Managing the Advance Refunding Option

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When and When Not to Advance Refund

Background

- There exists a call option value that is unique to the Tax-Exempt Municipal sector
- Its value arises from funding a tax-exempt bond call at higher taxable (Treasury) yields
- Called the “Advance Refunding Option” or “ARO”, it is available on a ONE-TIME Basis
- Until now not well defined or measured, it has financial and strategic value
- The value of the ARO can be easily and unintentionally misspent
- Preservation of the ARO has not typically appeared in most debt policies

Immediate Goals

- Develop estimation approaches for the ARO as a concept distinct from option value
- As a work in progress, some threshold observations could be considered in debt policy now

When close to the current call date – consider waiting, a hedge or a forward
Why is this more relevant now?

**Market Fundamentals Changed**

- For the last 30 years, the fixed-rate asset class has been generally rising (rates glacially falling)
- At virtually every point along the way, participants believed fixed rates at a “new low” trough
- Rates were always expected to rise, and minimal nod was to the value of aging yield curve slope
- Advance refunding was a value opportunity, and a risk-reducing decision to go sooner than later
ARO Compares Market Acquisition Cost to Escrow cost

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<tr>
<th>Maturity (Years)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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<td>2.66</td>
<td>2.89</td>
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**NO NEGATIVE ARBITRAGE**
- Old Bond at 5-year Yield in Secondary Market
  - PV% Value of the ARO - No Negative Arbitrage
    - 3.883

**ESCROW at MARKET**
- Old Bond at 5-year Yield in Secondary Market
  - PV% Value of the ARO - Escrow at 5-Year Treasury
    - 1.779

**First look at the ARO**
- Positive ARO if a bond can be discharged at a lower cost (through an escrow) than its alternative cost at fair market value.
- The ARO has time value. Market relationships change as the bond ages toward its call date.
- Green = Theoretical available yield at the Refunding Bond Yield (no negative arbitrage)
- Red = Actual available yield for an escrow investment to fund the call in 5 years
Methodology Strengths and Difficulties

Strengths

- Funding of a call has different economics than the market acquisition cost of the refunded bond
- Negative arbitrage is the cost difference between “allowable vs. available” escrow yield
- Municipal practitioners can replicate this calculation using standard excel finance functions

Complexities

- Comparison of “escrow cost” to “market acquisition cost” has calibration difficulty
  - Reliance on the 5-year tenor of a 15-year callable in 5 years is not certain until the bond is actually called
- Transactions are done in Bond Series rather than as individual maturities
  - Short maturities bias down the long maturities, and long maturities bias up the short maturities.
  - ARO might be better measured by an “exclusion delta” rather than by each maturity as a stand-alone
- YTC as the Refunding Replacement Yield -- may not reflect the Issuer’s real borrowing cost
  - The Issuer’s terminal cost of replacement funds relies the refunding bond ALSO BEING CALLED.
  - Market practice has been to discount cash-flow savings at the YTC (new bond yield) for PV Savings purposes
Market Signals

Presumption that the market always charges for a call option

- Recently inverted relationship – price resistance, market discount rule, anticipated refunding
- Absent specific structural goals such as TOB program seeking long-dated tax-exempt cash-flow, non-callable bonds have been pricing wider than their callable equivalent Yield to Maturity.

Buyers commonly anticipate an advance refunding

- Should be a pricing difference for Advance Refundable vs. Non-Advance refundable bonds.
- Advance refunding can deliver a credit-pickup windfall much sooner than a current refunding.
- Current refundable-only bonds introduce a “European” edge to the “American Option”

Issues with the market give an advance refunding preference at time of pricing

- Formal reliance on tax purpose designations for mixed refunding and new money
- Tax regulation change risk
Refunding Efficiency Methodology

\[
\text{Refunding Efficiency} = \frac{PV(Savings)}{\text{Option Value}_{\text{old}} - \text{Option Value}_{\text{new}}}
\]

Callable Advance Refunding Bonds
- Creates a new option exercisable only at the call date, exclude ARO

Callable Current Refunding Bonds (and not previously an advance refunding)
- Creates a new option exercisable in advance and including the call date
- Add 2% of refunded bond principal as an “ARO Proxy” to this term

Outcome:
- Loss of optionality reduces, ratio increases, in favor of a current refunding

Efficiency = Ratio of “Savings Captured” to “Reduction in Option Value”
Efficiency Ratio as a “Directional Indicator”

- Biases down for negative arbitrage
  - Absolute savings (numerator) decreases – ratio falls.
  - Negative arbitrage = Actual Escrow Cost --minus-- Cost at the “allowable bond yield”
  - Option-rich refunding structures tend to have lower bond yields (therefore less negative arbitrage)

- Bias up for option-rich refunding structures
  - 4-coupon refunding which Y-T-M is “just inside” the 5-Coupon Y-T-M
  - Option(new) goes down, net reduction to optionality in whole goes up, efficiency ratio falls

- Injecting the ARO component
  - Nearing the call date, ARO on the old bonds is low (the left term stays higher)
  - Nearing the call date (but still advance), ARO on the new bonds is zero (denominator increases)

- Refunding Bonds are non-callable
  - If the market charges or doesn’t charge for a call feature, the ratio will show it

- Discount rate for PV Savings
  - Market tradition uses the “yield to call” on the new bonds – requires option exercise to be real?
  - Kalotay research supports using a “term structure of interest rates” (vs. TIC) to avoid distortions.
Shadow ARO by Estimating its Cost of Preservation

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<tr>
<th>Maturity</th>
<th>Now 07/01/17</th>
<th>MMD 5% NC-10 Plus 100</th>
<th>Forward Premium Per Month</th>
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Attainable Escrow Yield: 0.50 0.45 0.40 0.35 0.30 0.25
Average Forward Premium (BPs): 0 14 35 56 77 98
Avg PV% Loss to Preserve ARO: 7.79% 7.31% 4.16% 3.42% 0.49% 0.00%

Getting within 3 months to a current refunding call date, sacrificing 0.5% PV savings as a forward to preserve the ARO, could be a successful argument.
Closing remarks

Concept is timely and relevant

- Relationship between the municipal curve and the Treasury curve couples and decouples quickly on macro economic drivers
- Call features are increasingly preferred by buyers (impact of market discount rule)
- Commonly avoidable situations in which the ARO is spent for too little value

Refinements to methodology

- Alternative market cost leg – perhaps cede that the old call date is the invested tenor
- Refunding replacement cost of funds – requires the refunding option to be exercised
- New ARO calculation, revisit when advance refunding is better than current refunding
- Efficiency ratio works as a directional signal; but not yet as an absolute decision metric

Supplemental to the economic discussion

- Tactical reasons apart from efficiency to preserve the ARO – tax caps and revenue limits
- Policy driven ARO might reduce incidence of taxable refunding for restructuring purposes
- When Treasury market furnishes high yield, escrow cost is limited by Section 148. The new refunding optionality now bears more directly in the form of increased escrow cost.