Benchmarks

Practical Applications - Return

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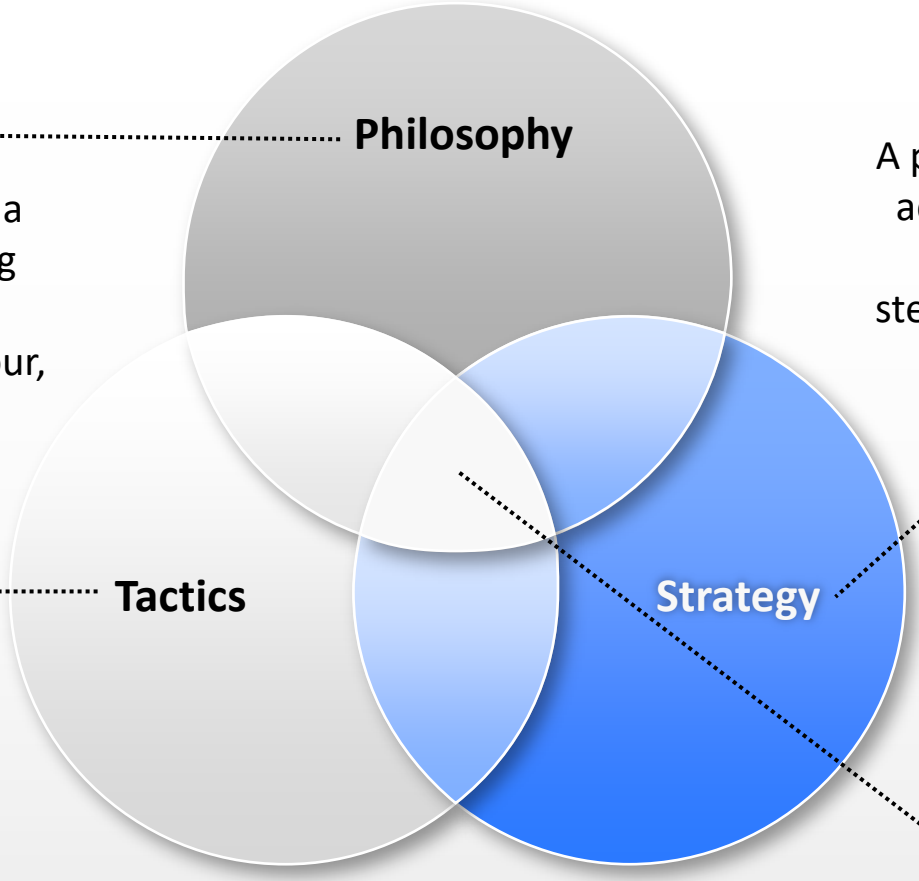
Philosophy, Strategy & Tactics

Sleep-Adusted returns via Suitability Benchmark using evidence based methods.



Investment philsophy is a coherent way of thinking about the markets, risk, return, investor behaviour, etc.

A plan of action or policy to achieve one or more goals (e.g., demonstrate good stewardship via a suitability benchmark).

Resources, skills & methods used to achieve the goal of a strategy (e.g., education, formulas, data, software, etc.)

The intersection of philosophy, strategy & tactics is the world of portfolio management

The difference between strategy and tactics: Strategy is done above the shoulders, Tactics are done below the shoulders.

Designed and created by Kevin Webb, CFA

Benchmark Practical Applications - Return

Agenda

1. Assumptions/Definitions
2. Return: Forecasting
3. Return: Book Yield / Total Return
4. Return: Gain/Loss
5. Return: Weighted Equivalent Bond Benchmarks

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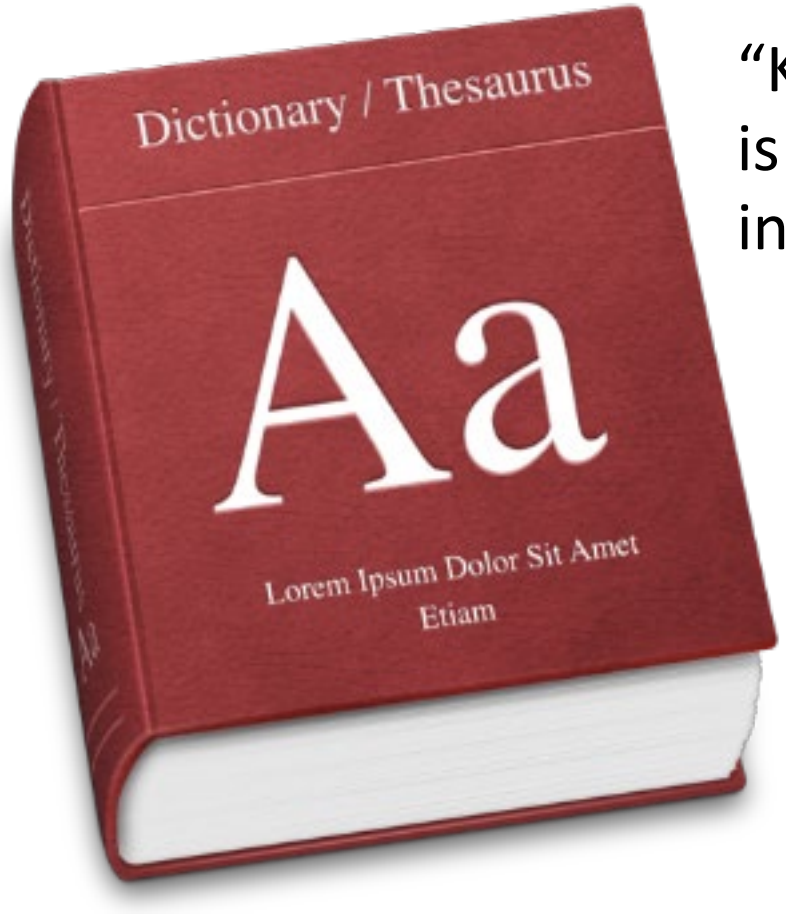
WARNING
ASSUMPTIONS
A H E A D

Definitions



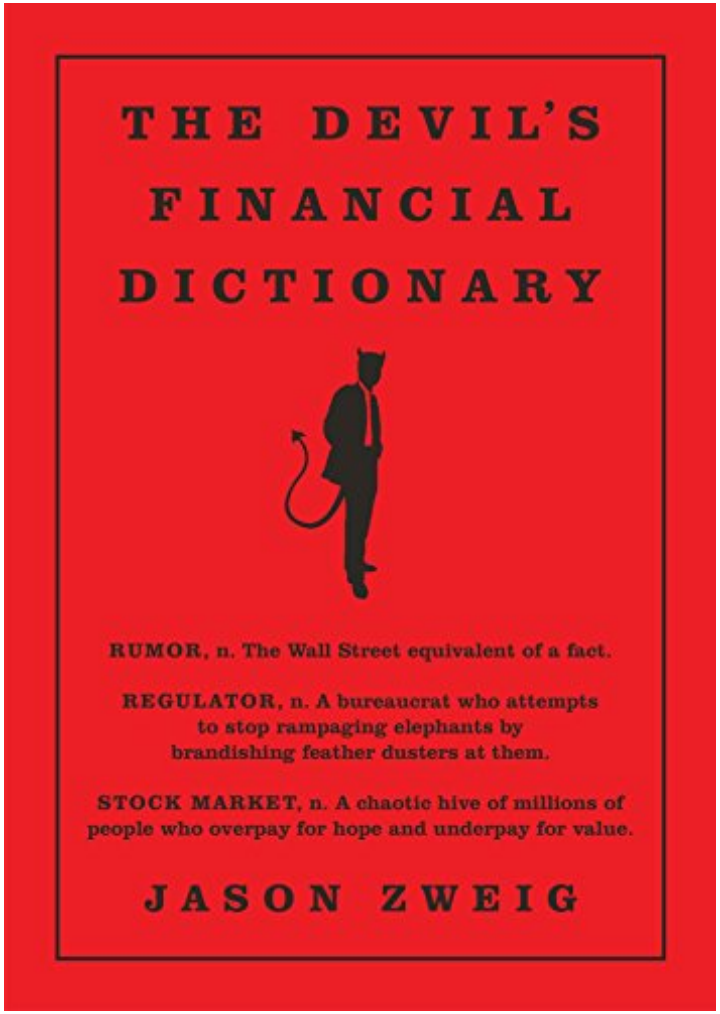
"Knowledge is knowing a tomato is a fruit; Wisdom is not putting it in a fruit salad."

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.

Return Defined

"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:

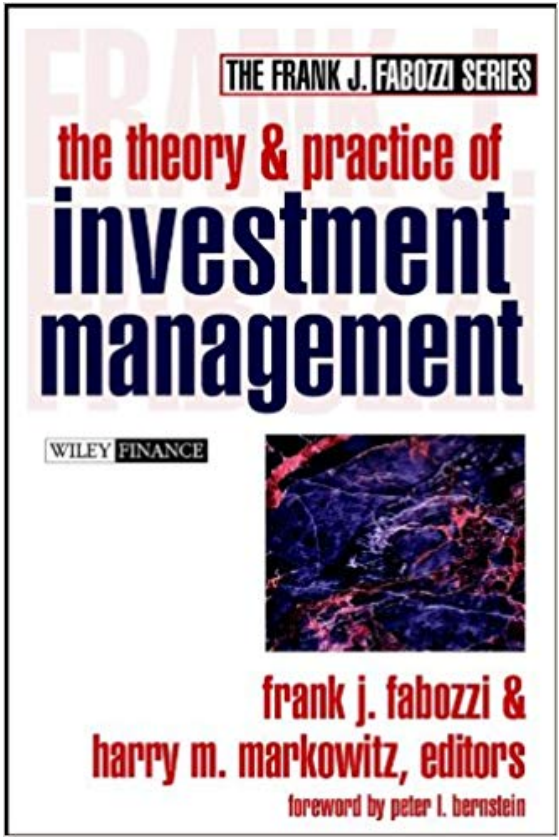
*The rate of return ***concentrates a lot of information into a single statistic***. ...

*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***. … "

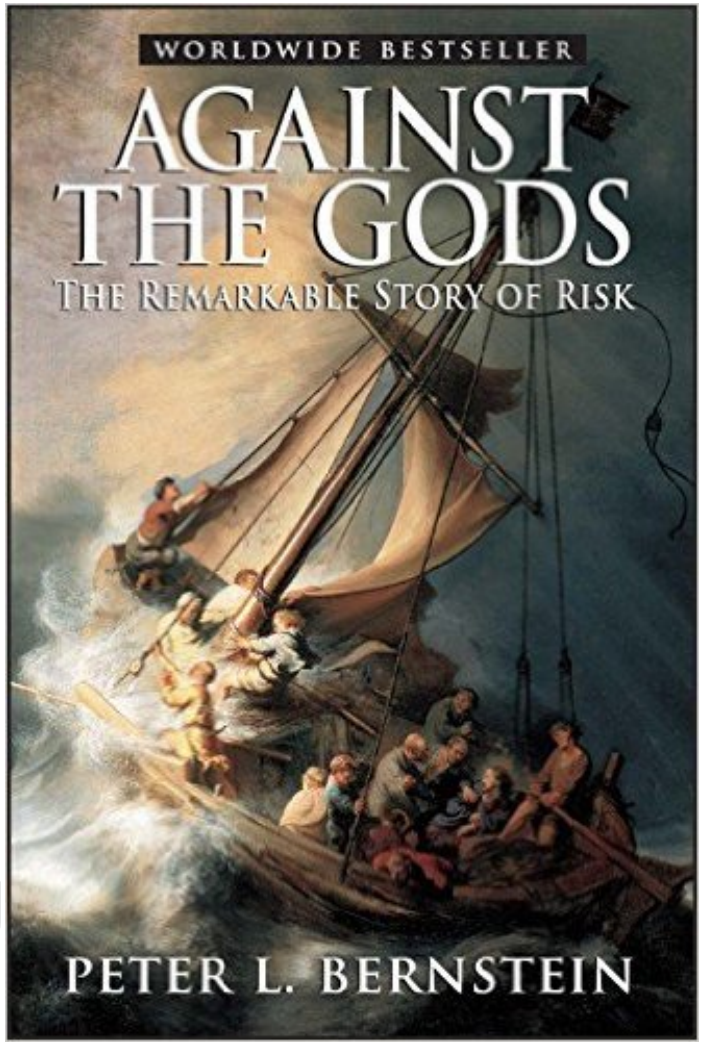


The Theory and Practice of Investment Management (Frank J. Fabozzi Series) (Kindle Locations 1180-1189). Kindle Edition. Emphasis added.

Risk & Return are Related

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.

Benchmark

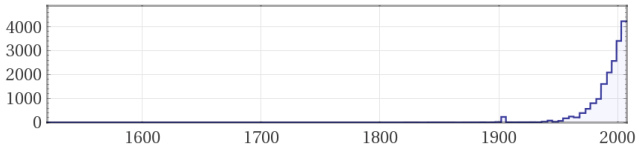
Definitions :

1 noun a standard by which something can be measured or judged

2 noun a surveyor's mark on a permanent object of predetermined position and elevation used as a reference point

benchmark | Computed by Wolfram|Alpha

Word frequency history :



(from 1539 to 2007) (in occurrences per billion words per year)

benchmark | Computed by Wolfram|Alpha

WolframAlpha, http://www.wolframalpha.com/input/?i=benchmark&rawformassumption=%7B%22C%22,+%22benchmark%22%7D+-%3E+%7B%22Word%22%7D&rawformassumption=%7B%22DPClash%22,+%22FinancialE%22,+%22benchmark%22%7D+-%3E+%7B%22NYSE:BHE%22%7D (December 30, 2016).

Benchmarks ~ Expectations

What Should I Benchmark?

Prudent Person

Investments shall be made with judgment and care, under circumstances then prevailing, which persons of prudence, discretion and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived.

Prudent Investor

A U.S. law that sets the standard of fiduciary duty for those entrusted with the responsibility of managing others' money, such as trustees and estate administrators. It requires that a trustee weigh risk versus reward when making investment decisions, taking into account the income that may be generated by the investment as well as the probable safety of the invested capital.

Prudent Investor vs Prudent Man/Person

1. Trust accounts are judged on their entire portfolio, rather than whether the investment was prudent at the time of purchase.
2. Diversification is explicitly required under the Prudent Investor Act
3. Suitability is deemed more important than individual investments
4. Fiduciaries are allowed to delegate investment management to qualified third parties

https://www.investopedia.com/terms/p/prudent-investor-rule.asp & https://www.investopedia.com/terms/p/prudentmanrule.asp

What Should I Benchmark?

General Objectives

"The primary objectives, in priority order...

1. Safety

Safety of principal is the foremost objective… ***The goal will be to mitigate credit risk and interest rate risk.***

2. Liquidity

The investment portfolio shall ***remain sufficiently liquid*** to meet all operating requirements that may be reasonably anticipated.

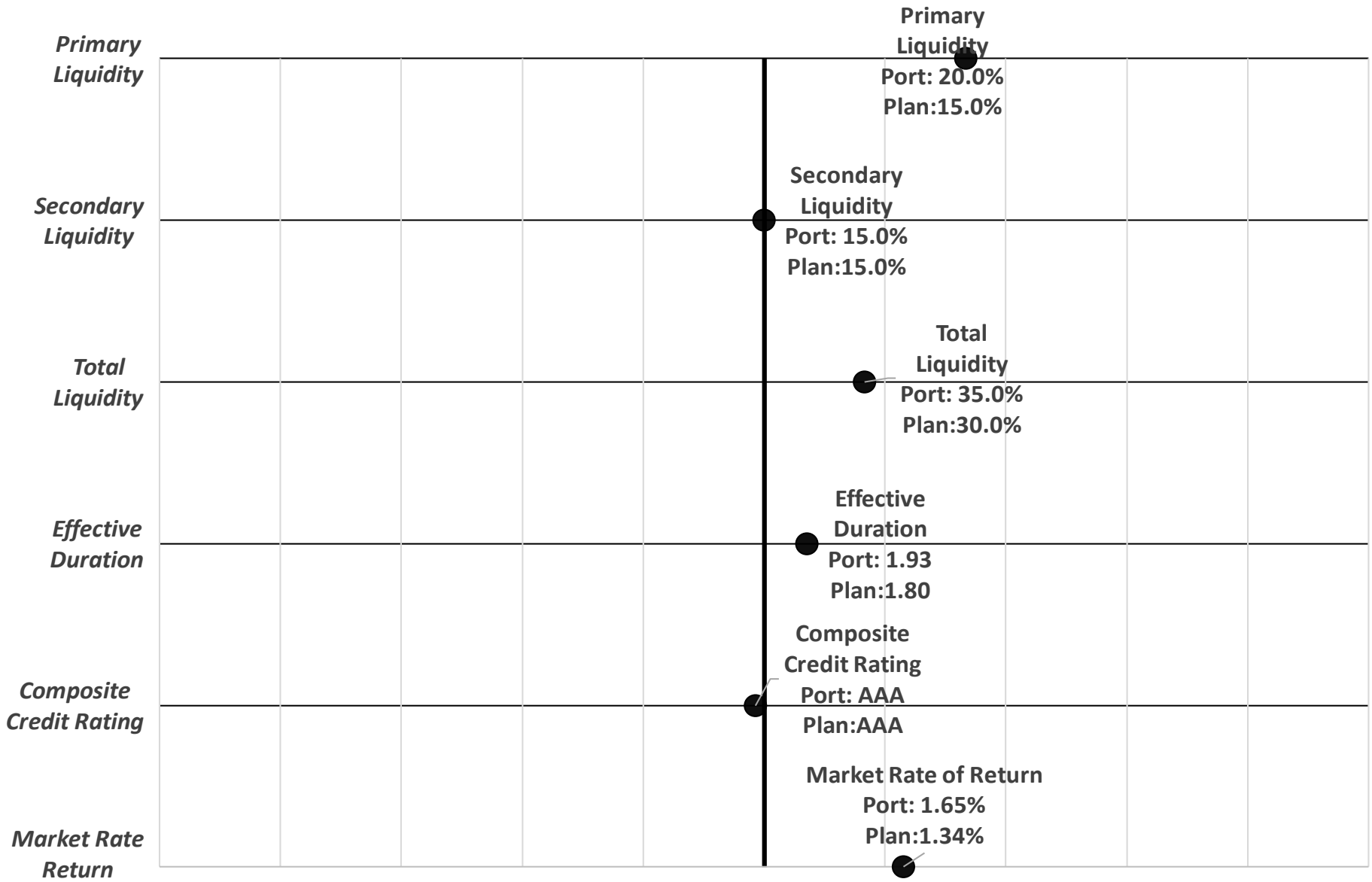
3. Return

The investment portfolio shall be designed with the objective of attaining a ***market rate of return throughout budgetary and economic cycles***, taking into account the investment risk constraints of safety and liquidity needs."

GFOA Sample Investment Policy, accessed 12/31/16, pages 1-2. Emphasis added.

Benchmark Suitability

Gain/Loss is not listed! Why not?



For the background and concepts behind this visualization see the presentation “Understanding Benchmarks: Concepts” by Kevin Webb, CFA

Benchmark Practical Applications - Return

Agenda

Assumptions/Definitions

Return: Forecasting

Return: Book Yield / Total Return

Return: Gain/Loss

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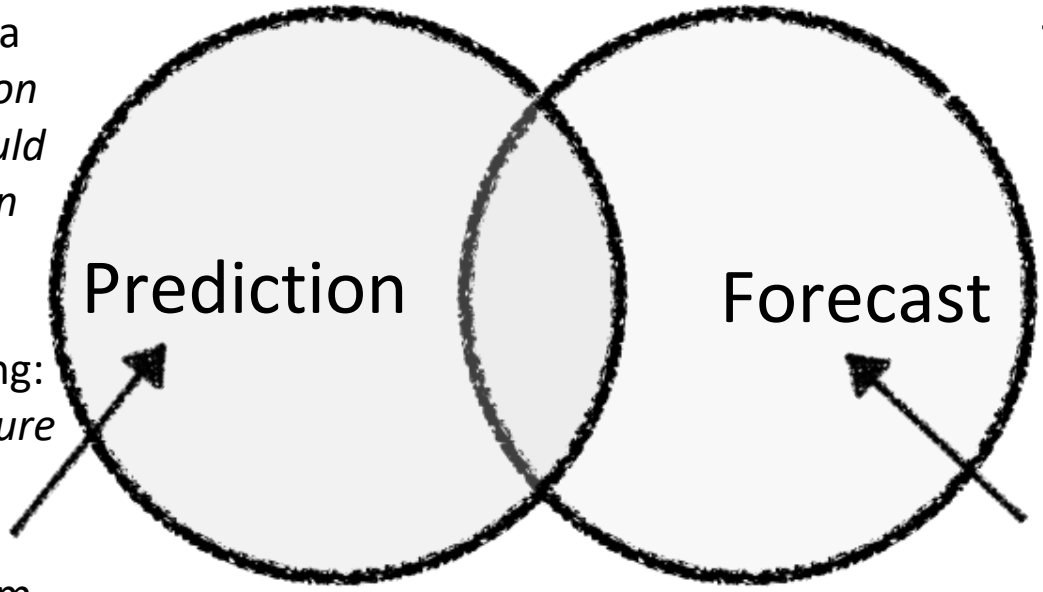
"The only function of economic forecasting is to make astrology look respectable." - John Kenneth Galbraith

Prediction ←→ Forecast

noun
a thing predicted; a forecast: *a prediction that the Greeks would destroy the Persian empire*.
• the action of predicting something: *the prediction of future behavior*.
ORIGIN
mid 16th cent.: from Latin *praedictio(n-)*, from *praedicere* **'make known beforehand'** (see predict) .



Verb
(past and past participle **forecast** or **forecasted**) *[with obj.]*
predict or estimate (a future event or trend): *rain is forecast for eastern Ohio | [with obj. and infinitive] : coal consumption is forecast to increase*.
noun
a prediction or estimate of future events, especially coming weather or a financial trend.

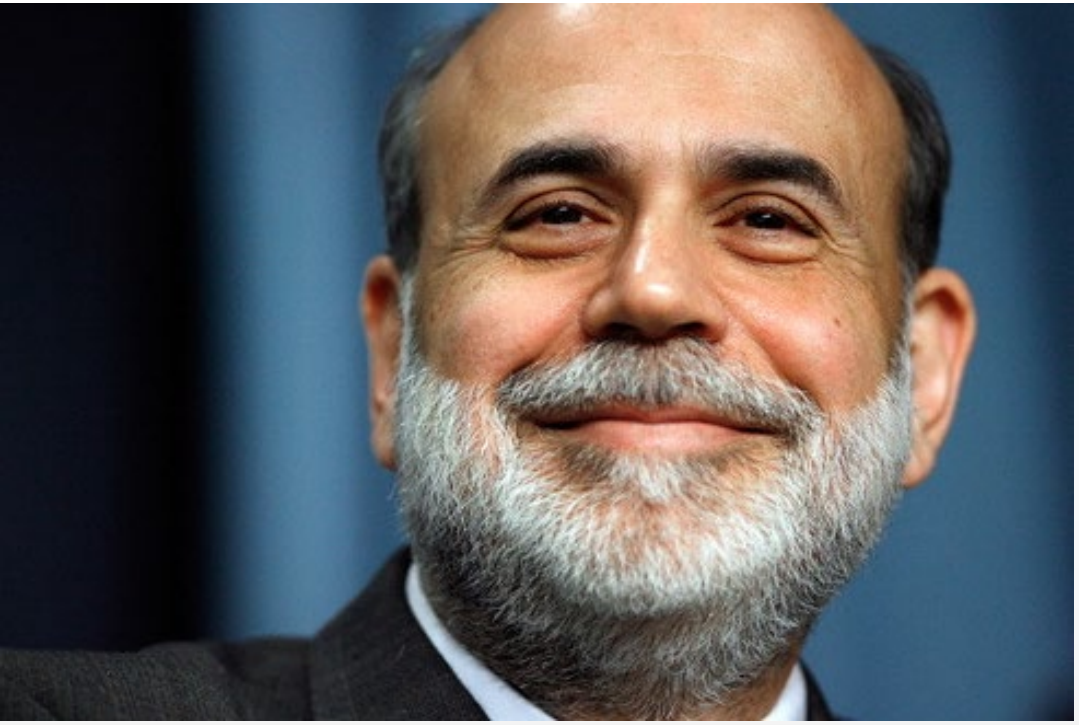
forecaster |ˈfôrˌkastər| noun: a person who predicts or estimates a future event or trend: economic forecasters are predicting a downturn.

Financial experts kNOw better, right?

Franklin Raines (CEO of Fannie Mae), 10th June 2004: "These subprime assets are so riskless that their capital for holding them should be under 2 percent."

http://www.zerohedge.com/news/2013-12-09/10-worst-economic-predictions-ever

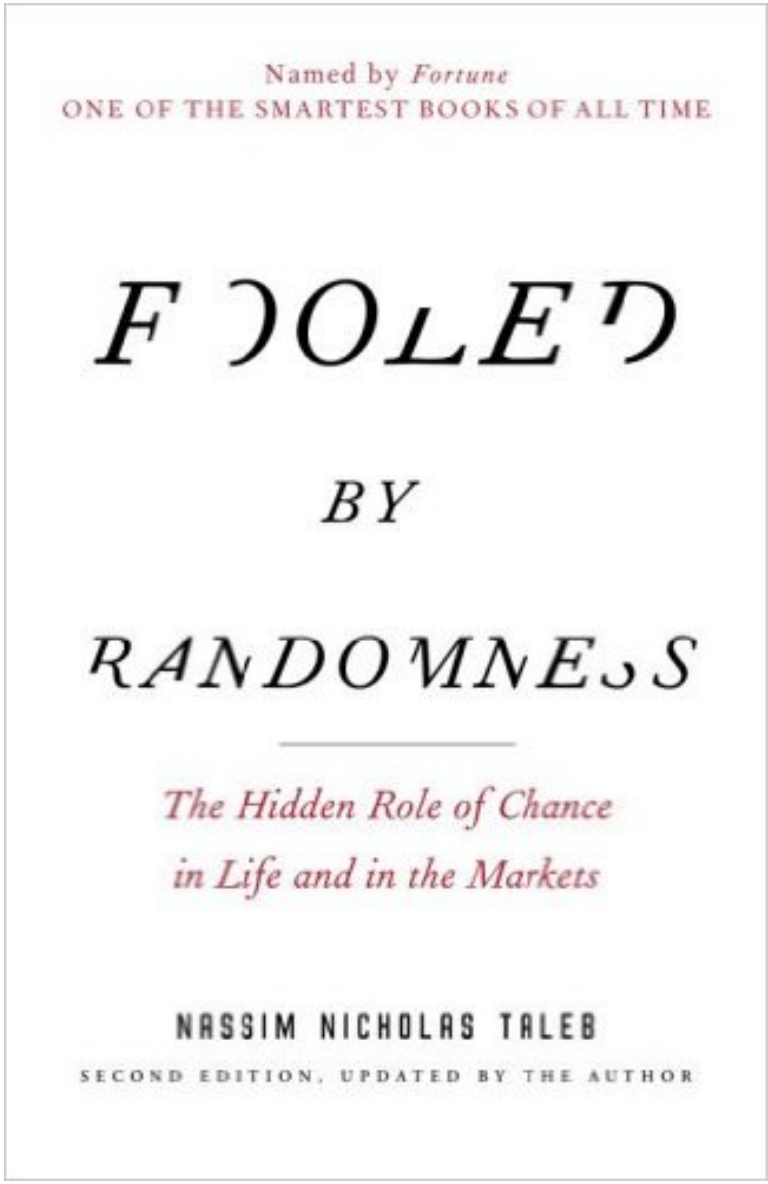
Financial experts kNOw better, right?



Ben Bernanke, 10th January 2008 - "The Federal Reserve is currently not forecasting a recession."

http://www.zerohedge.com/news/2013-12-09/10-worst-economic-predictions-ever

"Generate a long series of coin flips producing heads and tails with 50% odds each and fill up sheets of paper. If the series is long enough you may get eight heads or eight tails in a row, perhaps even ten of each. Yet you know that in spite of these wins the conditional odds of getting a head or a tail is still 50%."



Taleb, Nassim Nicholas (2008-10-06). Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets (Incerto) (Kindle Locations 2813-2815). Random House Publishing Group. Kindle Edition.

100 Simulations: Avg~4.7 / # >=4 ~ 70

Simulation #1				
	35	16	7	5
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	T			
2	H	T		
3	H	T		
4	T			
5	T			
6	H	T		
7	T			
8	H	H	T	
9	H	H	H	H
10	T			
11	T			
12	T			
13	T			
14	H	T		
15	T			
16	T			
17	H	T		
18	H	T		
19	T			
20	H	T		
21	T			
22	T			
23	H	H	H	H
24	H	T		
25	T			
26	H	T		
27	T			
28	H	H	H	H
29	H	T		
30	T			
31	T			
32	H	T		
33	T			
34	H	T		
35	H	H	H	H
36	H	H	T	
37	T			
38	T			
39	H	H	T	
40	T			
41	H	T		
42	T			
43	H	T		
44	H	H	T	
45	T			
46	H	H	T	
47	T			
48	T			
49	T			
50	H	H	T	
51	H	H	H	T
52	T			
53	H	H	H	H
54	T			
55	H	T		
56	T			
57	T			
58	T			
59	H	H	T	
60	T			
61	T			
62	T			
63	T			
64	H	T		
65	H	T		
66	H	H	T	
67	T			
68	T			
69	T			
70	H	T		
71	T			
72	H	T		
73	T			
74	H	H	T	
75	H	H	H	T

Simulation #2				
	35	19	6	2
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	T			
2	H	T		
3	H	H	T	
4	T			
5	H	H	T	
6	H	T		
7	H	H	T	
8	H	H	T	
9	T			
10	T			
11	H	H	T	
12	H	H	T	
13	H	H	T	
14	T			
15	T			
16	H	T		
17	T			
18	T			
19	H	T		
20	T			
21	T			
22	H	T		
23	H	H	H	T
24	H	H	T	
25	H	T		
26	T			
27	H	T		
28	T			
29	H	H	H	T
30	T			
31	T			
32	H	T		
33	T			
34	H	T		
35	T			
36	H	T		
37	T			
38	T			
39	T			
40	T			
41	T			
42	H	H	H	T
43	H	H	T	
44	H	H	T	
45	H	H	T	
46	H	H	H	H
47	T			
48	T			
49	H	H	H	T
50	T			
51	T			
52	T			
53	T			
54	H	T		
55	H	T		
56	T			
57	T			
58	H	T		
59	H	T		
60	T			
61	H	T		
62	H	H	T	
63	H	T		
64	T			
65	T			
66	T			
67	T			
68	T			
69	T			
70	H	H	H	H
71	T			
72	T			
73	H	H	T	
74	T			
75	T			

Simulation #3				
	46	27	18	4
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	T			
2	H	H	H	T
3	T			
4	H	T		
5	H	H	T	
6	H	H	H	T
7	H	H	H	T
8	H	T		
9	H	H	H	T
10	H	T		
11	H	H	H	T
12	T			
13	H	H	T	
14	T			
15	H	H	T	
16	H	T		
17	H	T		
18	H	H	T	
19	T			
20	H	T		
21	H	H	H	T
22	H	T		
23	H	H	H	T
24	T			
25	T			
26	T			
27	T			
28	H	H	T	
29	T			
30	T			
31	H	H	H	T
32	H	T		
33	H	H	H	H
34	H	T		
35	H	H	H	T
36	T			
37	H	T		
38	H	T		
39	H	H	H	T
40	T			
41	H	H	H	T
42	H	T		
43	H	H	H	T
44	H	T		
45	T			
46	T			
47	T			
48	T			
49	T			
50	T			
51	T			
52	H	T		
53	H	H	H	H
54	H	T		
55	H	H	T	
56	T			
57	T			
58	H	T		
59	H	T		
60	T			
61	H	H	H	H
62	T			
63	T			
64	T			
65	H	H	H	T
66	H	H	T	
67	H	T		
68	T			
69	H	H	H	H
70	H	H	T	
71	H	T		
72	H	H	H	T
73	H	H	T	
74	T			
75	T			

Simulation #4				
	36	21	9	5
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	T			
2	T			
3	H	H	T	
4	H	T		
5	T			
6	T			
7	H	T		
8	T			
9	T			
10	T			
11	T			
12	H	H	T	
13	T			
14	T			
15	T			
16	T			
17	H	H	T	
18	T			
19	H	H	H	T
20	H	T		
21	T			
22	H	H	T	
23	H	H	T	
24	H	T		
25	H	T		
26	H	T		
27	H	H	H	H
28	H	T		
29	H	H	T	
30	H	H	T	
31	T			
32	H	H	H	T
33	H	H	T	
34	H	H	H	H
35	H	T		
36	T			
37	T			
38	T			
39	T			
40	T			
41	H	H	T	
42	T			
43	T			
44	T			
45	H	H	H	H
46	H	H	T	
47	T			
48	T			
49	H	T		
50	T			
51	T			
52	H	H	T	
53	H	H	H	H
54	H	H	T	
55	T			
56	T			
57	T			
58	H	T		
59	T			
60	H	T		
61	T			
62	H	H	H	H
63	H	T		
64	T			
65	H	H	H	T
66	T			
67	T			
68	T			
69	H	T		
70	T			
71	H	H	H	T
72	H	T		
73	T			
74	T			
75	H	T		

Simulation #5				
	39	18	9	4
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	H	H	T	
2	T			
3	T			
4	H	T		
5	H	T		
6	T			
7	H	H	T	
8	H	T		
9	H	H	H	T
10	H	H	H	H
11	T			
12	H	T		
13	H	H	T	
14	H	H	T	
15	T			
16	H	H	T	
17	T			
18	H	H	T	
19	T			
20	T			
21	T			
22	H	H	H	H
23	T			
24	H	H	T	
25	H	T		
26	H	T		
27	H	T		
28	T			
29	H	T		
30	T			
31	T			
32	T			
33	H	T		
34	T			
35	H	H	H	H
36	H	T		
37	H	H	H	T
38	T			
39	T			
40	T			
41	H	T		
42	H	T		
43	H	T		
44	H	H	H	H
45	T			
46	T			
47	T			
48	H	T		
49	T			
50	T			
51	H	T		
52	T			
53	T			
54	H	T		
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61	H	H	H	T
62	T			
63	H	H	T	
64	T			
65	H	H	H	T
66	T			
67	T			
68	T			
69	H	T		
70	T			
71	H	H	H	T
72	H	T		
73	H	T		
74	H	T		
75	T			

Simulation #6				
	35	17	8	5
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	H	T		
2	T			
3	T			
4	H	T		
5	T			
6	T			
7	T			
8	H	H	T	
9	T			
10	H	T		
11	H	T		
12	H	H	T	
13	H	H	H	H
14	T			
15	T			
16	T			
17	H	H	H	T
18	T			
19	H	H	H	H
20	H	H	T	
21	T			
22	H	H	H	T
23	T			
24	H	H	T	
25	T			
26	T			
27	H	T		
28	H	T		
29	H	T		
30	H	H	T	
31	T			
32	H	H	H	H
33	H	T		
34	H	H	T	
35	T			
36	H	T		
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42	T			
43	T			
44	T			
45	H	T		
46	H	H	H	T
47	T			
48	H	H	T	
49	T			
50	T			
51	H	H	H	H
52	T			
53	T			
54	H	H	H	H
55	T			
56	H	T		
57	T			
58	T			
59	T			
60	T			
61	T			
62	H	T		
63	T			
64	H	T		
65	T			
66	T			
67	T			
68	T			
69	H	H	T	
70	H	T		
71	H	T		
72	H	T		
73	T			
74	T			
75	T			

Simulation #7				
	41	18	14	6
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	T			
2	H	H	H	T
3	H	H	H	H
4	H	H	H	T
5	T			
6	T			
7	H	T		
8	H	T		
9	H	H	H	H
10	H	T		
11	T			
12	H	H	T	
13	H	T		
14	H	T		
15	T			
16	T			
17	H	T		
18	H	H	H	T
19	T			
20	H	T		
21	H	T		
22	T			
23	T			
24	T			
25	H	T		
26	H	H	T	
27	T			
28	H	T		
29	H	H	H	T
30	T			
31	H	H	H	H
32	T			
33	H	H	H	H
34	T			
35	H	H	T	
36	H	T		
37	H	T		
38	T			
39	H	H	H	T
40	H	T		
41	H	T		
42	T			
43	H	H	H	T
44	T			
45	T			
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47	T			
48	H	T		
49	T			
50	T			
51	T			
52	H	T		
53	H	T		
54	H	T		
55	T			
56	T			
57	H	T		
58	T			
59	H	T		
60	T			
61	T			
62	H	T		
63	H	H	H	T
64	T			
65	H	H	H	H
66	H	T		
67	T			
68	T			
69	T			
70	T			
71	T			
72	H	H	H	H
73	H	H	H	T
74	H	H	T	
75	H	T		

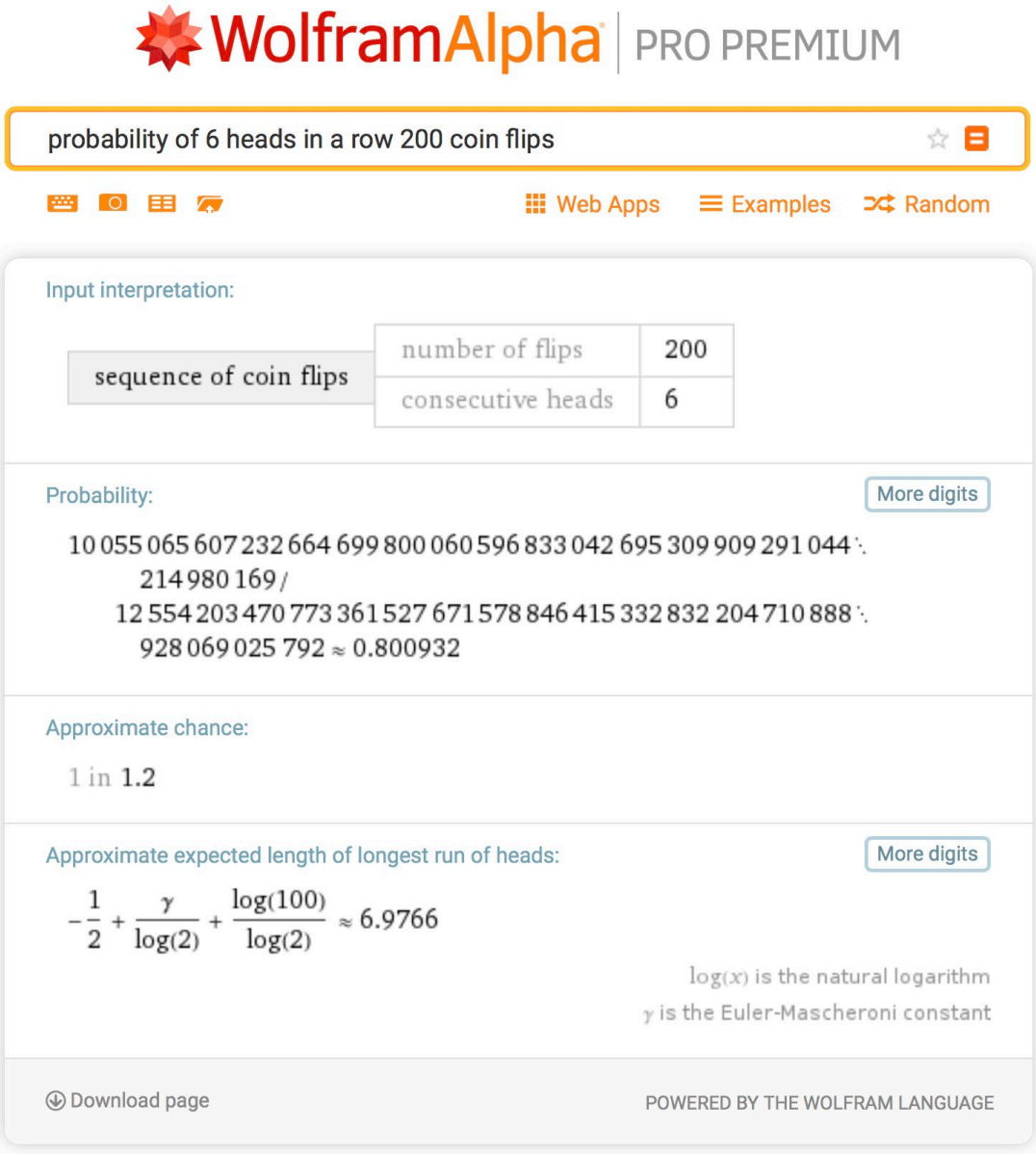
Simulation #8				
	45	16	11	7
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	H	H	H	H
2	T			
3	H	H	T	
4	T			
5	T			
6	H	T		
7	H	T		
8	T			
9	H	T		
10	H	T		
11	H	H	H	H
12	H	H	T	
13	T			
14	T			
15	H	T		
16	T			
17	T			
18	H	T		
19	H	H	H	H
20	H	T		
21	H	T		
22	H	T		
23	T			
24	T			
25	T			
26	T			
27	T			
28	T			
29	T			
30	H	T		
31	T			
32	H	T		
33	H	T		
34	H	T		
35	H	T		
36	H	H	H	H
37	T			
38	H	T		
39	T			
40	H	T		
41	H	T		
42	H	H	T	
43	T			
44	H	T		
45	H	H	T	
46	H	H	T	
47	H	T		
48	H	T		
49	T			
50	H	H	H	H
51	H	T		
52	T			
53	H	T		
54	H	H	H	T
55	H	H	H	H
56	T			
57	H	H	H	H
58	H	T		
59	T			
60	T			
61	H	H	H	T
62	T			
63	H	T		
64	T			
65	H	T		
66	T			
67	H	T		
68	H	T		
69	H	H	H	T
70	T			
71	H	T		
72	T			
73	H	T		
74	H	H	H	T
75	T			

Simulation #9				
	37	20	11	5
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	H	T		
2	H	T		
3	H	H	H	T
4	T			
5	H	H	T	
6	T			
7	T			
8	H	T		
9	T			
10	H	T		
11	T			
12	H	T		
13	H	T		
14	T			
15	H	T		
16	T			
17	H	T		
18	T			
19	T			
20	H	H	T	
21	T			
22	H	H	T	
23	T			
24	T			
25	H	H	H	T
26	H	H	H	H
27	H	T		
28	H	T		
29	H	H	H	H
30	T			
31	H	T		
32	H	H	H	H
33	H	T		
34	T			
35	H	H	T	
36	H	T		
37	H	H	H	T
38	T			
39	T			
40	T			
41	T			
42	H	H	T	
43	T			
44	H	T		
45	T			
46	H	H	H	T
47	H	H	H	T
48	H	T		
49	H	H	T	
50	T			
51	T			
52	H	H	H	H
53	T			
54	T			
55	T			
56	T			
57	T			
58	H	H	H	T
59	T			
60	H	T		
61	T			
62	H	H	T	
63	H	H	H	H
64	H	H	T	
65	T			
66	T			
67	T			
68	H	H	T	
69	T			
70	T			
71	T			
72	T			
73	T			
74	H	T		
75	T			

Simulation #10				
	36	21	10	4
Forecaster	Flip #1	Flip #2	Flip #3	Flip #4
1	H	H	H	H
2	H	H	T	
3	T			
4	T			
5	T			
6	T			
7	H	H	H	T
8	T			
9	T			
10	T			
11	H	T		
12	T			
13	T			
14	H	H	T	
15	H	T		
16	T			
17	H	H	H	T
18	T			
19	H	H	T	
20	T			
21	T			
22	H	H	T	
23	T			
24	H	H	T	
25	T			
26	H	H	T	
27	T			
28	T			
29	H	T		
30	H	H	H	H
31	T			
32	T			
33	H	T		
34	T			
35	T			
36	H	H	T	
37	T			
38	H	H	T	
39	T			
40	T			
41	T			
42	T			
43	T			
44	T			
45	H	H	H	H
46	H	H	H	T
47	H	T		
48	H	H	T	
49	T			
50	H	T		
51	H	T		
52	H	T		
53	H	T		
54	T			
55	T			
56	H	T		
57	H	H	H	T
58	H	T		
59	T			
60	H	H	H	T
61	H	H	T	
62	H	T		
63	T			
64	T			
65	T			
66	T			
67	H	H	H	T
68	H	T		
69	T			
70	H	H	T	
71	H	T		
72	H	T		
73	T			
74	T			
75	H	H	H	H

Analysis by Kevin Webb, CFA. WSJ and Bloomberg forecasts as published. Econ data from FRED.

Odds of 6 Heads in a row on 200 flips?



http://www.wolframalpha.com/input/?i=probability+of+6+heads+in+a+row+200+coin+flips

Who did the best?

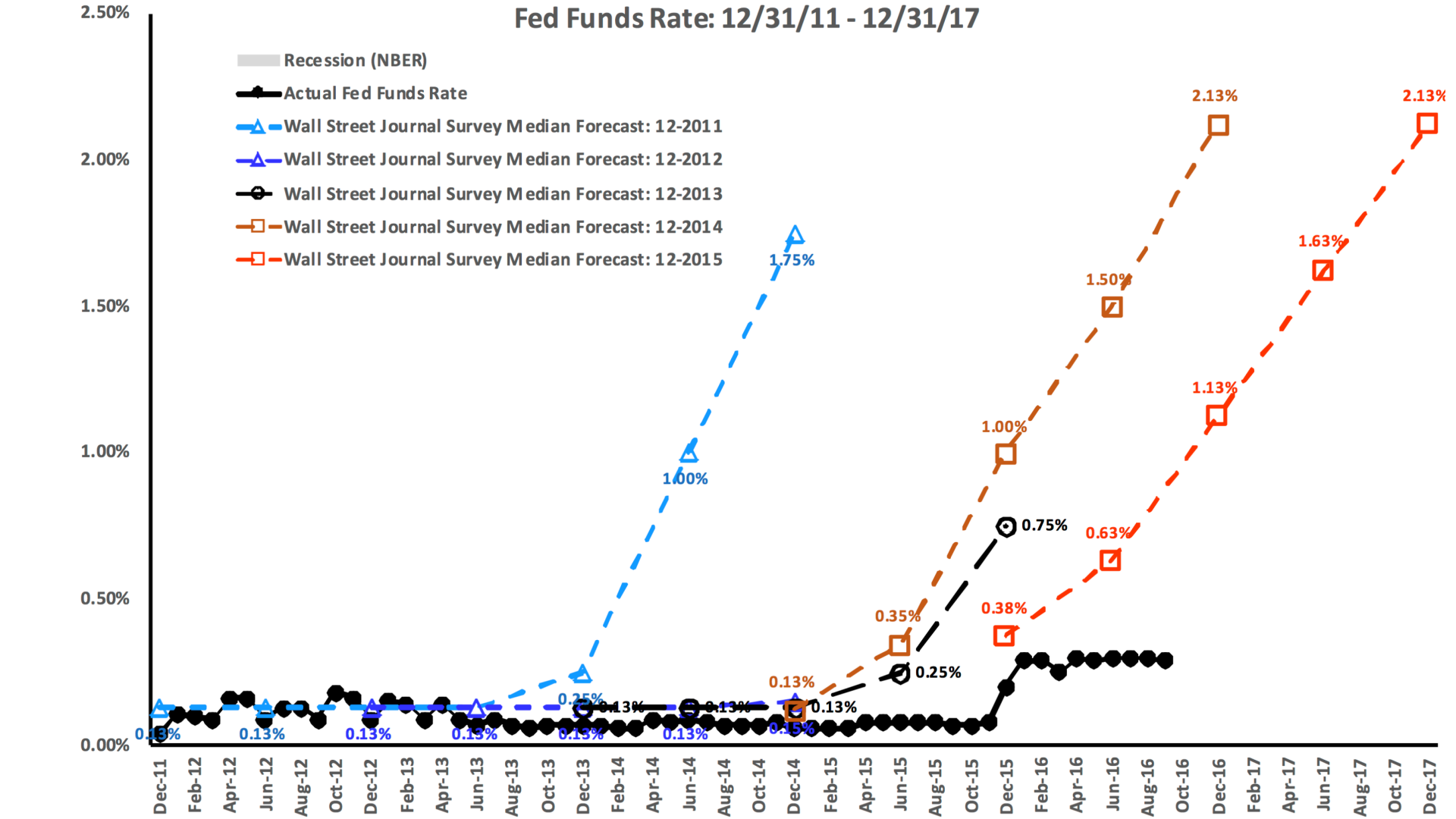
Overall Rank for Wall Street Journal 12-2011 Survey Forecasts for 06/30/12						
Overall Rank	**Forecaster**	**Fed Funds Rate**	**10Yr Treasury Yield**	**Unemployment Rate**	**CPI YoY**	**GDP**
1	Moody's Investors Service	9	11	21	12	9
2	Univ of Central FL	9	24	25	4	3
3	IHS Global Insight	9	24	30	4	6
4	NEMA Business Information Services	***1***	9	25	27	15
5	Capital Economics	24	***1***	41	4	9
6	The Conference Board	9	6	41	19	7
7	Mesirow Financial	***1***	11	21	8	43
8	Credit Suisse	24	3	30	8	25
9	Goldman Sachs & Co.	9	18	30	27	9
10	PNC Financial Services Group	***1***	17	21	21	34
11	Comerica Bank	9	32	6	16	32
12	***Morgan Stanley***	***8***	***6***	***37***	***13***	***32***
12	***UCLA Anderson Forecast***	***9***	***22***	***52***	***10***	***3***
14	***Bank of America Securities-Merrill***	***24***	***3***	***41***	***14***	***15***
14	***JPM***	***24***	***32***	***30***	***2***	***9***
16	Societe Generale	45	3	48	3	***1***
17	California State University	***1***	18	14	32	38
18	The Northern Trust	20	8	21	27	30
19	***Macroeconomic Advisers***	***24***	***31***	***30***	***10***	***15***
19	***Parsec Financial***	***24***	***27***	***4***	***1***	***54***
21	Fannie Mae	42	11	41	14	3
22	Decision Economics Inc.	***1***	32	6	35	38
23	Barclays	9	45	6	19	34
24	Vanderbilt University	24	11	41	16	25
25	Nomura Securities International Inc.	24	28	25	16	25

Analysis by Kevin Webb, CFA. WSJ and Bloomberg forecasts as published. Econ data from FRED.

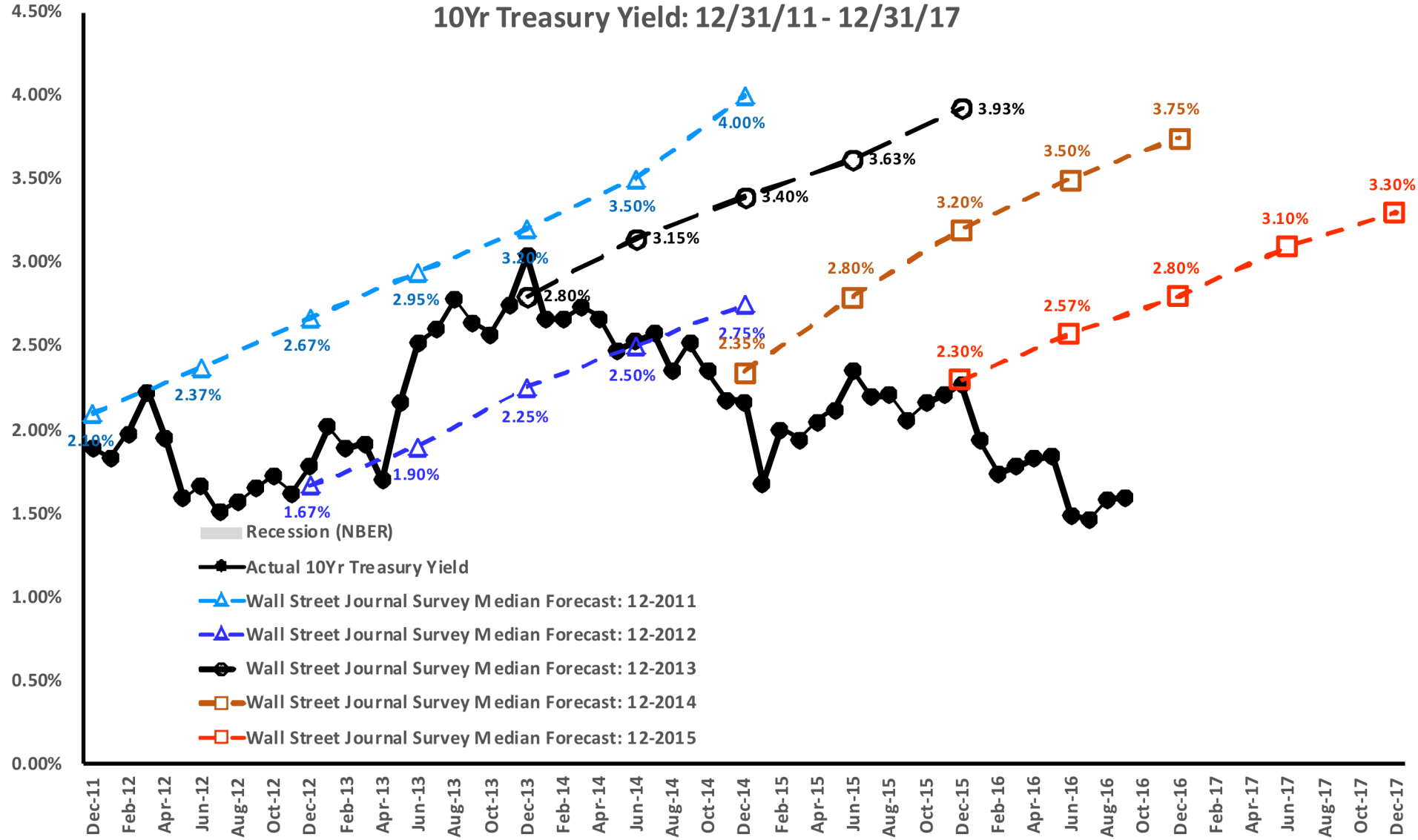
Who did the best the next time? Not the same firms.

Overall Rank for Wall Street Journal 12-2011 Survey Forecasts for 12/31/12						
Overall Rank	**Forecaster**	**Fed Funds Rate**	**10Yr Treasury Yield**	**Unemployment Rate**	**CPI YoY**	**GDP**
1	NEMA Business Information Services	***1***	6	30	12	2
2	Mesirow Financial	***1***	17	20	2	28
3	Capital Economics	24	***1***	43	2	3
4	Univ of Central FL	9	24	30	6	5
5	IHS Global Insight	9	23	34	2	9
6	The Conference Board	9	4	30	32	5
7	Bank of America Securities-Merrill	24	9	43	10	***1***
8	Morgan Stanley	8	3	34	26	19
9	Credit Suisse	24	6	34	11	18
10	California State University	***1***	17	20	20	36
11	JPM	24	17	34	6	22
12	Nationwide Insurance	9	16	24	46	9
13	PNC Financial Services Group	***1***	26	24	32	22
14	Economic Analysis	7	33	3	44	19
15	Vanderbilt University	24	5	43	20	16
16	***Goldman Sachs & Co.***	***9***	***17***	***43***	***18***	***22***
16	***Economic and Revenue Forecast***	***24***	***28***	***17***	***12***	***28***
18	***UCLA Anderson Forecast***	***9***	***33***	***52***	***2***	***16***
18	***Decision Economics Inc.***	***1***	***30***	***7***	***27***	***47***
20	Fannie Mae	42	9	43	15	4
21	Nomura Securities International Inc.	24	30	24	8	28
22	Perna Associates	***1***	41	17	27	31
23	***Comerica Bank***	***9***	***33***	***10***	***27***	***39***
23	***Moody's Investors Service***	***9***	***28***	***20***	***20***	***41***
25	International Council of Shopping	52	9	10	40	9

Analysis by Kevin Webb, CFA. WSJ and Bloomberg forecasts as published. Econ data from FRED.

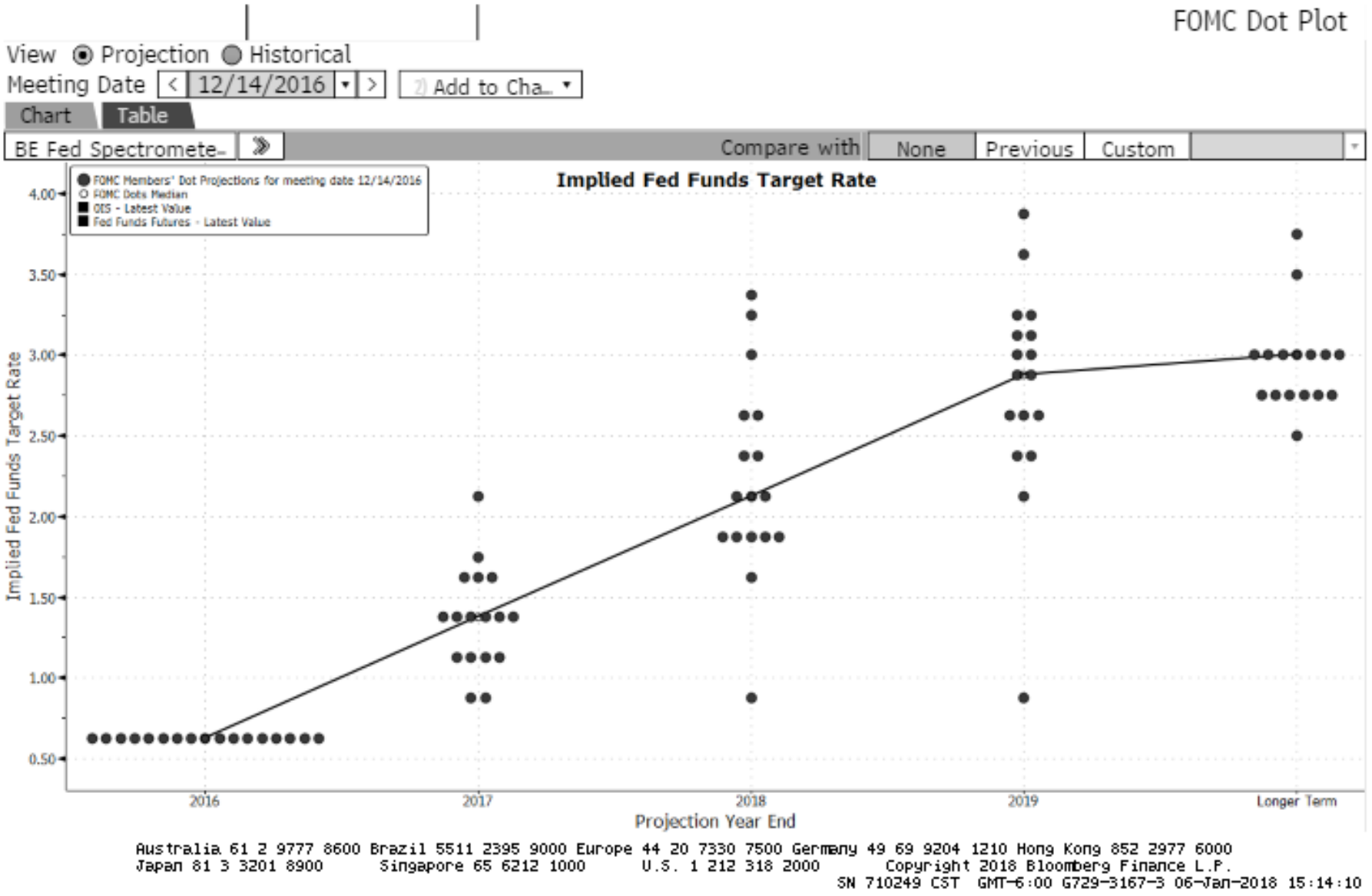


Analysis by Kevin Webb, CFA (kwebb@cantor.com). WSJ and Bloomberg forecasts as published. GIOA forecasts taken from internal survey. Econ data from FRED.



Analysis by Kevin Webb, CFA (kwebb@cantor.com). WSJ and Bloomberg forecasts as published. GIOA forecasts taken from internal survey. Econ data from FRED.

What about the FED? 12/14/2016 Forecasts



Benchmark Practical Applications - Return

Agenda

Assumptions/Definitions

Return: Forecasting

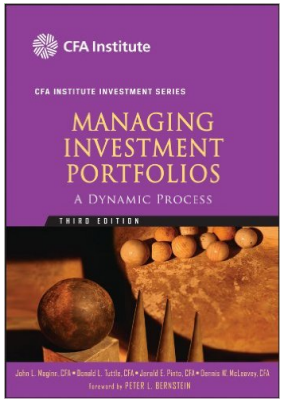
Return: Book Yield / Total Return

Return: Gain/Loss

Return: Weighted Equivalent Bond Benchmarks

Total Return Defined

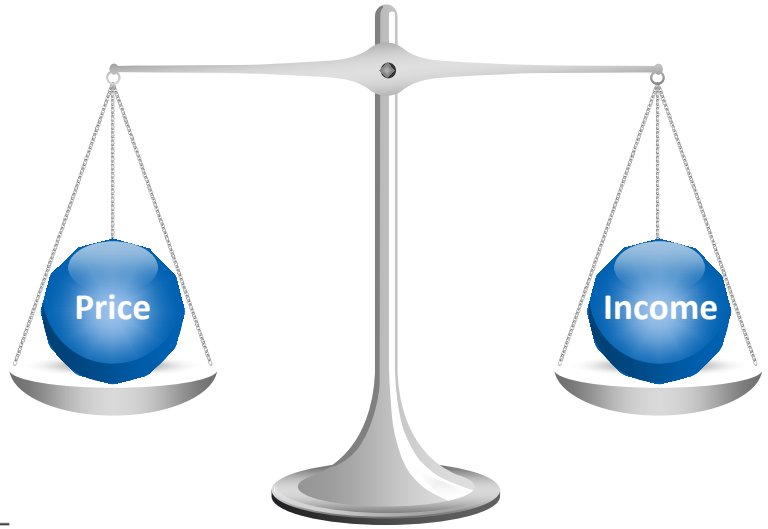
Total Return assumes indifference between Price return & Income return.



"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

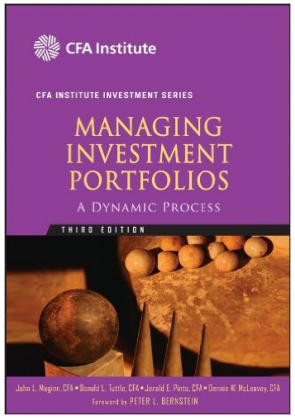


$$Total\ Return = \frac{(EndingMarketValue - BegMarketValue) + CashFlow}{BegMarketValue}$$

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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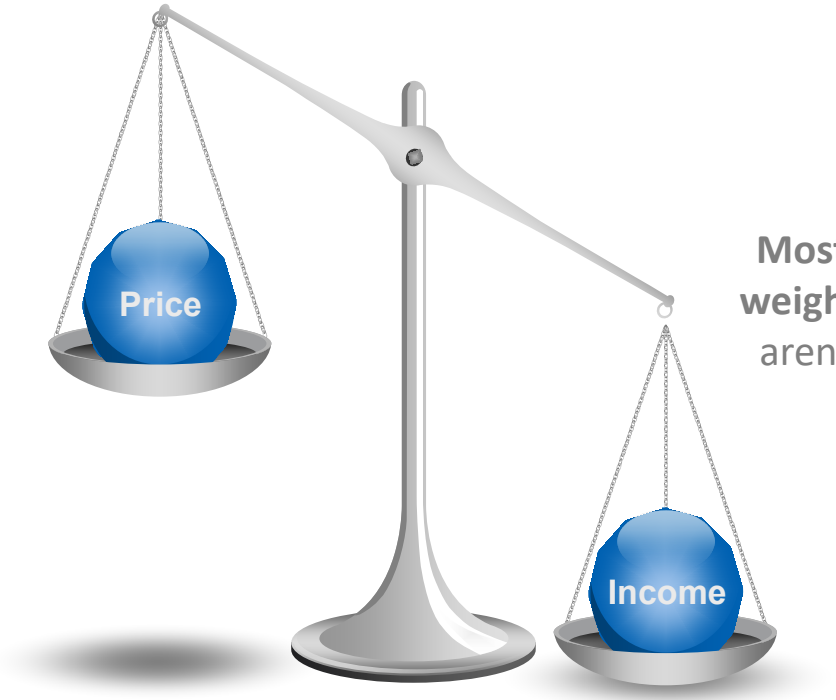


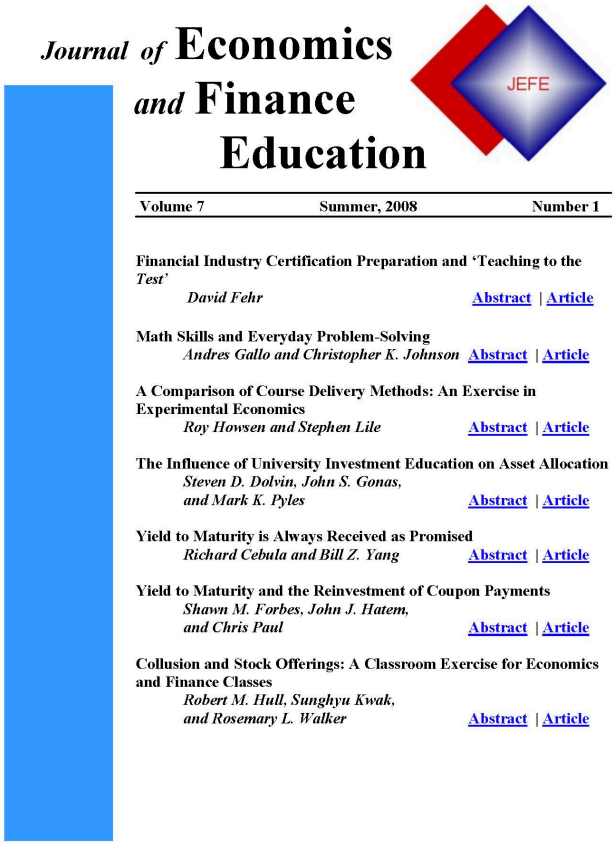
Income

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

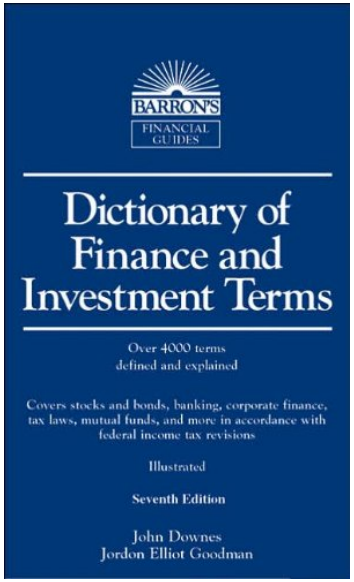
i = Yield = IRR = Required Rate of Return = etc…

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.

Strategy Webb Constant Maturity Treasury Yield, Duration & Convexity Calculations

		Treasury Yield Curve on 08/31/17				
Par Amount:	**$1,000,000.00**	Maturity	Duration	Yield	Slope(bp)	Slope(bp) to 3Mo
Treasury Maturity (Yrs):	**5.00**	0.00	0.00	1.07%		
Treasury Settlement Date:	**08/31/17**	0.25	0.25	1.01%		
Treasury Maturity Date:	**08/31/22**	0.50	0.50	1.08%	7.00	7.00
Coupon Rate:	**1.70%**	1.00	0.99	1.23%	15.00	22.00
Yield:	**1.70%**	2.00	1.97	1.33%	10.00	32.00
Price:	**100.000**	3.00	2.93	1.44%	11.00	43.00
Coupon Frequency:	**2.000**	5.00	4.77	1.70%	26.00	69.00
Price (Excel):	***100.000***	10.00	8.97	2.12%	42.00	111.00
Yield (Excel):	***1.70%***	30.00	20.39	2.73%	61.00	172.00
Modified Duration (Excel):	***4.774***					

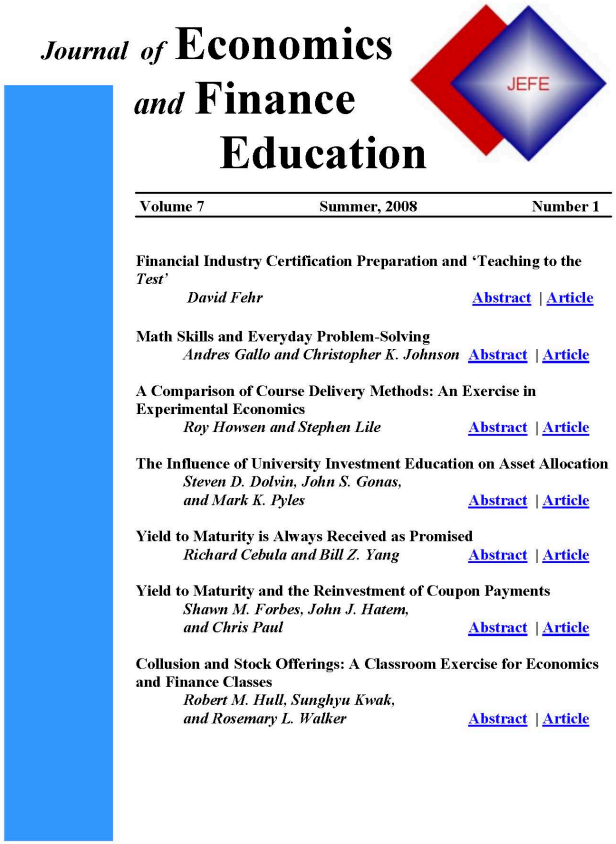
Table Calc Price:	**100.000**	**100.042**
Table Calc Yield (IRR):	**1.700%**	**1.691%**
Table Calc Duration:	**4.774**	**4.773**
Table Calc Convexity:	**0.2571**	**0.2570**

Semi-Annual Periods	Cash Flow	Present Value @ 1.70% Yield	Maturity Matched Discount Rates	Present Value @ Maturity Matched Rates
0	(1,000,000.00)	(1,000,000.00)	1.07%	(1,000,000.00)
1	8,500.00	8,428.36	1.08%	8,454.35
2	8,500.00	8,357.32	1.23%	8,396.41
3	8,500.00	8,286.88	1.28%	8,338.87
4	8,500.00	8,217.04	1.33%	8,277.61
5	8,500.00	8,147.78	1.39%	8,211.70
6	8,500.00	8,079.11	1.44%	8,141.88
7	8,500.00	8,011.02	1.51%	8,065.44
8	8,500.00	7,943.50	1.57%	7,984.57
9	8,500.00	7,876.55	1.64%	7,899.43
10	1,008,500.00	926,652.45	1.70%	926,652.45
Total	1,085,000.00	1,000,000.00		1,000,422.70

Data from ICE, Bloomberg & FRED. Calculations, graphs & analysis by Kevin Webb, CFA.

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".



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

Benchmark Practical Applications - Return

Agenda

1. Assumptions/Definitions
2. Return: Forecasting
3. Return: Book Yield / Total Return
4. Return: Gain/Loss
5. Return: Weighted Equivalent Bond Benchmarks

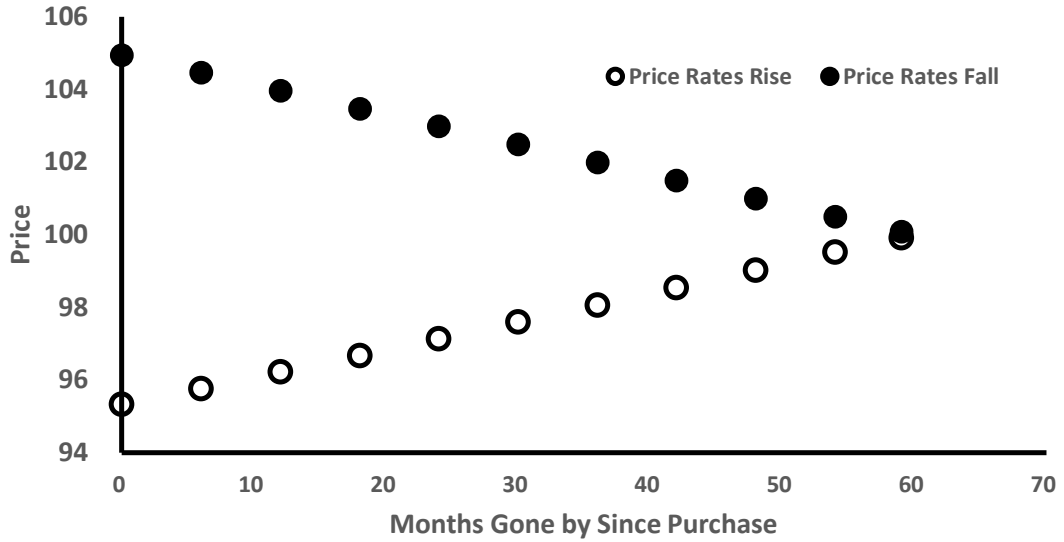
Strategy Webb Toolkit: Paper Gains/(Losses) Vanish as Time Passes

Settlement:	8/31/2019
Maturity:	8/31/2024
Par Amount:	1,000,000.00
Price:	100.000
Coupon:	1.39%
Payment Frequency:	2
Yield(Excel):	1.39%
Duration (Excel):	4.814
Yield Move (+/-):	1.00%

Assume rates rise or fall by the amount of the Yield Move (+/-) and see how time heals all wounds.

Time Heals All Wounds

	Price Rates Rise	Price Rates Fall
0.00	95.31	104.95
6.00	95.76	104.46
12.00	96.21	103.97
18.00	96.66	103.47
24.00	97.12	102.98
30.00	97.59	102.49
36.00	98.06	101.99
42.00	98.54	101.49
48.00	99.02	101.00
54.00	99.51	100.50
59.00	99.91	100.08



Data from ICE, Bloomberg & FRED. Calculations, graphs & analysis by Kevin Webb, CFA.

Interest Rate Changes & Gain/Losses (c)

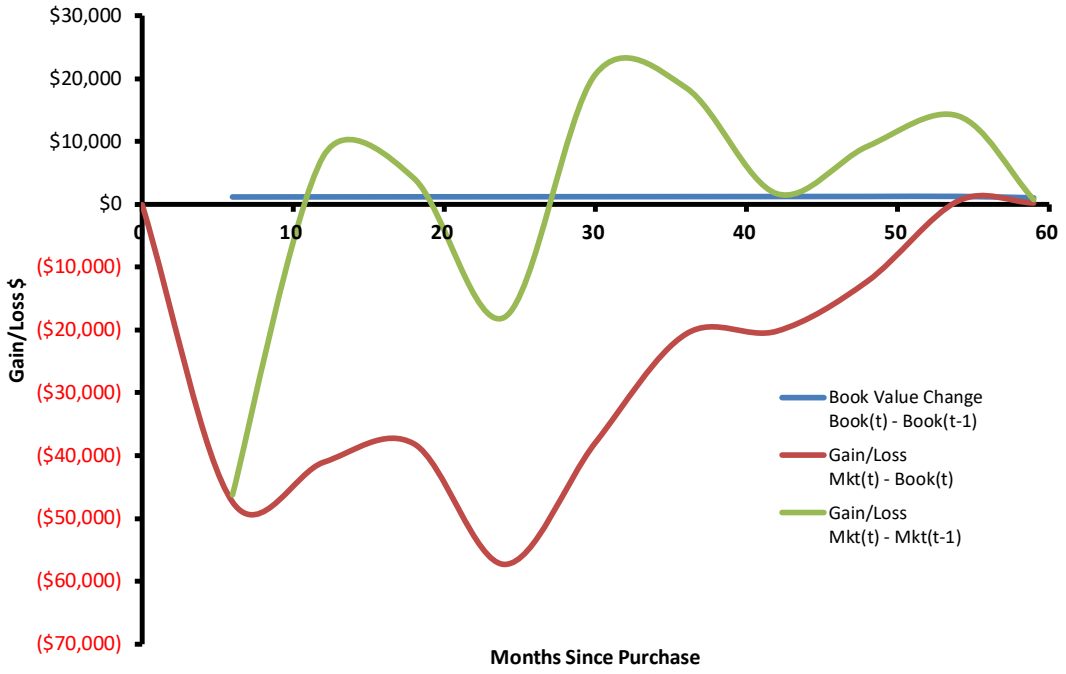
Month	Book Value	Market Value	Book Value ChangeBook(t) - Book(t-1)	Gain/LossMkt(t) - Book(t)	Gain/LossMkt(t) - Mkt(t-1)	Yield Change (bp)	New Discount Rate
0.00	987,607.67	987,607.67		0.00		0.00	1.76%
6.00	988,798.62	941,334.84	1,190.95	(47,463.78)	(46,272.83)	114.00	2.90%
12.00	990,000.05	948,940.12	1,201.43	(41,059.93)	7,605.28	(4.00)	2.86%
18.00	991,212.05	953,079.85	1,212.00	(38,132.20)	4,139.73	6.00	2.92%
24.00	992,434.71	935,095.54	1,222.67	(57,339.17)	(17,984.30)	89.00	3.81%
30.00	993,668.14	955,754.73	1,233.43	(37,913.41)	20,659.18	(45.00)	3.36%
36.00	994,912.42	974,314.99	1,244.28	(20,597.43)	18,560.26	(53.00)	2.83%
42.00	996,167.65	976,009.63	1,255.23	(20,158.01)	1,694.64	32.00	3.15%
48.00	997,433.92	985,234.17	1,266.28	(12,199.75)	9,224.54	(14.00)	3.01%
54.00	998,711.34	999,305.69	1,277.42	594.35	14,071.52	(137.00)	1.64%
59.00	999,774.50	1,000,050.82	1,063.16	276.33	745.13	(21.00)	1.43%

Settlement:	12/31/2015
Maturity:	12/31/2020
Par Amount:	1,000,000.00
Price:	98.761
Coupon:	1.50%
Payment Frequency:	2
Yield:	1.76%
Modified Duration:	4.792
Convexity:	0.258

Random Yield Change Range (bp)	
High:	150
Low:	(150)

Incremental Chng:	

Constant Chng:	



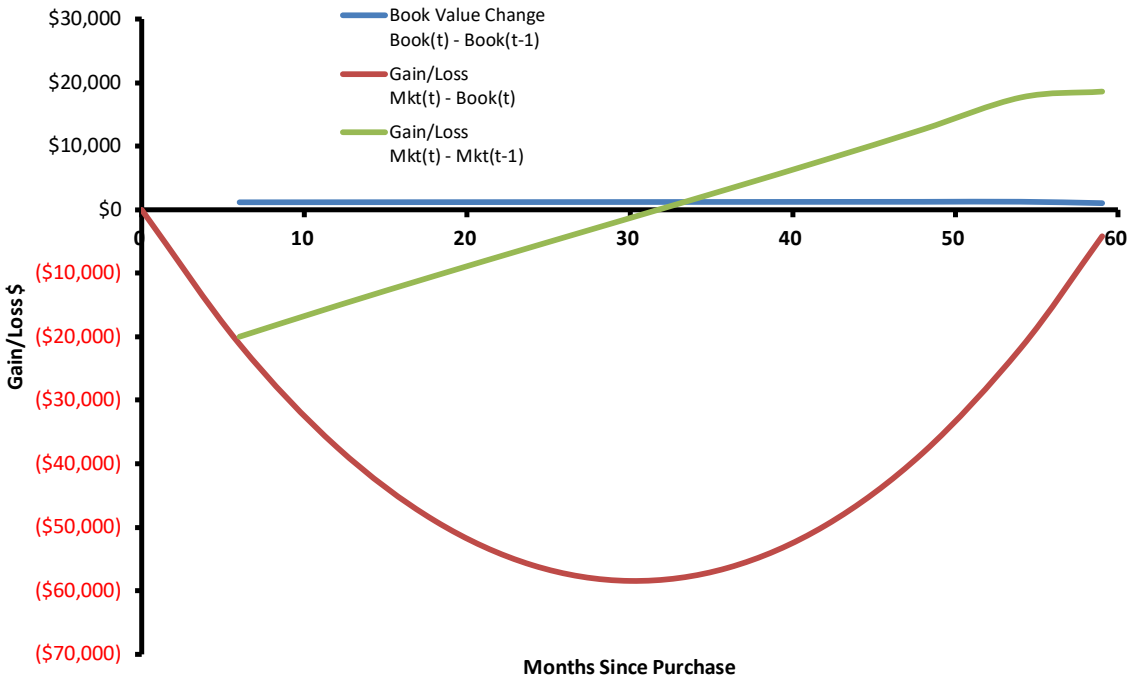
Data from ICE, Bloomberg & FRED. Calculations, graphs & analysis by Kevin Webb, CFA.

Interest Rate Changes & Gain/Losses (b)

Month	Book Value	Market Value	Book Value ChangeBook(t) - Book(t-1)	Gain/LossMkt(t) - Book(t)	Gain/LossMkt(t) - Mkt(t-1)	Yield Change (bp)	New Discount Rate
0.00	987,607.67	987,607.67		0.00		0.00	1.76%
6.00	988,798.62	967,654.87	1,190.95	(21,143.74)	(19,952.80)	50.00	2.26%
12.00	990,000.05	952,591.16	1,201.43	(37,408.89)	(15,063.72)	50.00	2.76%
18.00	991,212.05	942,227.65	1,212.00	(48,984.40)	(10,363.51)	50.00	3.26%
24.00	992,434.71	936,446.70	1,222.67	(55,988.01)	(5,780.95)	50.00	3.76%
30.00	993,668.14	935,198.96	1,233.43	(58,469.18)	(1,247.74)	50.00	4.26%
36.00	994,912.42	938,502.15	1,244.28	(56,410.27)	3,303.19	50.00	4.76%
42.00	996,167.65	946,441.55	1,255.23	(49,726.10)	7,939.40	50.00	5.26%
48.00	997,433.92	959,172.11	1,266.28	(38,261.81)	12,730.56	50.00	5.76%
54.00	998,711.34	976,922.33	1,277.42	(21,789.01)	17,750.22	50.00	6.26%
59.00	999,774.50	995,606.21	1,063.16	(4,168.29)	18,683.88	50.00	6.76%

Settlement:	12/31/2015
Maturity:	12/31/2020
Par Amount:	1,000,000.00
Price:	98.761
Coupon:	1.50%
Payment Frequency:	2
Yield:	1.76%
Modified Duration:	4.792
Convexity:	0.258

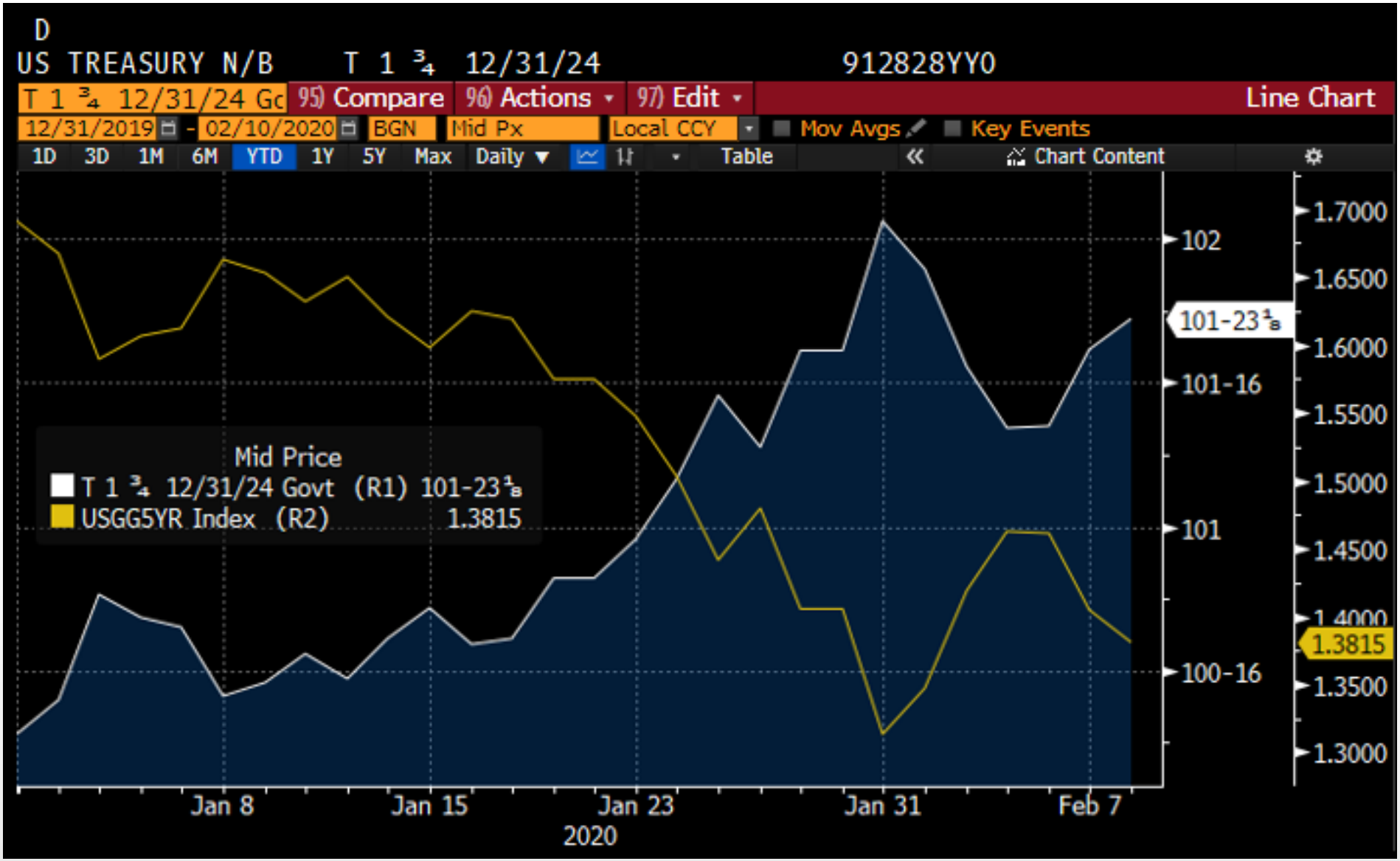
Random Yield Change Range (bp)	
High:	
Low:	
Incremental Chng:	500
Constant Chng:	



Data from ICE, Bloomberg & FRED. Calculations, graphs & analysis by Kevin Webb, CFA.

A Gain is Achieved Through Lower Yields

Relative to where yields were at time of purchase



Source: Bloomberg

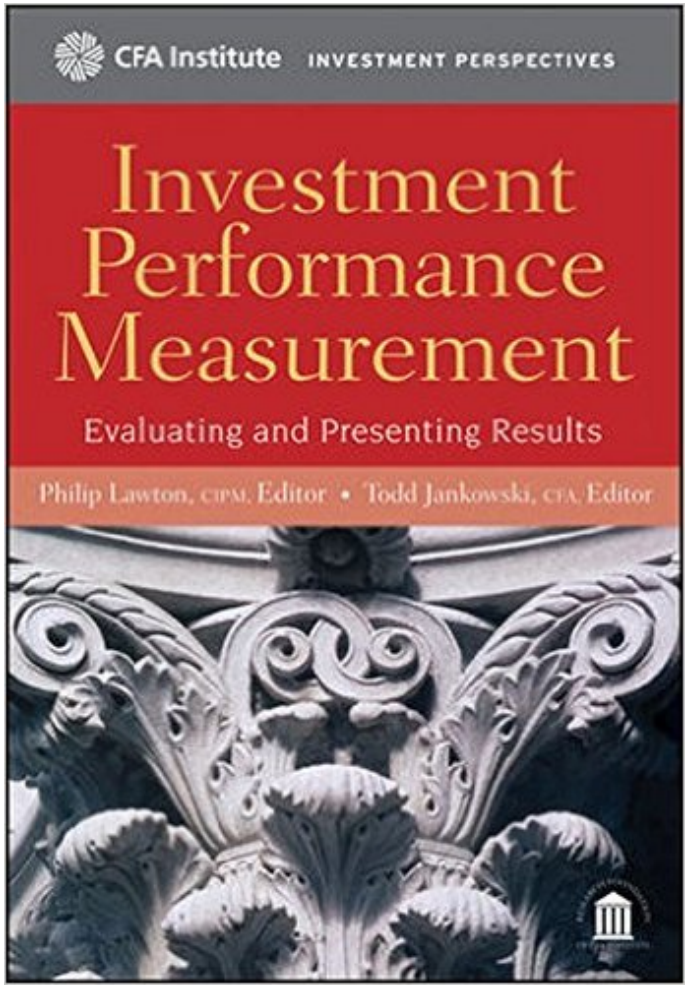
Benchmark Practical Applications - Return

Agenda

1. Assumptions/Definitions
2. Return: Forecasting
3. Return: Book Yield / Total Return
4. Return: Gain/Loss
5. Return: Weighted Equivalent Bond Benchmarks

Problems Using Bond Indices as Benchmarks

Bums & Duration



> Fixed-income benchmarks embody a great many complex issues … two issues: the duration problem and the "bums" problem. …The duration problem is the fact that the duration of the benchmark comes from issuer preferences and is not necessarily the duration that a given investor should hold. The bums (or deadbeats) problem is that the biggest debtors (whether companies, countries, or other entities) have the largest weights in the benchmark.

Investment Performance Measurement: Evaluating and Presenting Results (CFA Institute Investment Perspectives) (Kindle Locations 4006-4012). Wiley. Kindle Edition.

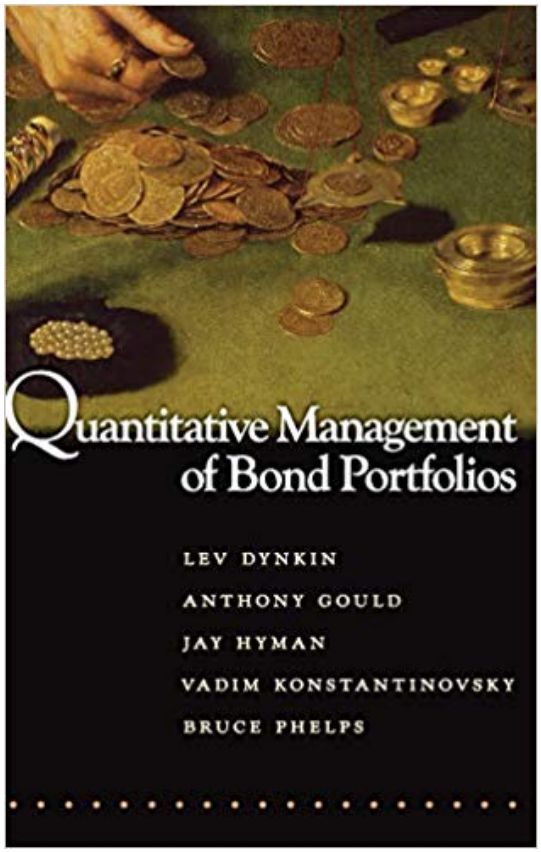
Don’t let Tactics drive Philosophy

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

...investors, who are predominantly concerned with book yield and risk adjusted book returns, can benefit from performance benchmarks that also use book accounting.

Because the book accounting performance of an index depends on the timing and amounts of cash inflows and outflows (and the particular rules for handling such cash flows) preceding the current performance month, no two investors will likely have the same book benchmark even if their underlying index is the same. By its very nature, a book benchmark must be customized for each investor to allow him or her to input their historical vector of cash inflows and outflows (including rules) so as to produce proper book accounting values in the current month. ...

The benchmark book yield and book income are indications of what could be achieved if the manager followed a passive strategy. ...

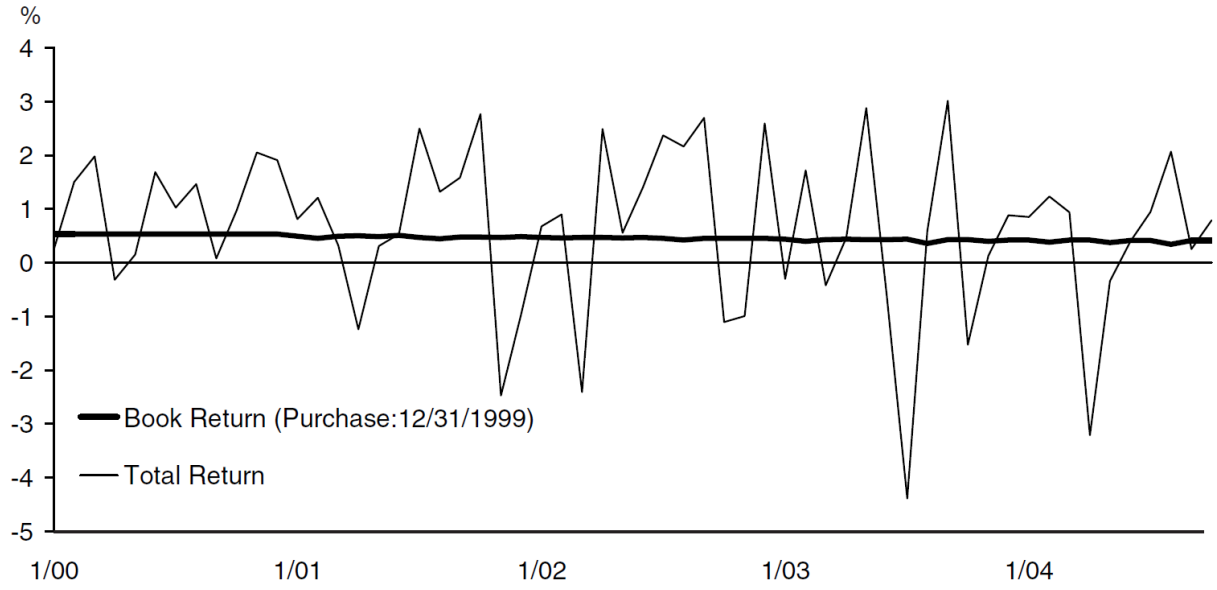


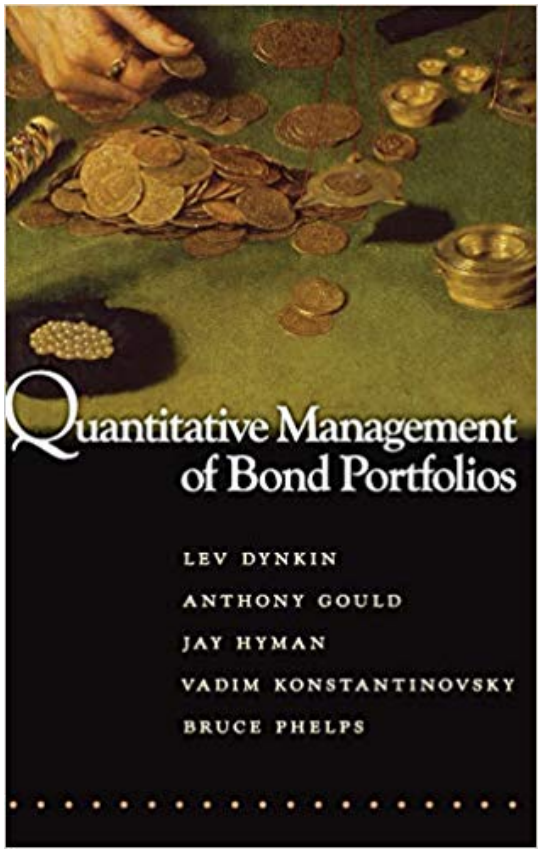
Bruce Phelps, et. al. Quantitative Management of Bond Portfolios. Emphasis added.

Don’t let Tactics drive Philosophy

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.

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