

MUNI RISK MANAGEMENT POST ADVANCE REFUNDING: *New Structures, New Yield Curves, Return of Discounts*

GARP

Chicago

November 15, 2018

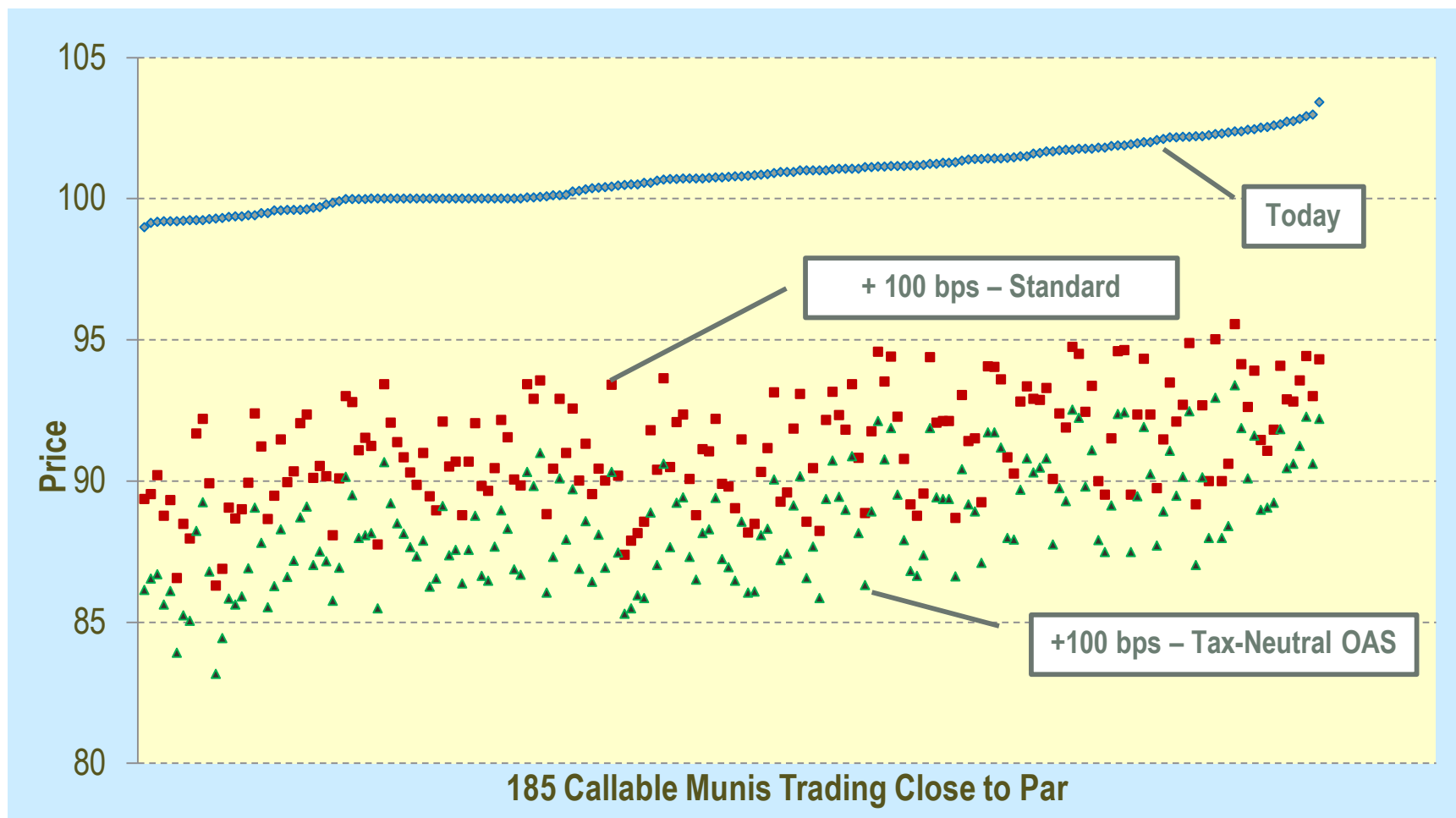


KalotayAnalytics

FIXED INCOME INNOVATION, PRECISION & PERFORMANCE

Taxes Depress Prices of Discounts

What Happens to Muni Prices When Rates Rise 100 bps?



How Did Advance Refunding Work?

For Not-Yet-Callable Issues With Above-Market Coupon

- ① Sell replacement issue
- ② Buy escrow of Treasury bonds with proceeds sufficient to defease outstanding issue to call date
- ③ Redeem original issue on the call date

Advance refunding provided option value to issuers, but resulted in proliferation of tax-exempt bonds — two issues supporting the same project until the call date.

*Update:
Advance refunding may get another look after mid-terms*



The Way We Were

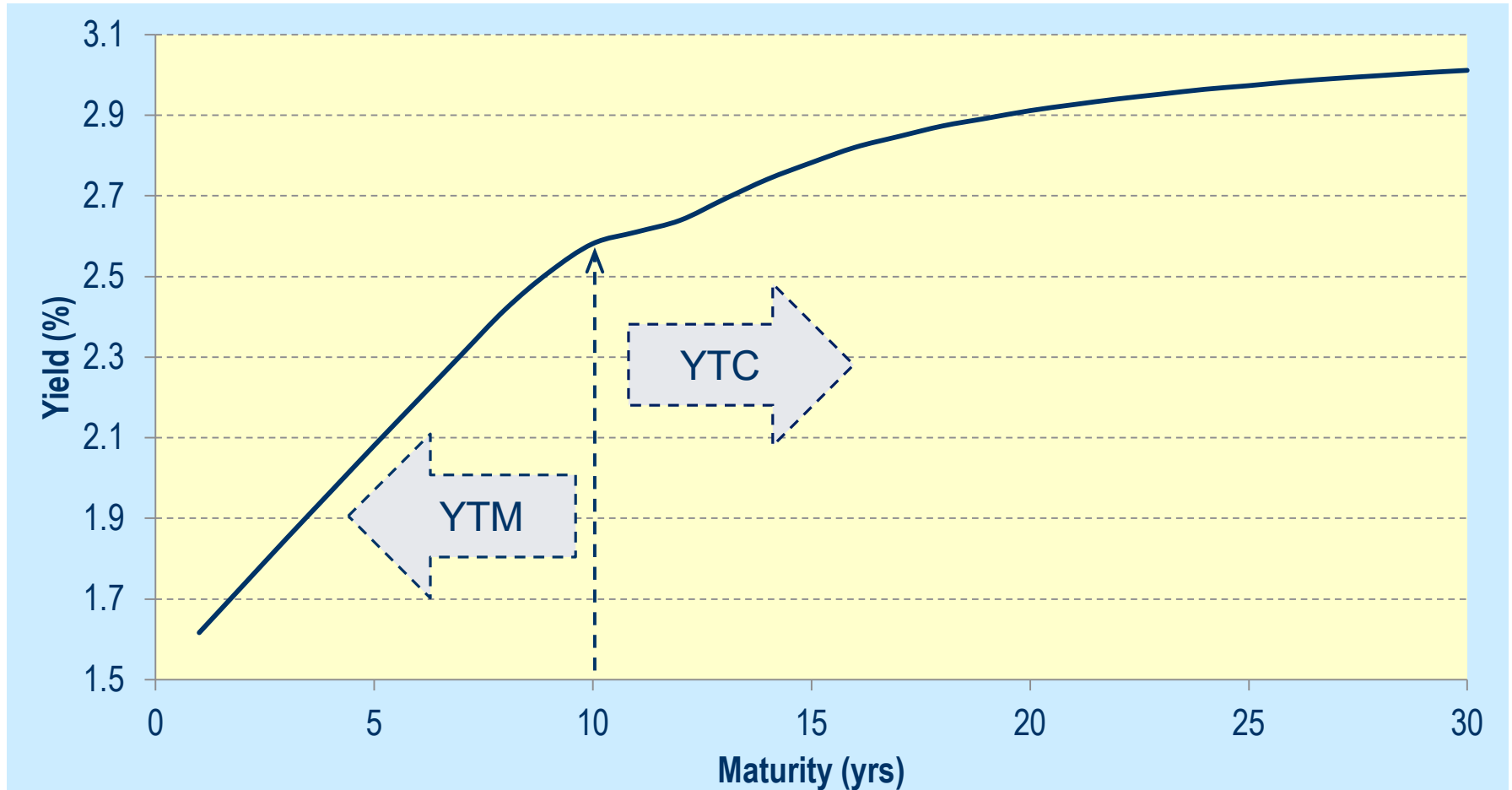
- Dominant bond structure: 5% non-call 10, at par
 - *Sold at significant premiums over par*

- 5% coupon minimized likelihood of price falling below par
 - *When rates rise, discounts underperform premiums (the so-called de minimis effect)*

- 5% NC-10 tailor-made for advance refunding
 - *Issuers: substantial savings appealed to constituents*
 - *Investors: benefited from premature option exercise and resulting AAA rating*
 - *Primary market infrastructure: churning produced revenue stream*



5% NC-10 Yield Curve Became the Benchmark



Source: MBIS May 29, 2018 (Intraday yield curve powered by Kalotay's CurviLinear)



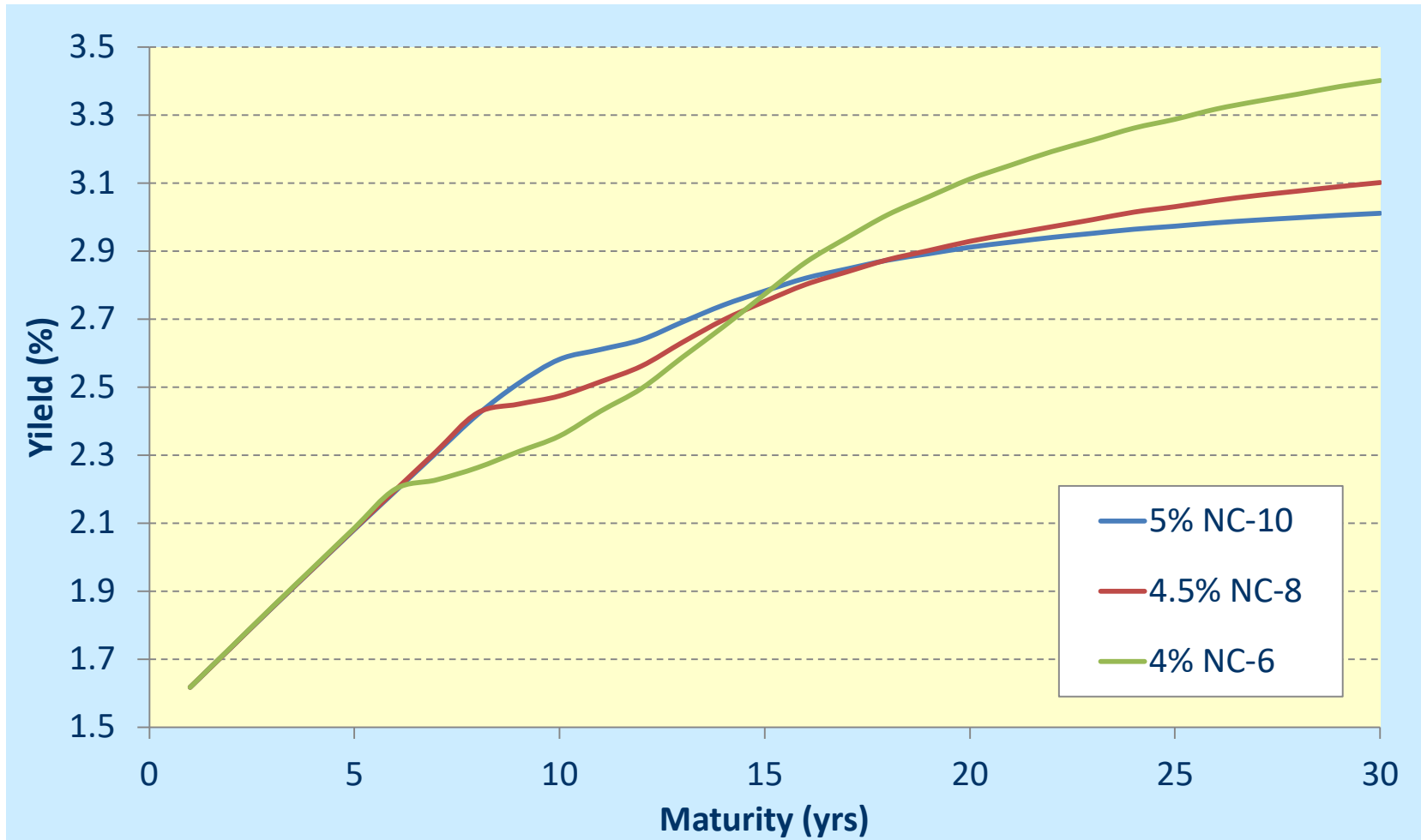
Life Without Advance Refunding

- Call protection less than 10 years
 - *Primary market infrastructure wants action*
 - *Issuers desire flexibility*
- Coupon below 5%
 - *5% bonds with short calls are effectively short bullets*
- New yield curves
 - *5% NC-10 will not suffice*

Lower coupons and higher rates ⇒ More discounts



The Shape of Things to Come



Tax Treatment of Secondary Market Purchases Held to Maturity or to Call

- Purchased at premium: no tax
- De minimis discount: gain taxed as capital gains (*roughly 20%*)
- Non-de minimis discount: gain taxed as ordinary income (*roughly 40%*)
- *Loss is not possible if bond held to maturity or to call*



'Tax-Neutral' Modeling of Muni Prices

- Assume 'buy-and-hold' investment strategy to maturity or to call
 - *Call decision made by issuer; can be sub-optimal (less than 100% efficient)*

- Recognize that gain is taxable at maturity or at call
 - *Working assumption: investors are in the highest tax bracket*
 - *Market-implied tax rate can be researched empirically*

- Incorporate tax treatment into standard OAS framework



Key Concept: Tax-Neutral Value*

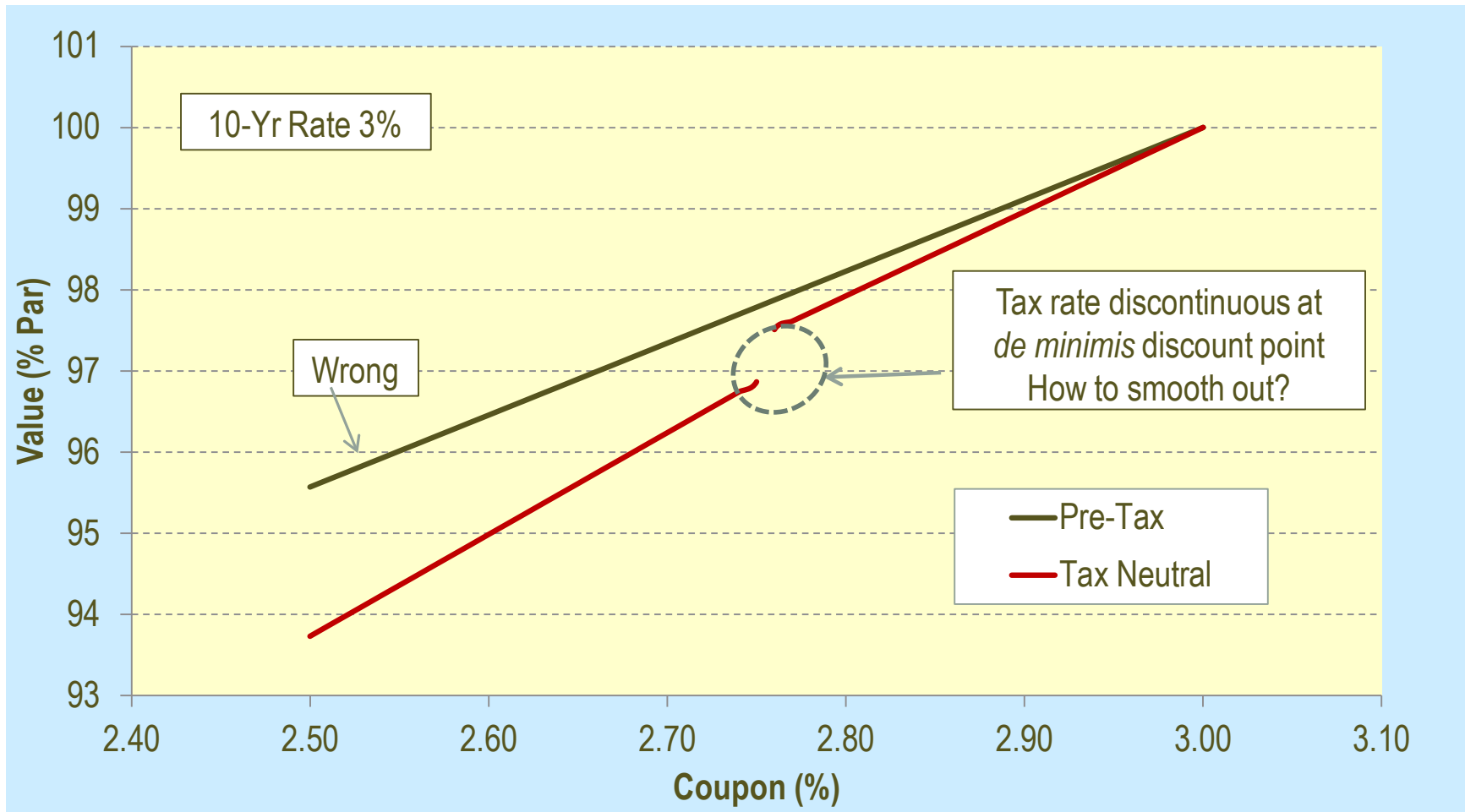
- Defined as the price which equals PV of after-tax cashflows, including tax at maturity or at call
 - *Because tax depends on price, calculation is iterative*
- For optionless bond closed-form solution exists
 - *But long-term munis are callable*

* The after-tax 'fair price'



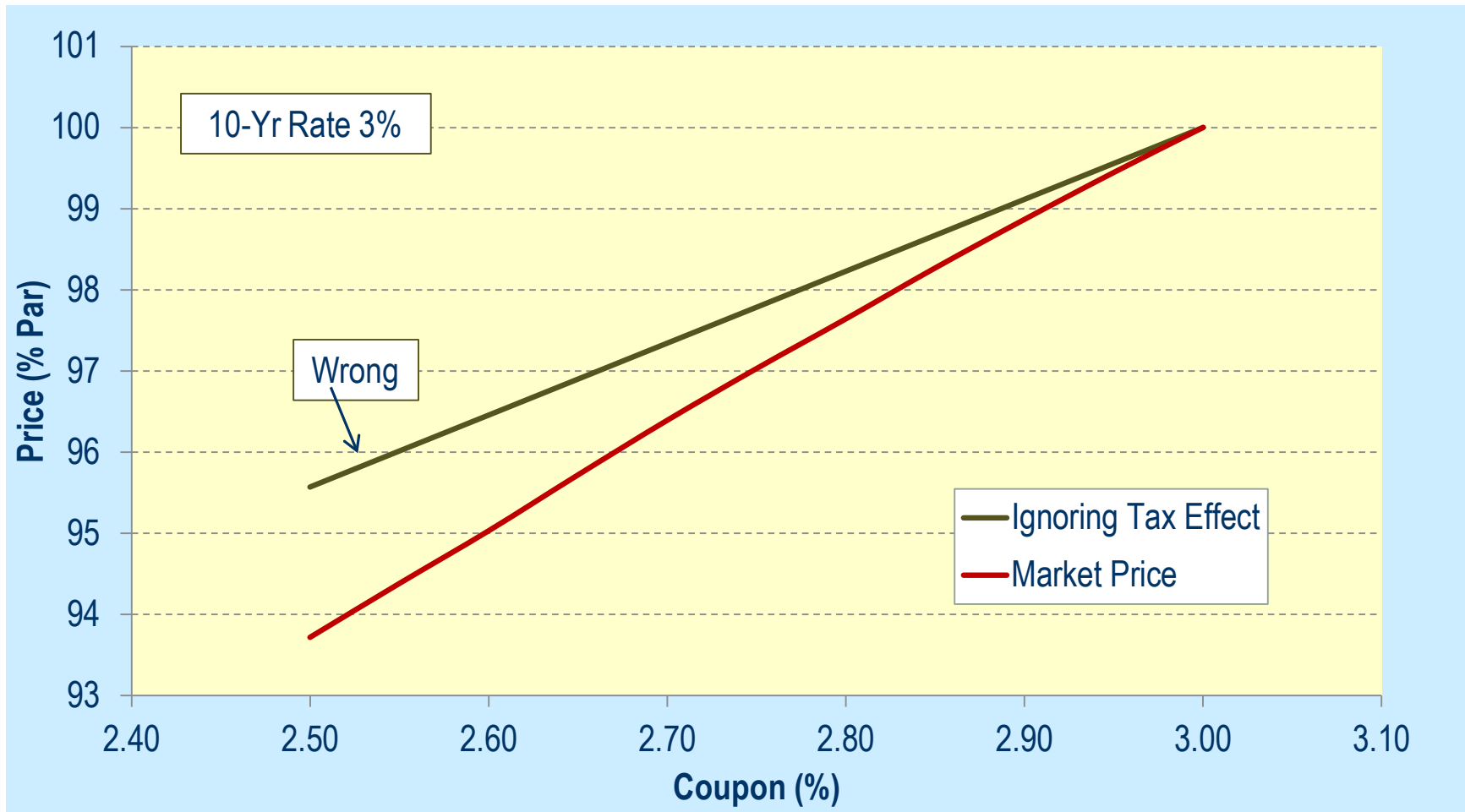
Taxes at Maturity Depresses Discount Muni Prices

Tax-Neutral Present Value of 10-Year Non-Call Life



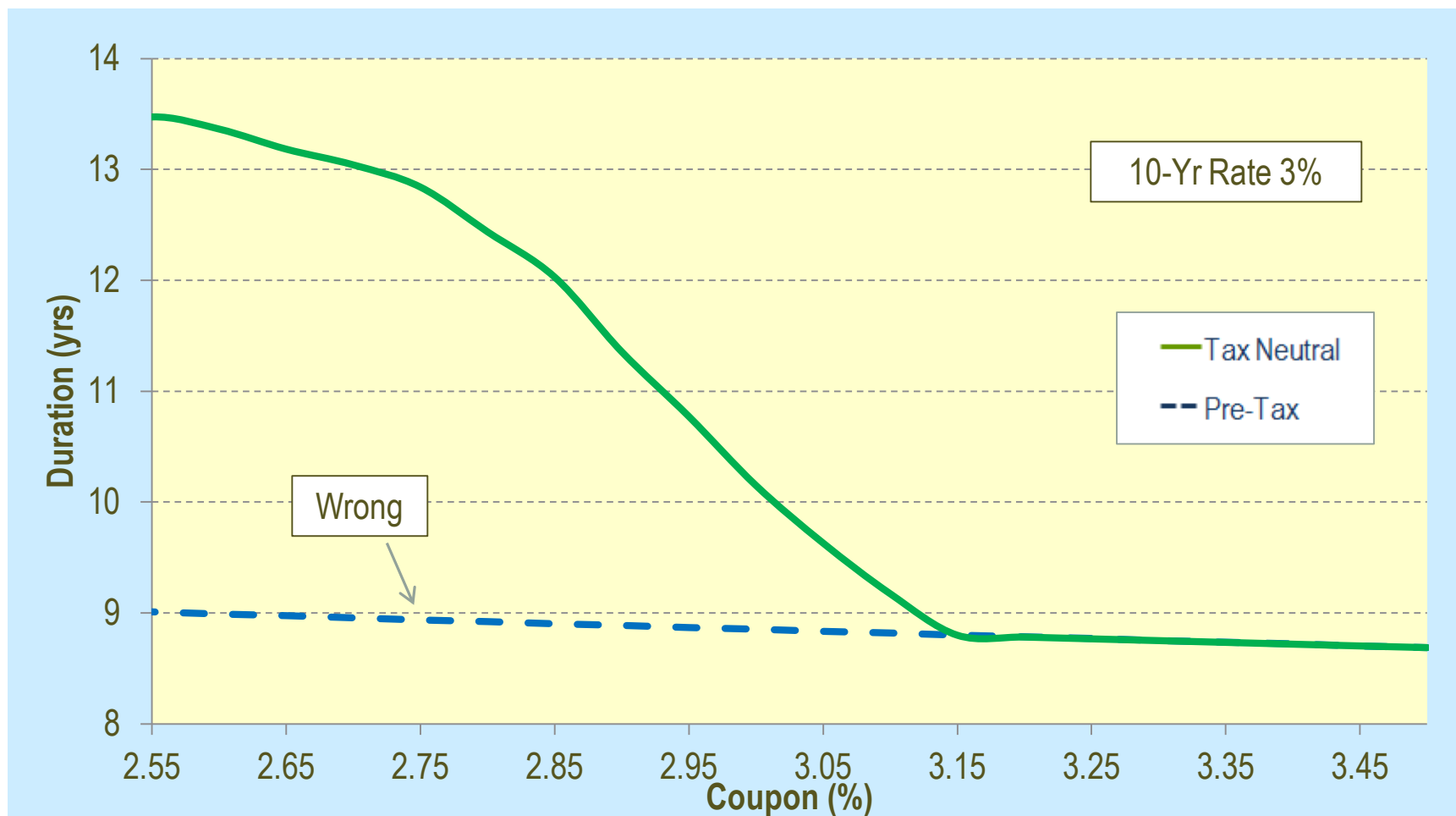
Tax at Maturity Depresses Prices of Discount Munis

Smoothed Tax-Neutral Value of 10-Year Non-Call Life



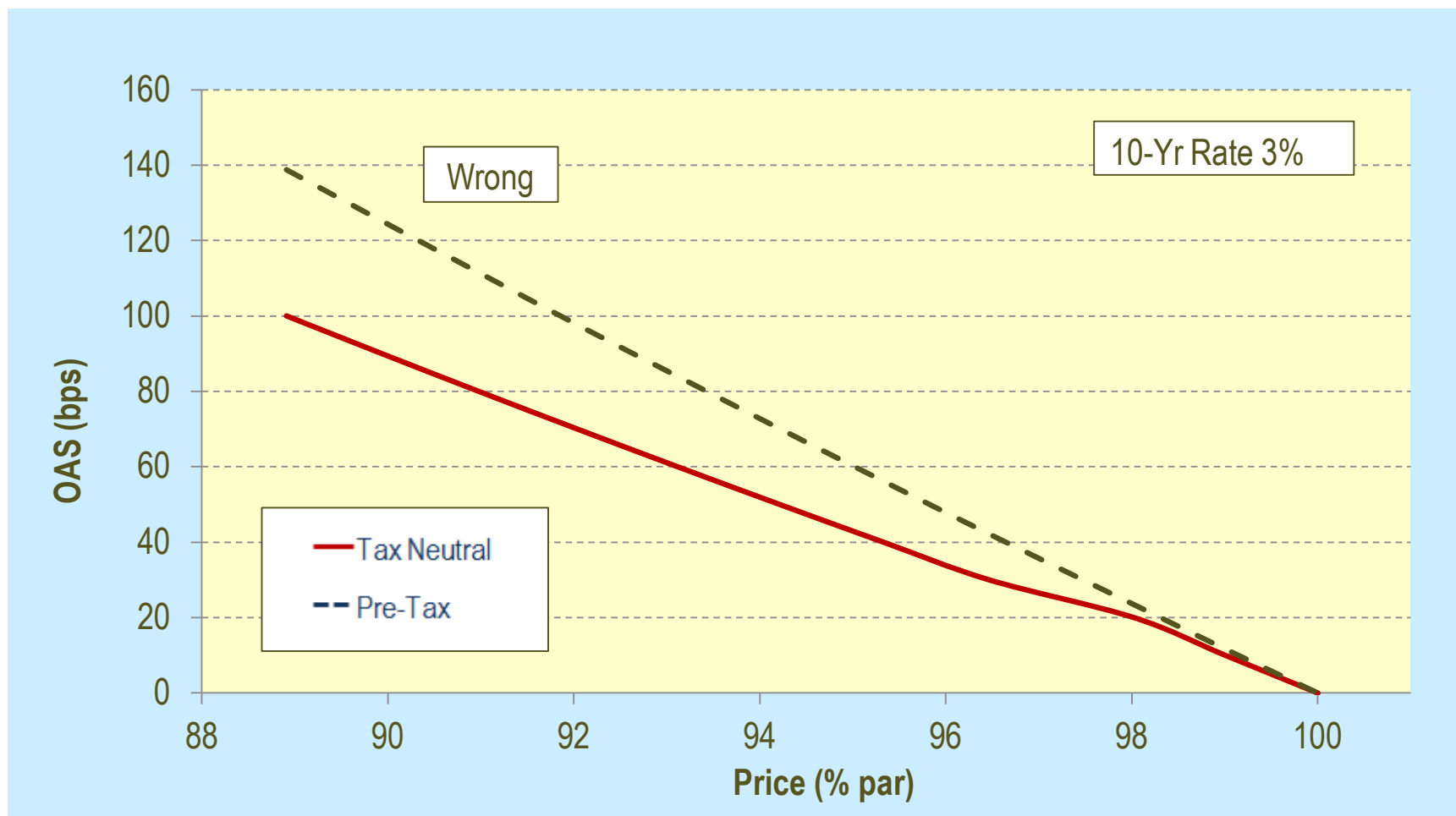
Ignoring Taxes → Duration Underestimated

10NCL Bonds




Ignoring Taxes → Spread Underestimated

3% 10-Year Bullet



Implementation of Tax-Neutral Valuation*

- Extends conventional OAS to munis by incorporating complex tax treatment of market discount
 - *Including OID's and callables (possibly split tax treatment)*
 - *Delivered as MuniOAS library*
- Commercially deployed by BlackRock, Investortools, and major asset managers
- Bloomberg app offers tax-neutral OAS analysis 
 - APPS RVMUNIS <GO>

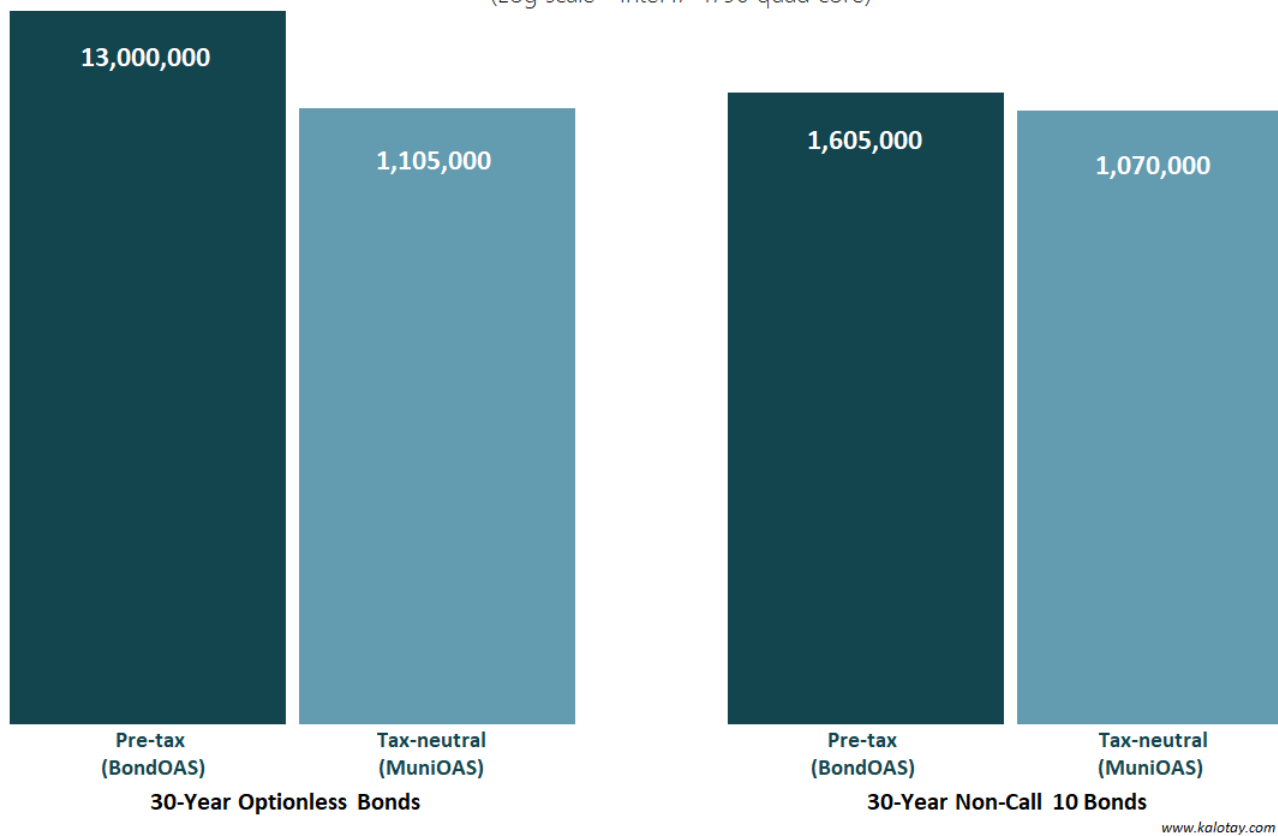
* *Patent pending*



Kalotay Implementation: Lightning Speed

Valuations Per Minute, OAS to Price

(Log scale - Intel i7-4790 quad core)

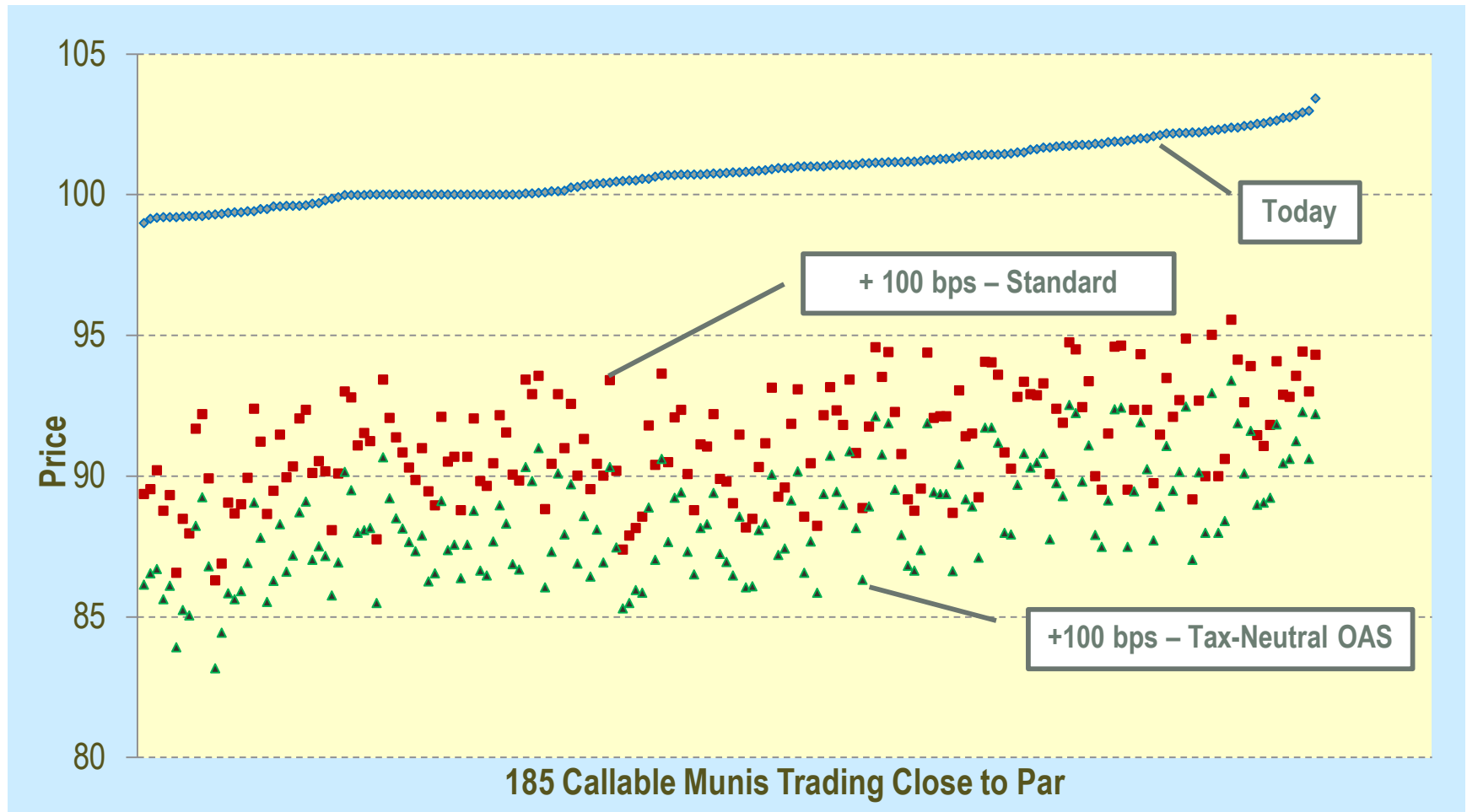


See Speed Demo at: <http://analytics.kalotay.com/realtimeagency/>



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References

- *Tax optimization of municipal bond portfolios: Investment selection and tax rate arbitrage*
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- *Life without advance refunding*
Municipal Finance Journal (forthcoming)
- *Creating a live yield curve in the illiquid muni market*
Journal of Fixed Income 2017
- *The interest rate sensitivity of tax-exempt bonds under tax-neutral valuation*
Journal of Investment Management 2014



Information & Contacts

Live Demos

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

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