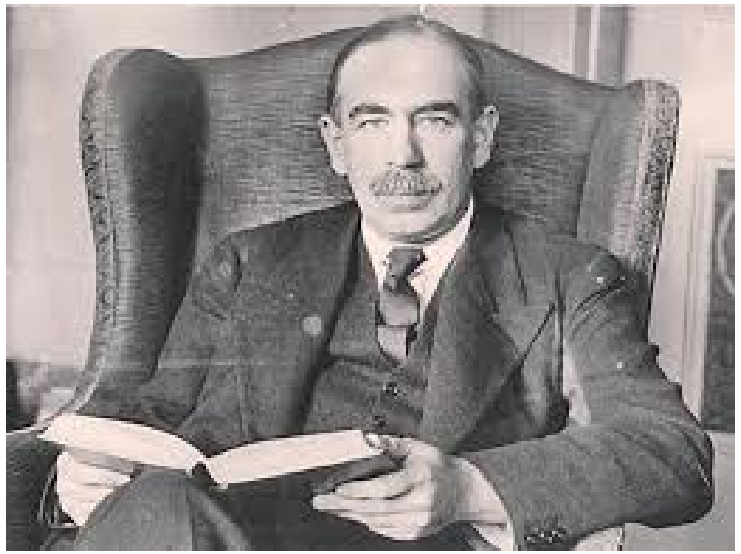
"The Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions."

John Maynard Keynes writing in the introduction of
H.D. Henderson, Supply and Demand (New York: Harcourt, Brace and Company, 1922), v.


WARNING
ASSUMPTIONS
A H E A D

Economic Words of Wisdom 1

"The Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. **It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions.**"



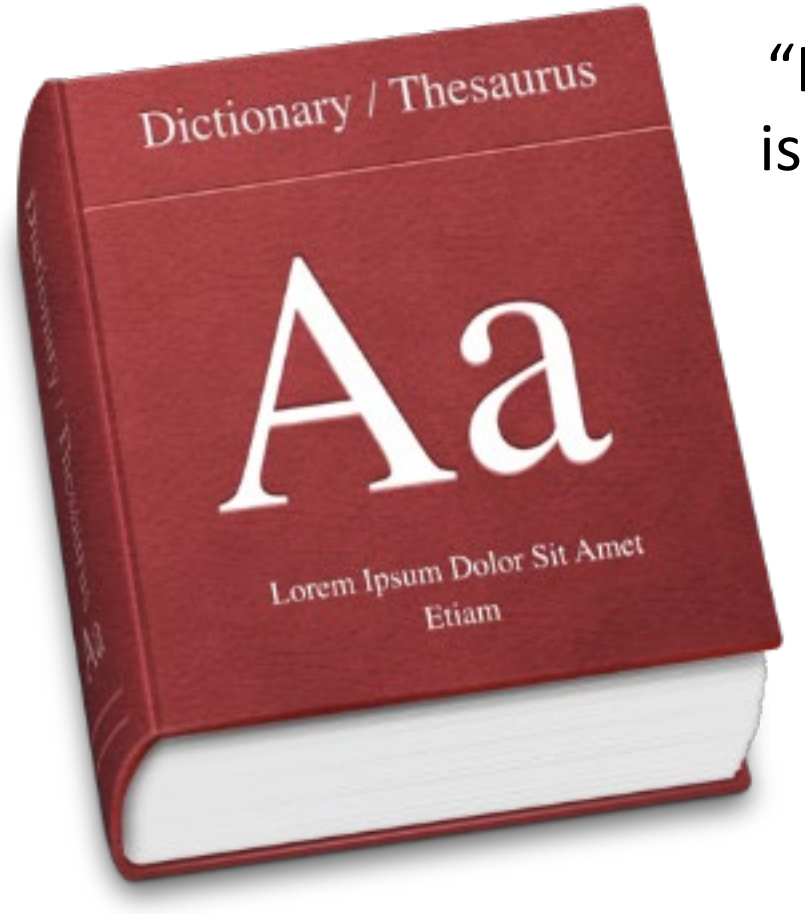
John Maynard Keynes writing in the introduction of
H.D. Henderson, Supply and Demand (New York: Harcourt, Brace and Company, 1922), v. Emphasis added.

Economic Words of Wisdom 2

“Nobel laureate Kenneth Arrow has warned, **"[O]ur knowledge of the way things work, in society or in nature, comes trailing clouds of vagueness. Vast ills have followed a belief in certainty."**”

Peter L. Bernstein. Against the Gods: The Remarkable Story of Risk (Kindle Location 126). Kindle Edition. Emphasis added.

Definitions



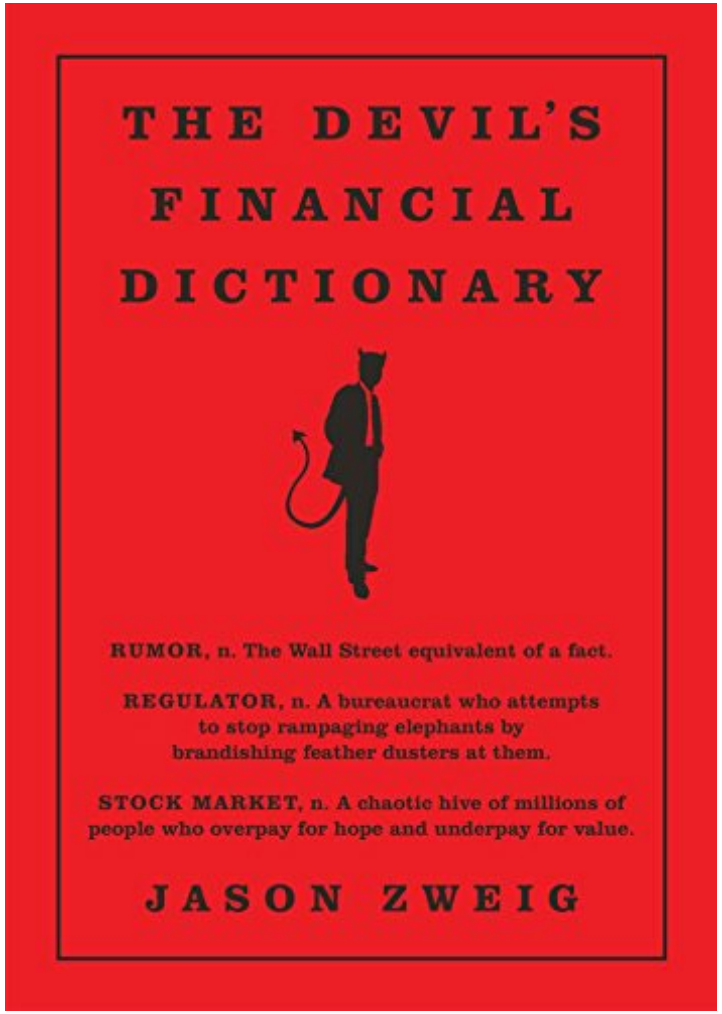
"Knowledge is knowing a tomato is a fruit; Wisdom is not putting it in a fruit salad."

Brandreth, Gyles. Oxford Dictionary of Humorous Quotations (Kindle Location 4265). OUP Oxford. Kindle Edition.
See this useful Microsoft Help page for Microsoft Word on the definition/history of "Lorem Ipsum Dolor Sit Amet Etiam":
https://support.microsoft.com/en-us/kb/114222

Risk Defined

More things can happen than will happen.

> … It has been philosophically defined by finance professor Elroy Dimson of London Business School this way: ***"Risk means more things can happen than will happen."*** In the end, risk is the gap between what investors think they know and what they end up learning— about their investments, about the financial markets, and about themselves.

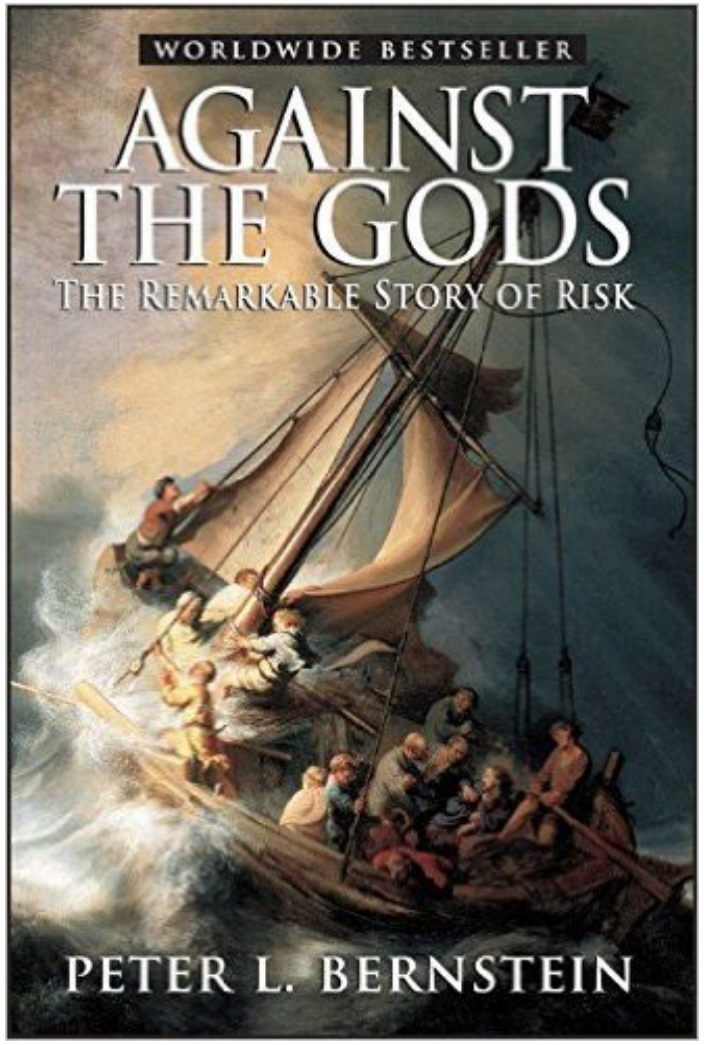


Zweig, Jason. The Devil's Financial Dictionary (p. 182). PublicAffairs. Kindle Edition. Emphasis added.

Risk &

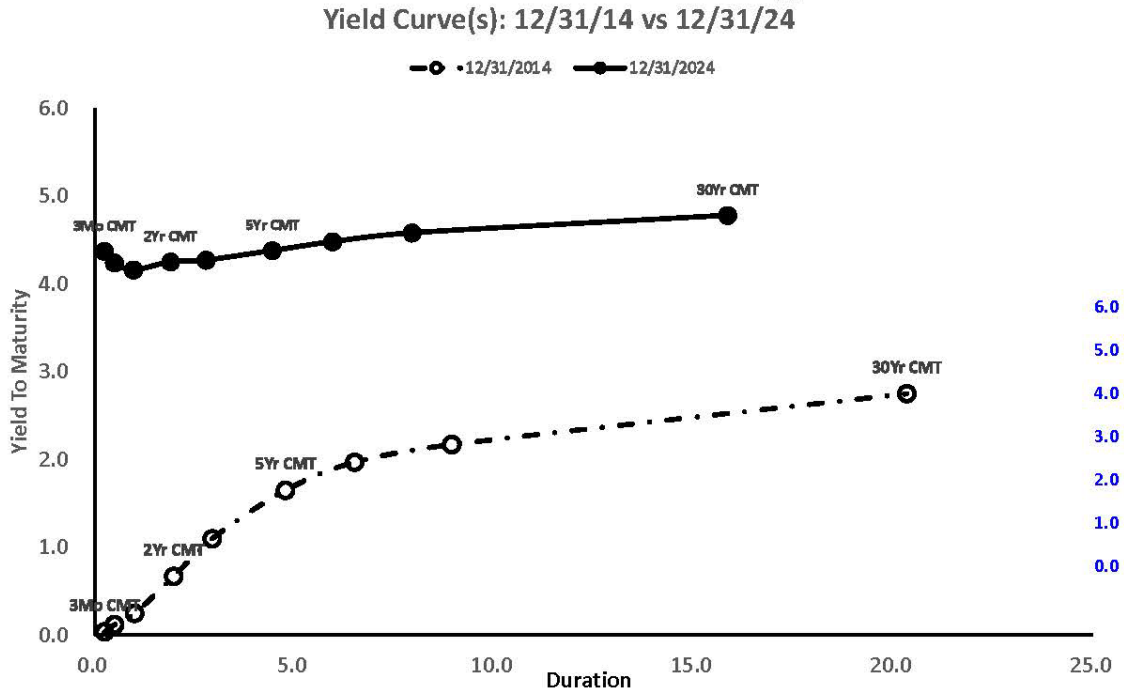
Finding the right trade-off is the key

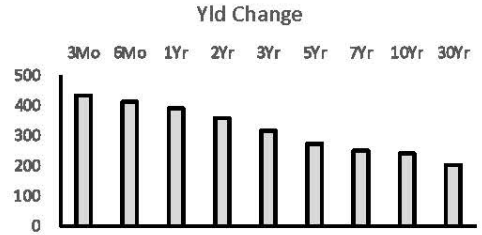
> *The scientist who developed the Saturn 5 rocket that launched the first Apollo mission to the moon put it this way: ***"You want a valve that doesn't leak and you try everything possible to develop one. But the real world provides you with a leaky valve. You have to determine how much leaking you can tolerate."*** (Obituary of Arthur Rudolph, in The New York Times, January 3, 1996.)

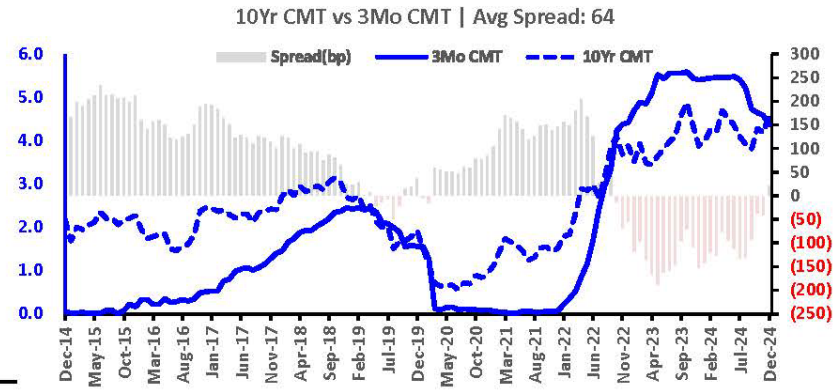


Peter L. Bernstein. Against the Gods: The Remarkable Story of Risk (Kindle Locations 69-71). Kindle Edition. Emphasis added.

Strategy Webb Toolkit Curve Lab Analysis

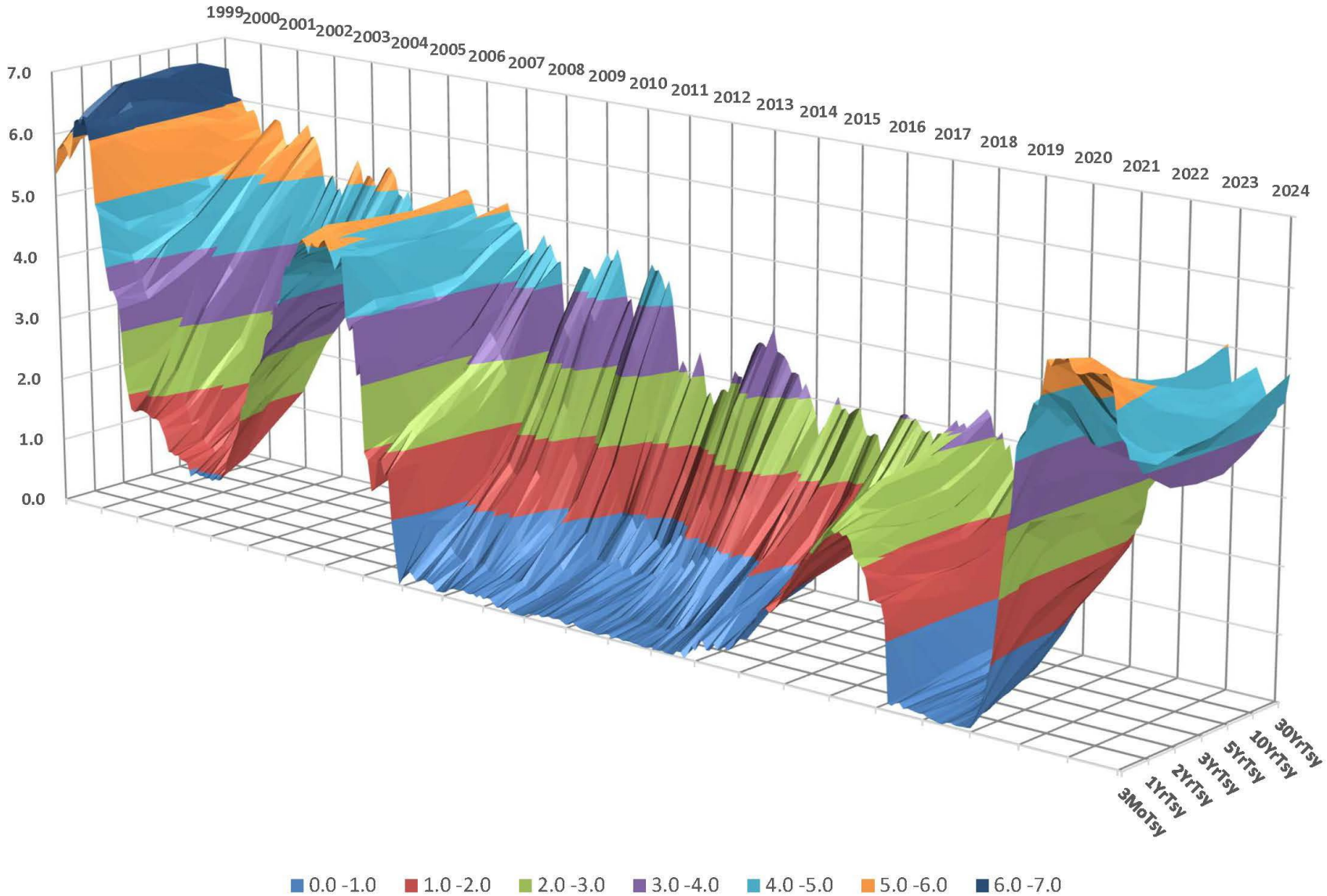






	Curve 1:	12/31/2014		Curve 2:	12/31/2024		Curve Risk as:	Duration		Treasury 1:	3Mo CMT		Treasury 2:	10Yr CMT	
Treasury (Constant Maturity)	Yield to Maturity	Modified Duration	Spread to 3Mo Treasury(bp)	Yield to Maturity	Modified Duration	Incremental Slope (bp)	Yield to Maturity	Modified Duration	Spread to 3Mo Treasury(bp)	Incremental Slope (bp)	Yield Change (bp)	Duration Change(bp)
3Mo CMT	0.04	0.25	0	4.37	0.24	0	433	(1)
6Mo CMT	0.12	0.50	8	8	4.24	0.49	(13)	(13)	412	(1)
1Yr CMT	0.25	1.00	21	13	4.16	0.97	(21)	(8)	391	(3)
2Yr CMT	0.67	1.98	63	42	4.25	1.90	(12)	9	358	(9)
3Yr CMT	1.10	2.94	106	43	4.27	2.79	(10)	2	317	(16)
5Yr CMT	1.65	4.78	161	55	4.38	4.45	1	11	273	(33)
7Yr CMT	1.97	6.51	193	32	4.48	5.95	11	10	251	(56)
10Yr CMT	2.17	8.95	213	20	4.58	7.95	21	10	241	(99)
30Yr CMT	2.75	20.34	271	58	4.78	15.85	41	20	203	(449)

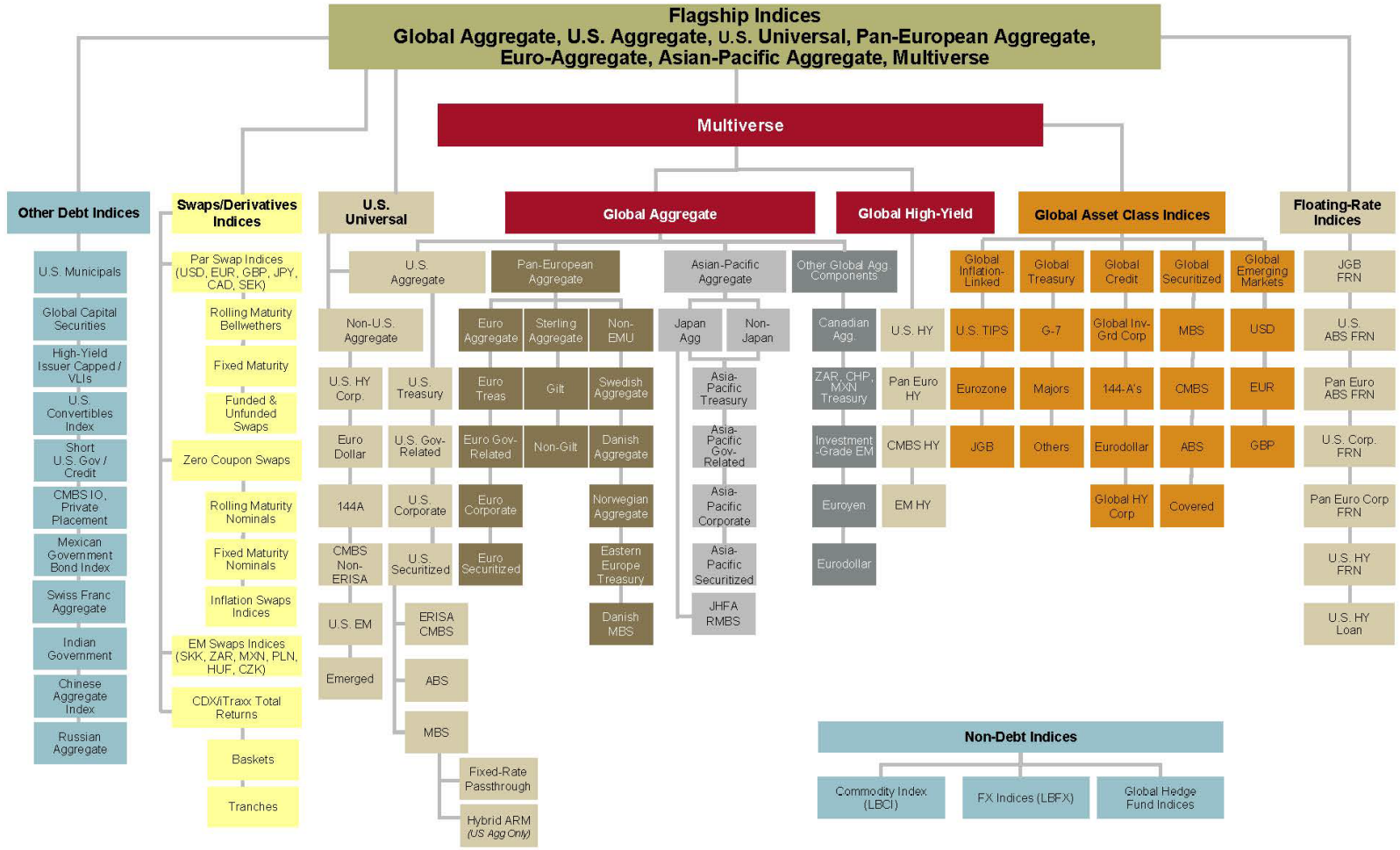
Strategy Webb Yield Curve Perspective: Dec-99 to Dec-2024



The analysis is provided for informational purposes and the accuracy is not guaranteed. Designed and created by Kevin Webb, CFA. Data from FRED @ St Louis Fed, BofA Merrill Lynch and Bloomberg.

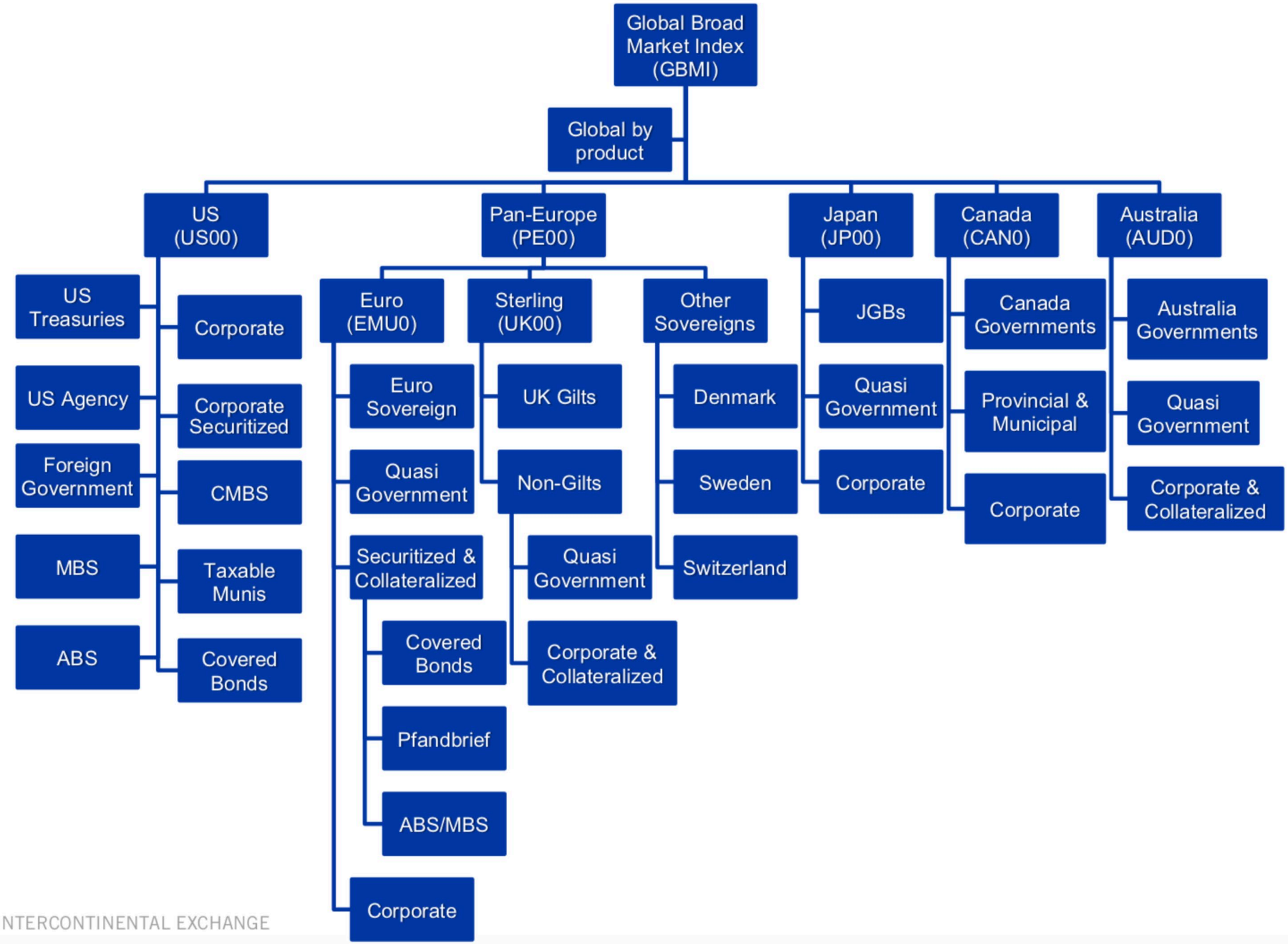
Bond Market Indices Overview

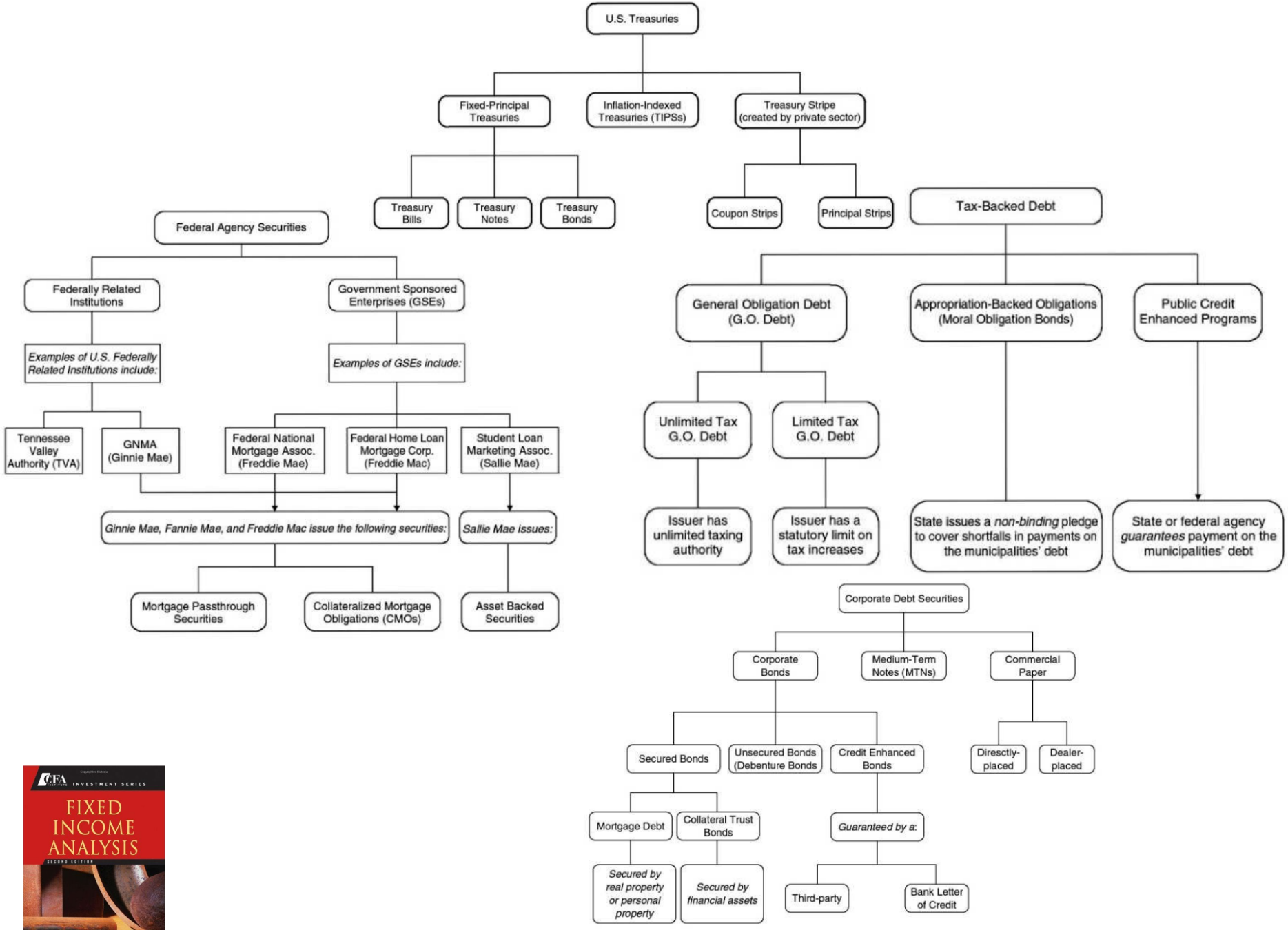
Figure 1. **Lehman Brothers Global Family of Indices-Index Map as of January 2008**

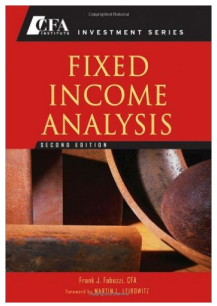


A Guide to the Lehman Brothers Global Family of Indices – Global Family of Indices 35th Anniversary 1973-2008, page 8, March 2008.
Note: Barclays purchased Lehman Brothers assets (including the indices) after Lehman's bankruptcy in Sep-08. Barclay's current guide can be found here: https://index.barcap.com/Home/Guides_and_Factsheets

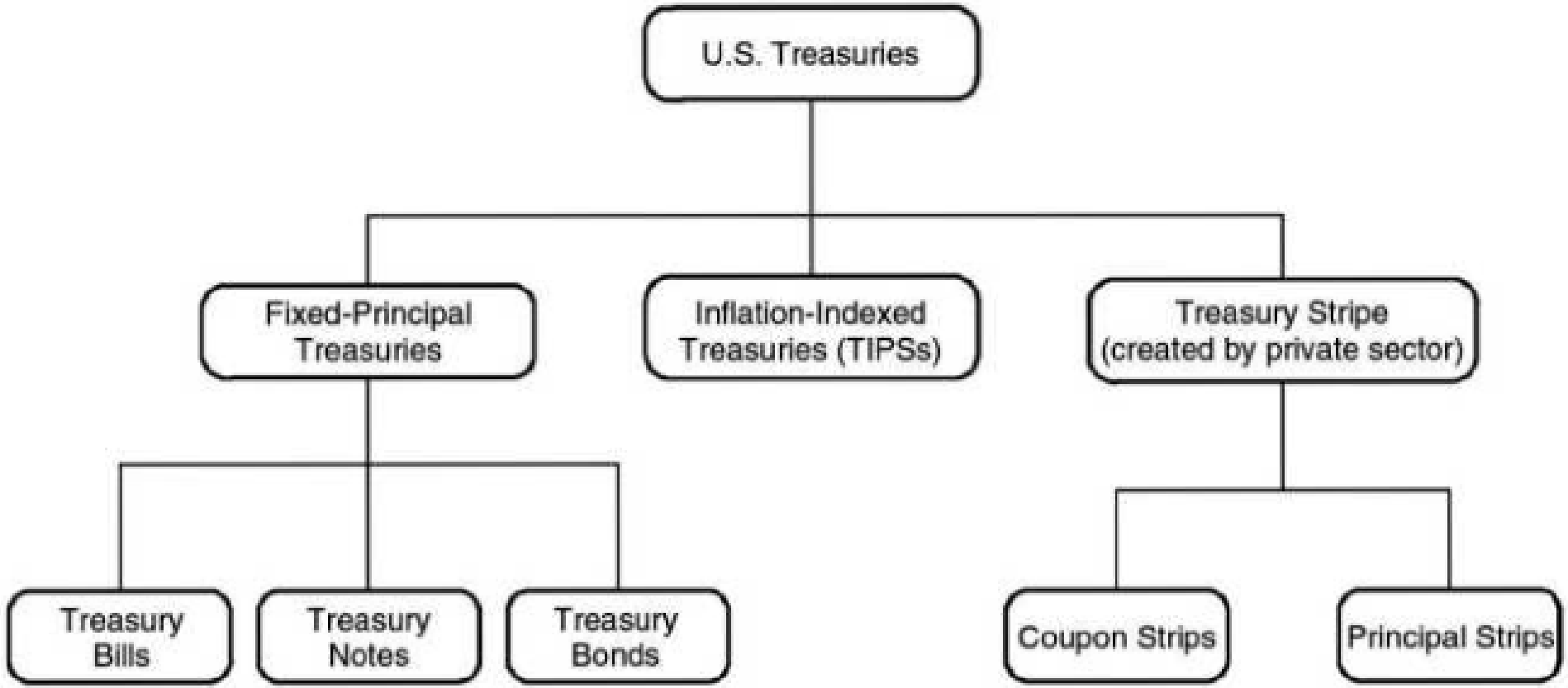
GLOBAL BROAD MARKET INDEX FAMILY

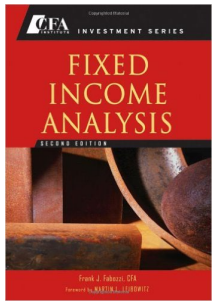






Frank J. Fabozzi. Fixed Income Analysis (Kindle Location 973-1212). Kindle Edition.





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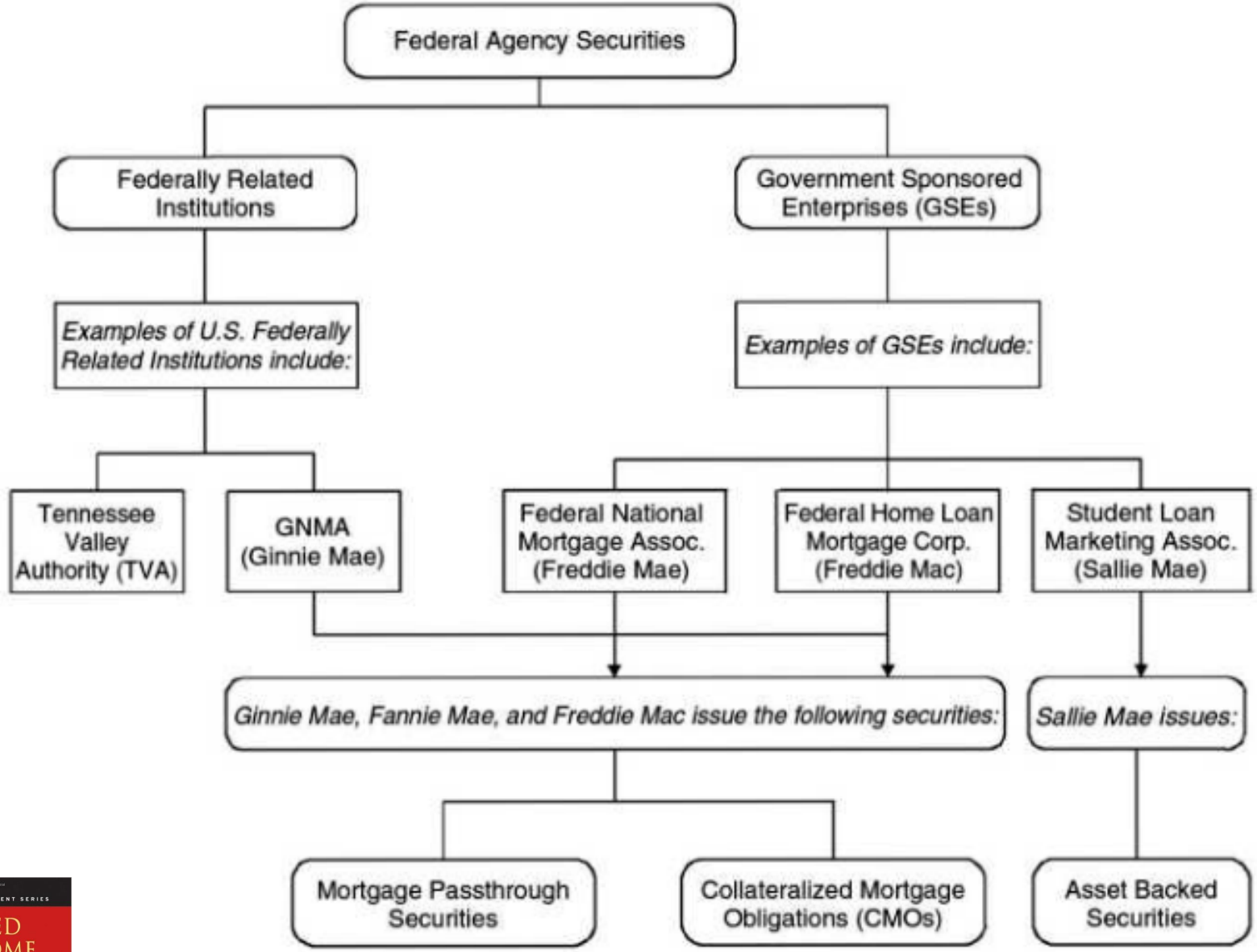

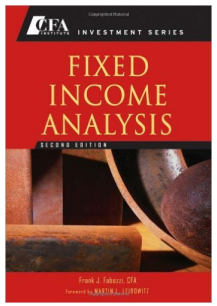

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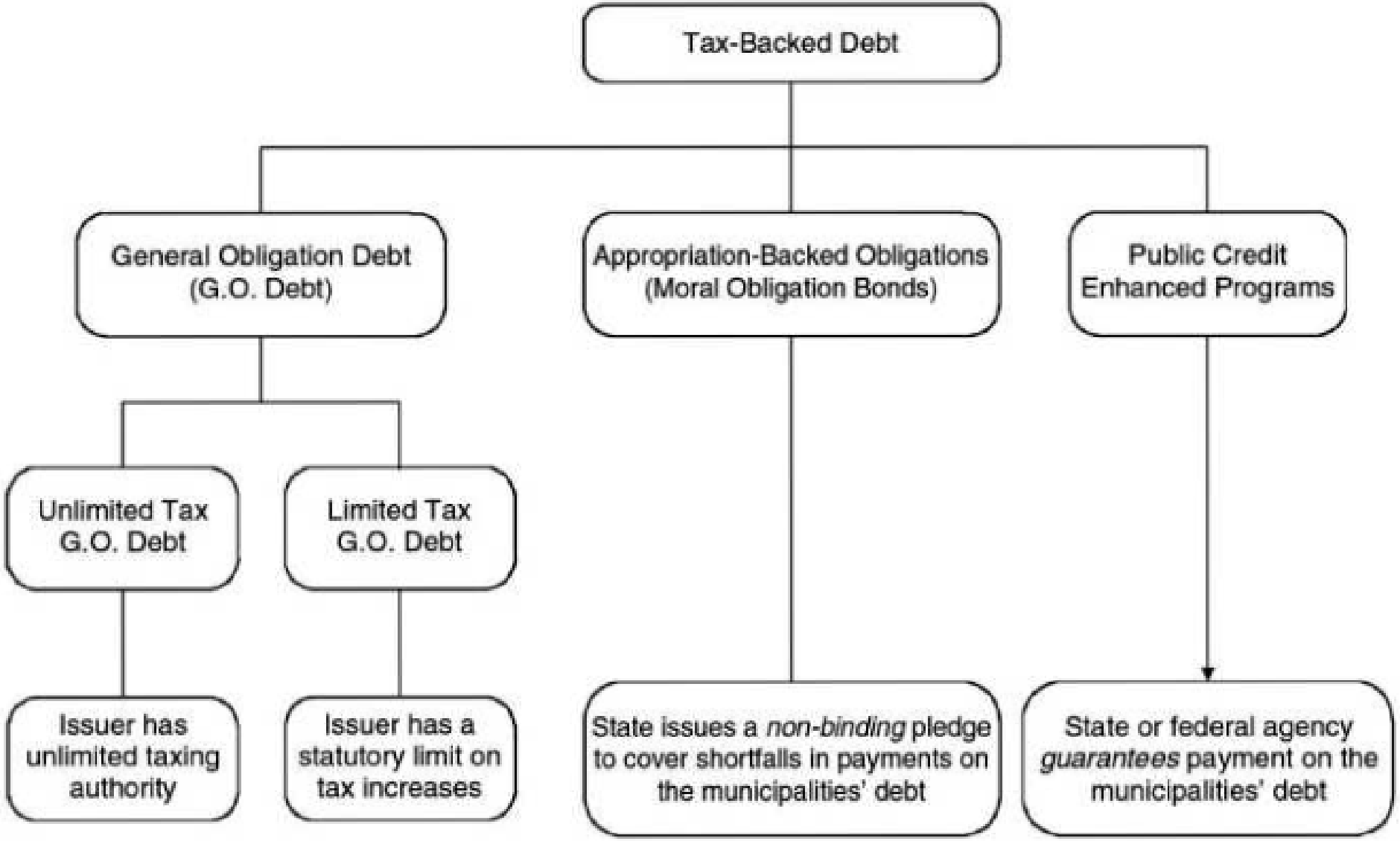

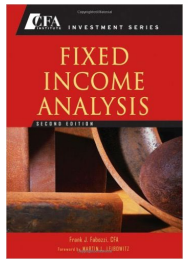

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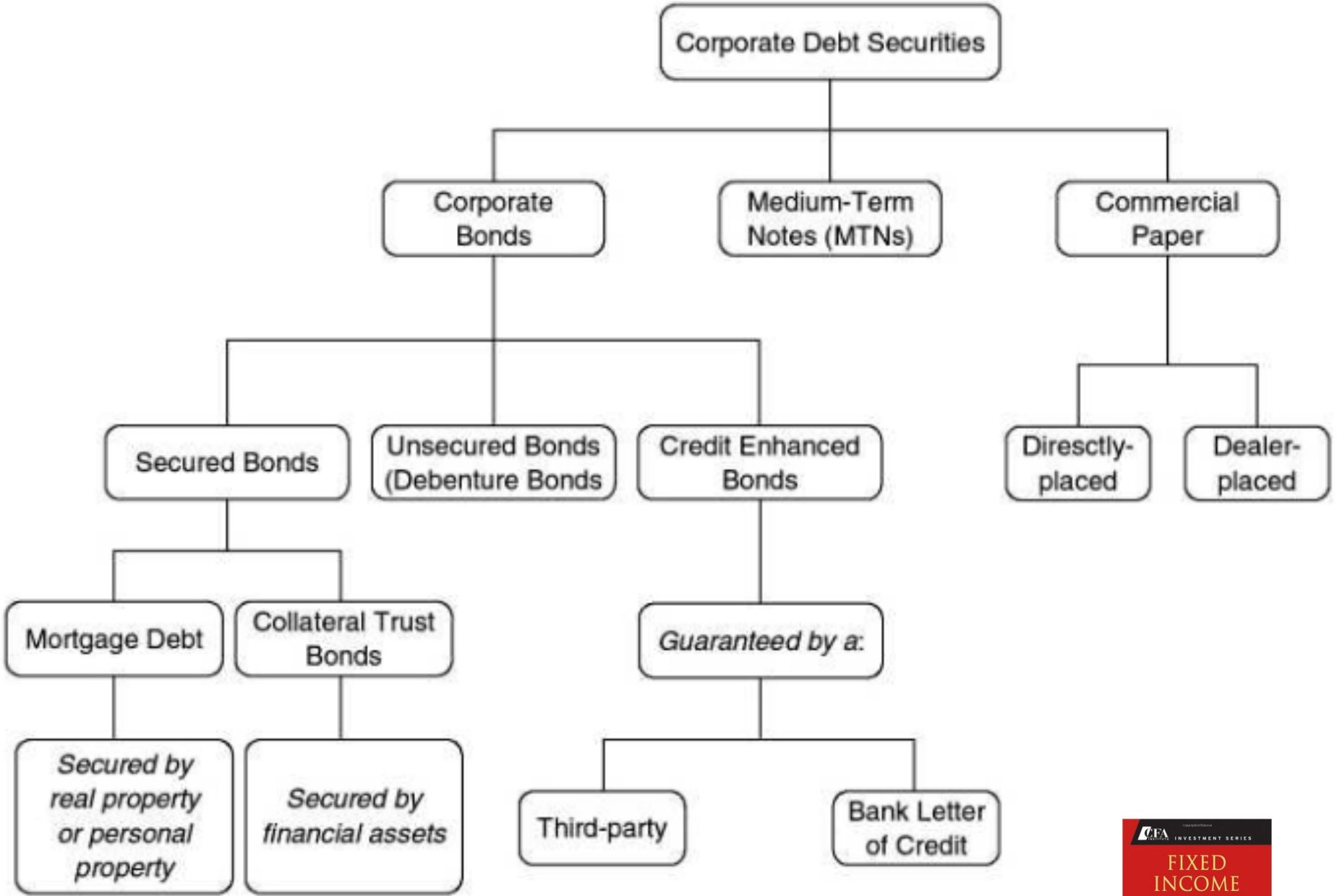
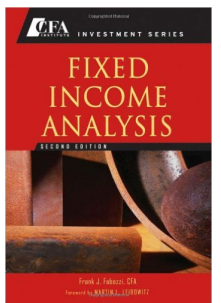




Frank J. Fabozzi. Fixed Income Analysis (Kindle Location 973-1212). Kindle Edition.

Fixed Income Structure Variations (not exhaustive)

Redemption Variations

- Bullet – fixed maturity date
- Callable – Can be redeemed in whole or part
  - Fixed Call Schedule
    - One Time – European
    - Discretely – Bermudan
    - Continuously – American
  - Variable Call Schedule
    - Make Whole – Dooms Day
    - Principal Prepayment – Variable over time

Coupon Variations

- Fixed Coupon – Doesn’t change
- Non-Fixed Coupon – Can change
  - Step Coupons
    - Step Up or Step Down
  - Floater – formula based
  - Formula - Example: Range Notes, Fixed to Float, etc.

Credit Variations

- NRSRO Rated
- Not Rated

Why do we use Return instead of $?

"A rate of return is the gain received from an investment over a period of time expressed as a percentage***. Returns are a ratio relating how much was gained given how much was risked***. …

There are several reasons that returns have emerged as the preferred statistic for summarizing investment performance:

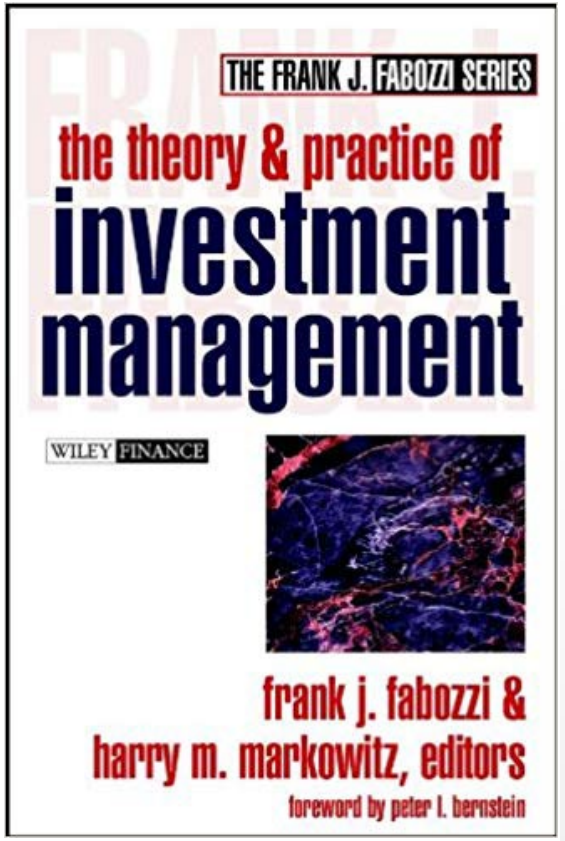
*The rate of return ***concentrates a lot of information into a single statistic***. ...

*This single number, the return, is a ratio. ***It is faster for an investor to analyze proportions than absolute numbers***. ...

****Returns are comparable even if the underlying figures are not***. ...

****Returns calculated for different periods are comparable***; that is, an investor can compare this year's return to last year's. …

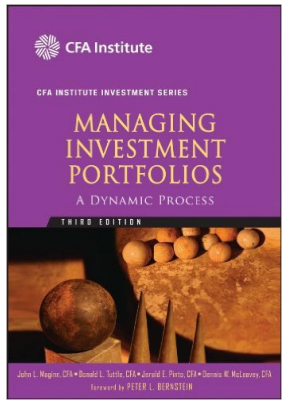
****The interpretation of the rate of return is intuitive. Return is the value reconciling the beginning investment value to the ending value over the time period we are measuring***. … "



The Theory and Practice of Investment Management (Frank J. Fabozzi Series) (Kindle Locations 1180-1189). Kindle Edition. Emphasis added.

Total Return Defined

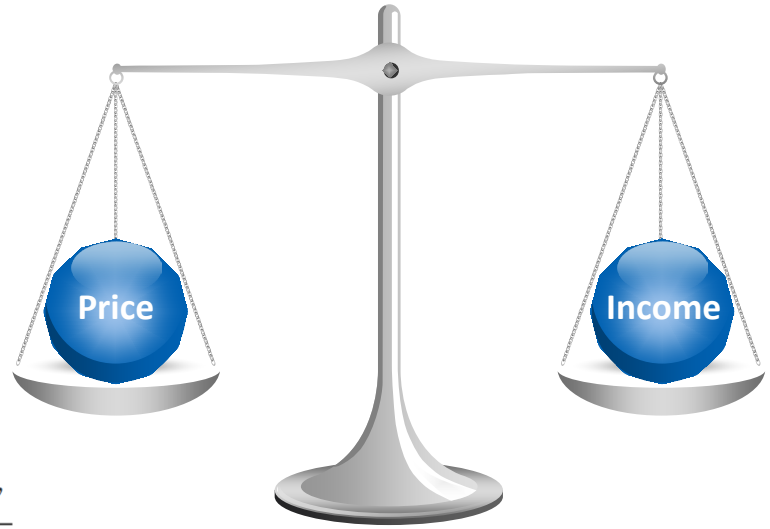
Total Return assumes indifference between Price return & Income return.



Total rate of return measures the increase in the investor's wealth due to both investment income (for example, dividends and interest) and capital gains (both realized and unrealized). ***The total rate of return implies that a dollar of wealth is equally meaningful to the investor whether that wealth is generated by the secure income from a 90-day Treasury bill or by the unrealized appreciation in the price of a share of common stock.***

$$HPR = \frac{I_t + P_t - P_{t-1}}{P_{t-1}}$$

where HPR = holding period return
I_t = income
P_t = ending price
P_{t-1} = beginning price

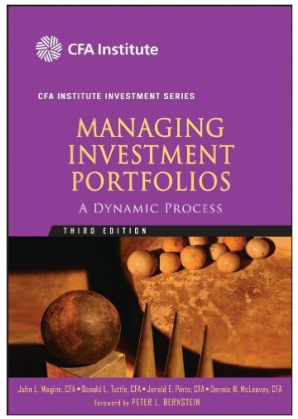


$$Total\ Return = \frac{(EndingMarketValue - BegMarketValue) + CashFlow}{BegMarketValue}$$

Managing Investment Portfolios: A Dynamic Process (CFA Institute Investment Series) (p. 723). Wiley. Kindle Edition. Emphasis added.
Mark P. Kritzman. The Portable Financial Analyst: What Practitioners Need to Know (Wiley Finance) (Kindle Locations 452-454). Kindle Edition.

What are your Return Preferences?

Total Return assumes indifference between Price return & Income return.



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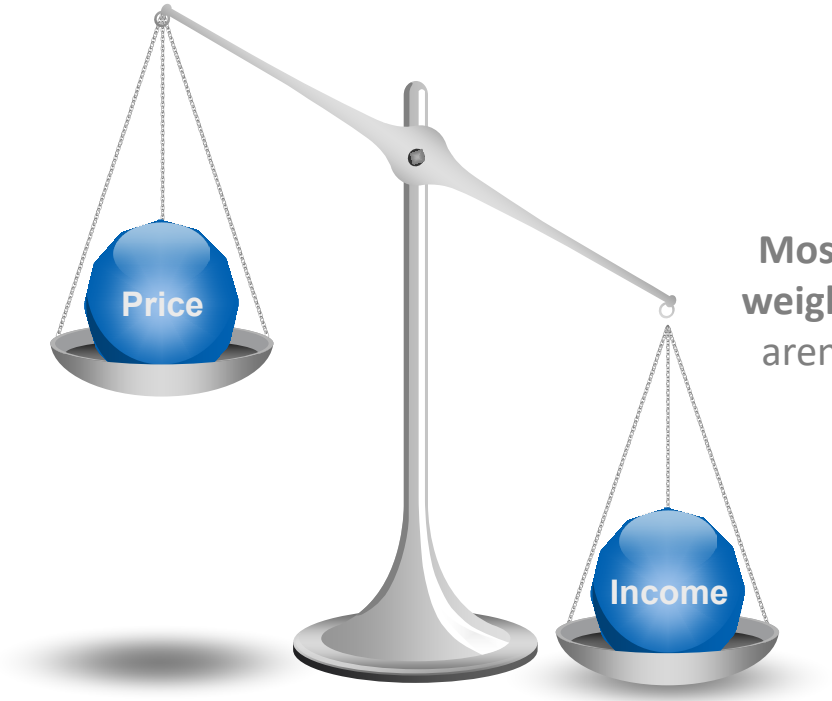


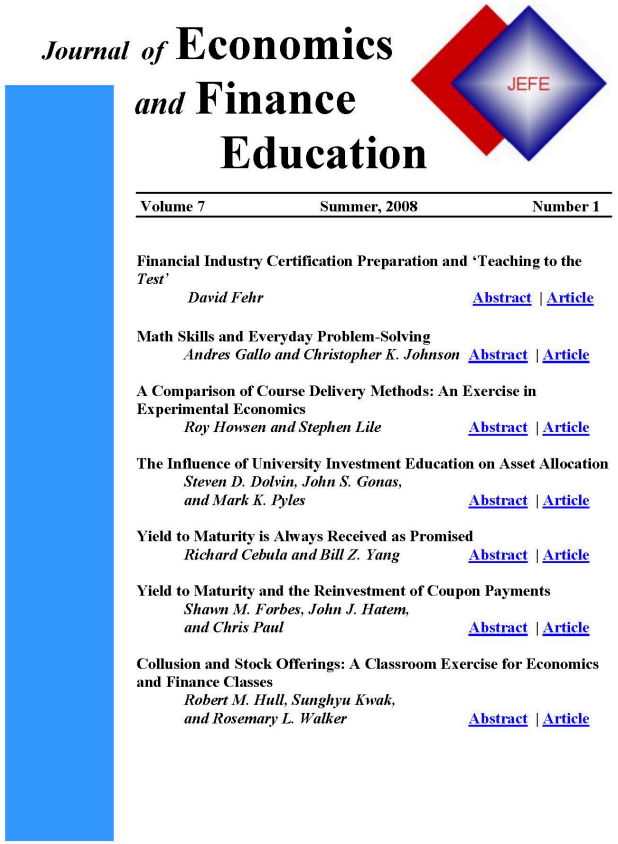
Income

Most public funds are income oriented and **put more weight on income.** If you don't budget gains/losses and aren't tasked with portfolio growth from investments then you likely have an income preference.

Managing Investment Portfolios: A Dynamic Process (CFA Institute Investment Series) (p. 723). Wiley. Kindle Edition. Emphasis added.

We are told that Total Return is “better” than yield.

“Yield to maturity (YTM hereafter) is “the standard measure of the total rate of return of the bond over its life. …… This interest rate is often viewed as a measure of the average rate of return that will be earned on a bond if it is bought now and held until maturity” (Bodie, et al, 2002, p. 426). And it is considered “the most accurate measure of interest rate” (Mishkin, 2004, p. 64). Unfortunately, due to a fact that “yield to maturity will equal the rate of return realized over the life of the bond if all coupons are reinvested at an interest rate equal to the bond’s yield to maturity (Bodie, et al, 2002, p. 429), YTM has been widely misinterpreted as “the true rate of return an investor would receive by holding the security until its maturity if each … interest payment is reinvested at the yield to maturity” (Strong, 2004, p.70, italic original). Similar interpretations can be also found in, to name a few, Reilly and Brown (1997, pp.530-531), Madura (1998, p. 217), and Fabozzi and Modigliani (2002, p. 364). “



Richard Cebula & Bill Yang, “Yield to Maturity is Always Received as Promised”, Journal of Economics and Finance Education Volume 7, no. 1 (2008): 43

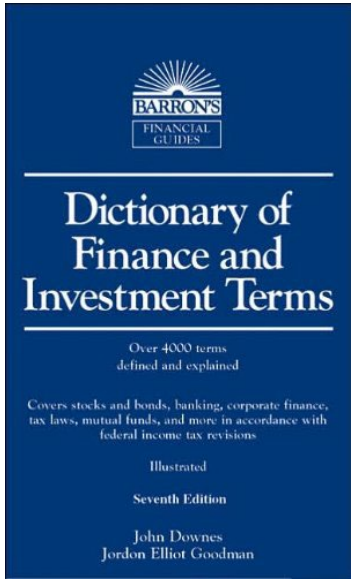
i = Yield = IRR = Required Rate of Return = etc…

$$i = (FV/PV)^{(1/n)-1}$$

INTEREST 1. cost of using money, expressed as a rate per period of time, usually one year, in which case it is called an annual rate of interest. (1)

REQUIRED RATE OF RETURN return required by investors before they will commit money to an investment at a given level of risk. Unless the expected return exceeds the required return, an investment is unacceptable. See also HURDLE RATE; INTERNAL RATE OF RETURN; MEAN RETURN. (2)

INTERNAL RATE OF RETURN (IRR) discount rate at which the present value of the future cash flows of an investment equal the cost of the investment. When the net present values of cash outflows (the cost of the investment) and cash inflows (returns on the investment) equal zero, the rate of discount being used is the IRR. When IRR is greater than the required return-called the hurdle rate in capital budgeting-the the investment is acceptable. (3)



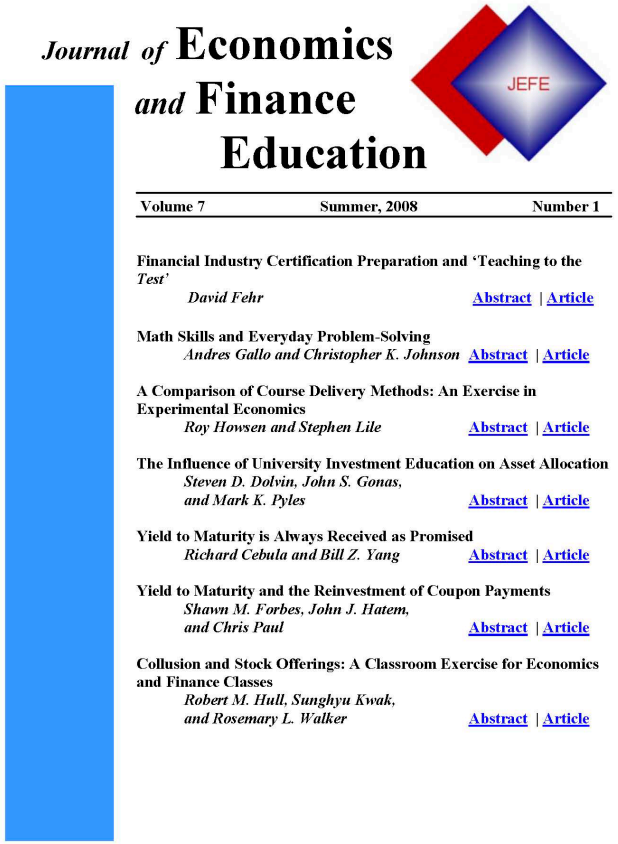
YIELD TO MATURITY (YTM) concept used to determine the rate of return an investor will receive if a long-term, interest-bearing investment, such as a bond, is held to its MATURITY DATE. It takes into account purchase price, REDEMPTION value, time to maturity, COUPON yield, and the time between interest payments. Recognizing time value of money, it is the DISCOUNT RATE at which the PRESENT VALUE of all future payments would equal the present price of the bond, also known as INTERNAL RATE OF RETURN. It is implicitly assumed that coupons are reinvested at the YTM rate. YTM can be approximated using a bond value table (also called a bond yield table) or can be determined using a programmable calculator equipped for bond mathematics calculations. ***See also DURATION***; HORIZON ANALYSIS; YIELD TO AVERAGE LIFE, YIELD TO CALL.

YIELD TO WORST bond yield assuming worst-case scenario, that is, earliest redemption possible under terms of the INDENTURE. See also YIELD TO CALL; YIELD TO MATURITY. (4)

1. John Downes;Jordan Elliot Goodman. Dictionary of Finance and Investment Terms (Barron's Financial Guides) (Kindle Locations 4807-4808). Kindle Edition.
2. John Downes;Jordan Elliot Goodman. Dictionary of Finance and Investment Terms (Barron's Financial Guides) (Kindle Locations 8221-8222). Kindle Edition.
3. John Downes;Jordan Elliot Goodman. Dictionary of Finance and Investment Terms (Barron's Financial Guides) (Kindle Locations 4849-4852). Kindle Edition.
4. John Downes;Jordan Elliot Goodman. Dictionary of Finance and Investment Terms (Barron's Financial Guides) (Kindle Locations 11433-11438). Kindle Edition.

YTM is always received as promised

This note points out that the above-mentioned common treatment in many textbooks turns out to be a fallacy. The truth is that YTM on a (coupon) bond is always received regardless of how coupon payments are re-invested, provided that the bond is held until maturity without default. It addresses a basic question in bond theory: between YTM and realized compounding yield (RCY hereafter), which concept measures the true rate of return from holding a coupon bond until maturity? It is well accepted that YTM measures the rate of return from holding a bond until maturity for both coupon bond and zero-coupon bond as well. By definition, the YTM received from holding a bond is independent of how coupon payments are allocated, as long as they are paid on time as contracted. By comparing the initial investment and the final value accumulated over the investment horizon, on the other hand, RCY on a bond measures the rate of return from an account (or trust) that holds the bond and the interests paid. Of course, it depends on how coupon payments are reinvested. We demonstrate that the RCY actually measures the YTM from a combined investment - holding a coupon bond plus an additional periodic investment with each coupon payment received. Not surprisingly, YTM and RCY would be normally unequal; RCY equals YTM if and only if coupon payments are reinvested at the same rate as the initial YTM. However, this conclusion should not be interpreted as "the yield to maturity is actually received only if coupon payments are reinvested at the yield to maturity".



Journal of **Economics and Finance Education**

JEFE

Volume 7 Summer, 2008 Number 1

Financial Industry Certification Preparation and 'Teaching to the Test'
David Fehr Abstract | Article

Math Skills and Everyday Problem-Solving
Andres Gallo and Christopher K. Johnson Abstract | Article

A Comparison of Course Delivery Methods: An Exercise in Experimental Economics
Roy Howsen and Stephen Lile Abstract | Article

The Influence of University Investment Education on Asset Allocation
Steven D. Dolvin, John S. Gonas, and Mark K. Pyles Abstract | Article

Yield to Maturity is Always Received as Promised
Richard Cebula and Bill Z. Yang Abstract | Article

Yield to Maturity and the Reinvestment of Coupon Payments
Shawn M. Forbes, John J. Hatem, and Chris Paul Abstract | Article

Collusion and Stock Offerings: A Classroom Exercise for Economics and Finance Classes
Robert M. Hull, Sunghyu Kwak, and Rosemary L. Walker Abstract | Article

Richard Cebula & Bill Yang, "Yield to Maturity is Always Received as Promised", Journal of Economics and Finance Education Volume 7, no. 1 (2008): 43

Settlement:	12/31/2024	
Maturity:	12/31/2029	
Par Amount:	1,000,000.00	
Price:	100.000	100.000
Coupon:	4.380%	
Payment Frequency:	2	
Yield:	4.380%	
Modified Duration:	4.447	4.447
Convexity:	0.232	0.232

Total Present Value

Price = ----------

Par Amount

Cash Flow

Present Value = ----------

(1 + Yield / Frequency)^Period

Present Value

Total Present Value

Time Period * Weight

Nominal Cash Flows Received

Cash Flow = Par*(Coupon / Frequency)

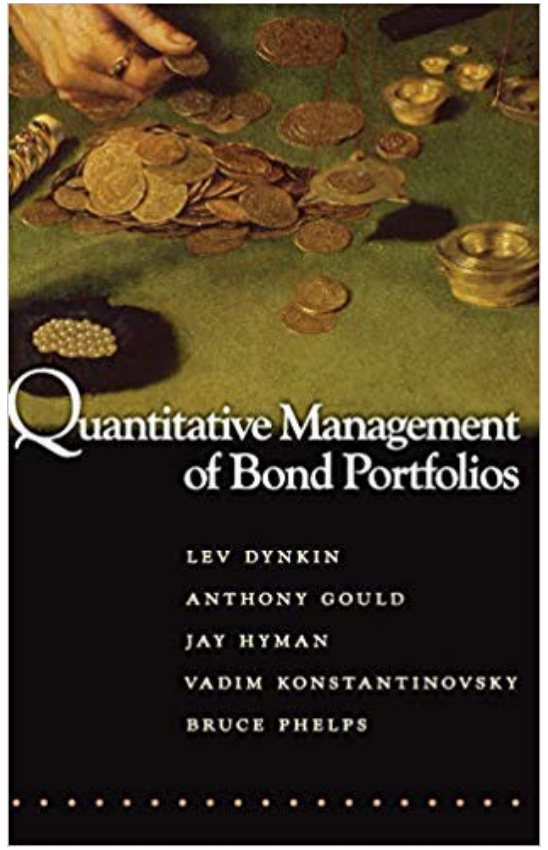
Time Period	Cash Flow	Present Value	Weight	Weighted Value Time To Receipt	Convexity Calc
1	21,900.00	21,430.67	0.0214	0.0214	41,043.93
2	21,900.00	20,971.39	0.0210	0.0419	120,492.99
3	21,900.00	20,521.96	0.0205	0.0616	235,821.48
4	21,900.00	20,082.16	0.0201	0.0803	384,612.78
5	21,900.00	19,651.79	0.0197	0.0983	564,555.41
6	21,900.00	19,230.64	0.0192	0.1154	773,439.26
7	21,900.00	18,818.51	0.0188	0.1317	1,009,151.92
8	21,900.00	18,415.22	0.0184	0.1473	1,269,675.15
9	21,900.00	18,020.57	0.0180	0.1622	1,553,081.45
10	1,021,900.00	822,857.08	0.8229	8.2286	86,676,286.11
Total	1,219,000.00	1,000,000.00	1.000	9.089	92,628,160.48

Macaulay Duration:	4.544	<--- Is the sum of the weighted time to receipt divided by the coupon frequency.
Modified Duration:	4.447	<--- Is the Macaulay Duration divided by (1+ Bond Yield/2) which converts the weighted time to receipt into a percentage change.

Don’t let Tactics drive Philosophy

Don’t let Wall Street make you over in their image and likeness…

"A manager of a book accounting portfolio is likely to follow different portfolio strategies than if he were managing a marked-to-market portfolio. ... a book manager may buy a widespread credit asset to produce a steady book yield and book income advantage ... He continues to enjoy this advantage even if the bond’s spread widens, as long as the bond does not become credit impaired ... In contrast, a total return manager buying the same asset would be penalized as soon as the asset’s market performance begins to deteriorate. Overall, the book manager typically strives more to identify assets that will produce relatively high book income (book yield) with a high degree of confidence (i.e., low default or prepayment risk) and less to anticipate monthly spread changes. This focus on book yield can often work to his advantage. To the extent that a portion of a bond’s yield reflects a risk premium to compensate total return managers for spread volatility unrelated to default risk, the book manager can garner that additional spread because spread volatility does not affect the manager’s performance."

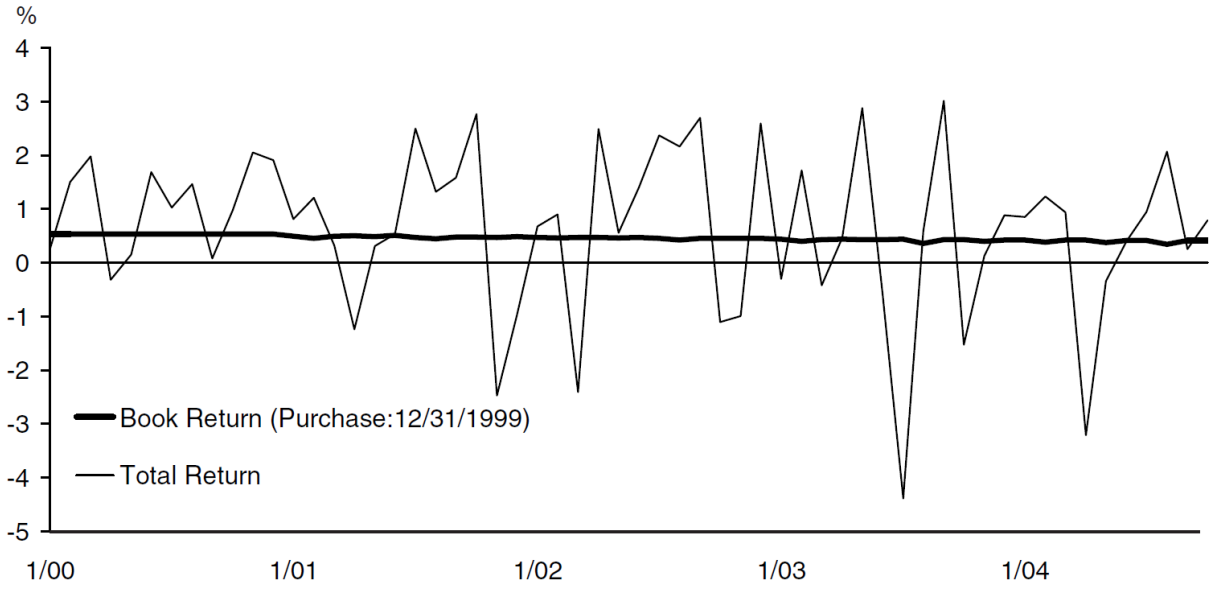


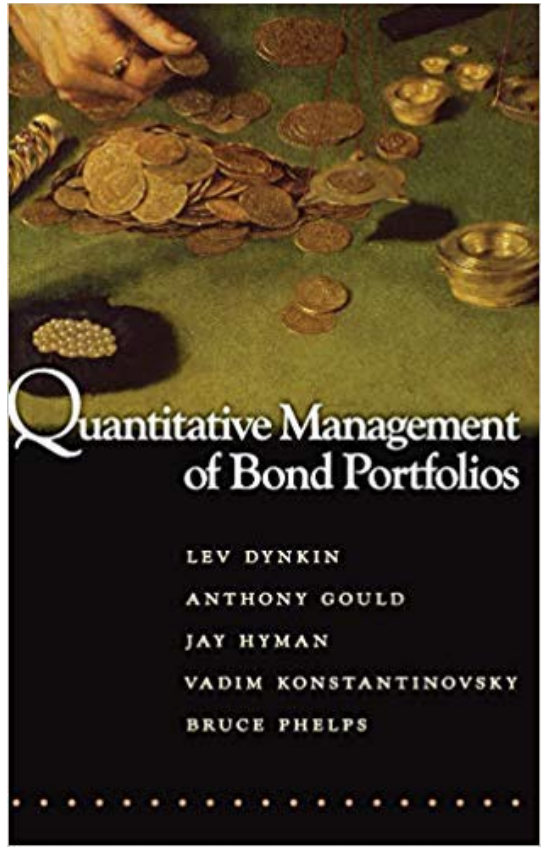
Dynkin, Lev; Gould, Anthony; Hyman, Jay; Konstantinovsky, Vadim; Phelps, Bruce. Quantitative Management of Bond Portfolios (Advances in Financial Engineering Book 1) (p. 255). Princeton University Press. Kindle Edition.

Don’t let Tactics drive Philosophy (cont. 2 of 2)

Don’t let Wall Street make you over in their image and likeness…

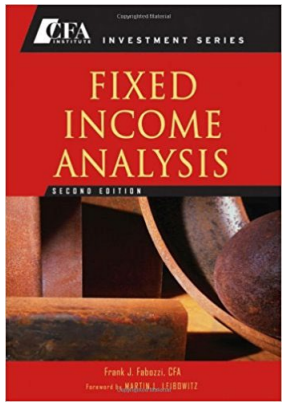
Figure 1. **Book Return versus Market Return: A Portfolio of the Lehman Brothers U.S. Treasury Index,** Purchased on December 31, 1999





Bruce Phelps, et. al. Quantitative Management of Bond Portfolios. Emphasis added.

Interest Rate Risk = Duration/Convexity



Duration

Interpretation: Generic description of the sensitivity of a bond's price (as a percentage of initial price) to a change in yield

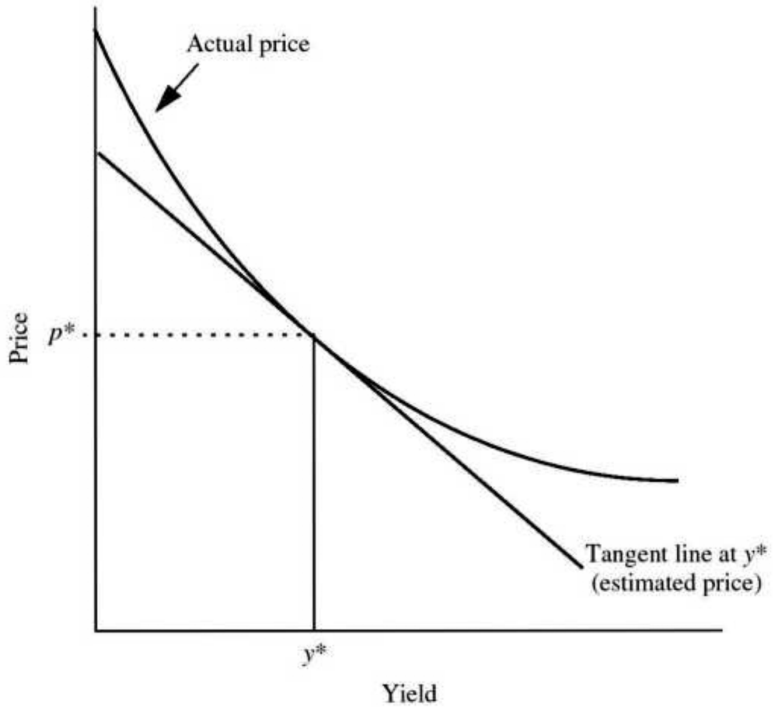
Duration is the approximate percentage change in a bond's price for a 100 basis point change in yields.

Modified Duration

Duration measure in which it is assumed that yield changes do not change the expected cash flows

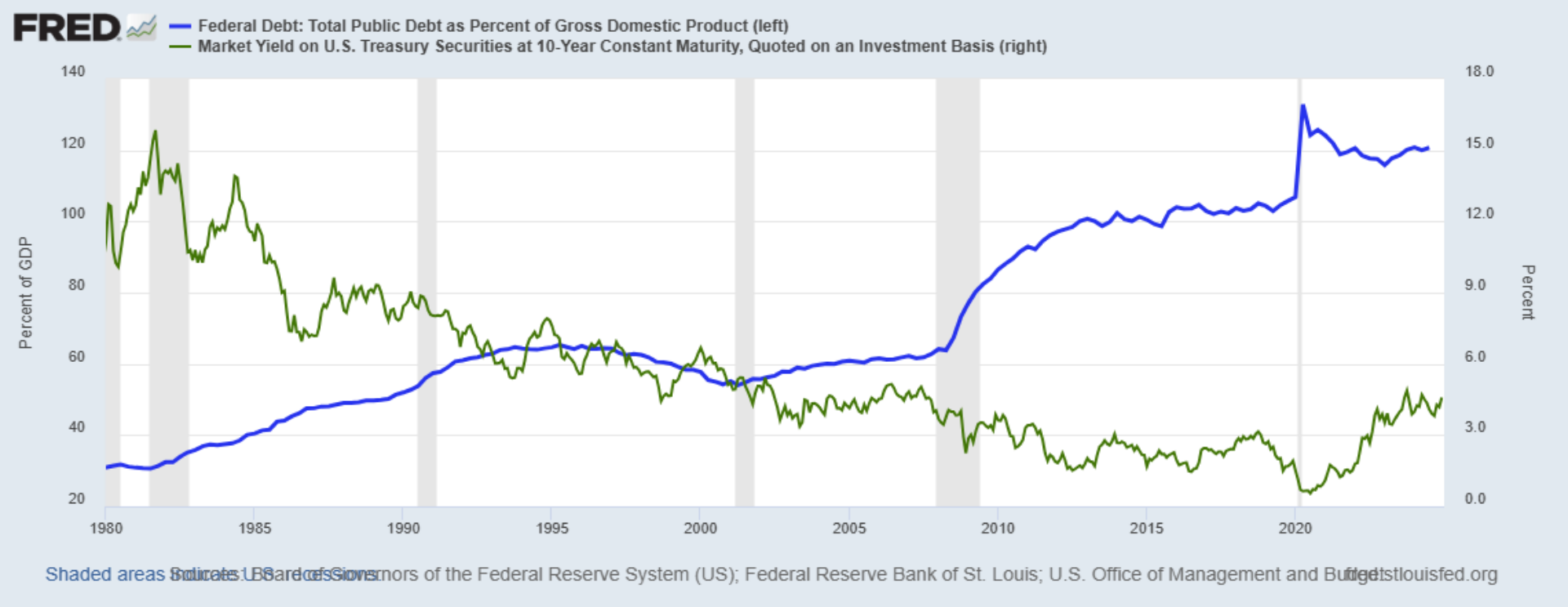
Effective Duration

Duration measure in which recognition is given to the fact that yield changes may change the expected cash flows

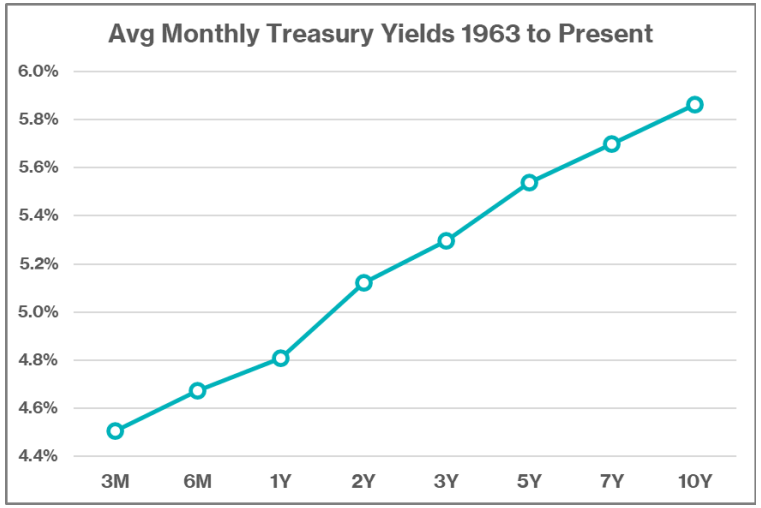


The duration measure indicates that regardless of whether interest rates increase or decrease, the approximate percentage price change is the same. … The duration measure indicates that regardless of whether interest rates increase or decrease, the approximate percentage price change is the same. The reason for this result is that duration is in fact a first (linear) approximation for a small change in yield.' **The approximation can be improved by using a second approximation. This approximation is referred to as the "convexity adjustment." It is used to approximate the change in price that is not explained by duration.**

Frank J. Fabozzi. Fixed Income Analysis (Kindle Locations 3111-3113). Kindle Edition. Emphasis added.



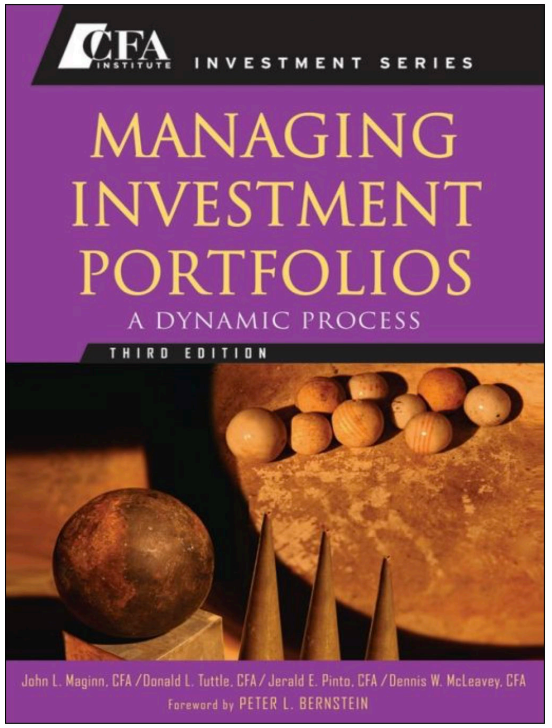
Maturity	Avg Yield	Avg Dur	Modified Sharp Ratio	% Yield of 10Yr	% Risk of 10Yr
3M T-Bill	4.50%	0.25		77%	3%
6M T-Bill	4.67%	0.50	**0.34**	80%	6%
1Y T-Bill	4.81%	1.00	**0.30**	82%	12%
2Y T-Note	5.12%	1.82	**0.34**	87%	22%
3Y T-Note	5.30%	2.79	**0.28**	90%	34%
5Y T-Note	5.54%	4.61	**0.22**	94%	56%
7Y T-Note	5.70%	6.36	**0.19**	97%	77%
10Y T-Note	5.86%	8.22	**0.17**	100%	100%



Upper graph from Fred. Lower table and graph from Rick Phillips presentation Day 1, Session 3.

Passive Portfolio Management

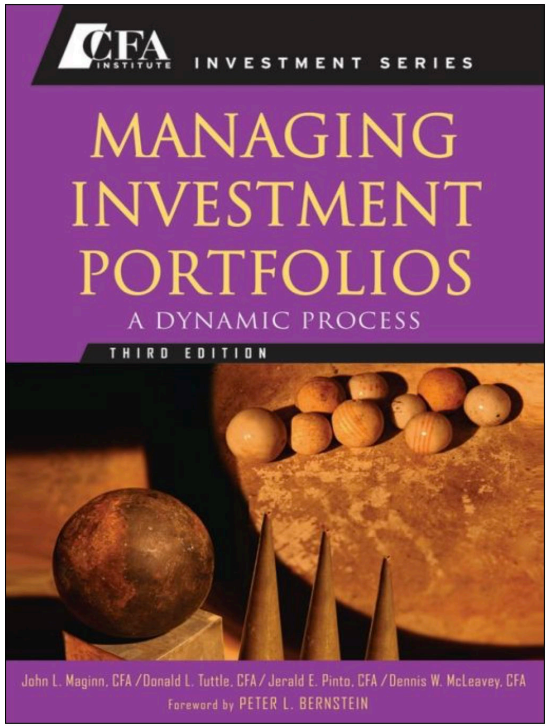
"A passive management strategy assumes that the market's expectations are essentially correct or, more precisely, that the manager has no reason to disagree with these expectations —perhaps because the manager has no particular expertise in forecasting. By setting the portfolio's risk profile (e.g., interest rate sensitivity and credit quality) identical to the benchmark's risk profile and pursuing a passive strategy, the manager is quite willing to accept an average risk level (as defined by the benchmark's and portfolio's risk profile) and an average rate of return (as measured by the benchmark's and portfolio's return). **Under a passive strategy, the manager does not have to make independent forecasts and the portfolio should very closely track the benchmark index.**"



Managing Investment Portfolios: A Dynamic Process (CFA Institute Investment Series) (p. 331). Wiley. Kindle Edition. Emphasis added.

Active Portfolio Management

“**An active management strategy essentially relies on the manager’s forecasting ability. Active managers believe that they possess superior skills in interest rate forecasting, credit valuation, or in some other area that can be used to exploit opportunities in the market.** The portfolio’s return should increase if the manager’s forecasts of the future path of the factors that influence fixed-income returns (e.g., changes in interest rates or credit spreads) are more accurate than those reflected in the current prices of fixed-income securities. The manager can create small mismatches (enhancement) or large mismatches (full-blown active management) relative to the benchmark to take advantage of this expertise.”



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Strategy Webb Risk/Reward Overview Part 1: The Yield Curve Framework

Curve Begin Date: 12/31/2000 Curve End Date: 12/31/2024

Bellwether Treasury	Average Edur	Average Ytw	Main Street Ratio	Annualized Total Return StdDev	Annualized Total Return	Sharpe Ratio (Total Return)
3-mo US Treasury Bill	0.236	1.646	0.000	0.547	1.738	0.000
6-mo US Treasury Bill	**0.483**	**1.755**	**0.225**	**0.609**	**1.982**	**0.399**
US Treasury Current 2 Yr	1.920	2.011	0.190	1.680	2.287	0.326
USTreasury Current 3 Yr	**2.813**	**2.189**	**0.193**	**2.566**	**2.718**	**0.382**
US Treasury Current 5 Yr	4.630	2.558	0.197	4.372	3.132	0.319
US Treasury Current 10 Yr	**8.559**	**3.141**	**0.175**	**7.547**	**3.173**	**0.190**
US Treasury Current 30 Yr	18.138	3.748	0.116	14.531	3.520	0.123

Graph Item Definitions

Average Edur (Horizontal Axis)

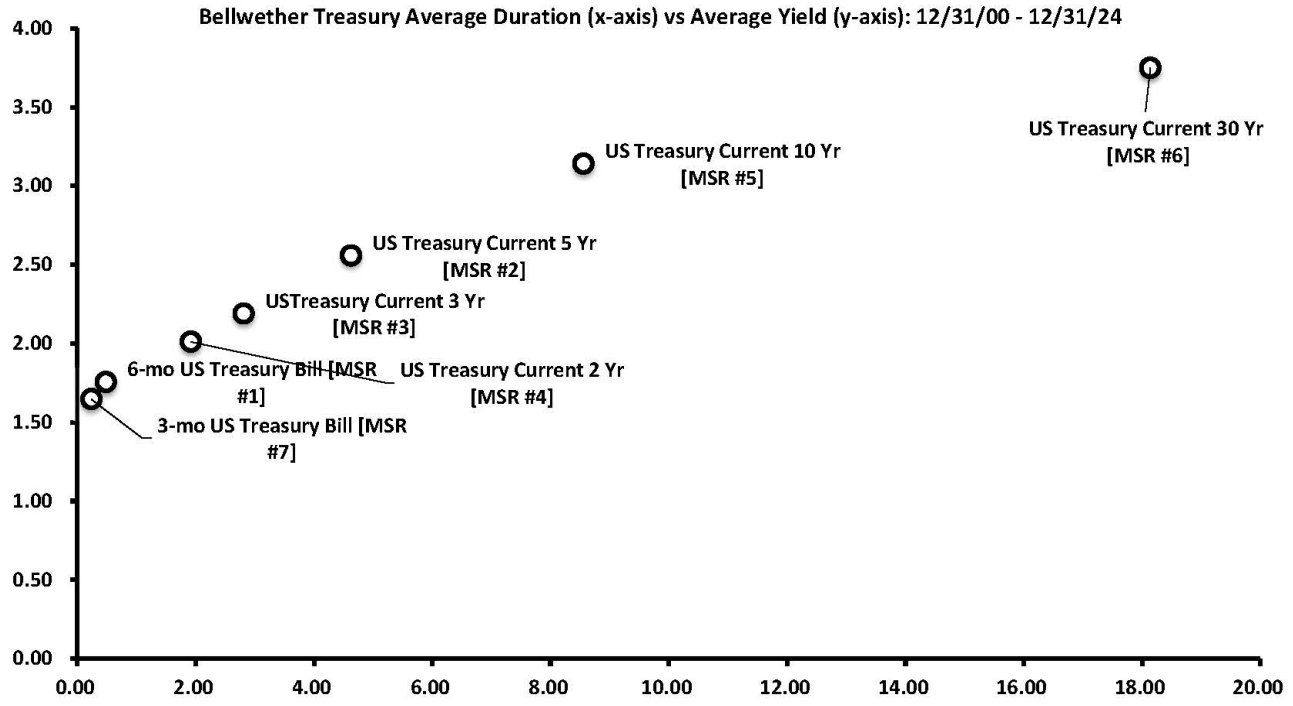
This is the average of the monthly effective durations over the period. Effective Duration is the by-product of an option model that takes into consideration any possible early redemption features and is read as a percent which gives the inverse percent change in market value for a given percent change in interest rates.

Average Ytw (Vertical Axis)

This is the Average Yield To Worst and represents the average over the period of all the yield to worsts. Yield to Worst is the lowest potential yield that can be received without a default. Yield To Worst over a given period can act as a proxy for what the expected book income might have been. A higher number, all things equal, is better.

Label Description

Identifies the Bellwether Treasury with the Main Street Ratio (MSR) ranking to the right in brackets. The rankings are arranged from best (#1) to worst (#7).



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Graph Item Definitions

Annualized Total Return StdDev (Horizontal Axis)

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Annualized Total Return (Vertical Axis)

The monthly total returns annualized over the period. This includes return from price and coupon. A higher number, all things being equal, is better.

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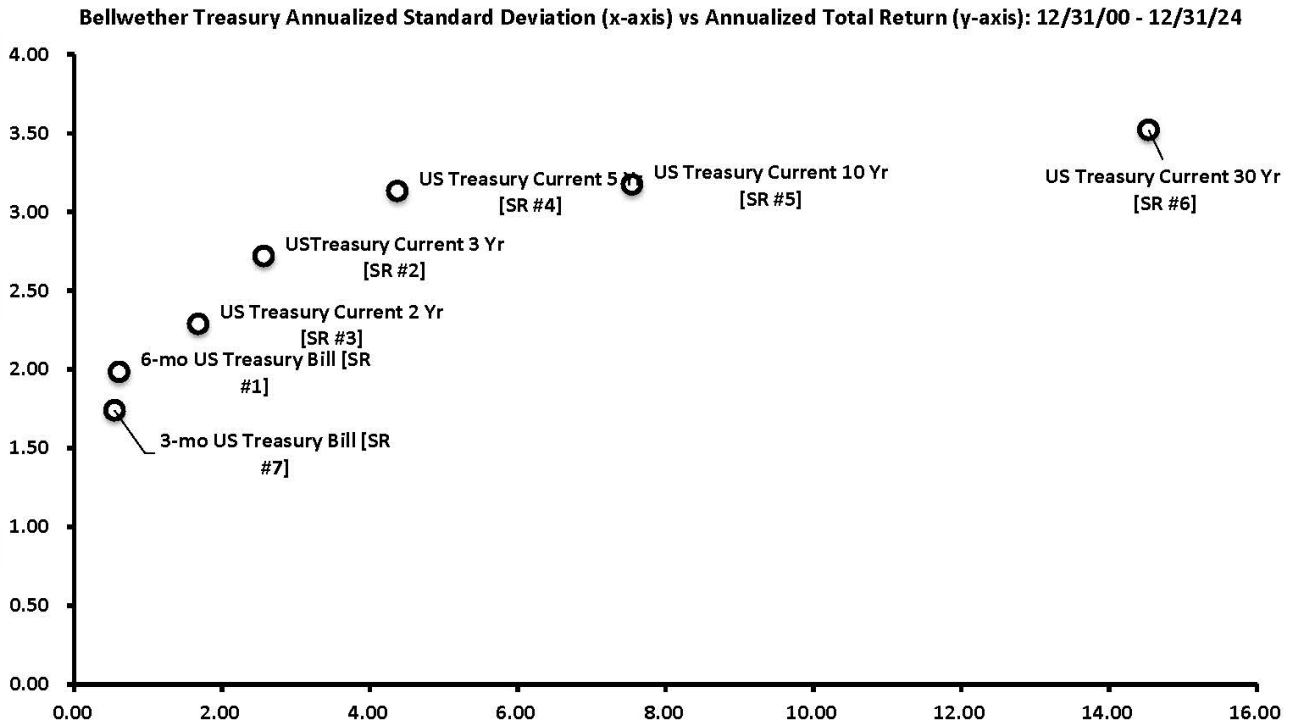

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Graph Item Definitions

Main Street Ratio (Horizontal Axis)

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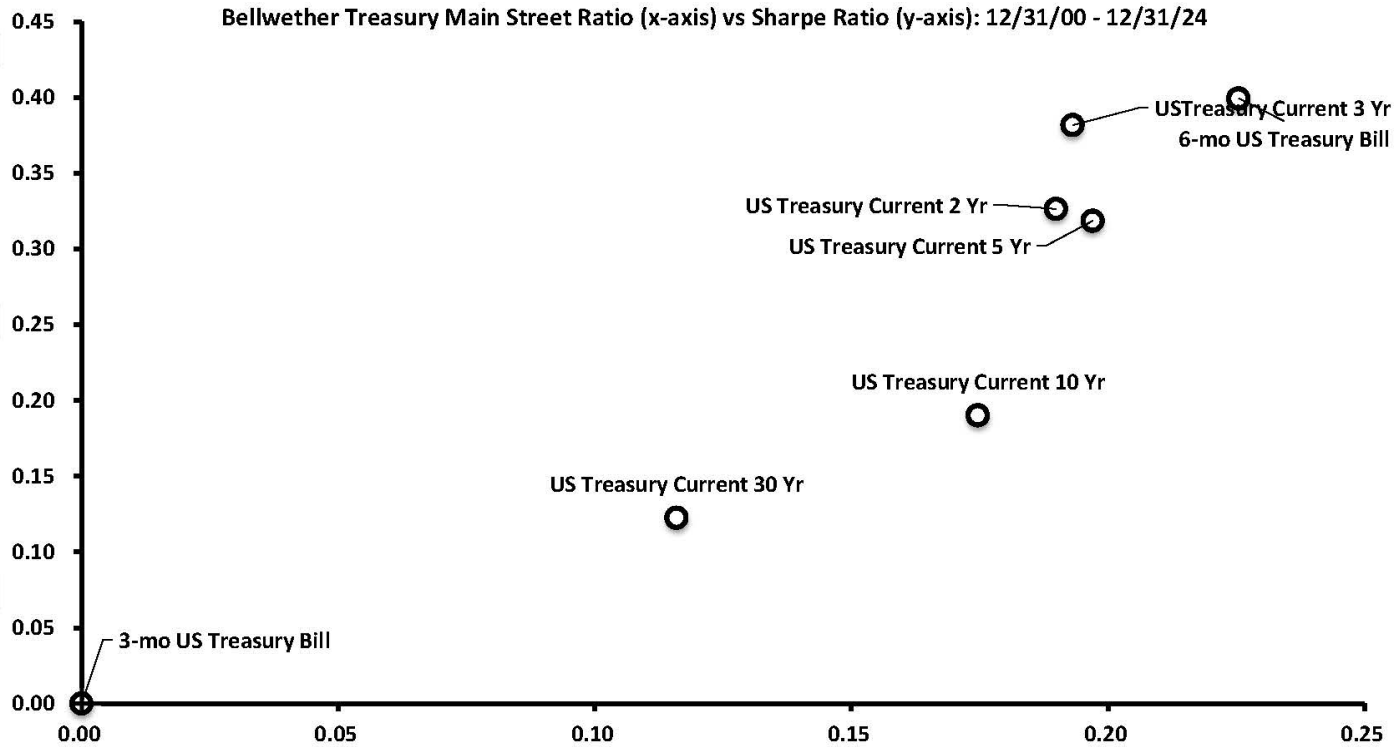
Sharpe Ratio (Total Return) (Vertical Axis)

Named after Nobel Laureate William Sharpe, the Sharpe Ratio shows the excess return over the risk-free rate (the US 3 Month Tsy Bill) per unit of risk (the standard deviation of the total return of the index being analyzed). The ultimate industry standard "how much bang for the buck" ratio. All things being equal, a higher ratio is better.

Label Description

Identifies the Bellwether Treasury. The layout of the scatter diagram shows the relationship between the Main Street Ratio (x-axis) and the Sharpe Ratio (y-axis).



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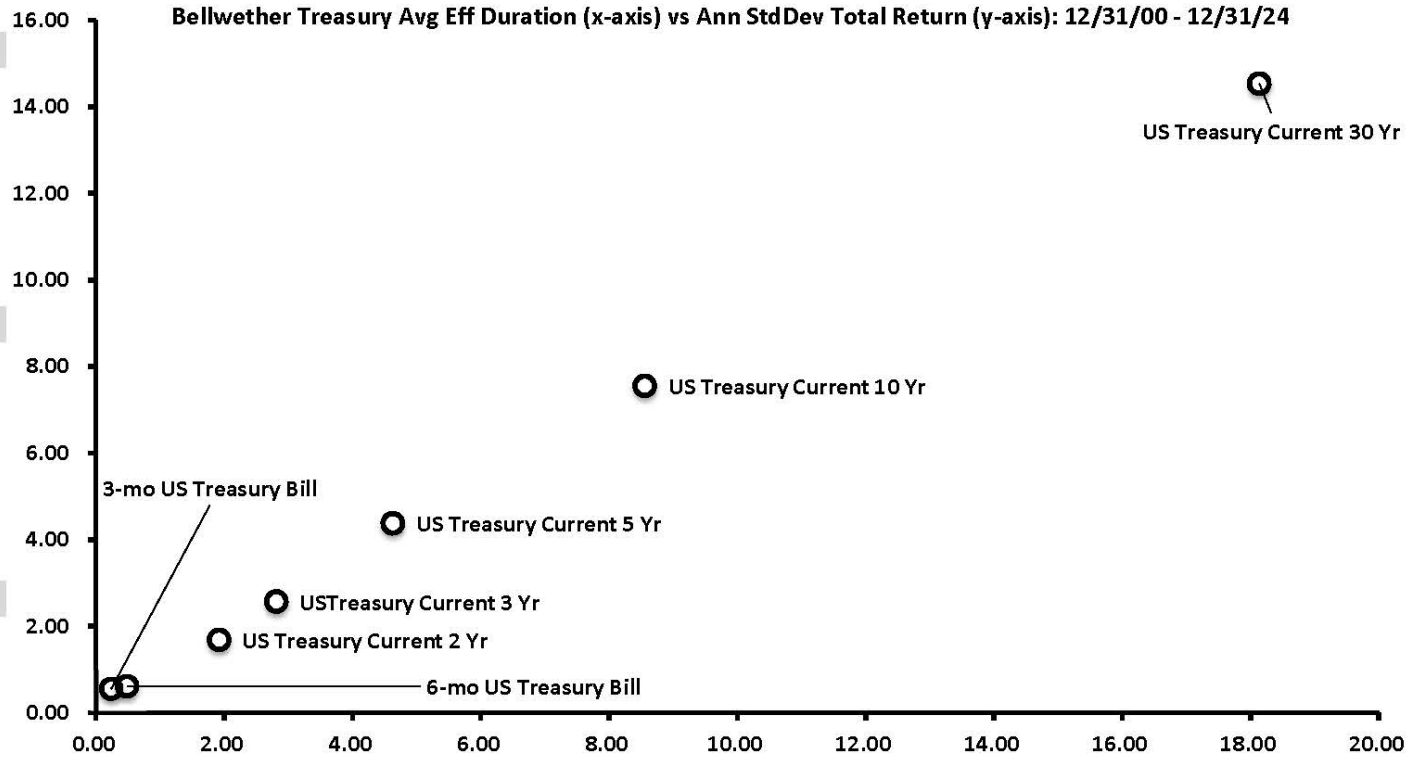
Annualized Total Return StdDev (Vertical Axis)

The Standard Deviation of the Monthly Return Annualized. Gives an indication of the historical market value volatility. The higher the number the more volatile. A lower number, all things being equal, is better.

Label Description

Identifies the Bellwether Treasury. The scatter plot shows that (for the Treasury Curve) Duration is a good proxy for total risk.



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Strategy Webb Risk/Reward Overview Part 2: Usefulness of the Yield Curve Framework

Indices Begin Date: 12/31/2000 **Indices End Date:** 12/31/2024

Fixed Income Sector	Average Edur	Average Ytw	Main Street Ratio	Annualized Total Return StdDev	Annualized Total Return	Sharpe Ratio (Total Return)
3-mo US Treasury Bill	0.236	1.646	0.000	0.547	1.738	0.000
US Treasuries 1-3yr	**1.813**	**2.002**	**0.196**	**1.530**	**2.328**	**0.385**
Agy Bullet 1-3Yr	1.810	2.187	0.299	1.587	2.651	0.575
Agy Callable 1-3Yr	**1.256**	**2.236**	**0.470**	**1.154**	**2.016**	**0.240**
US Treasuries 3-5yr	3.748	2.405	0.202	3.505	3.175	0.410
Agy Bullet 3-5Yr	**3.651**	**2.626**	**0.268**	**3.367**	**3.612**	**0.556**
Agy Callable 3-5Yr	2.206	2.597	0.431	2.189	2.327	0.269

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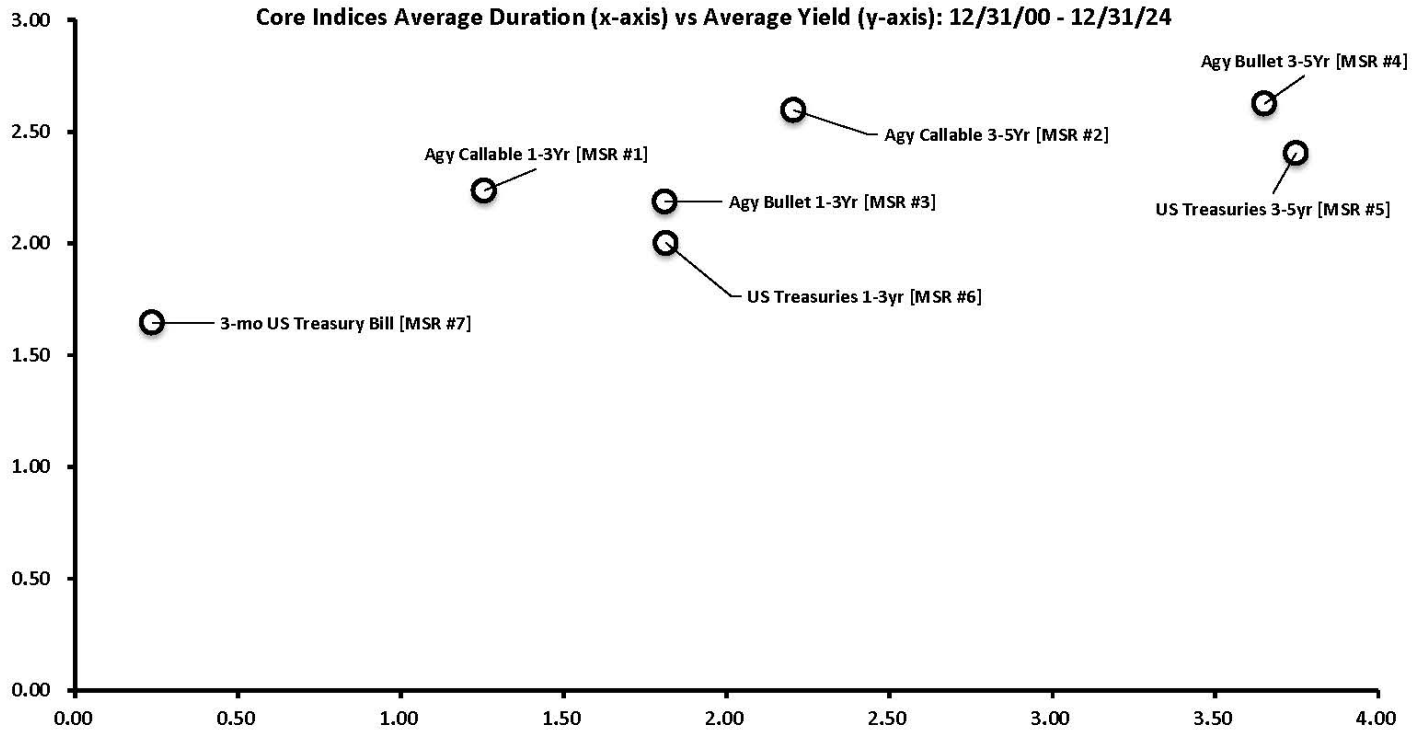

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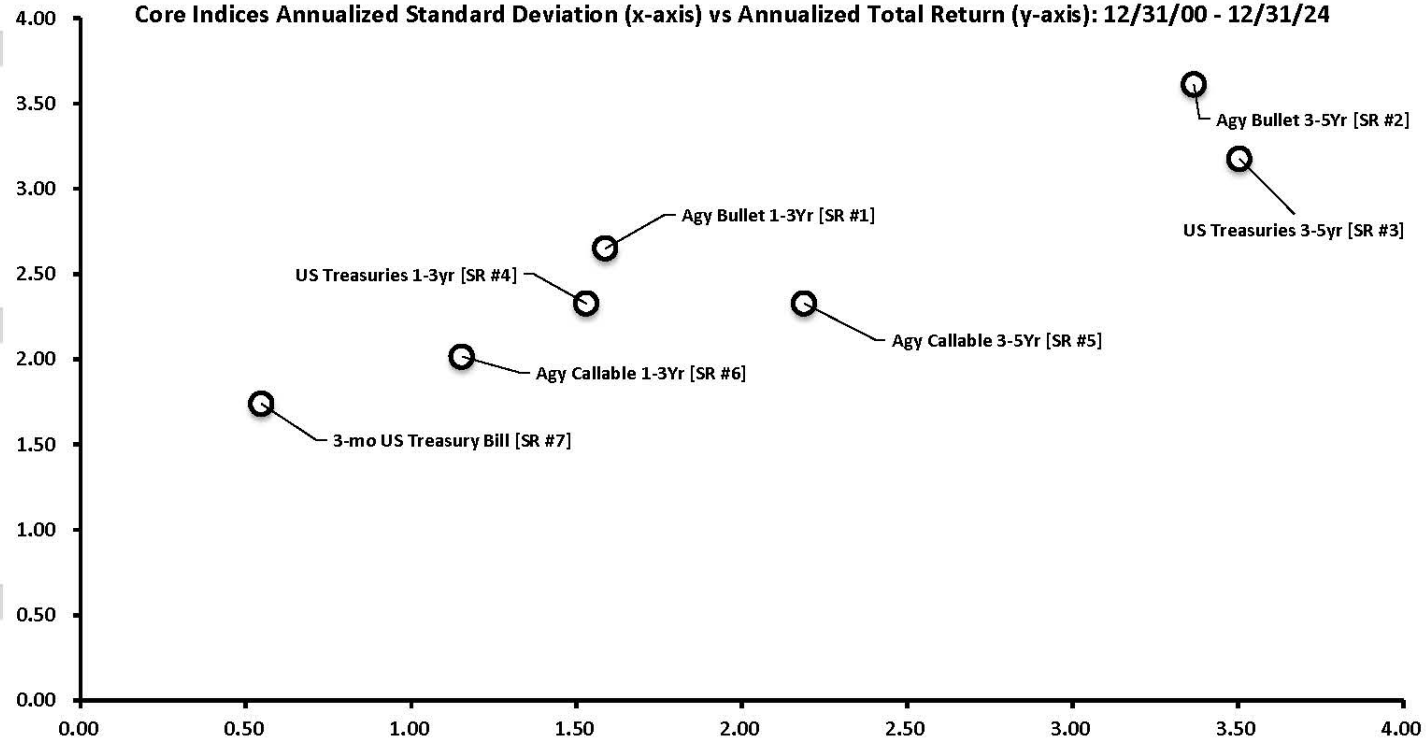

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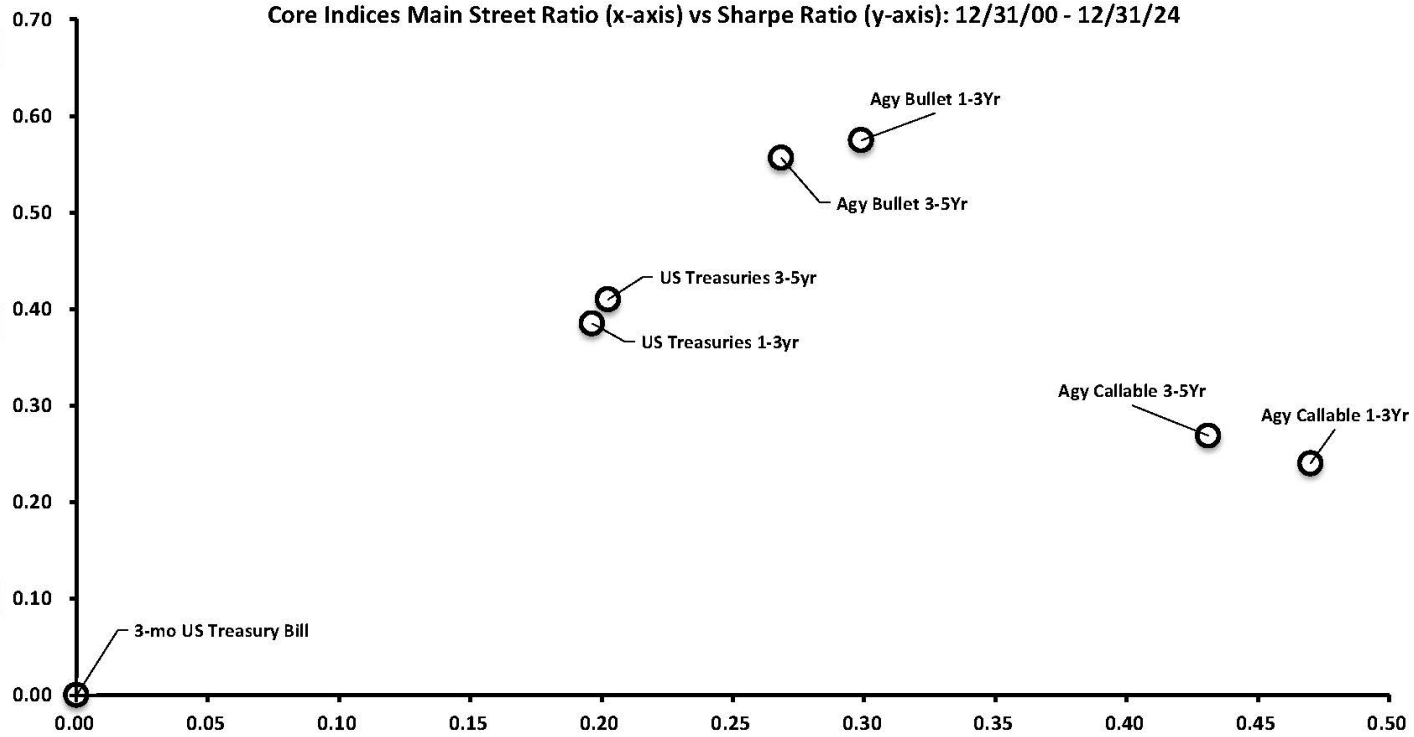
Label Description

Identifies the Fixed Income Sector. The layout of the scatter diagram shows the relationship between the Main Street Ratio (x-axis) and the Sharpe Ratio (y-axis).

Core Indices Main Street Ratio (x-axis) vs Sharpe Ratio (y-axis): 12/31/00 - 12/31/24



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Agy Callable 1-3Yr	**1.256**	**2.236**	**0.470**	**1.154**	**2.016**	**0.240**
US Treasuries 3-5yr	3.748	2.405	0.202	3.505	3.175	0.410
Agy Bullet 3-5Yr	**3.651**	**2.626**	**0.268**	**3.367**	**3.612**	**0.556**
Agy Callable 3-5Yr	2.206	2.597	0.431	2.189	2.327	0.269

Graph Item Definitions

Average Edur (Horizontal Axis)

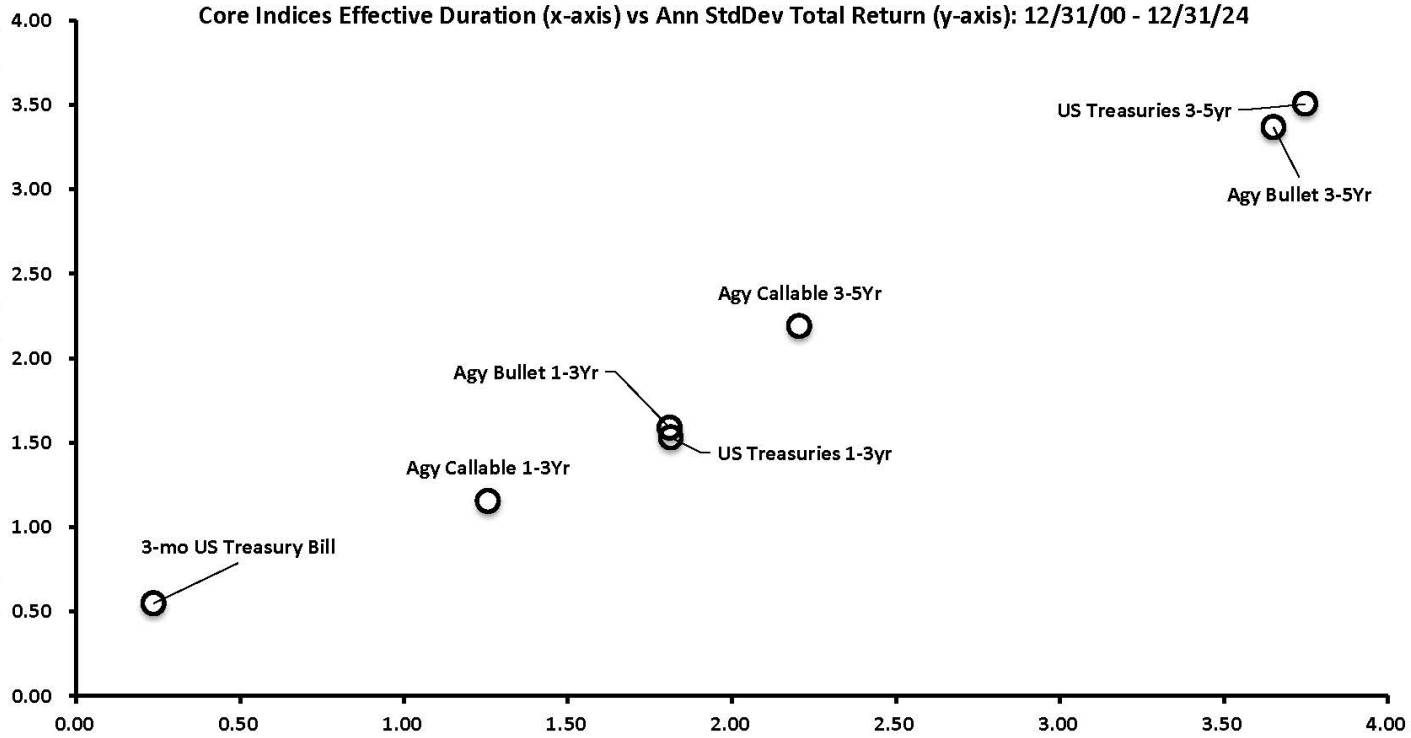
This is the average of the monthly effective durations over the period. Effective Duration is the by-product of an option model that takes into consideration any possible early redemption features and is read as a percent which gives the inverse percent change in market value for a given percent change in interest rates.

Annualized Total Return StdDev (Vertical Axis)

The Standard Deviation of the Monthly Return Annualized. Gives an indication of the historical market value volatility. The higher the number the more volatile. A lower number, all things being equal, is better.

Label Description

Identifies the Fixed Income Sector. Scatter plot shows that Duration breaks down as a proxy for total risk when you add optionality/credit.



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Strategy Webb Risk/Reward Overview Part 2: Usefulness of the Yield Curve Framework

Indices Begin Date: 12/31/2000 **Indices End Date:** 12/31/2024

Fixed Income Sector	Average Edur	Average Ytw	Main Street Ratio	Annualized Total Return StdDev	Annualized Total Return	Sharpe Ratio (Total Return)
3-mo US Treasury Bill	0.236	1.646	0.000	0.547	1.738	0.000
US Treasury Master	**5.944**	**2.647**	**0.168**	**4.881**	**3.153**	**0.290**
Agency Bullet Master	4.299	2.718	0.249	3.627	3.527	0.493
Agency Callable Master	**2.220**	**2.621**	**0.439**	**1.999**	**2.413**	**0.338**
US Corp Master	6.607	4.395	0.416	6.165	4.761	0.490
Mortgage Master	**3.724**	**3.674**	**0.545**	**3.857**	**3.406**	**0.432**
US Domestic Master	5.354	3.415	0.330	4.317	3.658	0.445

Graph Item Definitions

Average Edur (Horizontal Axis)

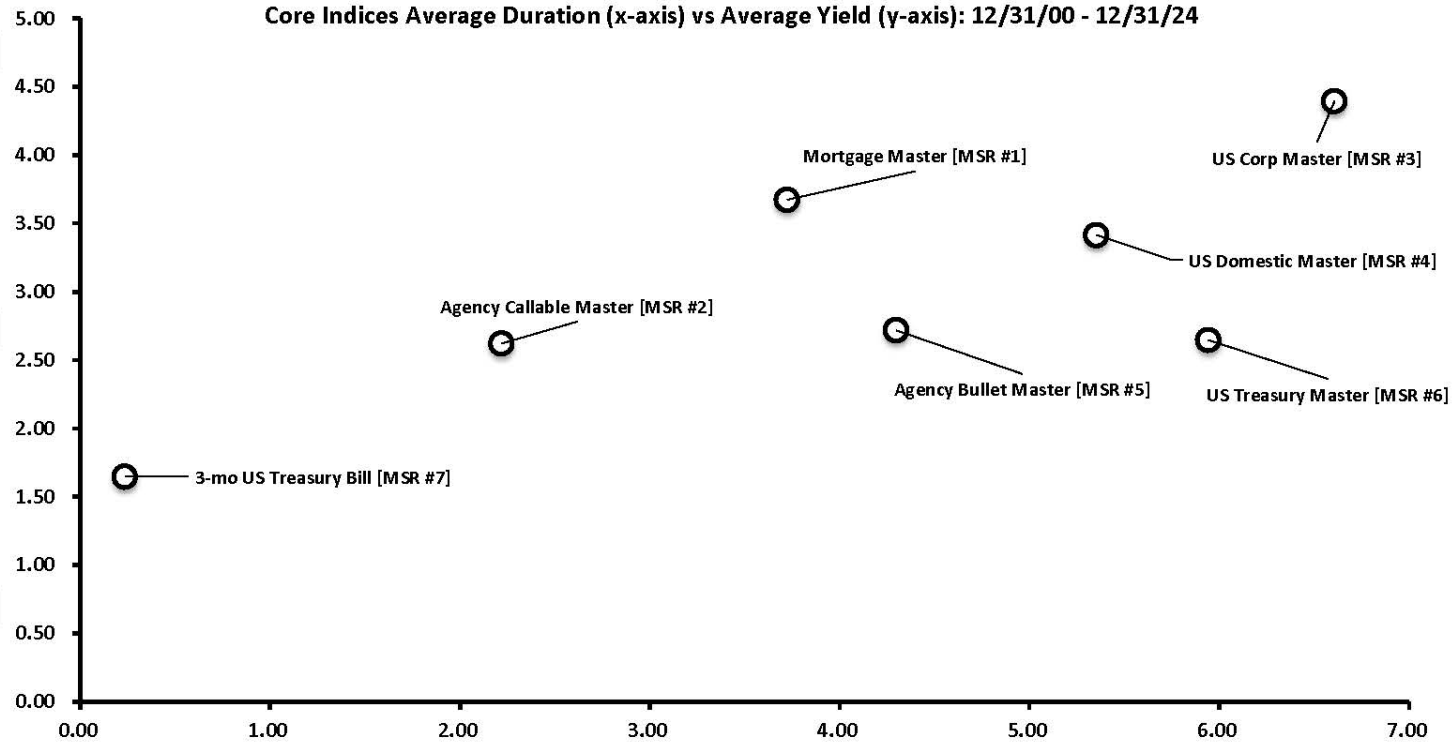
This is the average of the monthly effective durations over the period. Effective Duration is the by-product of an option model that takes into consideration any possible early redemption features and is read as a percent which gives the inverse percent change in market value for a given percent change in interest rates.

Average Ytw (Vertical Axis)

This is the Average Yield To Worst and represents the average over the period of all the yield to worsts. Yield to Worst is the lowest potential yield that can be received without a default. Yield To Worst over a given period can act as a proxy for what the expected book income might have been. A higher number, all things equal, is better.

Label Description

Identifies the Fixed Income Sector with the Main Street Ratio (MSR) ranking to the right in brackets. The rankings are arranged from best (#1) to worst (#12).



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Strategy Webb Risk/Reward Overview Part 2: Usefulness of the Yield Curve Framework

Indices Begin Date: 12/31/2000 **Indices End Date:** 12/31/2024

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US Domestic Master	5.354	3.415	0.330	4.317	3.658	0.445

Graph Item Definitions

Annualized Total Return StdDev (Horizontal Axis)

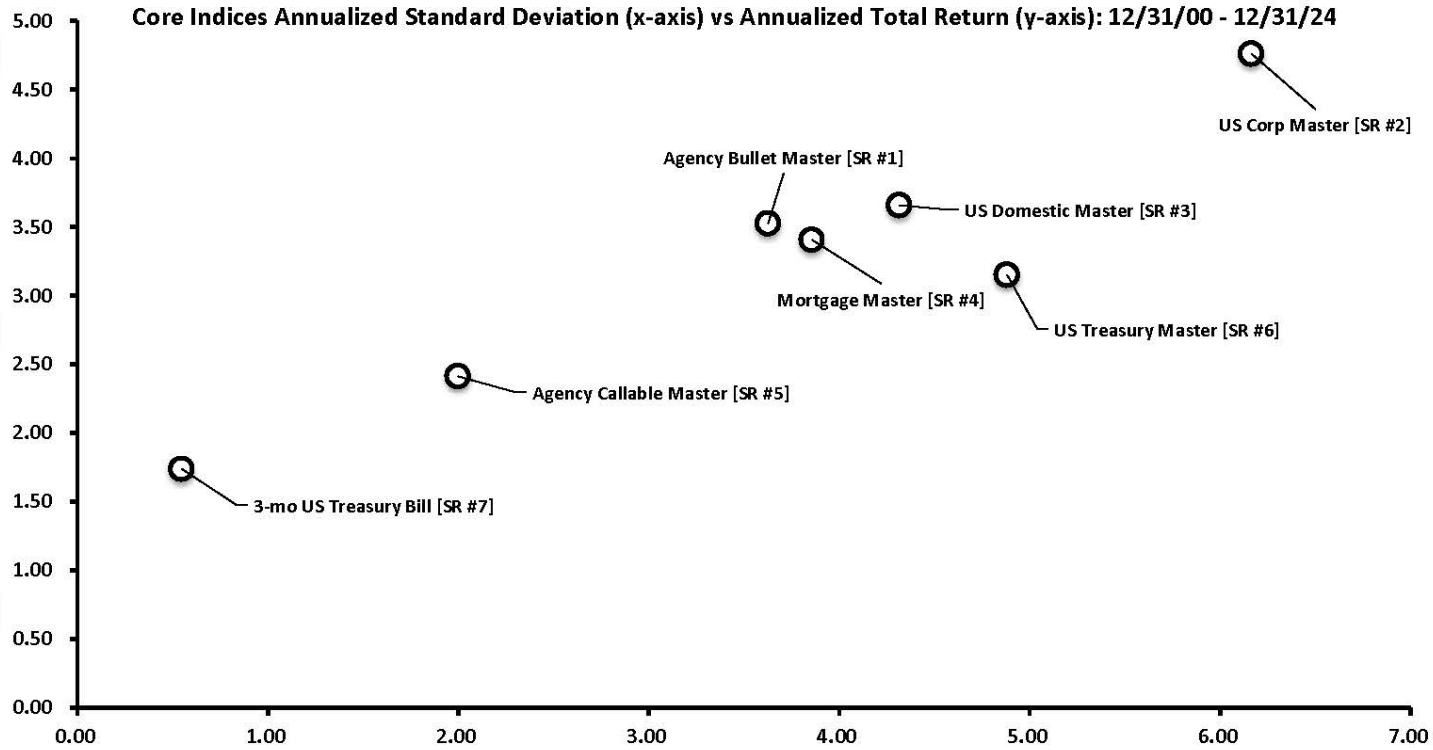
The Standard Deviation of the Monthly Return Annualized. Gives an indication of the historical market value volatility. The higher the number the more volatile. A lower number, all things being equal, is better.

Annualized Total Return (Vertical Axis)

The monthly total returns annualized over the period. This includes return from price and coupon. A higher number, all things being equal, is better.

Label Description

Identifies the Fixed Income Sector with the Sharpe Ratio (SR) ranking to the right in brackets. The rankings are arranged from best (#1) to worst (#12).



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Strategy Webb Risk/Reward Overview Part 2: Usefulness of the Yield Curve Framework

Indices Begin Date: 12/31/2000 **Indices End Date:** 12/31/2024

Fixed Income Sector	Average Edur	Average Ytw	Main Street Ratio	Annualized Total Return StdDev	Annualized Total Return	Sharpe Ratio (Total Return)
3-mo US Treasury Bill	0.236	1.646	0.000	0.547	1.738	0.000
US Treasury Master	**5.944**	**2.647**	**0.168**	**4.881**	**3.153**	**0.290**
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Agency Callable Master	**2.220**	**2.621**	**0.439**	**1.999**	**2.413**	**0.338**
US Corp Master	6.607	4.395	0.416	6.165	4.761	0.490
Mortgage Master	**3.724**	**3.674**	**0.545**	**3.857**	**3.406**	**0.432**
US Domestic Master	5.354	3.415	0.330	4.317	3.658	0.445

Graph Item Definitions

Main Street Ratio (Horizontal Axis)

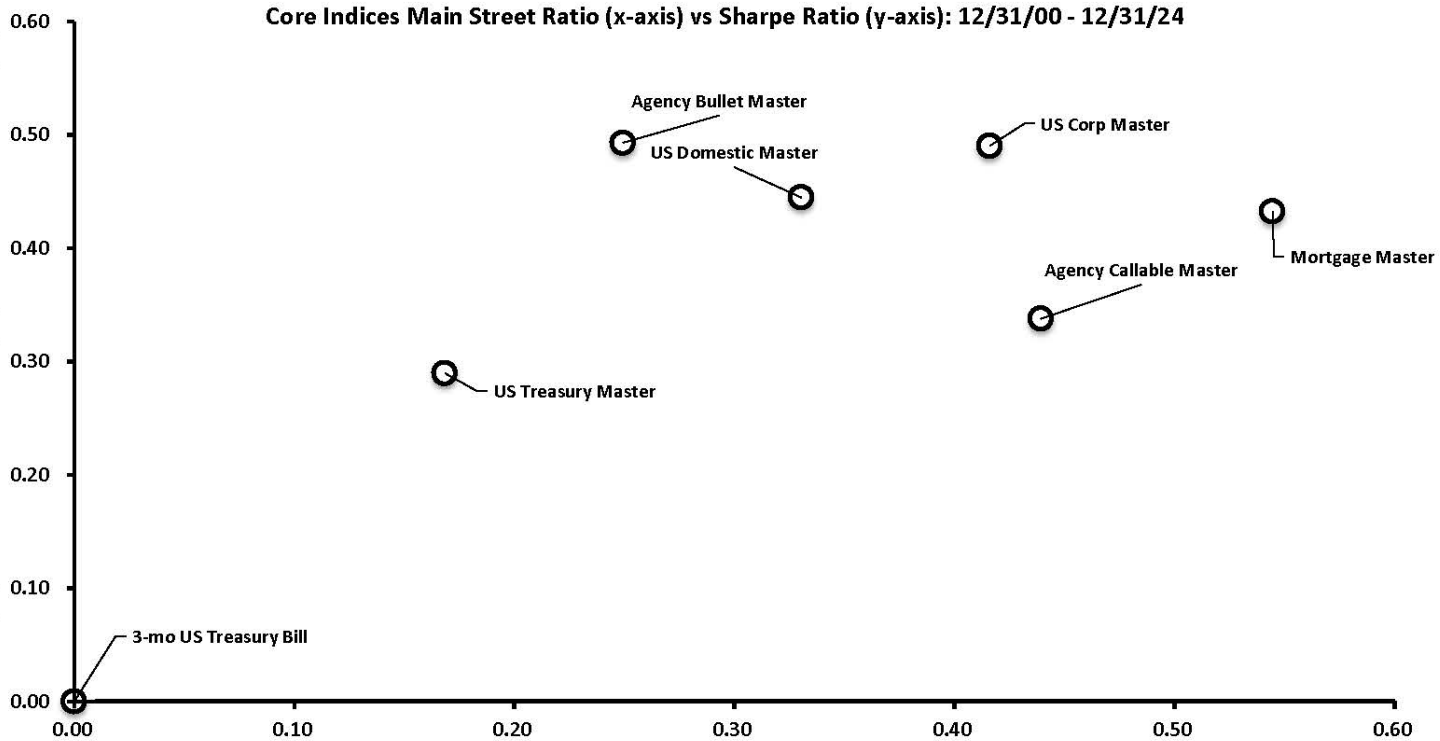
The Main Street Ratio measures the average excess Yield To Worst that could have been earned over the risk-free rate (US 3 Month Tsy Bill) per unit of average interest rate risk (Average Effective Duration) over the period. It is (Avg YTW-3MoTBillYTW)/Avg Edur. All things being equal, a higher ratio is better.

Sharpe Ratio (Total Return) (Vertical Axis)

Named after Nobel Laureate William Sharpe, the Sharpe Ratio shows the excess return over the risk-free rate (the US 3 Month Tsy Bill) per unit of risk (the standard deviation of the total return of the index being analyzed). The ultimate industry standard "how much bang for the buck" ratio. All things being equal, a higher ratio is better.

Label Description

Identifies the Fixed Income Sector. The layout of the scatter diagram shows the relationship between the Main Street Ratio (x-axis) and the Sharpe Ratio (y-axis).



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Strategy Webb Risk/Reward Overview Part 2: Usefulness of the Yield Curve Framework

Indices Begin Date: 12/31/2000 **Indices End Date:** 12/31/2024

Fixed Income Sector	Average Edur	Average Ytw	Main Street Ratio	Annualized Total Return StdDev	Annualized Total Return	Sharpe Ratio (Total Return)
3-mo US Treasury Bill	0.236	1.646	0.000	0.547	1.738	0.000
US Treasury Master	**5.944**	**2.647**	**0.168**	**4.881**	**3.153**	**0.290**
Agency Bullet Master	4.299	2.718	0.249	3.627	3.527	0.493
Agency Callable Master	**2.220**	**2.621**	**0.439**	**1.999**	**2.413**	**0.338**
US Corp Master	6.607	4.395	0.416	6.165	4.761	0.490
Mortgage Master	**3.724**	**3.674**	**0.545**	**3.857**	**3.406**	**0.432**
US Domestic Master	5.354	3.415	0.330	4.317	3.658	0.445

Graph Item Definitions

Average Edur (Horizontal Axis)

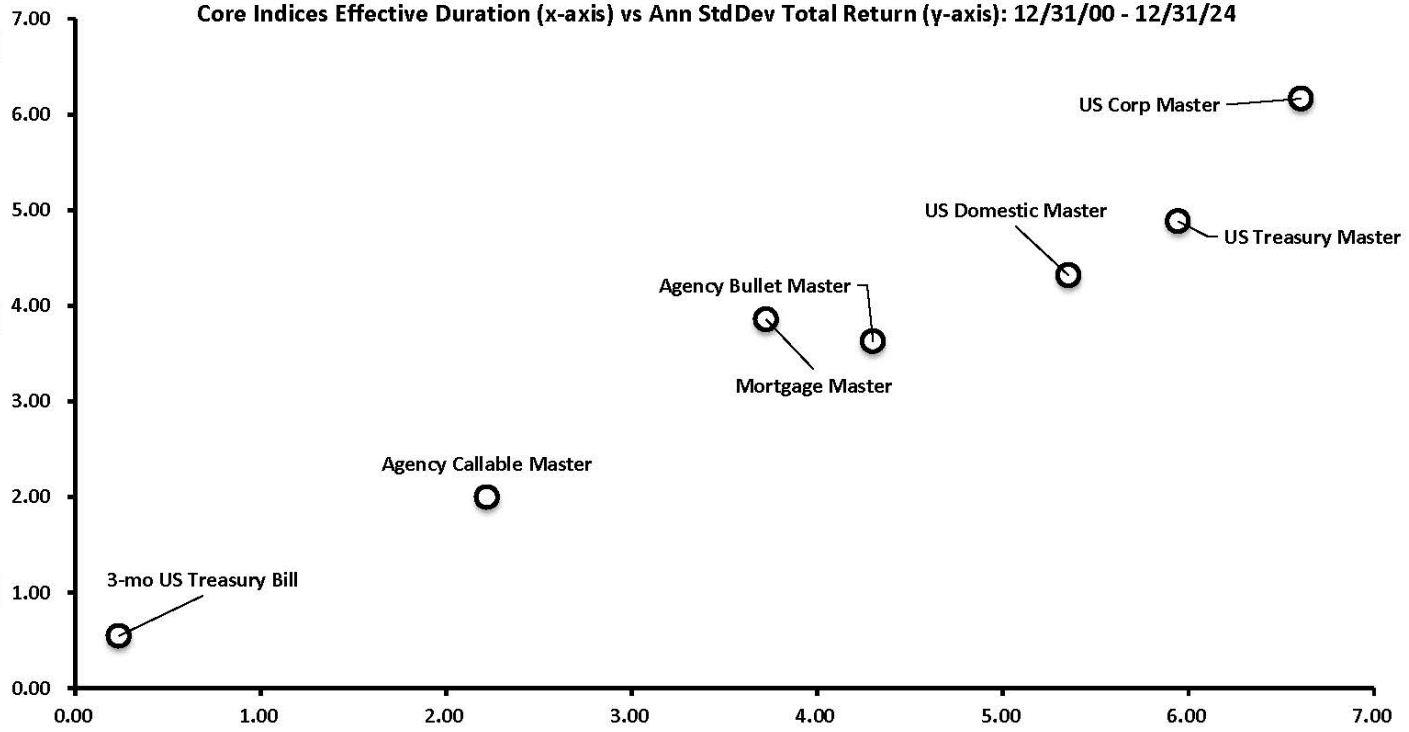
This is the average of the monthly effective durations over the period. Effective Duration is the by-product of an option model that takes into consideration any possible early redemption features and is read as a percent which gives the inverse percent change in market value for a given percent change in interest rates.

Annualized Total Return StdDev (Vertical Axis)

The Standard Deviation of the Monthly Return Annualized. Gives an indication of the historical market value volatility. The higher the number the more volatile. A lower number, all things being equal, is better.

Label Description

Identifies the Fixed Income Sector. Scatter plot shows that Duration breaks down as a proxy for total risk when you add optionality/credit.



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Strategy Webb Indices Comparison: 12/31/00 to 12/31/24

Fixed Income Sector	Average Edur	Average Ytw	Main Street Ratio	Annualized Total Return StdDev	Average Ytw	WEBB Ratio
US Treasuries 1-3yr	1.813	2.002	0.196	1.530	2.002	0.233
Agy Bullet 1-3Yr	1.810	2.187	0.299	1.587	2.187	0.341
Agy Callable 1-3Yr	1.256	2.236	0.470	1.154	2.236	0.512
US Treasuries 3-5yr	3.748	2.405	0.202	3.505	2.405	0.216
Agy Bullet 3-5Yr	3.651	2.626	0.268	3.367	2.626	0.291
Agy Callable 3-5Yr	2.206	2.597	0.431	2.189	2.597	0.434
US Treasuries 1-5yr	2.541	2.151	0.199	2.212	2.151	0.228
Agy Bullet 1-5Yr	2.347	2.325	0.289	2.062	2.325	0.330
Agy Callable 1-5Yr	1.565	2.365	0.459	1.493	2.365	0.482
US Treasuries 10+yr	14.220	3.666	0.142	11.681	3.666	0.173
Agy Bullet 10+Yr	11.597	4.082	0.210	9.851	4.082	0.247
Agy Callable 10+Yr	6.677	3.945	0.344	5.833	3.945	0.394

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Strategy Webb Indices Comparison: 12/31/00 to 12/31/24

Graph Item Definitions

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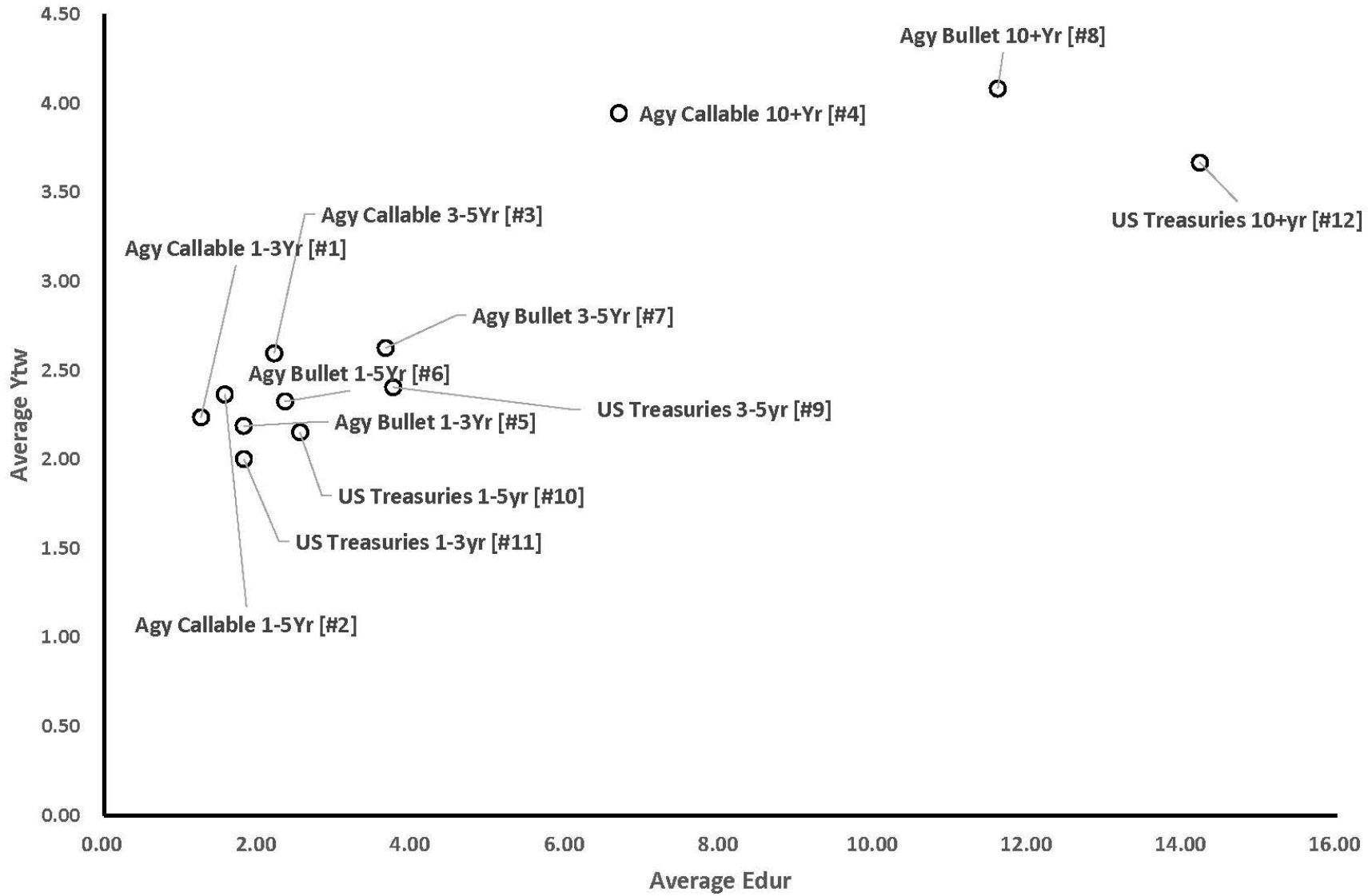
This is the average of the monthly effective durations over the period. Effective Duration is the by-product of an option model that takes into consideration any possible early redemption features and is read as a percent which gives the inverse percent change in market value for a given percent change in interest rates.

Average Ytw (Vertical Axis)

This is the Average Yield To Worst and represents the average over the period of all the yield to worsts. Yield to Worst is the lowest potential yield that can be received without a default. Yield To Worst over a given period can act as a proxy for what the expected book income might have been. A higher number, all things equal, is better.



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Strategy Webb Indices Comparison: 12/31/00 to 12/31/24

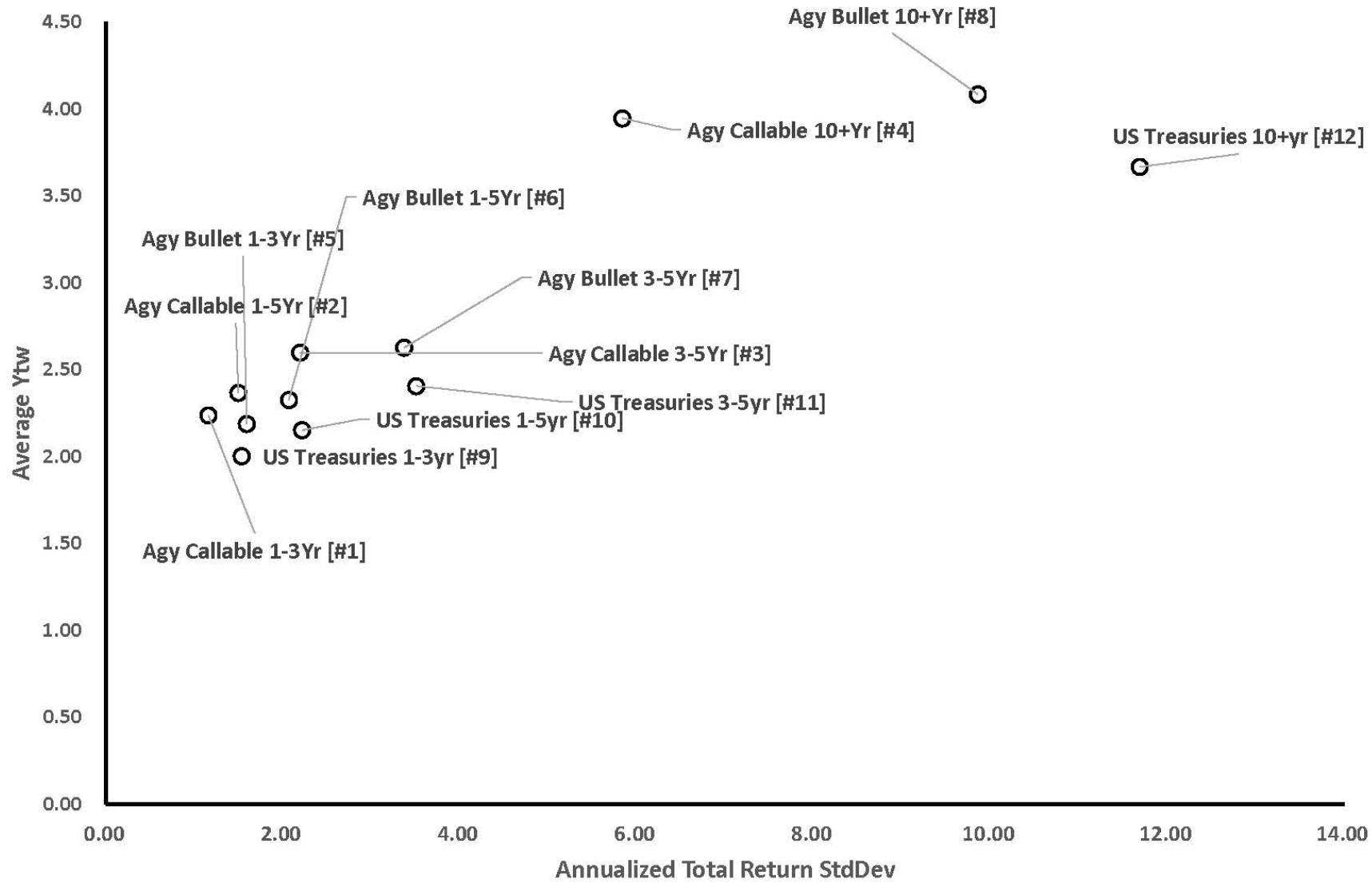
Graph Item Definitions

Annualized Total Return StdDev (Horizontal Axis)

The Standard Deviation of the Monthly Return Annualized. Gives an indication of the historical market value volatility. The higher the number the more volatile. A lower number, all things being equal, is better.

Average Ytw (Vertical Axis)

This is the Average Yield To Worst and represents the average over the period of all the yield to worsts. Yield to Worst is the lowest potential yield that can be received without a default. Yield To Worst over a given period can act as a proxy for what the expected book income might have been. A higher number, all things equal, is better.



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Strategy Webb Indices Comparison: 12/31/00 to 12/31/24

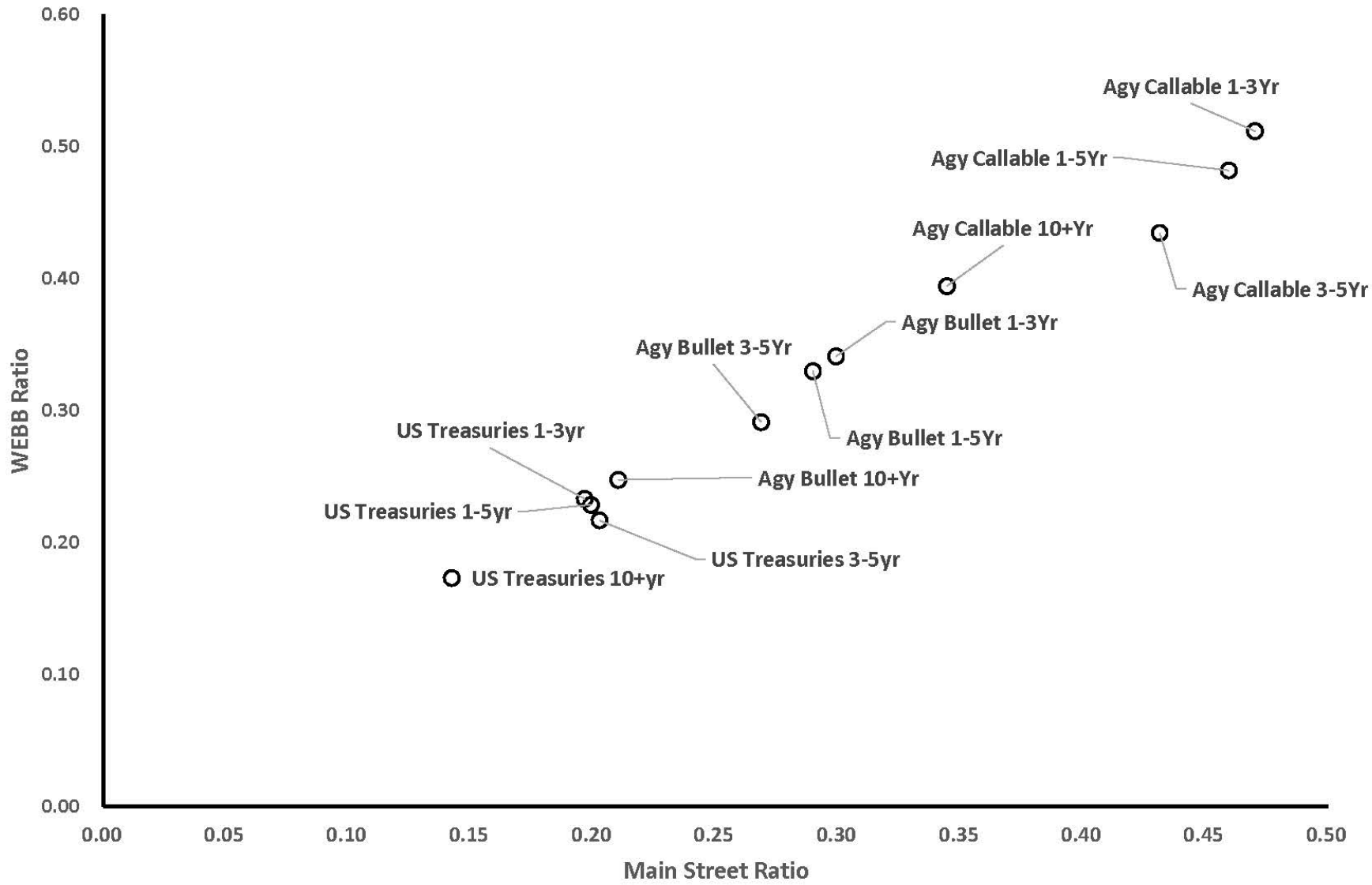
Graph Item Definitions

Main Street Ratio (Horizontal Axis)

The Main Street Ratio measures the average excess Yield To Worst that could have been earned over the risk-free rate (US 3 Month Tsy Bill) per unit of average interest rate risk (Average Effective Duration) over the period. It is (Avg YTW-3MoTBillYTW)/Avg Edur. All things being equal, a higher ratio is better.

WEBB Ratio (Vertical Axis)

The WEBB Ratio is an estimate of Book Income adjusted for Total Risk. It divides the Average Yield To Worst by the Annualized Total Return Standard Deviation. Provides an estimate of how much average income per unit of risk was obtained over the historical period. A higher number, all things equal, is better.



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QUESTIONS?

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