VOLUME 28 | NUMBER 4 | FALL 2016

# Journal of APPLIED CORPORATE FINANCE

In This Issue: **Capital Structure and Payout Policy**



Columbia Business School

# Don't Waste a Free Lunch: Managing the Advance Refunding Option

by Andrew Kalotay, Andrew Kalotay Associates, Inc. and Lori Raineri, Government Financial Strategies*

A callable municipal bond issue that funds a new project is usually eligible for *advance refunding*. Under favorable market conditions this enables the municipality to lock in lower interest rates prior to the call date; waiting until the call date exposes the issuer to the risk of higher rates. Advance refunding is a common practice in municipal finance. In 2015, when bond issuance volume was at its highest since 2010, refundings accounted for $165.7 billion of the $403.8 billion issued.[1] A significant percentage of these were advance refundings.

Advance refunding is the practice of issuing new bonds to repay an outstanding bond issue more than 90 days before its first call date.[2] The proceeds of the refunding issue are invested in an escrow portfolio consisting of Treasury bonds, which is structured so that its cashflows defease the original issue to the call date, when the original issue is called. Therefore the savings from advance refunding depend on both the issuer's refunding rate and on the yield of the escrow. The lower the refunding rate and the higher the escrow yield, the greater will be the savings.[3] Moreover, to comply with IRS regulations, the issuer must ensure that the yield of the escrow does not exceed the yield of the refunding issue.[4]

The right to advance refund is an option. What's more, this Advance Refunding Option (ARO) is effectively free to the issuer. While investors pay a lower price for a callable bond, the primary market does not reveal any difference in price based on eligibility for advance refunding (versus what is called "current" refunding, meaning within 90 days prior to the call date or after). In fact, investors prefer advance-refundable issues for well-understood reasons—namely, inefficient refunding decisions by issuers and the fact that advance-refunded bonds effectively have the credit of the Treasury bonds in the escrow supporting their repayment. Thus, with nothing to lose and possibly something to gain from an advance refunding, investors do not charge for the ARO.

An important limitation of the ARO is that, once it is exercised, the replacement issue is not advance-refundable. This rule attempts to curtail the volume of tax-exempt bonds associated with the funding of a project.[5] However, if the original issue is called,[6] the ARO is kept alive in the replacement issue. In other words, the municipality can acquire *additional* value at no cost when it calls a bond and replaces it with one that is also callable.

To summarize, the call option of a municipal bond can provide two related benefits to the issuer: to replace the outstanding bond with one with a lower cost, and, in case of calling, to obtain a free ARO.[7]

Everything else being the same, an advance-refundable issue is preferable to one that is not. Thus, the issuer should not relinquish the ARO without adequate compensation. As an extreme example, advance refunding shortly before the call date would be foolish because by deferring refunding until the call date, the issuer could obtain a new ARO at no additional cost. Of course, normally the situation is not as clear-cut. If the contemplated date of advance refunding is several years prior to the call date, waiting would entail considerable interest rate risk. At the same time, "negative arbitrage"[8] in the escrow may discourage issuers from acting.[9]

---

* This paper was presented at the 5th Annual Municipal Finance Conference at the Brookings Institution, Washington, DC on July 12, 2016.

1. The Bond Buyer, 2015 in Statistics Annual Review.

2. See the Municipal Securities Rulemaking Board's definition of advance refunding: http://www.msrb.org/Glossary/Definition/ADVANCE-REFUNDING.aspx.

3. The escrow yield determines the size of the refunding issue; the refunding rate determines that issue's debt service.

4. Specifically, a slightly specialized version of the yield that is defined by federal regulation 26 CFR 1.148-4. Issuers can raise the refunding yield, and therefore the legal cap on the escrow yield, by manipulating the structure of the refunding issue. Of course, in the current regime of low Treasury rates, there is little incentive to do so. In the past, when Treasury rates were high, bankers used to "assist" issuers in meeting the escrow cap by selling them Treasury bonds for the escrow portfolio at lower yields (higher prices) than available in the market—an illegal practice known as "yield burning."

5. Contrary to Congress's public policy objective of minimizing the volume of tax-exempt bonds outstanding, advance refunding in the presence of negative arbitrage (a term of art in municipal finance, explained in footnote 8) has the opposite effect.

6. Throughout this paper, "called" is used interchangeably with "current refunded." A refunding that occurs more than 90 days prior to the call date is an advance refunding.

7. This gives rise to a challenging problem—one that we do not explore in this article: how to structure the call feature to maximize the value of the ARO?

8. Negative arbitrage is a term of art in municipal finance. The Municipal Securities Rulemaking Board defines it as, "Investment of bond proceeds and other related funds at a rate below the bond yield," *http://www.msrb.org/Glossary/Definition/NEGATIVE-ARBITRAGE.aspx*. Rules governing advance refunding have become progressively more restrictive over time. Originally there was no limit to the number of times an issue could be advance refunded. Then, only two were permitted. Today, only a single advance refunding is allowed. Similarly, the yield of the escrow used to be unconstrained; if Treasury rates were sufficiently high, the municipality could earn a return on a riskless investment (the escrow portfolio) higher than its borrowing cost—an arbitrage. Eventually, changes to the tax code set the maximum allowed yield of the escrow to the yield of the refunding issue. The flip side of the interest rate situation, that is, when Treasury rates are lower than the issuer's borrowing costs, gave rise to the term, "negative arbitrage."

9. One emerging trend in issuance is to include a "make-whole" call to the initial par call date. The make-whole price is determined by a fixed spread to an agreed-upon AAA benchmark yield to the regular call date (Weitzman, 2016). This feature enables the is-

Table 1 **Interest Rate Assumptions**

| Maturity (yrs) | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 25 | 30 |
|---|---|---|---|---|---|---|---|---|---|
| 5% NC-10 Yield (%) | 0.50 | 0.81 | 1.09 | 1.40 | 2.15 | 2.62 | 2.91 | 3.10 | 3.19 |
| Par NCL Yield (%) @ 15% vol | 0.50 | 0.82 | 1.11 | 1.43 | 2.21 | 3.15 | 3.48 | 3.62 | 3.63 |
| Treasury Yield (%) | 0.58 | 1.03 | 1.30 | 1.74 | 2.25 | 2.50 | 2.66 | 2.89 | 3.00 |

Source: MMA, Bloomberg

In this paper, we develop the analytical framework to help issuers and their advisors deal with this problem. First, we take an in-depth look at the value of the ARO and explore how it depends on coupon, maturity, time to call (lockout), and prevailing Treasury rates.[10] We then use these results in the second part to make a recommendation about the advance refunding decision—act now or wait? In order to answer this question, we will extend the standard measure of refunding efficiency to incorporate the ARO of the replacement issue.

## What is the Value of an ARO?

As discussed above, the value of an ARO depends on both the municipality's borrowing rate and on Treasury rates, since the latter determines the yield of the escrow. While these rates are positively correlated, the correlation is far from perfect. Though a discussion of the co-movements of municipal and Treasury rates is beyond the scope of this article, it is important to note that, in the absence of negative arbitrage, the value of the ARO does not require the modeling of Treasury rates. In the examples below, the AROs are valued using a proprietary approach developed by one of us (Kalotay); but alternative approaches can be incorporated seamlessly. Our objective is to develop a method to determine the optimal refunding policy, assuming that the required ARO values are available.

A callable bond that is eligible for advance refunding has three option components: the right to call; the right to advance refund; and the right to issue an advance-refundable replacement bond. We define the value of the ARO as the value that is left (the "residual" value) after subtracting the values of the other options from the total.

Table 1 displays the assumed interest rates for both the issuer and the Treasury. In accordance with current practice, the issuer's rates are expressed as yields to call (YTC) for 5% NC-10 bonds.[11] Table 1 also shows the issuer's par non-callable (NCL) curve implied by the 5% NC-10 curve, assuming that the issuer's yield curve follows a lognormal process with 15% volatility. This volatility is used for all the examples below.

Our "base case" will be 5% NC-10 bonds, which are the current standard. Because 5% is well above the prevailing rates, these bonds are priced at significant premiums over par, depending on maturity, and they are excellent candidates for advance refunding. We will explore how the value of the ARO of 5% NC-10 bonds depends on maturity and Treasury rates, and then investigate the sensitivity of the results to other factors, namely coupon and lockout (but not volatility).

*5% NC-10 Bonds: No Negative Arbitrage*

As discussed earlier, the allowed yield of the escrow is capped by the yield of the refunding issue by IRS regulation. Everything else being the same, the most favorable case—that is, the one that maximizes the value of the ARO (and minimizes the size of the refunding issue)—is when the escrow yield is equal to the refunding yield. The terminology for this case is that "there is no negative arbitrage."[12] Under the current conditions of historically low Treasury rates, the value of the ARO is significantly smaller than that with no negative arbitrage.

The term "no negative arbitrage," as used in municipal finance, is actually a misnomer, because it implies that an escrow yield lower than the issuer's refunding yield is a "bad deal." In fact, the critical threshold of the escrow yield is the issuer's *funding yield to the call date*, rather than the (higher, longer-term) refunding yield. From the issuer's perspective, an escrow yield higher than the issuer's funding rate to the call date gives rise to arbitrage (free lunch) because the fair value of the bonds to be defeased would then exceed the cost of the escrow portfolio.

## Free Lunch Example

Consider advance refunding a 5% 20 NC-10 bond with 15 years left to maturity, i.e., five years remaining to the call date. This bond would be trading at a price reflecting the certainty of being called, assuming the issuer's credit is roughly in line with the benchmark curve shown in Table 1. So its fair value would be about 117.33 (YTC of 1.40%, the 5-year yield in

suer to lock in interest savings prior to the regular call date, in a way that is analogous to advance refunding. However, because the make-whole call price is higher than the fair value of the bond (Kalotay, 2010), there is no free lunch in this case. If the bonds redeemed at the make-whole price were advance refundable, the ARO would be preserved (which is not the case with advance refunding). But to date, the make-whole to call feature has been restricted to non-advance-refundable bonds.

10. Escrow portfolios may consist of Treasuries purchased in the open market or lower-yielding "State and Local Government Securities" (SLGS, colloquially "slugs") issued by the U.S. Treasury for this specific purpose.

11. Kalotay (2012).

12. See Kalotay and May (1998), and Zhang and Li (2004).

Figure 1 **Option Values of 5% NC-10 Bonds Assuming No Negative Arbitrage**

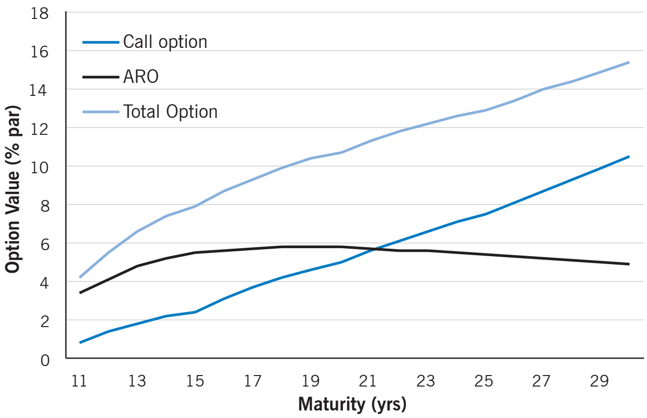



Figure 2 **Sensitivity of ARO of 5% NC-10 Bonds to Treasury Rates**

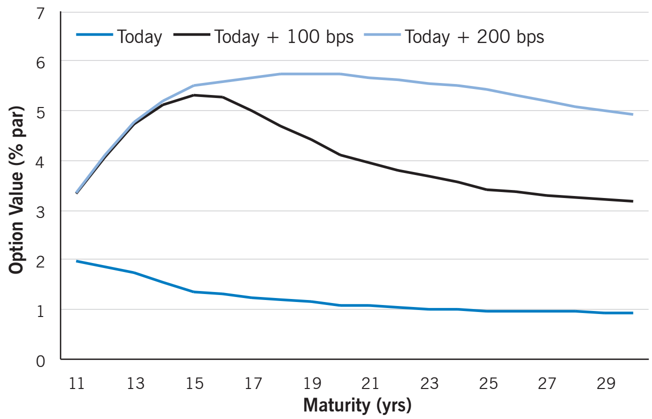


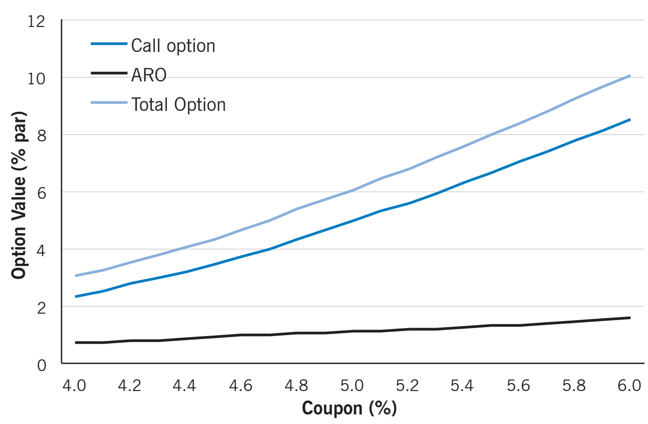

Table 1). The refunding yield (maturity-matched 5% 15NC-10) would be 2.62%. This would be the 'no-arbitrage' cap for the yield of the escrow portfolio of Treasuries. In other words, if Treasury rates were high enough, the escrow portfolio would be permitted to earn as much as 2.62%, making the cost of the escrow portfolio 111.09% of the amount outstanding. Put another way, the issuer would be able to extinguish an obligation with a fair value of 117.33 at a cost of 111.09—a financial arbitrage of over 6 points in a (legally speaking) no-positive-arbitrage advance refunding. But even at the current 5-year Treasury rate of 1.74% there is a free lunch, because the cost of the escrow is only 115.60, which represents a 1.78 point arbitrage without violation of the no-arbitrage rule.

A second, perhaps more compelling, indicator that the advance refunding option is a free lunch is the fact that the present value savings from an advance refunding often exceed the value of the call option.[13] This is possible because advance refunding can achieve lower replacement debt service earlier than on the call date.

Figure 1 displays the value of the ARO for 5% NC-10 bonds of various maturities under the assumption of no negative arbitrage, along with the value of the call option. As shown, the total option value and that of the call option increase as the maturity increases. However the value of the ARO peaks between 15 and 20 years, at slightly below 6% of the face amount, and then gradually declines to about 5% for a 30-year maturity.

Under the "no negative arbitrage" assumption, Treasury rates do not have to be considered explicitly; all we need to know is that the Treasury rates exceed the refunding yield.[14] In general, the value of an ARO does depend on the prevailing Treasury rates.

Figure 3 **Effect of Coupon on Option Value of 20 NC-10 Bonds (Current Treasury Rates)**




*5% NC-10 Bonds: Dependence of ARO on Treasuries*

Figure 2 displays how the values of the AROs of 5% bonds with different maturities depend on Treasuries (today's, +100 bps, +200 bps). Here, we do not show the value of the call option, which is the same as in Figure 1. The +200 bps case is essentially the no negative arbitrage case considered above. As

13. Ang et al. (2013), holding to textbook finance theory that precludes the existence of free lunches, completely miss this point when they argue that " … advance refunding of municipal bonds is, at best, zero net present value … ." But in fact, issuers routinely receive advance refunding proposals from bankers indicating refunding efficiencies (savings/forfeited option value) in excess of 100%. This absurd result—essentially claiming that value generated by exercising the option exceeds the value of the option—is a consequence of ignoring the advance refunding option in the efficiency calculation.

14. Assuming the refunding is being done to achieve savings. Occasionally, refundings are executed to get out of cumbersome covenants, or for some other non-economic reason.

Figure 4 **ARO Value of 20 NC-10 Bonds—Sensitivity to Treasury Rates**

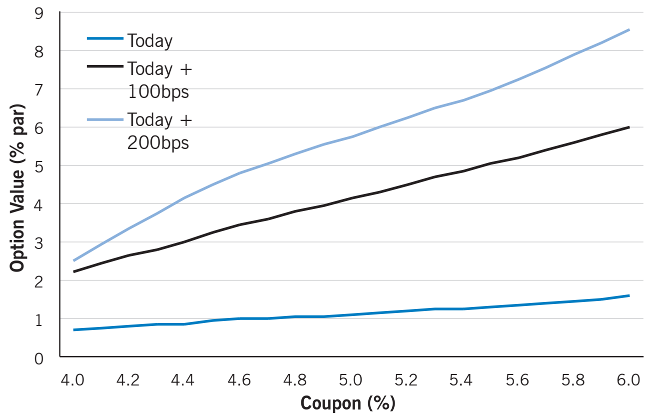
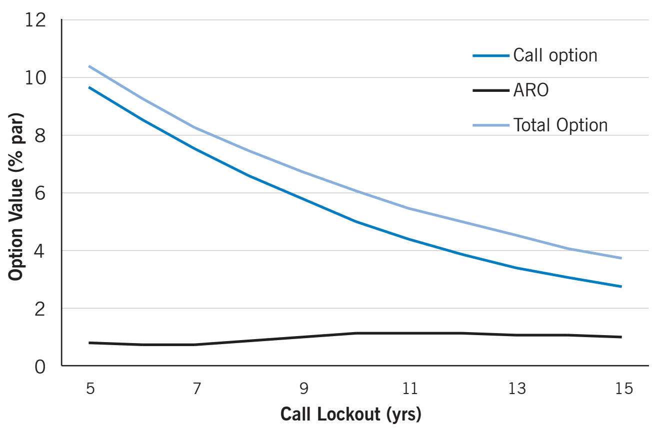



Figure 5 **Option Value of 5% 20-Year Bonds—Sensitivity to Call Lockout**

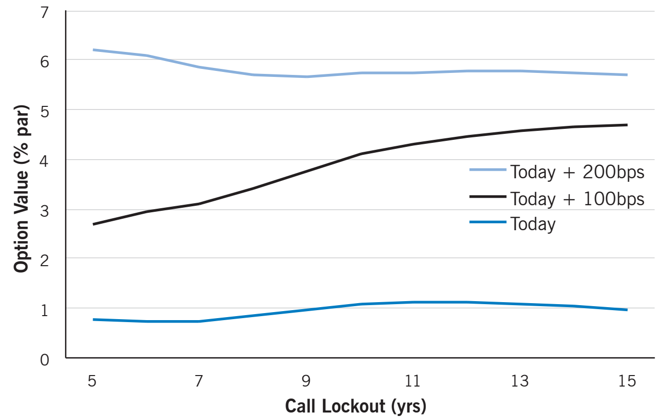



the maturity increases beyond 20 years, the value of the ARO gradually declines. As we have seen earlier, at the 20-year maturity the value of the ARO at current Treasuries is 1%, and at +100 bps it is 4%.

*Coupon Effect for 20 NC-10s at Current Treasuries*

Figure 3 displays how the coupon affects the value of the call option and the ARO for 20-year NC-10 bonds. As expected, the higher the coupon, the greater is the value of both the call option and the ARO, because there will be more opportunities to refund. The value of the ARO is around 0.75% at a 4% coupon, rising to 1% at a 5% coupon, and 1.75% at a 6% coupon.

Figure 6 **ARO Value of 5% 20-Year Bonds—Sensitivity to Call Lockout and Treasury Rates**




*20 NC-10s—Effect of Treasuries*

Next, we'll explore the effect of Treasuries on the value of the ARO, keeping the issuer's current borrowing rate unchanged. Note that the value of the call option depends only on the issuer's borrowing rates.

Figure 4 shows the values of the AROs for 20-year bonds, coupon ranging from 4% to 6%, at current Treasuries, +100 bps, and +200 bps. Not surprisingly, the higher the escrow yield, the greater the value of the ARO. For example, at a 5% coupon, increasing Treasuries by 100 bps raises the value of the ARO from 1% to 4% of the face amount.

But it's important to keep in mind that the issuer's borrowing rate is correlated with Treasuries. If Treasury rates increase, muni rates are likely to follow suit. Also, the value of the ARO does not increase indefinitely with Treasury rates because the escrow yield is capped by the yield of the refunding issue—which, in order for the refunding to be beneficial, has to be significantly lower than the coupon of the outstanding bond.[15]

*Effect of Remaining Time to Call*

Figure 5 displays how the value of the call option and the ARO is affected by the lockout for the case of 20-year 5% bonds at current Treasury rates. A shorter lockout steeply increases the value of the call option (and commensurately reduces the price of the bond). Although a shorter lockout provides fewer opportunities to use the ARO, the value of the ARO is relatively insensitive to the lockout; at current Treasury rates it is roughly 1%.

Figure 6 displays the relationship between lockout period and Treasury rates. As we have seen, at current Treasury rates it is worth roughly 1 point virtually independent of the

15. See Kalotay (2007).

Figure 7 **Refunding Efficiency of Seasoned 30 NC-10 Bonds Assuming No Arbitrage**

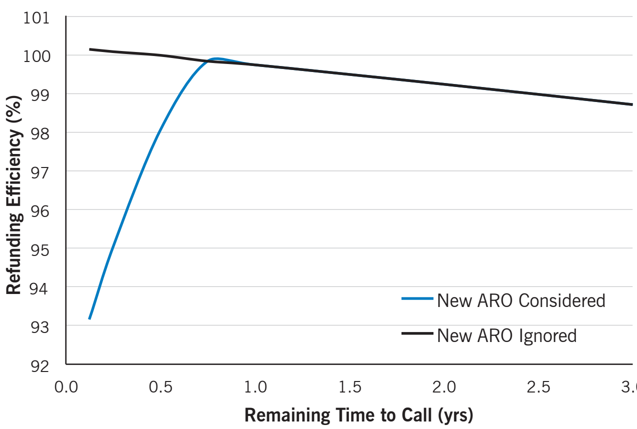
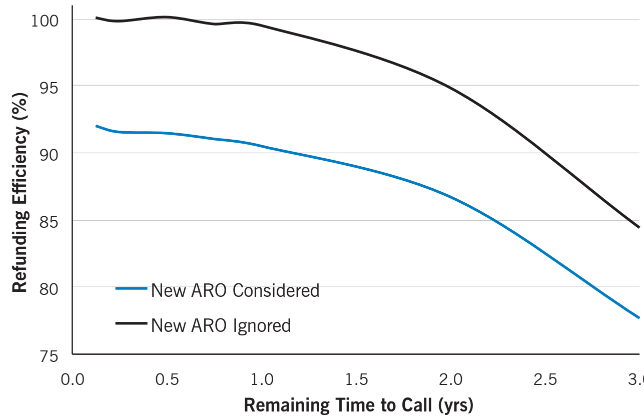



Figure 8 **Refunding Efficiency of Seasoned 30 NC-10 Bonds Assuming Current Treasuries**




lockout period. In the no negative arbitrage case (+200 bps), it is worth roughly 6%, independent of lockout. Between these extremes, the value of the ARO gradually increases because there are more opportunities to use it.

As shown in the figures above, the value of an ARO of a new issue depends on the interest rate environment—and it can vary from substantial to almost negligible. Because the ARO is a free option, issuing a callable bond eligible for advance refunding is preferable to one that is not. As we show in the next section, this becomes a critical consideration in the refunding decision.

## Analytical Framework for the Refunding Decision

Refunding is an option exercise. The primary benefit is savings in cashflow, but such savings come at a cost: refunding today forfeits the option to refund the outstanding bond in the future. Advance refunding also forfeits the opportunity to advance refund the replacement bond. We also observe that a callable replacement bond reduces the savings (because it increases the coupon or lowers the price), but provides additional option value in return.

We need a rigorous rule, based on the above variables, to signal when to refund. In the absence of advance refunding, the standard approach is to use the so-called generalized refunding efficiency that was developed by one of us in 2007:

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

The numerator is the present value of the cashflow savings. The denominator is the difference between the option value being given up and that acquired through the replacement bond.

The maximum value of refunding efficiency is 100%. Once that level is reached, the issue should be refunded; there is no incentive for waiting. Risk aversion may provide an impetus to refund below 100%. However, in that case alternative transactions such as hedging or market purchase should be considered.

The challenge is to include the ARO in the refunding efficiency formula. The critical consideration is that a callable bond may contain three option components enabling the issuer to benefit from lower rates: to advance refund, to current refund, and in case of the latter to obtain an ARO at no cost by issuing a callable replacement bond. The formula below incorporates these factors.

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

Option $\text{Value}_{old}$ = Call option in outstanding bond + R + ARO in outstanding bond, where R is the right to issue a replacement bond eligible for advance refunding; and

Option $\text{Value}_{new}$ = Call option and ARO in replacement bond.

These option values depend on prevailing market conditions. (Perfectionists may include the negligible value of subsequent ARO's, in the event the replacement bond is eventually called rather than advance refunded.)

Waiting until the call date preserves the right to advance refund the refunding issue. The benefit from current refunding would consist of cashflow savings, and the call option and the ARO of the replacement issue.

## Refunding Efficiency in Action: Examples

We now consider an advance-refundable 5% bond, with original maturity 30 years, and explore the efficiency of refunding it at various times prior to the call date. In this case the replacement bond would not be advance-refundable. However, beyond the call date the replacement bond could be advance refunded.

We assume that the replacement bond is a maturity-matched 5% NC-10 structure. Thus if the outstanding bond is refunded at the end of Year 7, the replacement bond would be a 23-year 5% NC-10 bond; and if it is called at the end of Year 12, the replacement bond would be an 18-year 5% NC-10 bond.

The results for up to 3 years prior to the call date are shown in Figures 7 and 8. For illustrative purposes, we assume the value of the ARO in the replacement bond is 2% of the face amount of the outstanding bond. In Figure 7, the results are under a 'no negative arbitrage' regime. Under this assumption both efficiencies are close to 100%, but higher if the new ARO is (mistakenly) ignored by issuers. The difference is striking during the year just prior to the call date: ARO-aware analysis reduces the efficiency below 94%; otherwise it is essentially 100%, signaling incorrectly that the bond should be advance refunded. Risk-averse issuers who recognize the value of the new ARO should consider hedging.

Figure 8 considers the same decision under current market conditions. In this case the efficiencies are uniformly lower than those in Figure 7. As before, near the call date the efficiency in the case ignoring the new ARO is very close to 100% (recommending advance refunding), while in the ARO-aware case it is only 91% (recommending waiting until the call date). Note that two years prior to the call date, ignoring the new ARO would result in an efficiency of about 94%, while including it would lower the efficiency to roughly 86%.

## Summary

A municipal issue funding a project may be eligible for advance refunding—a valuable option. When the escrow yield is higher than the issuer's funding rate to the call date, the issuer can in essence repurchase the bonds below their fair market value. Despite arguments by finance scholars, this opportunity does represent a free lunch, since the advance refunding option is acquired automatically, at no cost, by issuing a callable bond. Another manifestation of the free lunch is when the savings from advance refunding exceed the value of the call option. Thus, the claim by Ang, et al. (2013) that advance refunding has " … at best, zero net present value …" is mistaken.

Advance refunding can be used only once in a funding lifecycle. If the original issue is advance refunded, the replacement bonds are not eligible. However, refunding beyond the call date preserves eligibility—and so there's a potential free lunch down the road.

To determine how the above consideration affects the advance refunding decision, we developed the muni refunding efficiency formula, which takes into account the advance refundability of the replacement issue. We find that ignoring the ARO of the refunding bond favors the wrong decision on advance refunding. Close to the call date, it may be preferable to hedge the forward long-term rate, and then current refund as of the initial call date.

ANDREW KALOTAY is President of Andrew Kalotay Associates, Inc., a fixed income analytics and advisory firm. He is also a member of the Fixed Income Analysts Society Hall of Fame.

LORI RAINERI is President of Government Financial Strategies, a registered municipal advisor firm that has aided hundreds of California public agencies. She is also a Certified Fraud Examiner, and a member of the Santa Clara Unified School District Hall of Fame.

## References

Ang, A., R. Green, and Y. Xing (2013). "Advance Refundings of Municipal Bonds." *Working paper.*

Kalotay, A. and W. May (1998). "The Timing of Advance Refunding of Tax-Exempt Municipal Bonds," *Municipal Finance Journal,* 19(3), 1-15.

Kalotay, A., D. Yang, and F. Fabozzi (2007). "Refunding Efficiency: A Generalized Approach." *Applied Financial Economic Letters,* 3, 141-146.

Kalotay, A. (2012). "The Allure of 5% Bonds: Coupon Levitation Creates Magical Savings." *The Bond Buyer,* January 27.

Kalotay, A. (2010). "Making Sense of the Make-Whole Call, From Its Origins to BABs." *The Bond Buyer,* July 26.

Weitzman, A. (2016). "Ramirez Develops Redemption Feature," *The Bond Buyer,* March 21.

Zhang, W. D. and J. Li (2004). "The Value of the Advance Refunding Option and the Refunding Efficiency of Tax-Exempt Bonds." *Municipal Finance Journal,* 25(1), 17-32.

***Journal of Applied Corporate Finance*** (ISSN 1078-1196 [print], ISSN 1745-6622 [online]) is published quarterly by Wiley Subscription Services, Inc., a Wiley Company, 111 River St., Hoboken, NJ 07030-5774.

Postmaster: Send all address changes to JOURNAL OF APPLIED CORPORATE FINANCE, John Wiley & Sons Inc., C/O The Sheridan Press, PO Box 465, Hanover, PA 17331.

**Information for Subscribers**
Journal of Applied Corporate Finance is published in four issues per year. Institutional subscription prices for 2016 are:
Print & Online: US$645 (US), US$772 (Rest of World), €501 (Europe), £395 (UK). Commercial subscription prices for 2016 are: Print & Online: US$860 (US), US$1025 (Rest of World), €666 (Europe), £525 (UK). Individual subscription prices for 2016 are: Print & Online: US$121 (US), £67 (Rest of World), €100 (Europe), £67 (UK). Student subscription prices for 2016 are: Print & Online: US$43 (US), £24 (Rest of World), €36 (Europe), £24 (UK). Prices are exclusive of tax. Asia-Pacific GST, Canadian GST/HST and European VAT will be applied at the appropriate rates. For more information on current tax rates, please go to www.wileyonlinelibrary.com/tax-vat. The price includes online access to the current and all online back files to January 1st 2012, where available. For other pricing options, including access information and terms and conditions, please visit www.wileyonlinelibrary.com/access.

**Delivery Terms and Legal Title**
Where the subscription price includes print issues and delivery is to the recipient's address, delivery terms are Delivered at Place (DAP); the recipient is responsible for paying any import duty or taxes. Title to all issues transfers FOB our shipping point, freight prepaid. We will endeavour to fulfil claims for missing or damaged copies within six months of publication, within our reasonable discretion and subject to availability.

**Journal Customer Services**: For ordering information, claims and any inquiry concerning your journal subscription please go to www.wileycustomerhelp.com/ask or contact your nearest office.
**Americas**: Email: cs-journals@wiley.com; Tel: +1 781 388 8598 or +1 800 835 6770 (toll free in the USA & Canada).
**Europe, Middle East and Africa**: Email: cs-journals@wiley.com; Tel: +44 (0) 1865 778315.
**Asia Pacific**: Email: cs-journals@wiley.com; Tel: +65 6511 8000.
**Japan**: For Japanese speaking support, Email: cs-japan@wiley.com; Tel: +65 6511 8010 or Tel (toll-free): 005 316 50 480.
**Visit our Online Customer Help** available in 7 languages at www.wileycustomerhelp.com/ask

**Production Editor: Amit Bansal (email: ambansal@wiley.com).**

**Back Issues:** Single issues from current and recent volumes are available at the current single issue price from cs-journals@wiley.com. Earlier issues may be obtained from Periodicals Service Company, 351 Fairview Avenue – Ste 300, Hudson, NY 12534, USA. Tel: +1 518 537 4700, Fax: +1 518 537 5899, Email: psc@periodicals.com

View this journal online at wileyonlinelibrary.com/journal/jacf.

Access to this journal is available free online within institutions in the developing world through the AGORA initiative with the FAO, the HINARI initiative with the WHO, the OARE initiative with UNEP, and the ARDI initiative with WIPO. For information, visit www.aginternetwork.org, www.who.int/hinari/en/, www.oaresciences.org, www.wipo.org/int/ardi/edn.

Journal of Applied Corporate Finance accepts articles for Open Access publication. Please visit http://olabout.wiley.com/WileyCDA/Section/id-406241.html for further information about OnlineOpen.
Wiley's Corporate Citizenship initiative seeks to address the environmental, social, economic, and ethical challenges faced in our business and which are important to our diverse stakeholder groups. Since launching the initiative, we have focused on sharing our content with those in need, enhancing community philanthropy, reducing our carbon impact, creating global guidelines and best practices for paper use, establishing a vendor code of ethics, and engaging our colleagues and other stakeholders in our efforts.

Follow our progress at www.wiley.com/go/citizenship

**Abstracting and Indexing Services**
The Journal is indexed by Accounting and Tax Index, Emerald Management Reviews (Online Edition), Environmental Science and Pollution Management, Risk Abstracts (Online Edition), and Banking Information Index.