



FORWARD THINKING

## Challenging Traditional Bond Analytics

ANALYTICALLY DRIVEN

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## Our Background

- Sister company Performance Trust Capital Partners founded in 1994
- Leading provider of fixed income expertise to regional banks nationally
- Over 5,000 buy-side Institutions trained at Performance Trust University®

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## PTAM (PT Asset Management, LLC)

- › Managing assets since 2008
- › \$890 million in AUM (as of March 31, 2016)
- › Hedge Funds, SMAs and two core Mutual Funds
- › Ten person Investment Team
  - › Alternatives DNA
  - › Coverage across all fixed income sectors
  - › Average 15 years investment experience

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## U.S. Treasury 10 Yield 1980-2014 (34 years)



Source: Bloomberg

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### Traditional Metrics For Security Selection—Which Would You Choose?

› Yield Curve: October 15, 2003

› Rates will go up ~200 bps over the next two years.

tenor	yield	duration
1-Month	1.50%	0.9 years
3-Month	1.75%	1.8 years
6-Month	2.25%	2.7 years
1-Year	3.30%	4.5 years

	Yield	Duration
1-Year	1.50	0.9 years
2-Year	1.75	1.8 years
3-Year	2.25	2.7 years
5-Year	3.30	4.5 years

Source: Bloomberg

### Shortcomings Of Traditional Metrics For Fixed Income Investing

### Yield As A Measure Of Return

Yield Assumptions

1. Income reinvested will be reinvested at the same yield
2. Yield is equal to total return
3. Yield is static

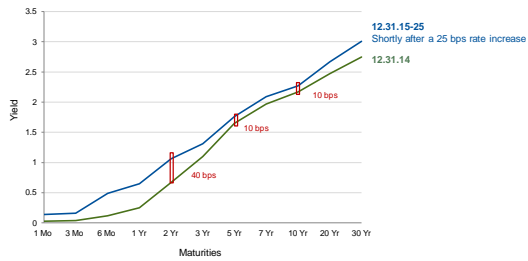
### Duration As A Measure Of Risk

Duration Assumptions

1. Accurate regardless of the magnitude of interest rate changes
2. Bond price movements are linear
3. Duration is static
4. Parallel shift in the yield curve

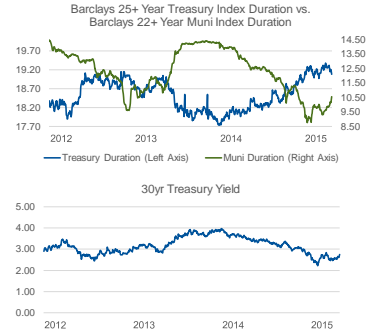
Source: Bloomberg

### Non Parallel Shifts Of Treasury Yield Curve in 2014 and 2015



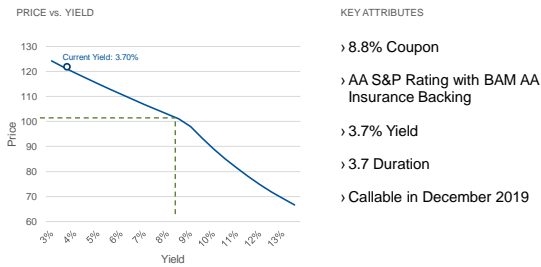
Source: U.S. Treasury Department  
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### Duration is Dynamic and can Change Dramatically



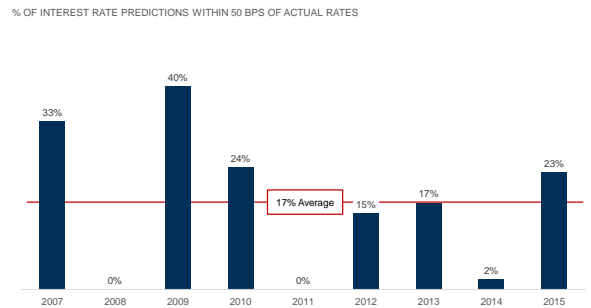
Source: Bloomberg  
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### A Practical Example Of Durations Limitations



Source: Bloomberg  
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### Inaccuracy of Economist Interest Rate Predictions



Source: Wall Street Journal, Bloomberg  
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### Top-Down Investing

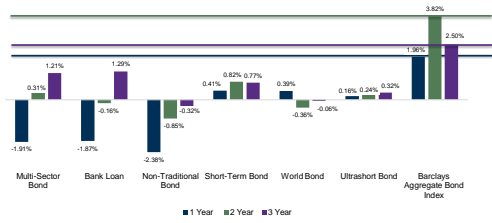
In a recent survey, Jim Bianco studied 20 years of *Wall Street Journal* interest rate surveys and found that as a group, they successfully predicted the future **direction** of interest rates only 30% of the time.

The problem with "top-down investing"...

- > If the forecast is wrong, the investment will be wrong
- > And would you know which security to buy even if your forecast was correct?

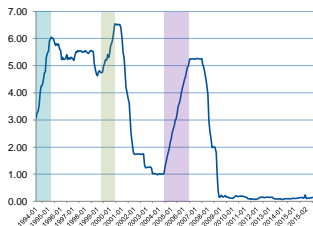
### Sacrificing Returns for Rate Predictions

TOTAL RETURN OF MORNINGSTAR CATEGORY AVERAGES



### Fed Fund Rate Increases vs. Bond Fund Returns

EFFECTIVE FEDERAL FUNDS RATE 1993-2015

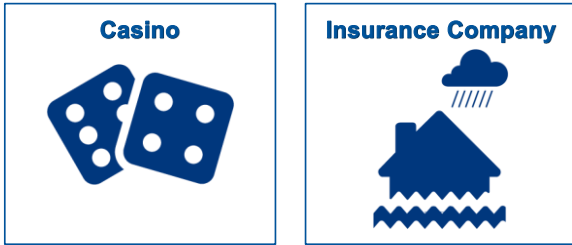


	12/93-4/95	6/99-7/00	9/04-9/06
Length of rate hike	17 months	14 months	27 months
Morningstar Intl. Bond Category	1.68	2.94	3.68
Morningstar Intermediate Gov't Category	1.66	3.28	3.23
Barclays Agg Index	2.01	5.25	3.72

### Open vs. Closed System

## Casino vs. Insurance Company

RISK MANAGEMENT



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## Casino

HOW DOES THE CASINO DETERMINE THE ODDS AT THE CRAPS TABLE?

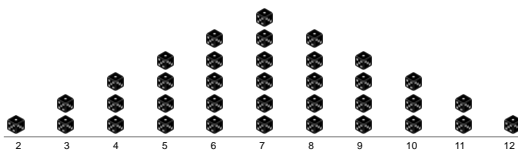
- › The Probability of a particular roll must be calculated
- › There are two ways to do this:
  - › Roll the dice and figure it out
  - › Do the math

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## Casino

A SYSTEM WHERE WE KNOW ALL POSSIBLE OUTCOMES = A CLOSED SYSTEM



What are the odds of rolling a 13?

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## Past Performance...

HOW DOES THE INSURANCE COMPANY DETERMINE THE COST OF INSURING THEIR POLICY HOLDERS?

- › They must first determine the **probability of a claim**
- › Based on data collected from the past
  - › "We can assume":
    - › What happened in the past will likely continue into the future
    - › What has not happened in the past will not happen in the future

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## Past Performance...

100 YEARS OF FLORIDA WEATHER ON RECORD...

- › Average seven hurricanes per year which caused damage
- › Experienced 12 hurricanes in one year which caused damage (worst season on record)
- › Averaged \$300 million in claims per hurricane
- › Single worst hurricane caused \$1.6 billion in claims
- › What is the chance of 13 hurricanes in one year?
- › I **HOPE** NONE
- › Open System: I **HOPE** I Know the Odds
- › Closed System: I **KNOW** the Odds

## Closed System Riddle

THE OPPORTUNITY IS NOT OBVIOUS UNTIL THE RIDDLE IS SOLVED...

How many socks to be guaranteed a matching pair?



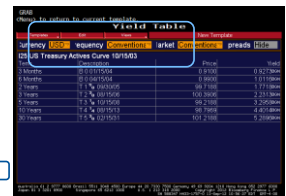
## An Alternative: Scenario Based Total Return Analysis

## Traditional Metrics For Security Selection—Which Would You Choose?

› Yield Curve: October 15, 2003

› Rates will go up ~200 bps over the next two years.

	Yield	Duration
1-Year	1.50	0.9 years
2-Year	1.75	1.8 years
3-Year	2.25	2.7 years
5-Year	3.30	4.5 years



### Break-Even Analysis

5-Year	2-Year
3.30	1.75
3.30	1.75
3.30	X
3.30	X
3.30	X
16.50	16.50

$$1.75 + 1.75 = 3.50$$

$$16.50 - 3.50 = 13.00$$

$$13.00 / 3 = 4.33$$

When we solve for X we find that the 3-yr yield MUST = 4.33%

### Break-Even Analysis

Yield Curve: October 15, 2003

1-Year	1.50
2-Year	1.75
3-Year	2.25
5-Year	3.30

The 3-Year Treasury must be 4.33 or up 208 bps for the 5-Year Treasury to break-even with the 2-Year Treasury.

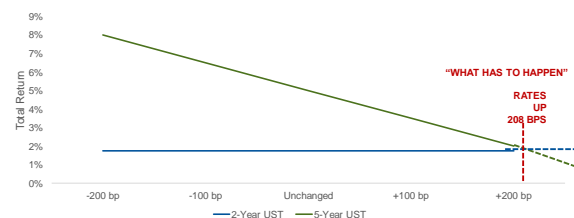
Which Treasury will win if rates are up 200 bps?

### Bonds: A Closed System

5-Year Treasury: 3.30%

Interest Rate Scenario	Purchase	Year 1 Payment	Year 2 Payment	Income in Years 3-5	Year 2 End Price	Total Return
-200	100	3.3%	3.3%	9.15%	109.15	8.0%
-100	100	3.3%	3.3%	6.15%	106.15	6.5%
Unchanged	100	3.3%	3.3%	3.15%	103.15	5.0%
+100	100	3.3%	3.3%	0.15%	100.15	3.5%
+200	100	3.3%	3.3%	-2.85%	97.15	2.0%

### Scenario Based Total Return Analysis

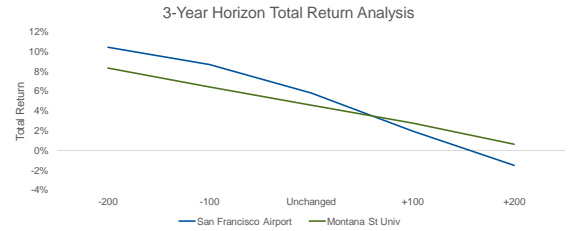


	-200 bp	-100 bp	Unchanged	+100 bp	+200 bp
2-Year UST	1.75%	1.75%	1.75%	1.75%	1.75%
5-Year UST	8.00%	6.50%	5.00%	3.50%	2.00%

## Why Shape Management®

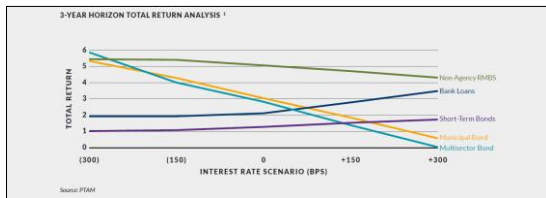
- › Bonds are a closed system
- › Rooted in math, not predictions
- › Future value over time horizons, not net present value
- › Scenarios tell a different story than snapshots
- › A common denominator

## A Practical Example



	-200	-100	Unchanged	+100	+200
<b>San Francisco Airport 3.5% 5/1/2029 (Callable 5/1/2023)</b>	10.44%	8.68%	5.81%	1.95%	(1.50%)
<b>Montana St Univ 4% 11/15/2023 (Non-Callable)</b>	8.33%	6.43%	4.57%	2.77%	0.64%

## The "Shapes" Of Various Fixed Income Sectors



1: The graph is provided for illustrative and educational purposes only. To mirror the profiles of the Morningstar bank loan, short-term bond, municipal national intermediate and multisector bond categories, representative bonds were chosen that had similar credit quality, duration and yield as buckets within the Morningstar category, and then blended to resemble the allocation within the Morningstar category.

The RMBS were run using Blackrock An/Sar credit and prepayment models using ICC prices; the representative bonds were chosen to represent the makeup of the Prime and A/A- universe, using the appropriate weights for fixed-rate and hybrid ARM/collateral.

PTAM selected securities that we believe are representative of each sector. More details of security selection and methodology can be obtained by emailing mutualfunds@ptam.com

## Ladder Book Ends: Total Return Revisited

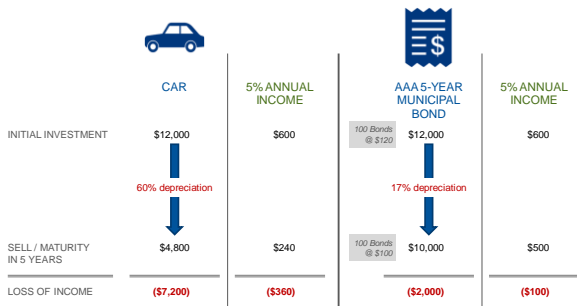
RATES UNCHANGED

	Bond A	Bond B—Callable
Coupon	5%	5%
Maturity	7 years	1 year
Cost	118	104.5
Price in 1 yr	116	100
Total Return	(2) + 5 = 3	(4.5) + 5 = 0.5

• Rates need to move more than you think to be indifferent



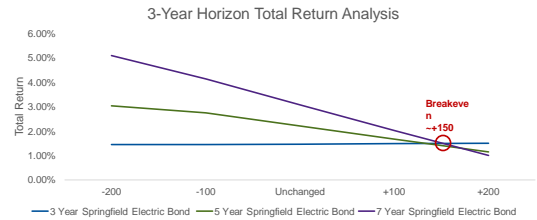
### Does your income generating ability erode?



Sources: Carfax, Bloomberg  
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### Why Wouldn't You Overweight the 7 Year Bond?

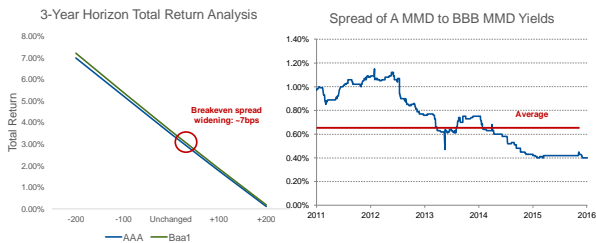
#### Springfield Electric Bonds with 5% Coupons and Various Maturities



	-200	-100	Unchange d	+100	+200
3 Year	1.45%	1.45%	1.47%	1.49%	1.51%
5 Year	3.05%	2.76%	2.22%	1.68%	1.16%
7 Year	5.11%	4.15%	3.08%	2.04%	1.01%

Source: PTAM, Bloomberg, IDC data as of 2/16/16  
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### Shape of A vs. BBB Bonds



1-AAA bond is Western Illinois Flood Priv District 2-BBB bond is Tallahassee Memorial Healthcare Data source: PTAM, Thompson Reuters, 2/9/11-2/12/16  
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### Summary

- › Shape Management can address the shortcomings of traditional metrics
- › We have only scratched the surface
  - › e.g. non-parallel shifts, spread movements
- › A differentiated approach
- › Analytical support

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