

# OPTIMAL TAX-LOSS HARVESTING OF MUNICIPAL BONDS

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Berkeley

March 9, 2021



KalotayAnalytics

**FIXED INCOME** INNOVATION, PRECISION & PERFORMANCE

# Maximizing Tax Savings Is Not The Goal

<b>2% Bond Purchased 2 Years Ago for 100 8 Years to Maturity</b>			
Fair Sale Price	Loss	Tax Savings	Benefit
99.00	1.00	0.20	0.03
96.00	4.00	0.80	-0.52



# Key Concepts of Tax-Loss Harvesting

- Muni prices are affected by tax payable by marginal investor
  - *Tax rate depends on “de minimis threshold”*
- Hold value – worth to current holder
  - *Investor-specific; may differ from market price*
- Resetting the short-term clock
  - *Short-term losses deductible at 40%, long-term losses at 20%*
- Tax option – right to execute tax-beneficial transactions
  - *Acquired automatically and at no cost*
  - *Selling and reinvesting entails swap of tax options*
- Tax efficiency – signals when to sell
  - *Based on cost-benefit analysis*
  - *Takes into account tax option acquired upon reinvesting*

*Bogey to beat: Buy and hold*

*Reinvesting in similar bond maintains risk exposure*



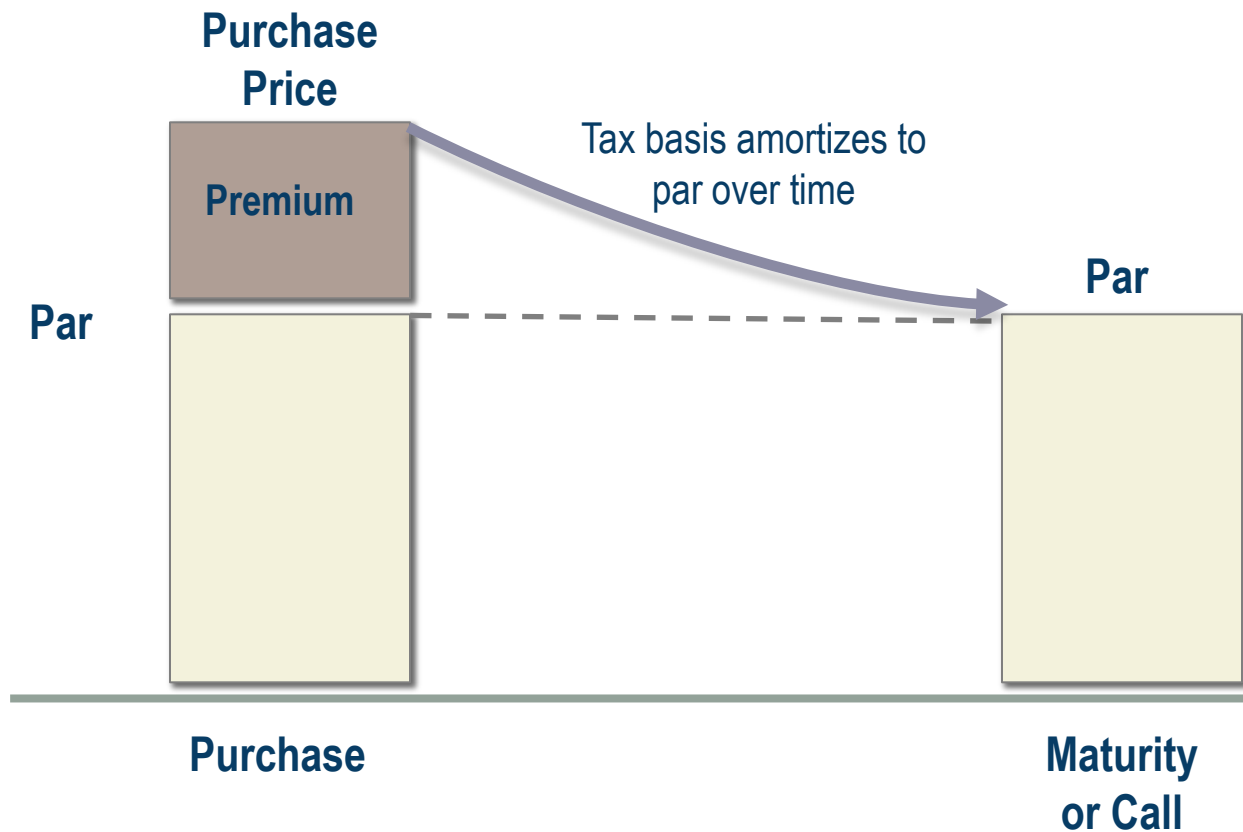
# Tax Treatment – Above Par Purchase

*Held to Maturity*

No tax effect

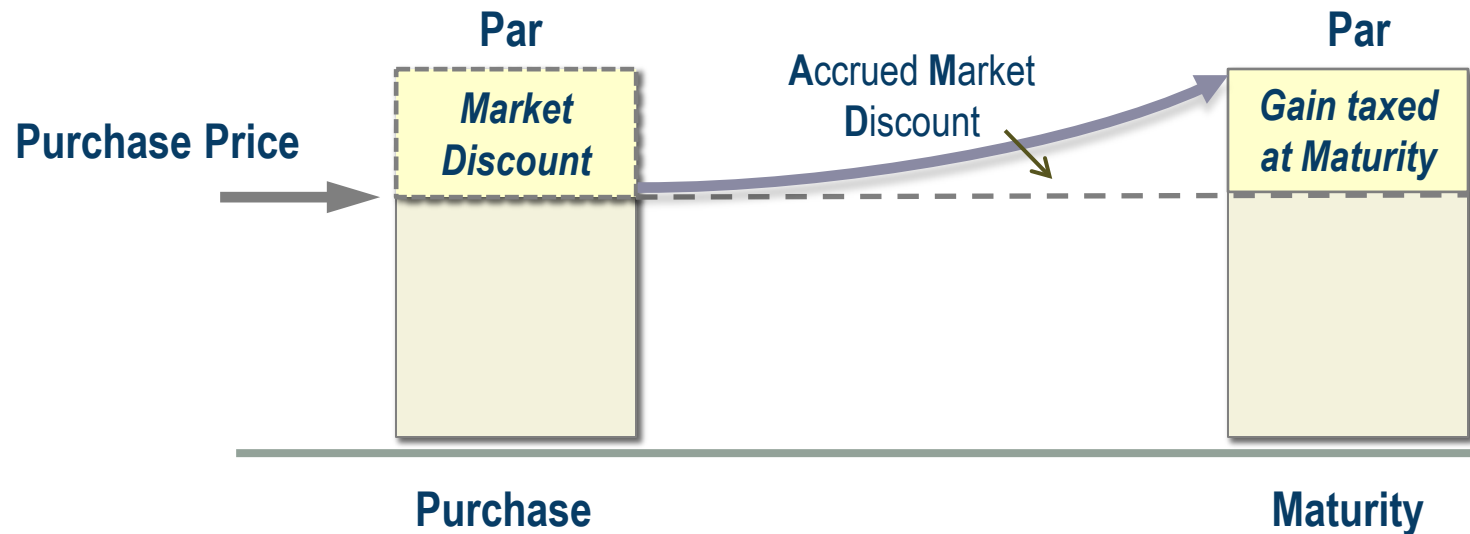
*Sold Before Redemption*

Taxed as capital gain/loss versus basis



## Tax Treatment – Below Par Purchase

<i>Held to Maturity</i>	Large discount – resulting gain taxed as ordinary income (40%) Small discount – capital gain (20%)
<i>Sold Before Redemption</i>	Gain up to AMD taxed as ordinary income; excess as capital gain Sale below purchase price taxed as capital loss



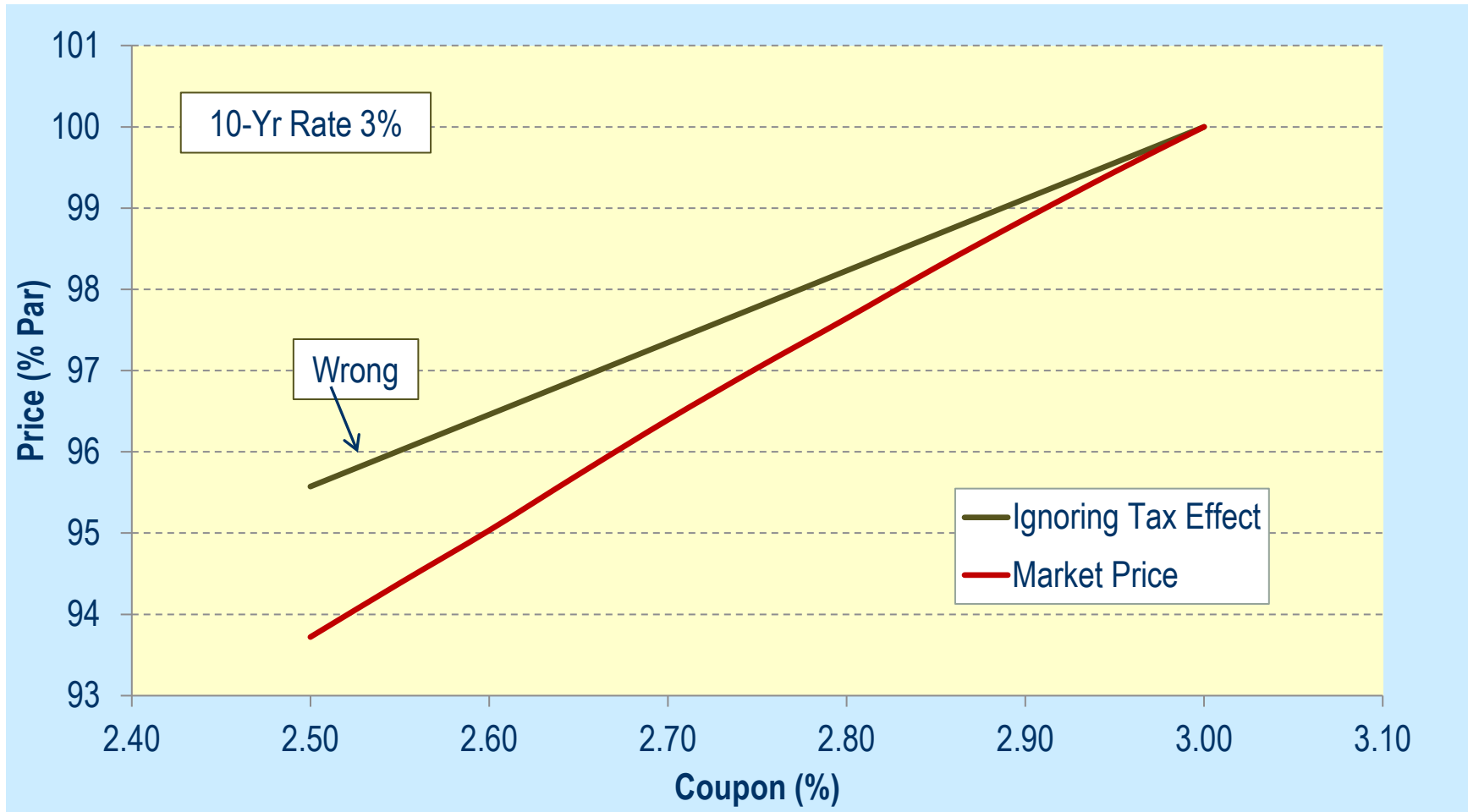
## Tool Kit for Analysis: Tax-Neutral OAS

- Extends standard Option Adjusted Spread analysis to tax-exempt munis by including tax treatment of market discount
  
- Key concepts:
  - *Tax-neutral price – PV of after-tax cashflows, given discount rates*
    - *Calculation is iterative, because **tax payable at maturity/call depends on price***
  - *Tax-neutral OAS – Spread required to equate **after-tax** cashflows to given price*



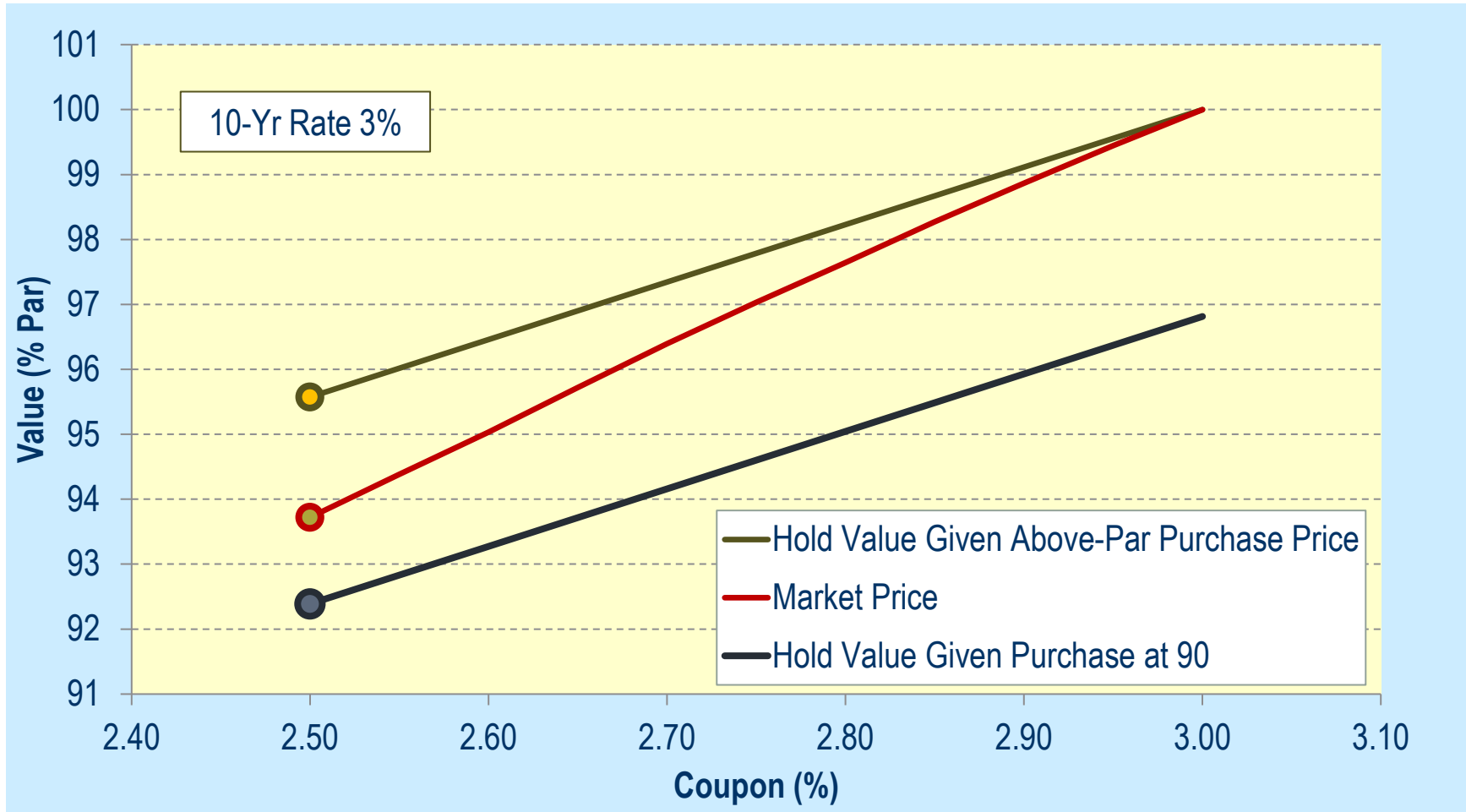
# Tax at Maturity Depresses Prices of Discount Munis

## *10-year Bonds of Various Coupons*



# Hold Value Depends on Purchase Price

## 10-Year Bullets of Various Coupons





# Calculation of Cashflow Benefit from Sale

- Cashflow benefit: (*After-tax proceeds*) — (*Hold value*)
  - *After-tax proceeds: sale price + tax savings*
  - *Hold value: PV of cashflows, including tax at maturity payable by holder*
    - *Estimated from market price, but can substantially differ from it*
    - *“Tax-neutral” OAS needed for calculation*
  
- What is the role of the replacement bond?
  - *Not needed to calculate cashflow benefit*
  - *Reference to a ‘bond swap’ to determine savings is unnecessary*



# Benefit from Tax-Loss Selling

*Purchased at Par, Sold Below Par*

<b>2.5% Bond – 8 Years to Maturity</b>	
① Purchase Price (2 years ago)	100.00
② Holder's Basis	100.00
③ Sale Price (after 0.4% bid/ask spread)	97.00
④ Loss (③ – ②)	(3.00)
⑤ Tax Savings @ 20%	0.60
⑥ After-tax Proceeds from Sale (③ + ⑤)	<b>97.60</b>
⑦ Hold Value*	<b>98.10</b>
⑧ Net Benefit of Transaction (⑥ – ⑦)	<b>(0.50)</b>

*\*PV of A/T flows to holder @2.767% (A/T yield of 97.20 mid-market price)  
All values in percent of par*



# Sale Decision is a Two-Step Process

- ① Is it cashflow beneficial?
  - *As discussed above*
  
- ② Do it now or wait?
  - *Sale at a later time may be more beneficial*
  - *Decision depends on time value of tax option*



## More on the Tax Option

- Value is investor-specific
  - *Availability of offsetting gain, transaction cost*
  - *Conservative assumption for valuing tax option: s/t losses in the future will be written off against l/t gains*
- Option value acquired with reinvestment affects sale decision
  - *Resets short-term clock, increases incentive to transact*
  - *'Like' bond preserves risk profile*
- Can be valued using tax-neutral OAS analytics
  - *Value depends on interest rate volatility and transaction cost (bid-ask spread)*



## Tax Efficiency Signals When to Sell

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

Act at or near 100% (maximum)

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



# Tax Efficiency: Purchased and Sold Above Par

<b>3% Bond – 8 Years to Maturity</b>	
<b>①</b> Net Benefit of Transaction	<b>0.14</b>
<b>②</b> Tax Option Forfeited	0.54
<b>③</b> Tax Option Received from Reinvestment	0.36
<b>④</b> Net Option Loss ( <b>③</b> – <b>②</b> )	<b>0.18</b>
<b>⑤</b> Tax Efficiency ( <b>①</b> / <b>④</b> )	<b>77.8%</b>

*All values in percent of par*



# Portfolio Review: Sales Recommendations

**XYZ Wealth Management** **Daily Tax Monitor**  
5/17/2017

Jane Investor Your Wealth Manager  
Account No. SMA-436901-2 Peter W. Manager, CFA (212) 999-5432

	Par Amount (\$)	Purchase Date	Purchase Price	Current Basis	Sale Price*	After-Tax Benefit if Sold (\$)	MuniSignal™ Score (%)	Action
3% due 6/15/2025	250,000	6/15/2015	110.00	108.22	106.50	360.00	77.8	Watch
2.5% due 6/15/2025	78,000	6/15/2015	100.00	100.00	97.00	-382.20	N/A	No Benefit
4% due 6/15/2025	80,000	8/15/2016	115.00	113.82	111.00	742.40	100.0	Sell

Short-term gains: 40%, long-term gains: 20%, Income tax rate: 40%. \*Assumes 0.40 bid/ask spread.

Tax benefit (0.60 pts) @ long-term gains rate insufficient to overcome difference between hold value (98.09) and sale price (97.00).



## Expected Performance Boost Over 10 Years\*

Bond	Tax Option Value (Percent of Purchase Price)	Annualized Performance Boost
10-Year 5% @~112.75	2.61	~31 bps
10-Year 2% @ ~82.25	1.72	~21 bps

Interest rate volatility 15%  
Bid-ask spread 0.50

Assumes reinvestment in a like bond  
Extension of duration would increase expected return and risk





# Tax-Loss Harvesting of Munis in Practice

- Required inputs: Tax effect of sale, Hold value, Value of tax options
- In-house wealth management systems are inadequate
  - *Never heard of hold value and tax option*
  - *Erroneously assume that tax savings guarantee a beneficial sale*
- Major platforms don't offer relevant analytics
  - *After-tax purchase yield is the state of the art*
- Tax-neutral OAS is essential
  - *See demo at <http://analytics.kalotay.com/munisignal/>*



# Summary

- Tax-driven sales enable tax-savvy managers to outperform buy-and-hold by 20 to 30 bps annually
- Investment strategy for tax-loss harvesting:
  - *Buy bonds selling well above par*
  - *Avoid bonds selling near par*
- Tax efficiency signals optimal time to sell
  - *Benefit should capture high percentage of forfeited tax option value*



# Publications

## Tax-Neutral Valuation

- [“The Interest Rate Sensitivity of Tax-Exempt Bonds under Tax-neutral Valuation”](#), *Journal of Investment Management* 2014
- [“Par Munis – Sub-Par Performance”](#), *Unpublished*, 2021

## Tax-Loss Harvesting

- [“Tax-Efficient Trading of Municipal Bonds”](#), *Financial Analysts Journal* 2016
- [“Tax Optimization of Municipal Bond Portfolios: Investment Selection and Tax Rate Arbitrage”](#), *Journal of Portfolio Management* 2018

## Municipal Yield Curves

- [“Creating a Live Yield Curve in the Illiquid Muni Market”](#), *Journal of Fixed Income* 2017



# Information & Contacts

## Live Demos

- MuniOAS: <http://analytics.kalotay.com/munianalyzer/>
- MuniSignal: <http://analytics.kalotay.com/munisignal/>

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