



# ***San Francisco Treasury Symposium*** ***Benchmark Your Corporate Cash Portfolio*** ***September 21, 2001***

***Presented by:***

***Linda Ruiz-Zaiko, President***  
***Bridgebay Financial, Inc.***  
***[www.bridgebay.com](http://www.bridgebay.com)***  
***925-743-0200***

***Kurt Zumwalt, Treasurer***  
***Wind River Systems, Inc.***  
***[www.windriver.com](http://www.windriver.com)***  
***510-749-2301***

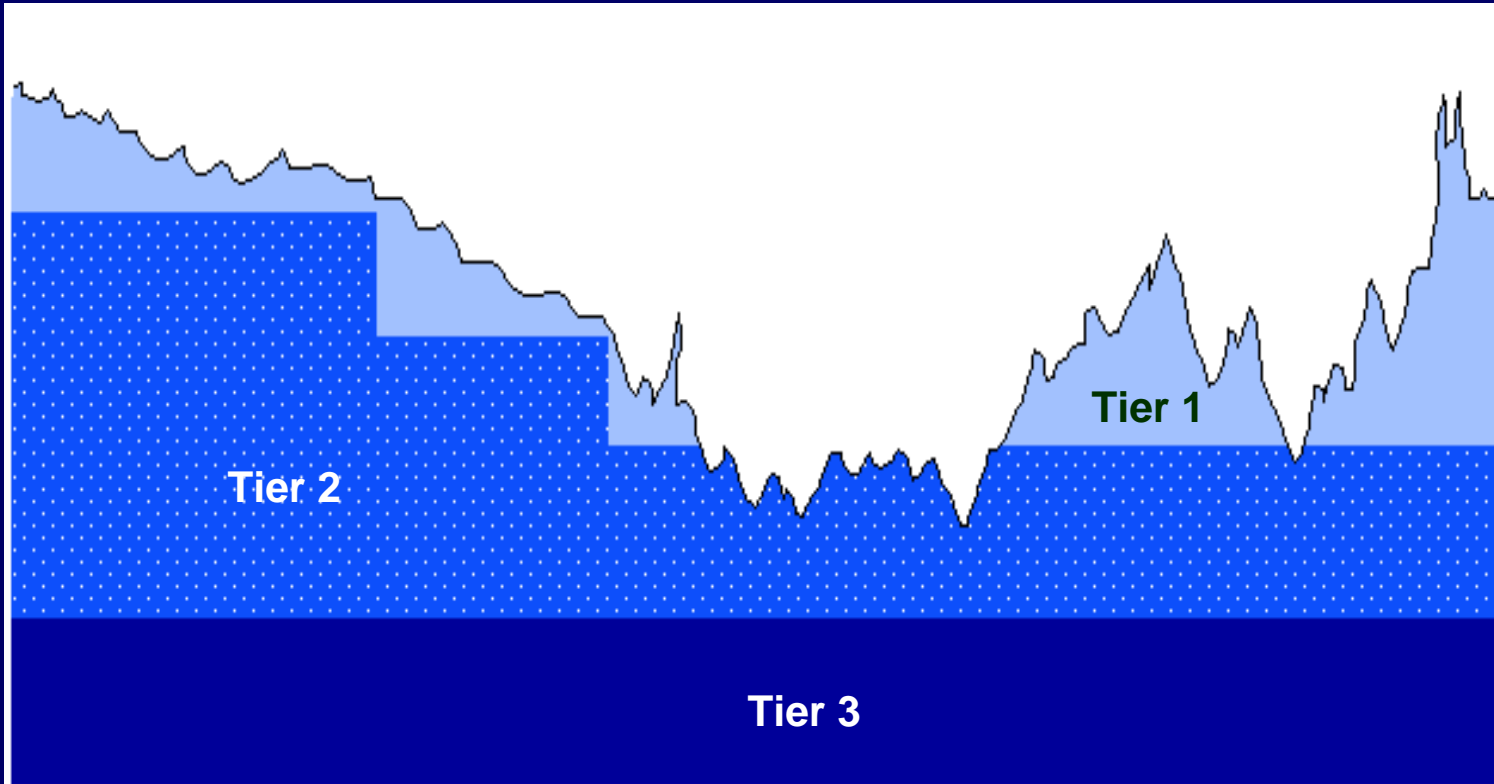
***Janette San Luis***  
***Sun Microsystems, Inc.***  
***[www.sun.com](http://www.sun.com)***  
***650-336-0232***





# Cash Portfolios Can be Stratified by Liquidity and Investment Horizon

**Each Tier is distinct and can be benchmarked.**





## *Why Benchmark Corporate Cash Portfolios?*

- ◆ Measure portfolio performance under similar market conditions
  - ◆ Determine opportunity cost
  - ◆ Assess level of risk taken
  - ◆ Attribute the quality of performance to
    - ◆ Yield curve positioning
    - ◆ Sector selection
    - ◆ Credit decisions
  
- ◆ Model portfolios
  - ◆ Benchmarks can be used to create simulated portfolios
  - ◆ Evaluate risk/return of different securities
  - ◆ Credit quality
  - ◆ Duration/maturities



# Short-Term Benchmarks



- ◆ Taxable Fixed Income
  - ◆ iMoney Net
  - ◆ 6 month LIBID
  - ◆ Merrill Lynch 0-1 Year Treas.
  - ◆ Merrill Lynch 1 Year LIBOR
  - ◆ Merrill Lynch 1-3 Yr. Govt/Corp.
  
- ◆ Tax-Advantaged Fixed Income
  - ◆ PSA Muni Index
  - ◆ Lehman Bros. 1 Year Muni Index
  - ◆ Bond Buyer AA GO
  - ◆ Merrill Lynch 0-3 Yr. Muni Index





# ***Performance Measurement***

## ***Compare Performance TROR to Benchmark TROR***

- ◆ Total rate of return
  - ◆ Time-weighted
  - ◆ Not yield but return
- ◆ After-tax
  - ◆ Use AIMR-PPS
  - ◆ Tax adjust either price return or coupon return
- ◆ Actual monthly returns
  - ◆ Geometrically link monthly returns
  - ◆ Different methods of calculation
  - ◆ Trailing 1, 3, 6, 12 months
  - ◆ Year-to-Date and Inception-to-Date

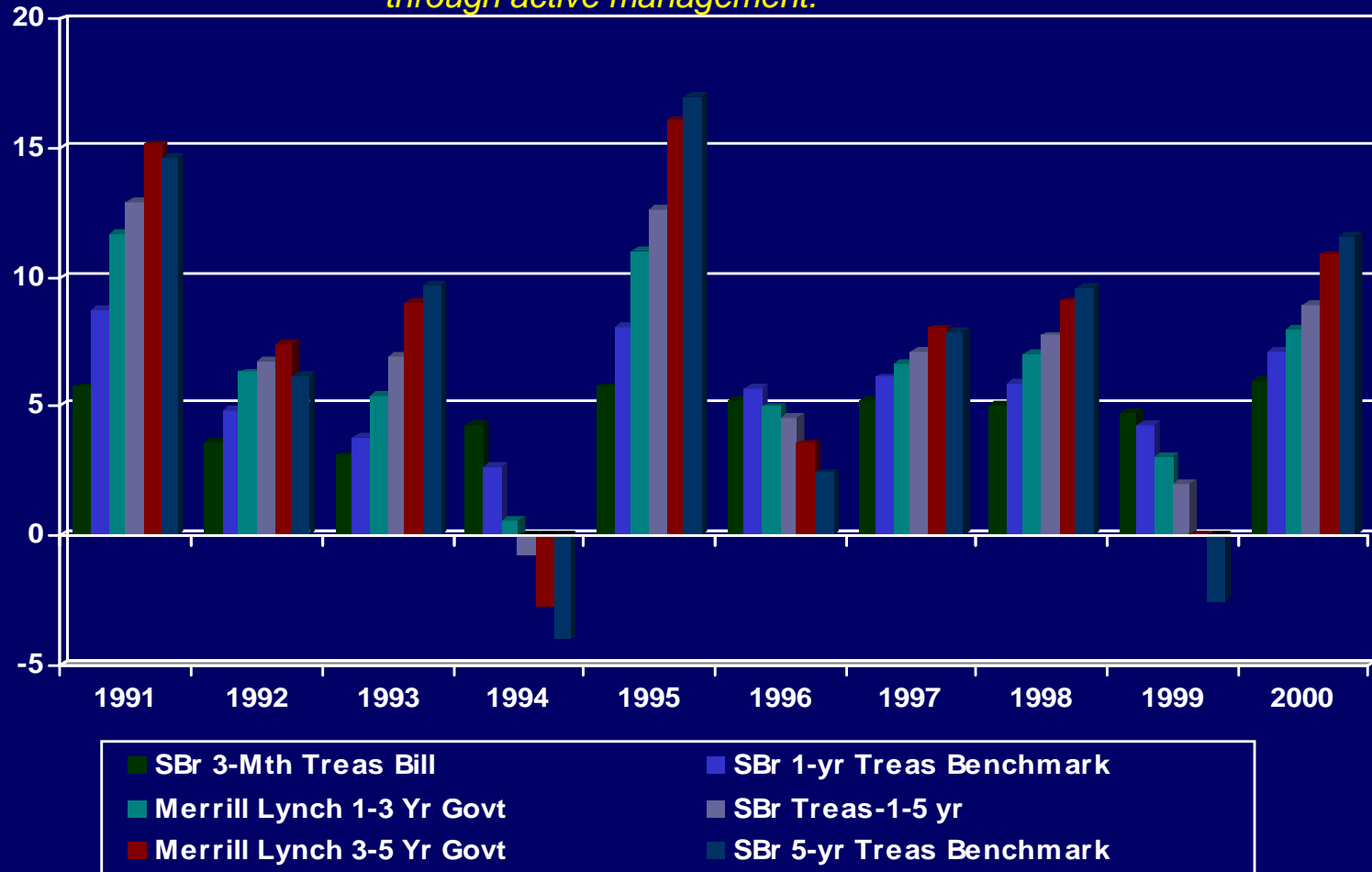




# Annual Benchmark Returns

## Risk/Return Trade-Off

*Historically, the longer the maturity the higher the expected total rates of return. The trade-off has been higher volatility which can be mitigated through active management.*



# Criteria for Selecting Benchmark



- ◆ Viable alternative as a passive strategy
  - ◆ Neutral position
  - ◆ Without fees or transaction costs
- ◆ Consistently calculated and obtained from third party
- ◆ Reflect liquidity needs and risk tolerance
- ◆ Represent similar duration and market sectors as portfolio
- ◆ Should have similar credit quality
- ◆ Similar eligible instruments



# Selecting a Benchmark



- ◆ Back test data over market cycle
  - ◆ Risk/Return profile
  - ◆ Measure volatility of index returns
  - ◆ Range of changes in duration
  - ◆ Number and size of negative quarters
- ◆ Customized or blended
  - ◆ Specify components and weightings



# Custom-Designed Benchmarks



- ◆ Specialized way to measure investment manager
  - ◆ Use a specific list of securities
  - ◆ Combined with multiple published indices
  - ◆ Arrive at an expected rate of return
- ◆ Drawbacks
  - ◆ Complex can be costly to track and maintain
  - ◆ Benchmark composition may drift over time
  - ◆ Composition must be reviewed annually
  - ◆ Manager may mirror the index to reduce tracking error





# Risk/Return Profile

As of June 30, 2001

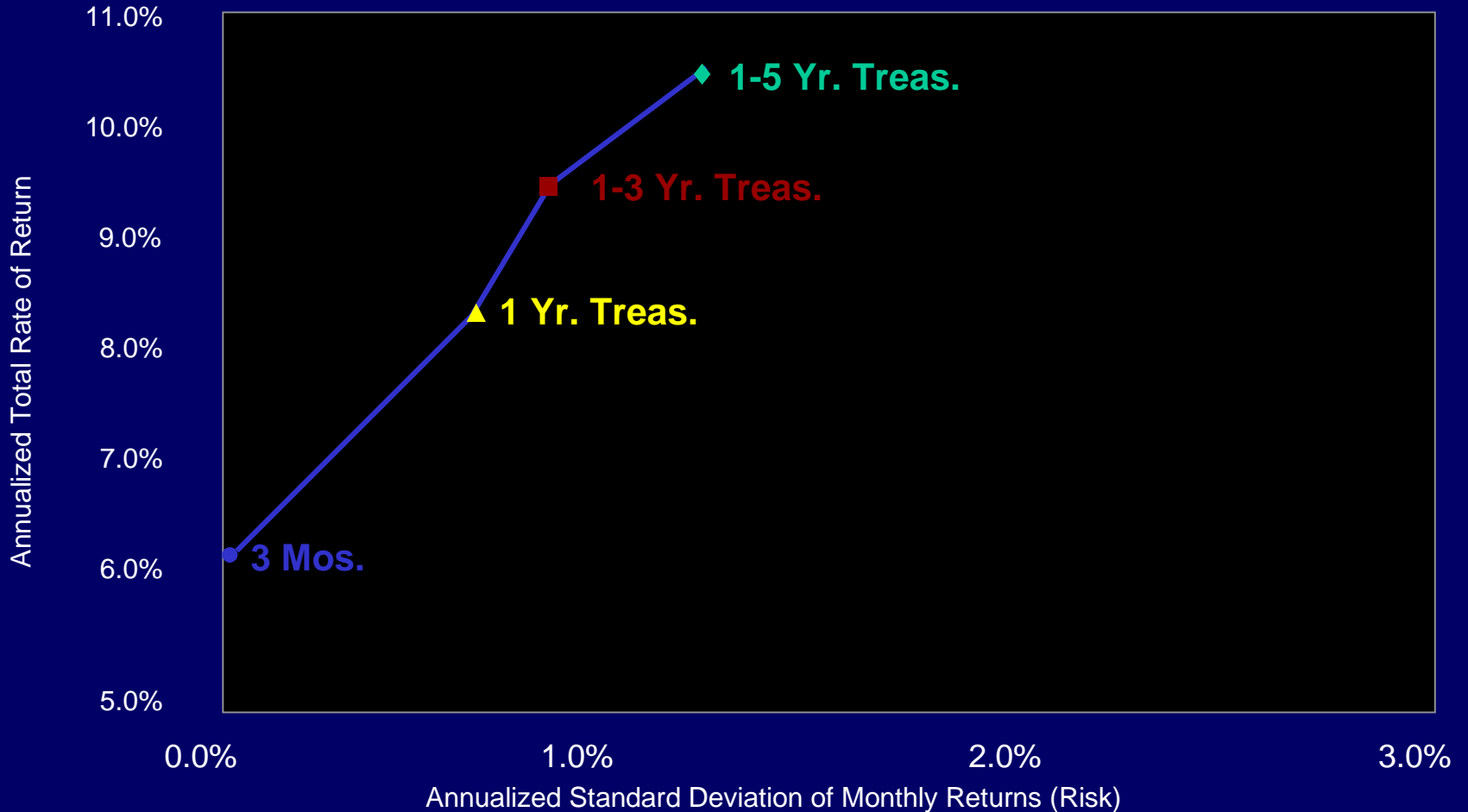
Treasury Index	Total Rate of Return				Standard Deviation of Returns				Duration Adjusted Returns			
	1 Yr.	3 Yrs.	5 Yrs.	10 Yrs.	1 Yr.	3 Yrs.	5 Yrs.	10 Yrs.	1 Yr.	3 Yrs.	5 Yrs.	10 Yrs.
1 Year Govt.	8.35	6.07	6.08	5.73	0.71	0.79	0.68	0.81	8.27	6.01	6.02	5.67
1-3 Year Govt.	9.60	6.44	6.43	6.48	0.99	1.36	1.30	1.64	6.40	4.29	4.29	4.32
1-5 Year Govt.	10.56	6.66	6.66	6.88	1.24	1.88	1.83	2.27	4.80	3.03	3.03	3.13
3-5 Year Govt.	12.52	7.09	7.11	7.61	1.85	2.98	2.94	3.44	5.01	2.84	2.84	3.04
5 Year Govt.	12.97	6.51	6.61	7.19	2.33	3.78	3.70	4.15	4.32	2.17	2.20	2.40





# Historical Risk/Return

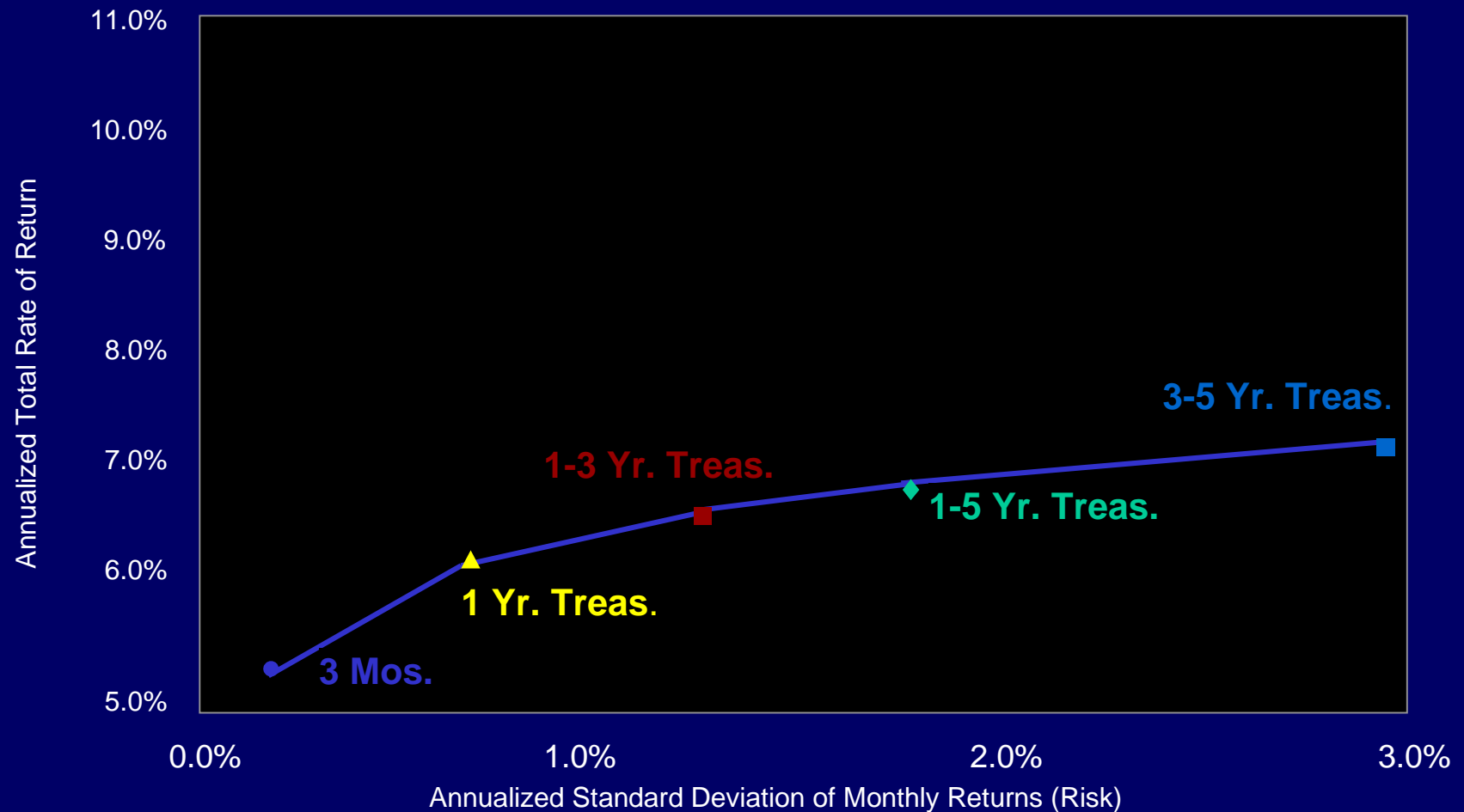
One Year ended June 30, 2001





# Historical Risk/Return Efficient Frontier

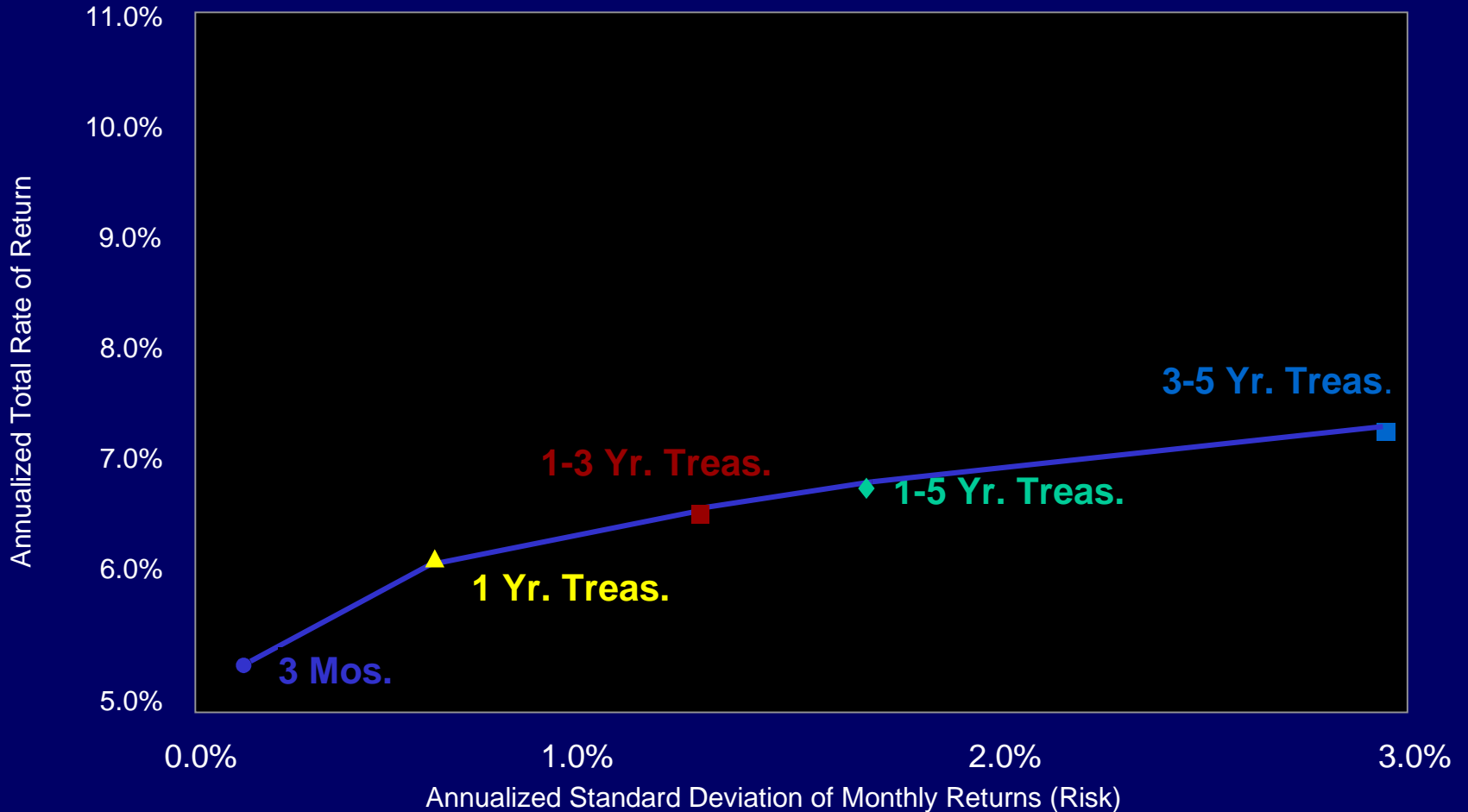
Three Years ended June 30, 2001





# Historical Risk/Return Efficient Frontier

Five Years ended June 30, 2001

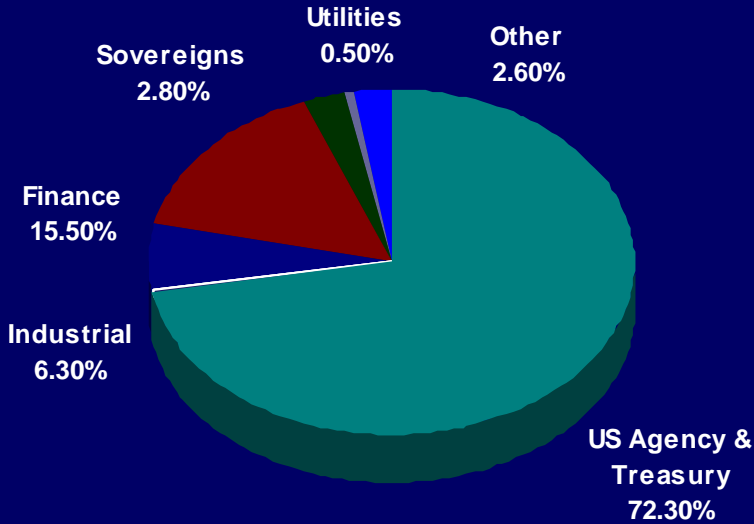




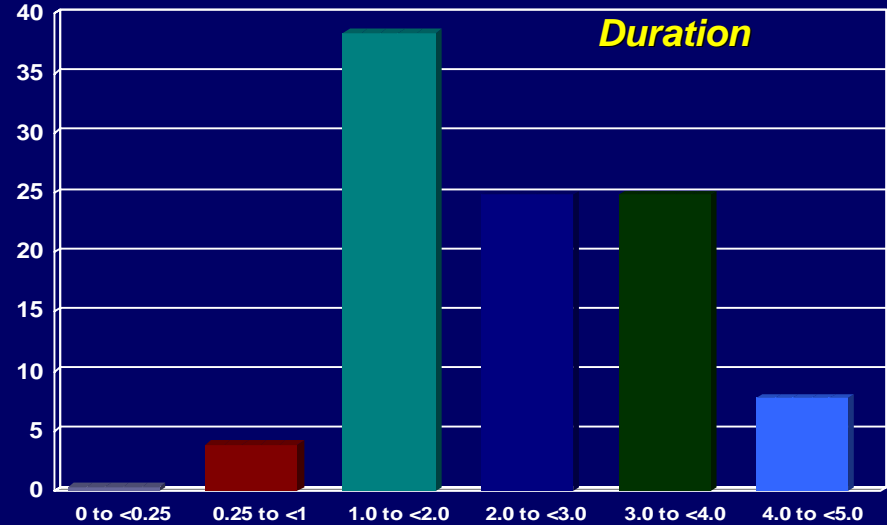
# Benchmark Characteristics

## Merrill Lynch 1-5 Govt/Corp Index

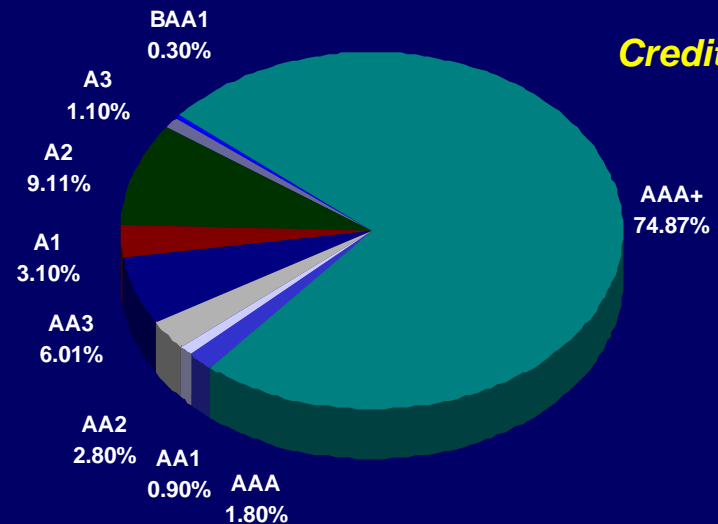
**Sector**



**Duration**



**Credit Quality**





# Benchmark Characteristics

## Merrill Lynch 1-5 Govt/Corp Index

<i>Inception Date of Index</i>	4/30/1986
<i># of Issues</i>	1,978
<i>Average Credit Quality</i>	AA1
<i>Market Weighted Coupon</i>	6.262
<i>Yield to Maturity</i>	3.906
<i>Yield to Worst</i>	3.847
<i>Modified Duration</i>	2.465
<i>Effective Convexity</i>	0.056
<i>Option Adjusted Spread</i>	49





# Benchmark Return Patterns

## Merrill Lynch 1-5 Govt/Corp Index

### Composition of Total Return As of 8/31/2001

	<b>Total Return</b>	<b>Price Return</b>	<b>Coupon Return</b>
<b>1 Month</b>	0.726	0.229	0.497
<b>3 Month</b>	2.719	1.195	1.524
<b>6 Month</b>	4.335	1.192	3.143
<b>1 Year</b>	10.925	4.297	6.628





# Benchmark Returns

## Merrill Lynch 1-3 General Obligation (Municipal)

### Components of Total Return As of 8/31/2001

	<b>Total Return</b>	<b>Price Return</b>	<b>Coupon Return</b>	<b>Taxable Equivalent Return</b>	<b>After Tax Return</b>
<b>1 Month</b>	1.159	0.71	0.449	1.40	0.91
<b>3 Month</b>	1.924	0.56	1.364	2.66	1.73
<b>6 Month</b>	3.584	0.796	2.788	5.09	3.31
<b>1 Year</b>	7.393	1.789	5.604	10.41	6.77



***Wind River Systems, Inc.***  
***Kurt Zumwalt***  
***Treasurer***





***Sun Microsystems, Inc.***  
***Janette San Luis***



# Overview Sun Microsystems, Inc.



- ◆ Total Revenue \$18.25 B as of Fiscal Year End 6/30/01
- ◆ Net Income was \$ 981 M
- ◆ Nasdaq stock ticker is SUNW
- ◆ Investment Portfolio: \$6.2 B
- ◆ Portfolio Composition:
  - ◆ Corporate Notes & Bonds \$1.7 Billion
  - ◆ Asset-backed & Mortgage-backed Securities 1.5 Billion
  - ◆ US Government/Agency Securities 1.5 Billion
  - ◆ Cash Equivalent .8 Million



# Sun Microsystems Portfolio Allocation



- ◆ Sun Microsystems has 7 portfolios allocated among:
  - ◆ Money Market Funds
  - ◆ Five Investment Managers
- ◆ Investment strategies are distinct
  - ◆ Each portfolio has custom guidelines
  - ◆ Each portfolio is a sub-set of the overall policy
- ◆ Investment Managers selected for their fixed income expertise
  - ◆ Diversify by investment style and strategy
  - ◆ Sector rotation
  - ◆ Security selection
  - ◆ Quantitative systems
  - ◆ Stress test portfolios
  - ◆ Compliance checking, pre-trade and post-trade



# *Sun Microsystems Treasury Curve*



- ◆ Portfolio Assets diversified and distributed along yield curve
- ◆ Treasury curve - segmented by pools and average duration
  - ◆ Less than 1 year
  - ◆ Average 1 year duration
  - ◆ 1.5 year duration
  - ◆ 2.2 year duration
  - ◆ 3 year duration
- ◆ Decisions based on extensive analysis



# *Sun Microsystems Portfolio Duration*



- ◆ Considered various portfolio durations, multiple sectors
  - ◆ 0-1 year
  - ◆ 0-2 years
  - ◆ 1-3 years
  - ◆ 1-5 years
  - ◆ 3-5 years
  - ◆ 5-7 years
- ◆ Detailed evaluation determined
  - ◆ Acceptable risk/return profile over 3, 5, 10 years
  - ◆ Acceptable levels of volatility under different subperiods
  - ◆ Concentrations
- ◆ Sun selected different durations for liquidity portfolios
  - ◆ Ranging from .75 - 2.2 years



# *Sun Microsystems Benchmarks*



- ◆ Process taken using the market benchmarks
  - ◆ Asset Allocation Study
    - ◆ Evaluate historical volatilities of returns, market price and income return
    - ◆ Returns by credit quality such as MBS 0-5 years AAA-rated
    - ◆ Duration risk
    - ◆ Sector risk/returns, scatter diagrams
  - ◆ Use benchmarks for ongoing performance tracking
    - ◆ Decompose returns for tracking
    - ◆ Performance attribution
    - ◆ Tracking error
    - ◆ Sector weights vs. benchmark



# *Sun Microsystems Portfolio Allocation*



- ◆ Balance sheet assets allocated by
  - ◆ Domestic portfolios and offshore portfolios
  - ◆ Unique objectives and goals
  - ◆ Liquidity needs differ based on cash flows
  - ◆ Different investment horizons
  - ◆ Individualized guidelines
  - ◆ Separate portfolios with distinct, custom benchmarks



# *Sun Microsystems Ongoing Monitoring*

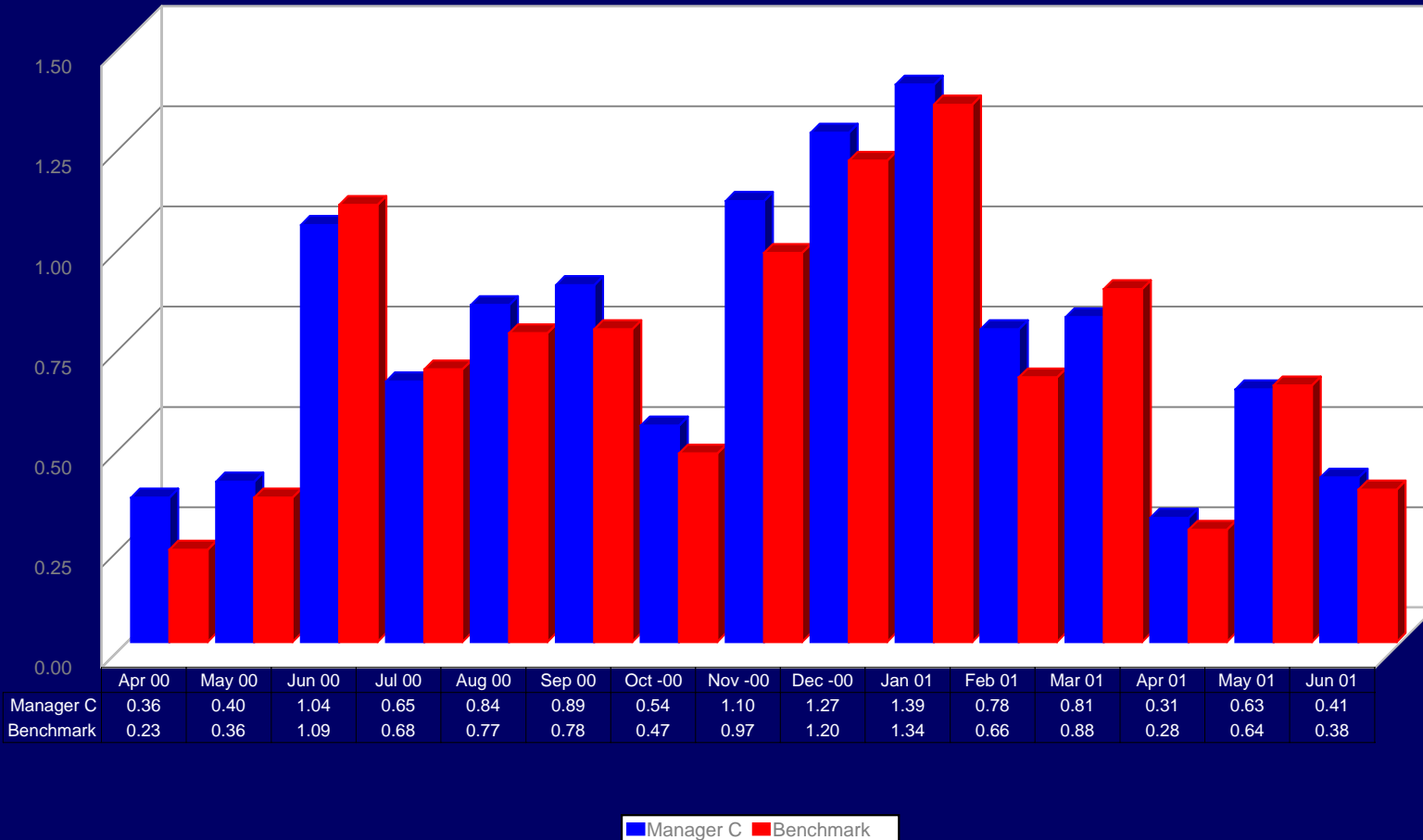


- ◆ Use benchmarks to evaluate manager performance
  - ◆ Measure monthly, quarterly, trailing 12 month, inception to date performance
  - ◆ Volatility measured by duration
  - ◆ Credit quality drift
  - ◆ Sector allocation
  - ◆ Convexity for MBS
- ◆ Review monthly and formally on quarterly basis
  - ◆ Quarterly consolidated review with third party consultant
  - ◆ Joint quarterly manager and consultant updates
- ◆ Internal review of portfolios posted on Intranet for Sun Treasury





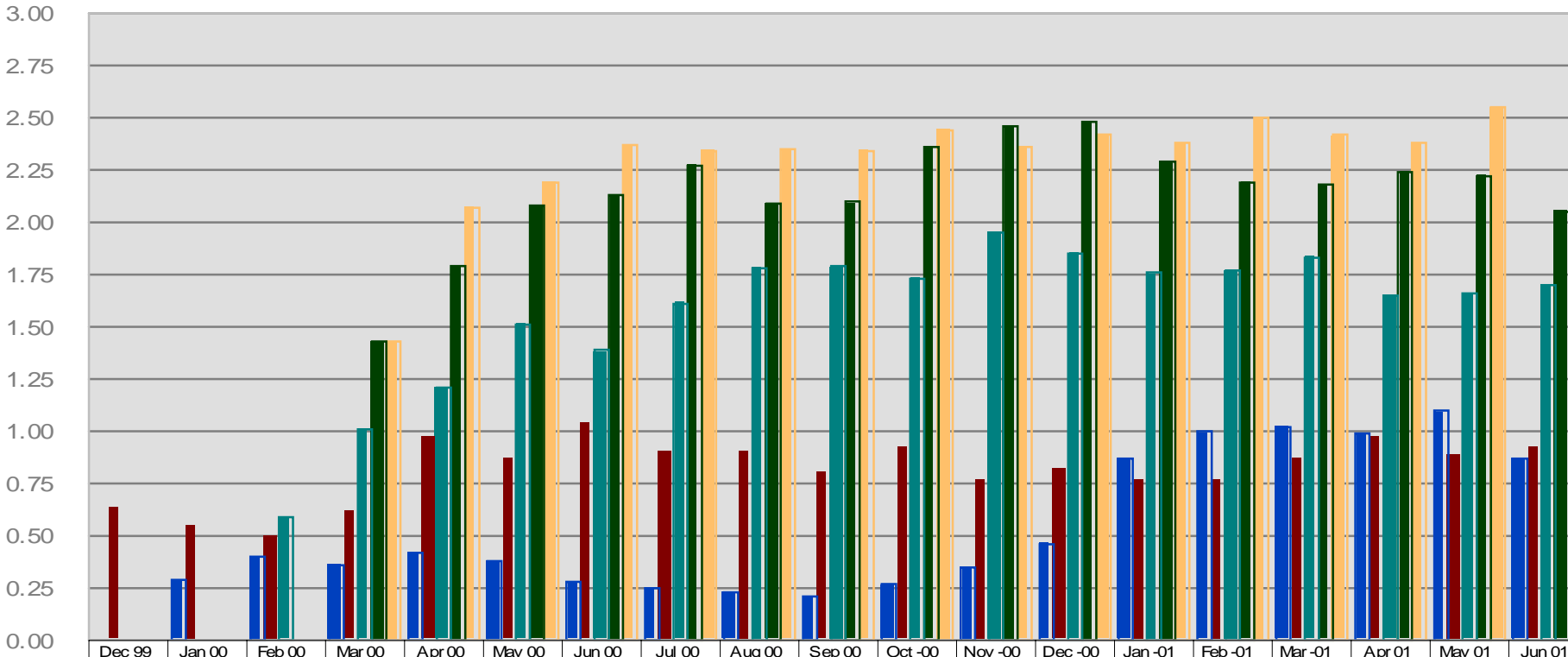
# Sample Manager Performance vs. Benchmark





# Sample Manager Performance Review

## Average Portfolio Duration



■ Manager A 
 ■ Manager B 
 ■ Manager C 
 ■ Manager D 
 ■ Manager E

# *Sun Microsystems Conclusion*



- ◆ Benchmarks are valuable tools
- ◆ Use benchmarks extensively
  - ◆ Simulate portfolios using historical return patterns under different market conditions
  - ◆ To construct model portfolios
  - ◆ Evaluate performance for manager selection
  - ◆ Provide ongoing monitoring of managers or portfolios
  - ◆ Identify style drift
  - ◆ Highlight potential risks in management style





# *Appendix*



# Return vs. Yield



- ◆ Yield to Maturity
  - ◆ Assumes a constant reinvestment rate (IRR)
  - ◆ Calculated by applying a discount rate to each cash flow of a bond, market value is sum of the present value of all cash flows
  - ◆ Assumes a buy and hold strategy
  - ◆ Assumes all coupons are reinvested at the same rate of interest
  - ◆ If interest rate rise during life of security, reinvestment rate rises and return is higher
  - ◆ If interest rates fall during life of security, reinvestment rate declines and return is lower



# Return vs. Yield



- ◆ Yield to Call
  - ◆ Assumes a constant reinvestment rate (IRR)
  - ◆ Calculated to the call date and call price by applying a discount rate to each cash flow of a bond, market value is sum of the present value of all cash flow
  - ◆ Used to compare securities upon purchase
  - ◆ Always use Yield to Worst: lowest of YTC, YTM, YAL
  - ◆ Assumes a buy and hold strategy
  - ◆ Over life of bond it may trade on YTC or YTM depending on level of interest rates and if at premium to call price



# Return vs. Yield



- ◆ Current Yield
  - ◆ Coupon interest rate divided by its market value or price
  - ◆ Ignores impact of premiums and amortization over time
  - ◆ Often used to project interest income
  - ◆ Overstates yield when market value drops (unrealized losses)
  - ◆ Understates yield when market value rises (unrealized gains)
  - ◆ Overstates high coupon, premium securities
  
- ◆ Book Yield
  - ◆ Yield to maturity using original purchase price
  - ◆ Often used to project interest income
  - ◆ Book yield can fluctuate sharply when securities are traded



# Return vs. Yield



- ◆ Total Rate of Return
  - ◆ Dollars in and dollars out analysis
  - ◆ Captures all of the changes in the value of an investment over time
  - ◆ 
$$\frac{[\text{Ending Market Value}(\text{adjusted by wtd. Inflows and outflows}) - [\text{Beginning Market Value}] + [\text{Interest and dividends earned}] + [\text{Accrued interest and dividends}]}{\text{Beginning Market Value}}$$

$$\frac{(\text{Adjusted EMV-BMV}) + (I) + (AI)}{\text{BMV}}$$

- ◆ Monthly returns are linked and not annualized because it overstates capital gains/losses





# *Maturity or Duration Risk and Volatility Measure*

7% Coupon, 5 Year Maturity @ Par



7% Coupon, Callable in 2 years @ 101. 5 Year Maturity @ Par



Zero Coupon, 5 Year Maturity @ Par, IRR 7%

