



## Option-based Debt Management Analytics

### Issuers

*What to sell —  
option-based structuring*

*When to call —  
option-based refunding*

### Advisors

*Demonstrate sharper  
technical and analytical  
expertise*

### Underwriters

*Communicate effectively  
with issuers and advisors*

# Refunding+™

## Cutting-edge Structuring and Refunding Analysis

Refunding+ enables issuers, advisors, and underwriters to analyze contemplated transactions. This powerful tool offers option-based analysis for current refunding, and new issue structuring with different coupons and call protection periods.

## Essential in Today's Municipal Market

With the elimination of advanced refunding, bond structures with calls shorter than 10 years and coupons lower than 5% are becoming more prevalent. Market participants need rigorous analytics to compare alternative structures. On the refunding side, escrow costs and negative arbitrage are no longer relevant, but issuers do need to ensure that they are exercising call options efficiently.

## Key Features

- Extracts spot rates from 5% callable scale for proper discounting
- Determines fair price given coupon, maturity, and call date
- Incorporates transaction costs
- Signals when to call, based on refunding efficiency
- Ranks refunding candidates by savings and efficiency
- Present value savings supported by schedule of cashflows, discounted at spot rates

## Flexible Desktop Application

Refunding+ is available as a feature-rich Excel add-in for fast and convenient desktop use.

## About Kalotay Analytics

For three decades Kalotay Analytics has been at the core of leading fixed income valuation and risk systems. The firm's patented technology performs computationally intensive calculations with the precision and speed demanded by sophisticated fixed income market participants.

Extracts implied optionless par curve from 5% non-call 10 muni curve

Essential for discounting and option valuation

## Yield Curve Conversion

| Issuer Curve  |    | Maturity (Yrs)    | 1     | 2     | 5     | 7     | 10    | 15    | 20    | 30    |
|---------------|----|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Coupon %      | 5  | Issuer Curve (%)  | 1.600 | 1.640 | 2.052 | 2.303 | 2.638 | 2.831 | 2.971 | 3.991 |
| Years to call | 10 | Par NCL Curve (%) | 1.600 | 1.641 | 2.067 | 2.328 | 2.678 | 3.106 | 3.261 | 4.303 |
| Volatility    | 15 |                   |       |       |       |       |       |       |       |       |

Determines fair price given any combination of coupon, maturity, and call date

Uses optionless par rates and user-specified volatility

## Structuring Analysis

| Coupon | Structure | Fair Price | YTC   | YTM   | YTW   |
|--------|-----------|------------|-------|-------|-------|
| 5.00   | 30 NC-10  | 108.253    | 3.991 | 4.496 | 3.991 |
| 5.00   | 30 NC-8   | 107.374    | 3.917 | 4.547 | 3.917 |
| 5.00   | 30 NC-6   | 106.199    | 3.834 | 4.616 | 3.834 |
| 5.00   | 20 NC-10  | 117.443    | 2.971 | 3.752 | 2.971 |
| 5.00   | 20 NC-8   | 115.432    | 2.831 | 3.883 | 2.831 |
| 5.00   | 20 NC-6   | 113.025    | 2.639 | 4.044 | 2.639 |
| 5.00   | 15 NC-10  | 118.775    | 2.831 | 3.393 | 2.831 |
| 5.00   | 15 NC-8   | 116.623    | 2.678 | 3.560 | 2.678 |
| 5.00   | 15 NC-6   | 114.051    | 2.466 | 3.765 | 2.466 |
| 4.00   | 30 NC-10  | 92.804     | 4.920 | 4.436 | 4.436 |
| 4.00   | 30 NC-8   | 92.563     | 5.146 | 4.452 | 4.452 |
| 4.00   | 30 NC-6   | 92.316     | 5.522 | 4.467 | 4.467 |
| 4.00   | 20 NC-10  | 106.478    | 3.237 | 3.545 | 3.237 |
| 4.00   | 20 NC-8   | 105.552    | 3.208 | 3.608 | 3.208 |
| 4.00   | 20 NC-6   | 104.519    | 3.167 | 3.679 | 3.167 |
| 4.00   | 15 NC-10  | 108.708    | 2.986 | 3.261 | 2.986 |
| 4.00   | 15 NC-8   | 107.685    | 2.916 | 3.344 | 2.916 |

Reports present value savings and loss of option value

Call decision can be based on *Refunding Efficiency* — a standard widely used by corporate and agency issuers

## Refunding Analysis

| Outstanding Bond |            | Refunding Bond |          | Refunding+ Analysis and Report |            |                       |            |
|------------------|------------|----------------|----------|--------------------------------|------------|-----------------------|------------|
| Dated            | 4/1/2008   | Dated          | 4/1/2018 | PV Date                        | 4/1/2018   | Old PV                | 63,119,096 |
| Maturity         | 4/1/2038   | Maturity       | 4/1/2048 | Fair Ref Price                 | 104.52     | New PV                | 54,543,291 |
| Coupon           | 5.000      | Coupon         | 4.000    | Refunding Face                 | 49,071,891 | Savings               | 8,575,804  |
| Face             | 50,000,000 | Fee            | 0.500    | YTC                            | 3.167      | Savings %             | 13.6       |
| Call Type        | American   | Call Type      | American | YTM                            | 3.679      | Old Option            | 12,149,760 |
| Call Date        | 4/1/2018   | Call Date      | 4/1/2024 | YTW                            | 3.167      | New Option            | 3,135,110  |
| Call Price       | 100        | Call Price     | 100      | Option Loss                    |            | Option Loss           | 9,014,651  |
|                  |            |                |          | Option Loss %                  |            | Option Loss %         | 74.2       |
|                  |            |                |          | Efficiency                     |            | Efficiency            | 95.13      |
|                  |            |                |          |                                |            | (Savings/Option Loss) |            |

