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# Optimal Municipal Bond Portfolios For Dynamic Tax Management

Fourth Annual

## Municipal Finance Conference

 FEDERAL RESERVE  
BANK OF BOSTON™

BRANDEIS INTERNATIONAL  
BUSINESS SCHOOL

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Rosenberg Institute  
of Global Finance

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# Tax-Loss Selling: Basic Concepts

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Cashflow benefit from sale: After-tax proceeds – *Hold value*

Gain/loss depends on investor's tax basis

Short-term (40% tax rate) or long-term (20%)

Losses need offsetting gains; otherwise carried forward

Proceeds are assumed to be reinvested in a similar bond

Credit exposure and market risk unaffected

Tax option: right to execute tax-beneficial transactions

Acquired automatically, *at no cost*, at time of purchase

*Multigenerational*: repeated sales and reinvestments provide additional optionality

*Tax-efficiency* signals optimum time to sell (discussed below)

# Questions Addressed

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Which bonds are best suited for tax-loss selling?

What are the implications for issuers?

What is the expected excess return from dynamic tax management over buy-and-hold?

Calculation requires appropriate definition of *after-tax portfolio value*; hold value is a reasonable choice

# Tax-Loss Selling: Beware of Discount Munis

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Tax on gain at maturity depresses market price

Large gain taxed at 40%, small gain as capital gains at 20%

Sale at a lower price increases tax savings, but may *decrease* benefit

Benefit depends on hold value

Tax-aware analytics needed to optimize timing of sale

Standard systems ignore taxes; overestimate scenario-dependent prices of discounts (shown below)

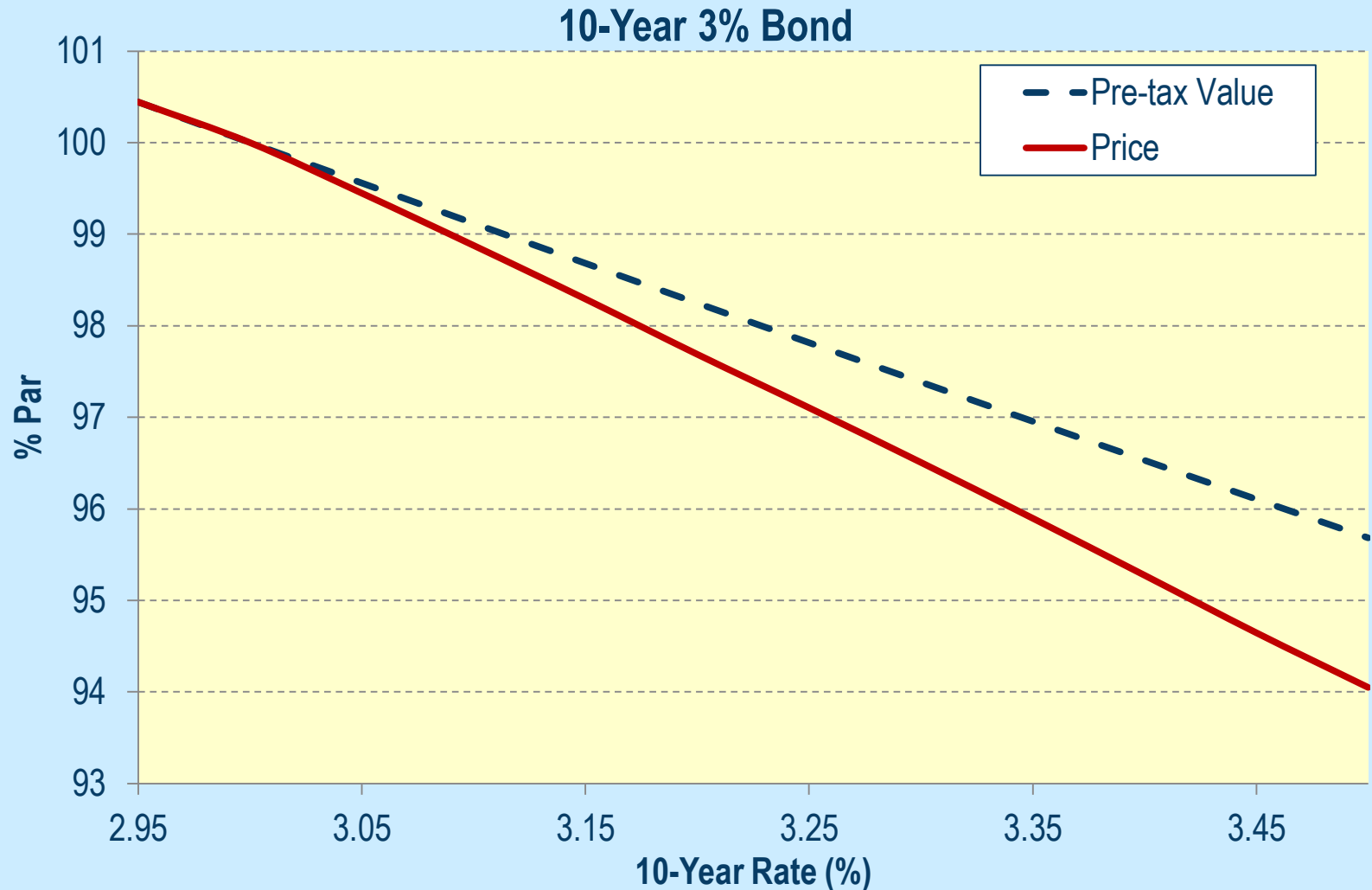
Solution: tax-neutral valuation

Overlay taxes on OAS framework

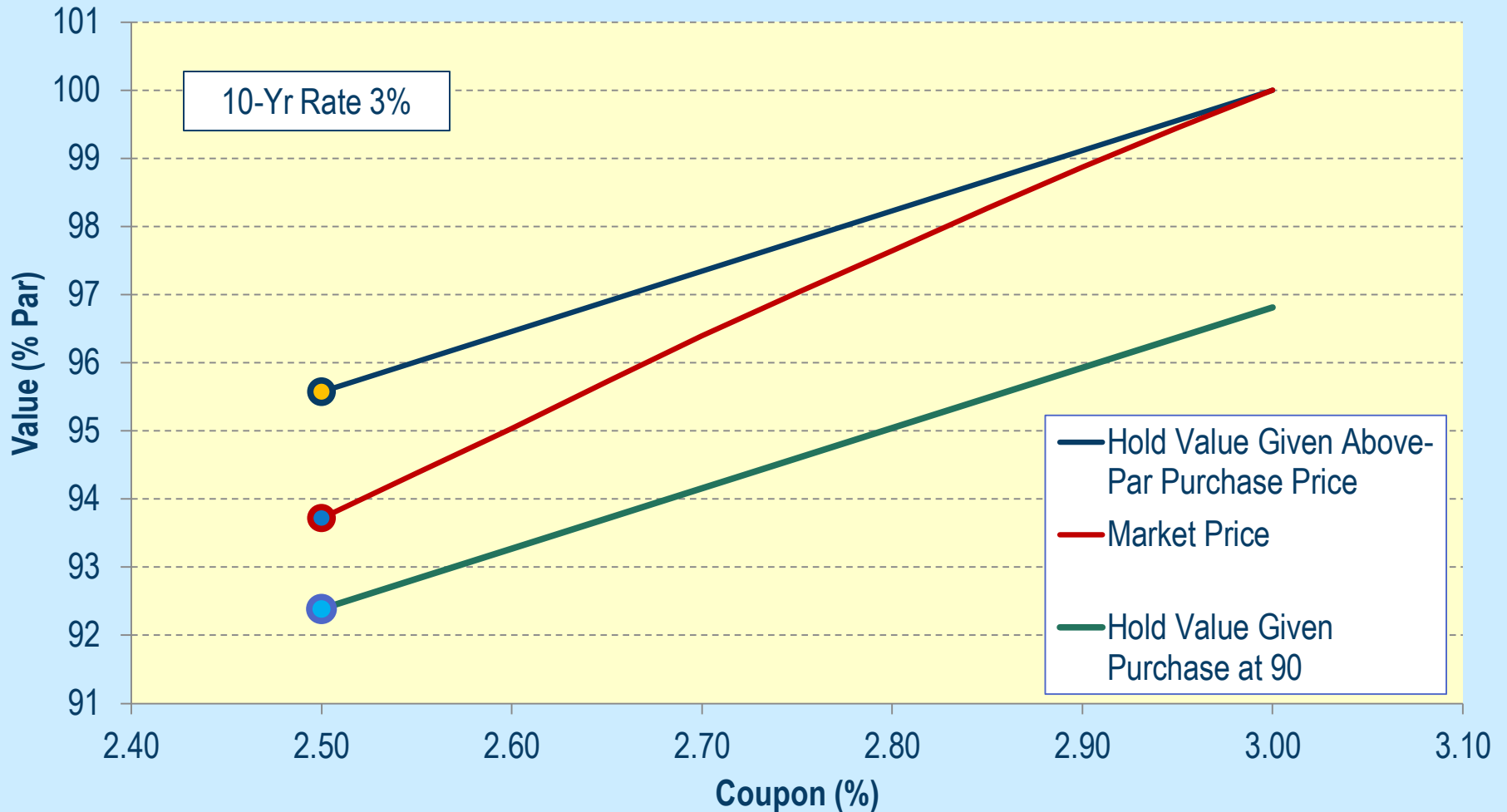
T/N value is the PV of after-tax cashflows

T/N OAS adjusts for both call<sup>4</sup> option and taxes

# When Rates Rise Muni Prices Decline More Than Predicted by Pre-Tax Analytics



# Market Price and Hold Value May Diverge 10-Year Bullets



# Sale Decision Is a Two-Step Process

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## 1. Is it cashflow beneficial?

Excess of after-tax proceeds over hold value

*Independent of reinvestment; like bond maintains risk exposure*

## 2. Do it now or wait?

Optimal timing depends on reinvestment strategy

Dynamic tax management (as below) or one-time sale

# Tax Efficiency Signals When to Sell

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$$\textit{Tax Efficiency} = \frac{\textit{Cashflow Benefit} *}{\textit{Net Loss of Tax Option Value}}$$

*\*After-tax Proceeds from Sale – Hold Value*

Maximum 100%

See demo at <http://analytics.kalotay.com/munisignal/>



# Identifying Tax-Efficient Sale Opportunities

XYZ Wealth  
Management

## Daily Tax Management Monitor

3/15/2015

Jane Investor

Your Wealth Manager

Account No. SMA-436901-2

Peter W. Manager, CFA (212) 999-5432

Bond	Par Amount (\$)	Purchase Date	Price	Current Basis	Sale Price*	After-Tax Benefit if Sold (\$)	Tax Efficiency (%)	Signal
5539928A2 5% due 3/1/2039-Call 3/1/2018	60,000	8/15/2014	123.00	119.14	118.00	-66.00	N/A	No Benefit
319995AH6 5% due 6/15/2024	85,000	8/15/2014	112.00	111.40	108.00	365.50	97.93	Sell
297552QR5 3% due 3/1/2021	95,000	12/2/2012	108.00	105.91	100.50	788.50	99.48	Sell
615887YE5 3% due 3/1/2024	78,000	7/8/2014	104.00	103.62	101.00	210.60	85.84	Watch
977564HW5 2% due 5/1/2023	65,000	11/7/2012	80.00	80.00	94.00	552.50	100.00	Sell**
546787UX8 3% due 5/1/2023	80,000	10/1/2014	100.00	100.00	95.00	-544.00	N/A	No Benefit
855972ZA9 5% due 6/15/2043-Call 6/15/2024	90,000	8/15/2013	122.00	119.16	117.00	162.00	71.15	Hold

Short-term losses offset against long-term gains (20%). Income tax rate: 40%.

\*Assumes 0.50 bid/ask spread.

\*\*Bifurcated tax treatment.

# Alternative Definitions of After-Tax Value Needed to Calculate After-Tax Performance

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Market Value

Liquidation Value

**Hold Value**    *Used below; also for duration calculation*

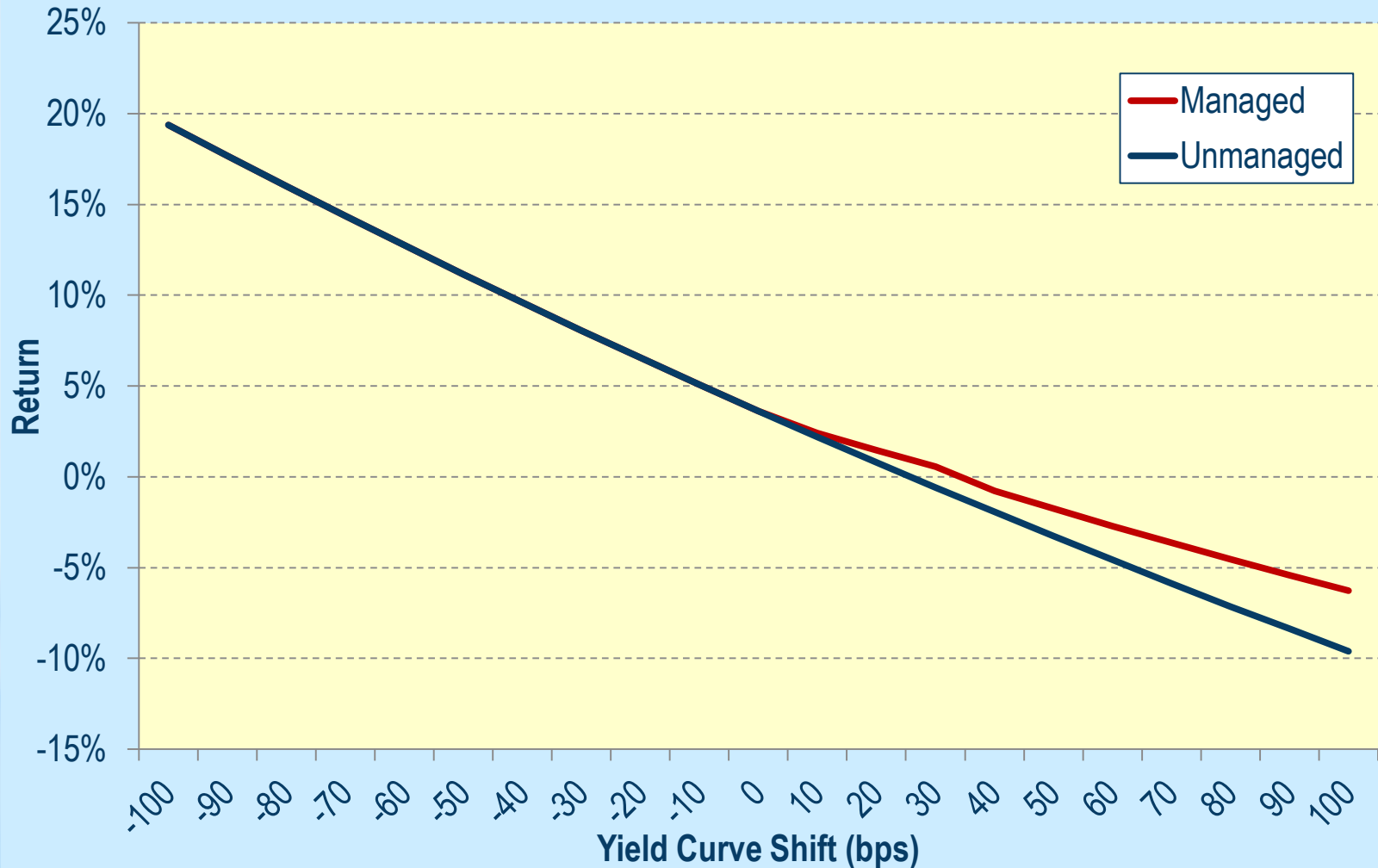
Hold Value + Exercise Value of Tax Option

Hold Value + Value of Tax Option

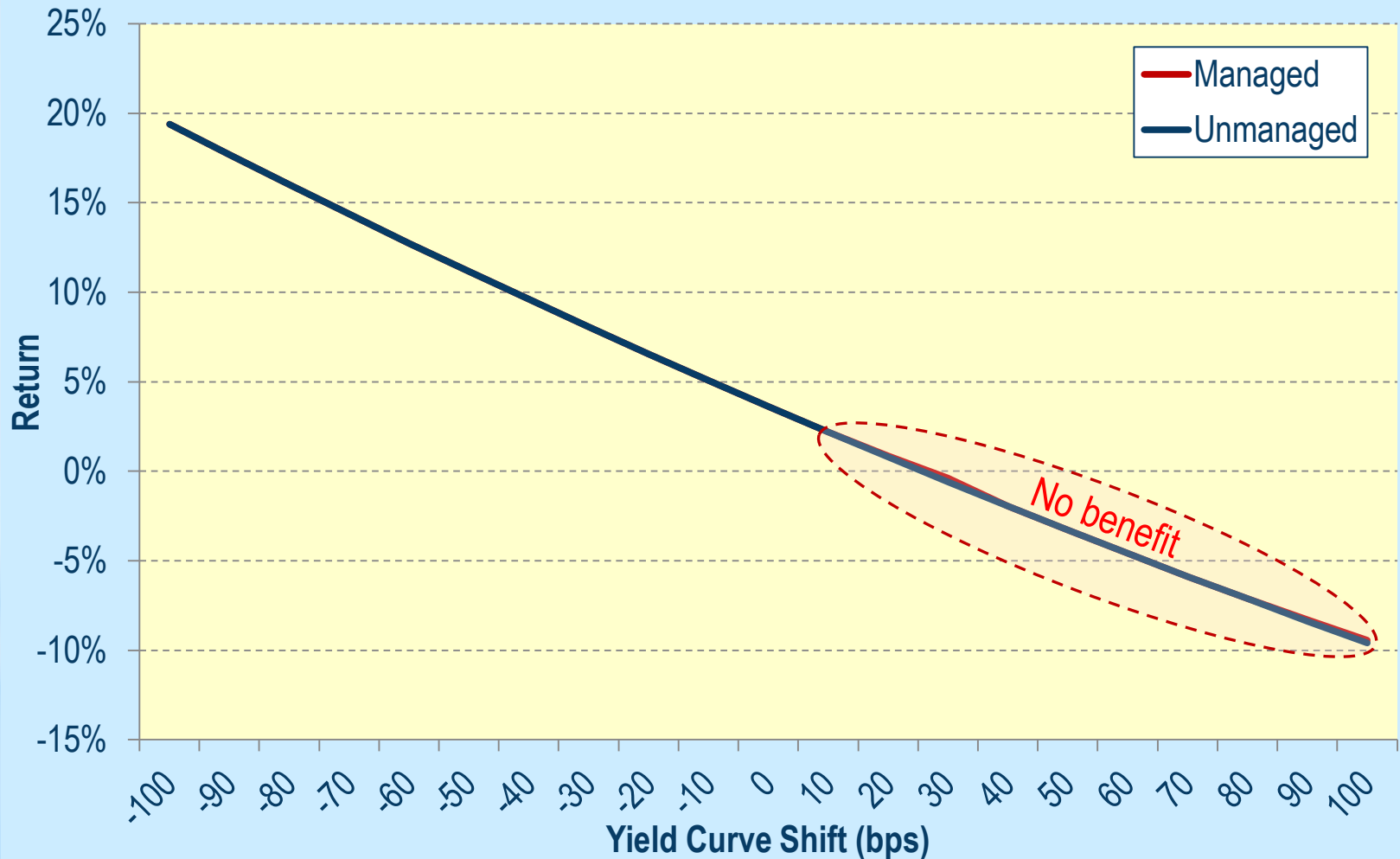
# Assumptions for Exhibits Below

Interest Rate Process	Black-Karasinski				
Initial Optionless Yield Curve	1y	5y	10y	20y	30y
	2.0%	2.4%	3.0%	3.25%	3.50%
Short Rate Volatility	15%				
Mean Reversion	2				
Tax Rate Assumptions	Income 40%				
	Short-term gain/loss 40%				
	Long-term gain/loss 20%				
Transaction Cost	0.25% of par				

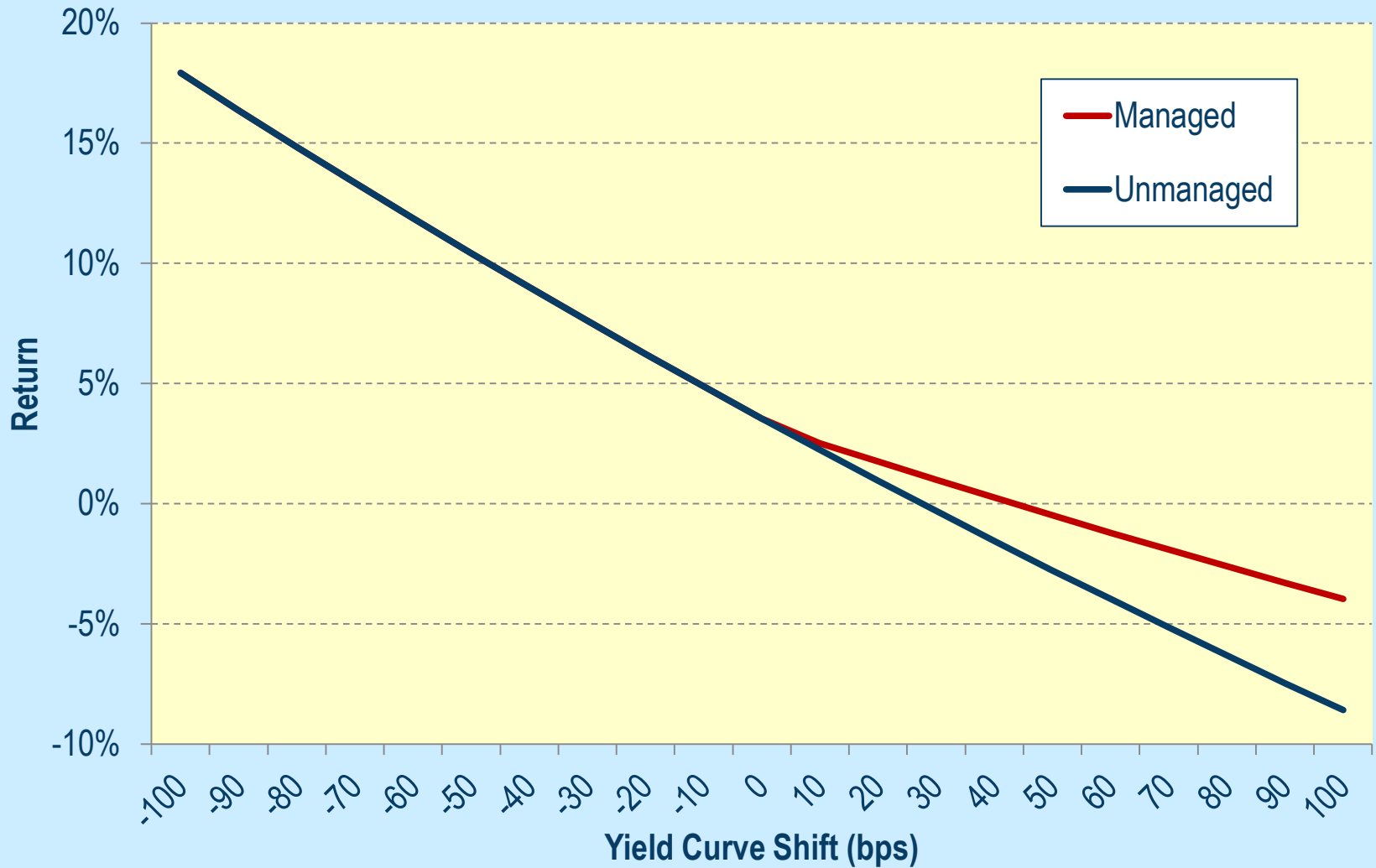
# After-Tax Return for 20-NCL 3.25% Par Bond Held 1 Year – 1 Day



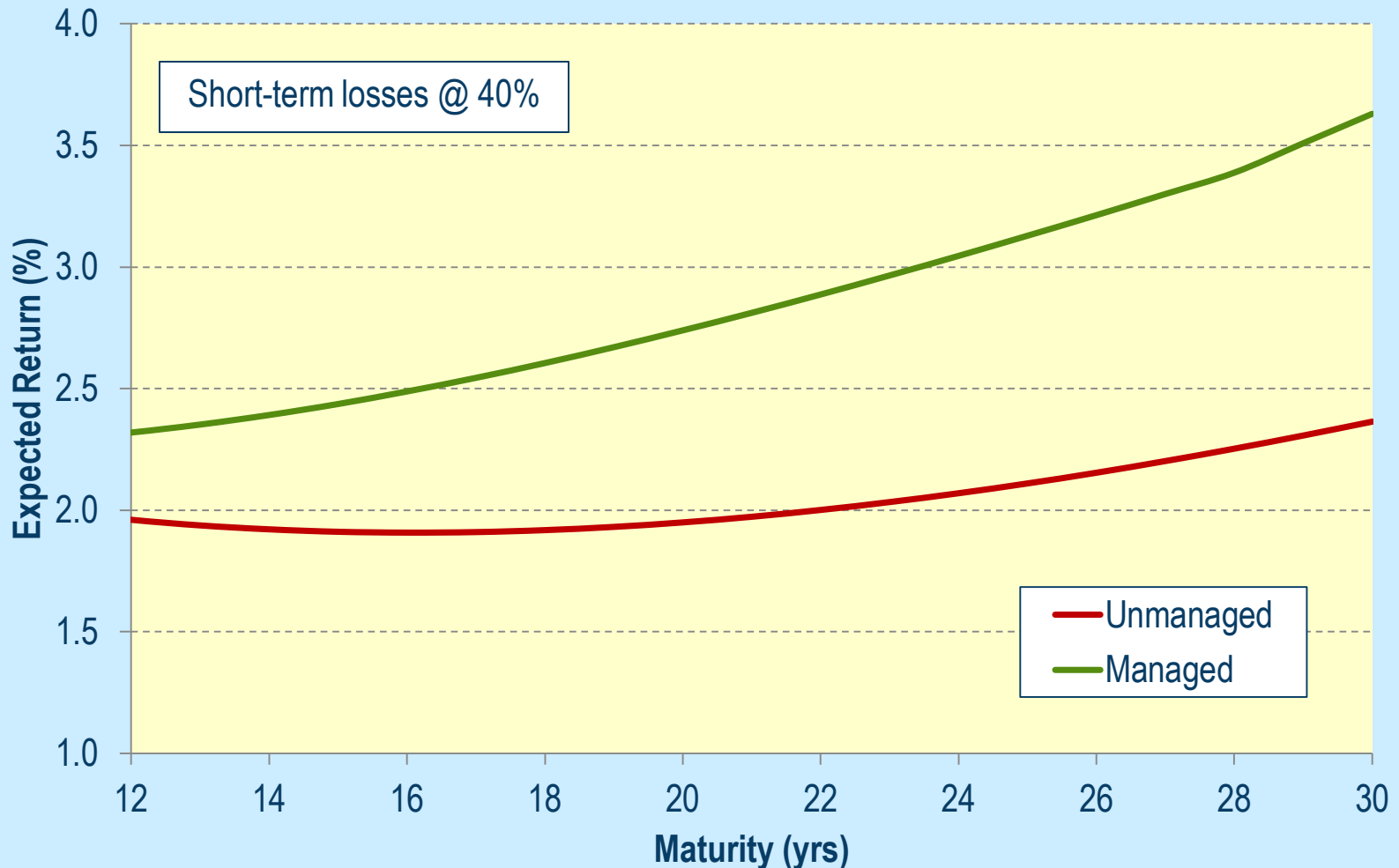
# After-Tax Return for 20-NCL 3.25% Par Bond Held 1 Year + 1 Day



# After-Tax Return for 20-NCL 5% Bond Held 1 Year – 1 Day



# Tax Management Improves Expected Return\* Par Bonds of Various Maturities (Held 1 Year – 1 Day)

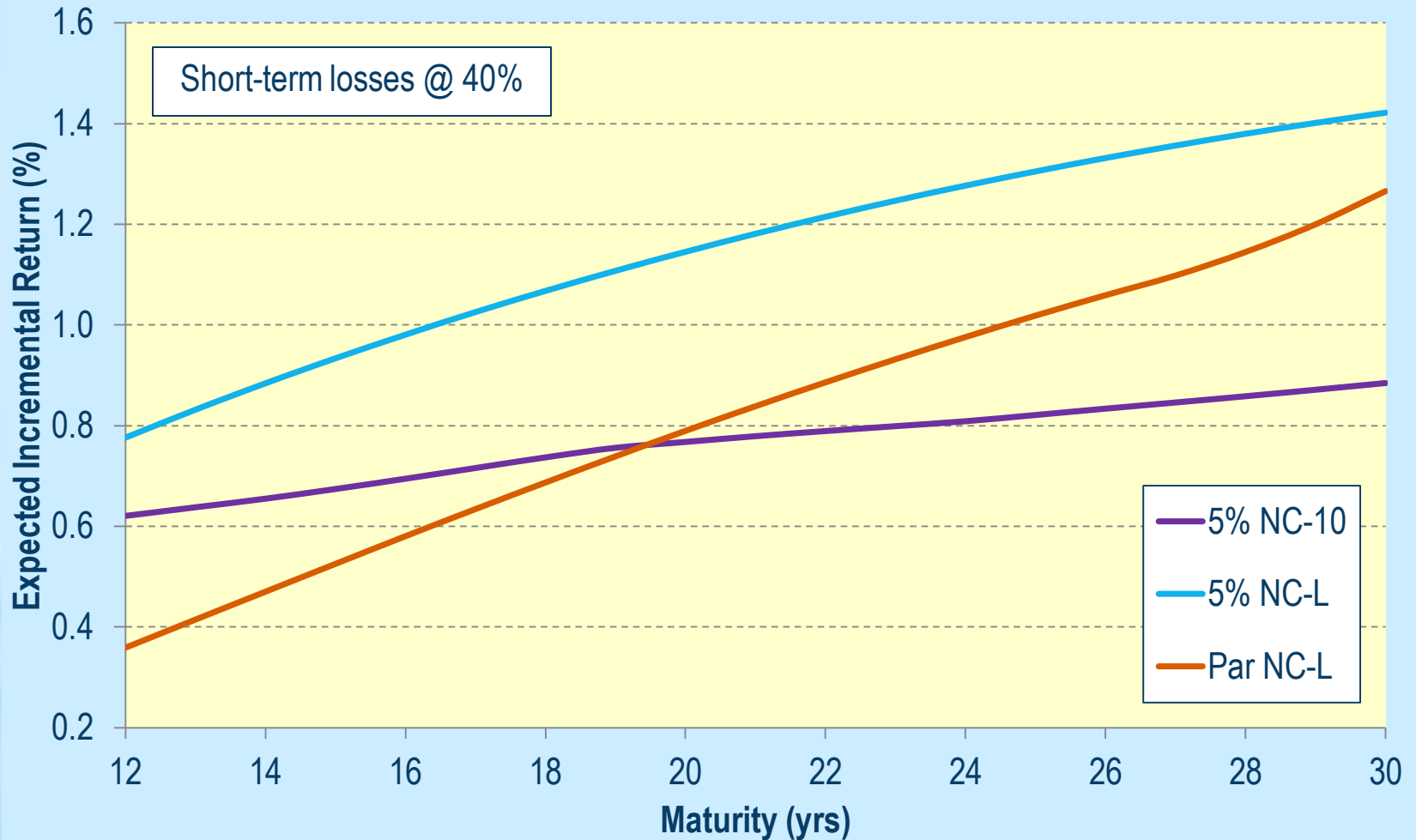


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\*Monte Carlo simulation, Black-Karasinski process @15% vol. Transaction cost 0.25% par.

# Performance Boost From Tax Management\*

## Held 1 Year – 1 Day



\*Monte Carlo simulation, Black-Karasinski process <sup>16</sup>@15% vol. Transaction cost 0.25% par.



# Setting Up For Success: Maximize Tax Option Value

## 10-Year Target Duration

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Bond	Purchase Price	Hold Value Duration (Yrs)	Tax Option Value (% par)	
			Short-Term Losses Offset Short-Term Gains	Short-Term Losses Offset Long-Term Gains
5% 13-year NC-L	120.83	10.04	2.91	1.17
5% 20-year NC-10	116.18	10.04	2.90	1.32
3.05% 12-year NC-L	100.00	10.15	0.79	0.00

# Tax Option Value is a Good Predictor Of Tax-Managed Performance – 1-Yr Horizon

Bond	Purchase Price	Un-managed Return (%)	Excess Return From Tax Management	
			Short-Term Loss @ 40%	Short-Term Loss @ 20%
5% 13-year NC-L	120.83	1.95	+83bps	+35bps
5% 20-year NC-10	116.18	2.14	+76bps	+32bps
3.05% 12-year NC-L	100.00	1.96	+36bps	0 bps

# Recap

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Expected excess return of optimized portfolio is significant  
As much as 80 bps for intermediate-duration portfolio

Long-duration premium bonds are best poised to achieve superior after-tax return

Bonds purchased near par are unsuitable for sale after 1 year  
Consideration for issuers: tax-aware investors may prefer optionless bonds to callable bonds

Reducing variance of excess return is a challenge  
Feast if market worsens, famine if it improves

# Tax Management Today: Missed Opportunities

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SMA managers reluctant to advise on taxes

Mutual funds and ETF's measured on pretax performance

Banks and insurance companies focus on regulatory and accounting matters

# References

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- “Bond Valuation in Tax Denial” *Quant Forum* (March 29, 2014)
- “The Tax Option in Municipal Bonds” A. Kalotay, D. Howard, *Journal of Portfolio Management*, (Winter 2014)
- “The Interest Rate Sensitivity of Tax-Exempt Bonds under Tax-Neutral Valuation” *Journal of Investment Management*, (First Quarter 2014)
- “Optimum Tax Management of Municipal Bonds” *Journal of Portfolio Management*, (Winter 2015)
- “Tax-Efficient Trading of Municipal Bonds” *Financial Analysts Journal*, (Forthcoming)
- “Optimal Municipal Bond Portfolios for Dynamic Tax Management” *Journal of Investment Management*, (Forthcoming)
- “How to Take a Tax Loss and Then Profit From Obamacare” *Bond Buyer*, (December 11, 2013)