Taxable Advance Refundings: A Critical Examination

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The Tax Cuts and Jobs Act of 2017 (TCJA) eliminated advance refundings with tax-exempt bonds, but it is silent on advance refundings with taxable bonds. In today's low interest rate environment, such taxable refundings have become a trend. Although these transactions generate large savings, the odds favor waiting until the call date and then refunding with tax-exempt bonds. Unless interest rates rise significantly, waiting would result in much greater savings. The interest rate risk can be mitigated by issuing callable taxable bonds, which afford eventual refunding with tax-exempt bonds. However, this strategy does not improve the economics significantly—the higher coupon of the callable bonds reduces the savings until they are called. The typical savings from taxable refundings extract only about 70% of the forfeited option value of the refunded bonds.

Introduction

Issuance of tax-exempt bonds is subject to federal regulations. As regulations change, the industry adapts accordingly. Perhaps the most significant change over time has been the tightening of the rules pertaining to advance refunding. At one time, an advance refunding issue could itself be advance refunded while the original issue was still outstanding, and this resulted in the proliferation of tax-exempt bonds. The permitted number of advance refundings was gradually reduced over time, until they were completely eliminated by the Tax Cuts and Jobs Act of 2017 (TCJA). Today, only a single tax-exempt issue can support a qualifying project.[1]

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[1] The Internal Revenue Code has included significant requirements for advance refundings to qualify as tax exempt since 1986, including a limitation of one advance refunding per original tax-exempt issue. In 2017, with the approval of Public Law No. 115-97, 131 Stat. 2054, 2154 (2017), sometimes referred to as the "2017 Tax Act" or the "Tax Cuts and Jobs Act of 2017" (TCJA), tax-exempt advance refundings were eliminated. The relevant section of Public Law No. 115-97, Section 13532, is titled "Repeal of Advance Refunding Bonds."

Although advance refunding with tax-exempt bonds is no longer allowed, the TCJA is silent on doing so with taxable bonds, and in today's low interest rate environment, the latter has become a trend. Advance refunding high-coupon bonds with taxable bonds can generate large savings; however, there is considerable interest rate risk—unless interest rates increase significantly by the call date, refunding then with tax-exempt bonds would be preferable. The interest rate risk can be mitigated by issuing callable taxable bonds and replacing them with tax-exempt bonds once the original tax-exempt bonds are retired. Adding the call feature does not significantly improve the economics, because doing so would increase the coupon and thus reduce the savings until the call date of the taxable bonds.

In technical terms, the trade-off is between the realized present value savings and the forfeited time value of the call option. Our analysis indicates that the typical advance refunding with taxable bonds extracts only about 70% of the option value; the remaining 30% is a loss to the municipal taxpayers. The potential waste is comparable to that of the notorious synthetic fixed coupon transactions involving swaps about a decade ago.

At the start of the taxable advance refunding fad, municipalities issued non-callable bonds to refund. Subsequently, callable taxable bonds, which enable the municipality to eventually revert to tax-exempt bonds, gained popularity. In the latter case, the call decision depends on the borrower's tax-exempt borrowing rates, and we show that this can result in a windfall for investors.

There are two distinct beneficiaries from taxable advance refunding. One is the familiar collection of intermediaries and ancillary service providers in municipal finance. The other is the U.S. government, because the decline in the volume of tax-exempt bonds reduces the implied federal subsidy.

Coupon Levitation Stimulates Refunding Transactions

For more than a decade, the standard structure for municipal bonds has been a 5% coupon across the maturity spectrum, with bonds longer than 10 years being callable at par at any time after Year 10 (5% NC-10 for short). Due to the prevalence of this structure, the standard tax-exempt benchmark yield curve is based on the prices of 5% NC-10 bonds. Because tax-exempt rates have been much lower than 5%, these bonds are normally issued at substantial premiums above par, even at prices above 120. Institutional investors prefer premium bonds to par bonds in order to avoid the "de minimis" effect in the event interest rates rise and the prices of the bonds decline below par. When that happens, the marginal buyer is taxed on the resulting gain at maturity, the applicable tax rate being the capital gains rate or ordinary income, depending on the size of the gain. This de minimis tax effect further depresses the prices of discount bonds, resulting in underperformance relative to bonds selling at a premium.

Callable bonds issued at a high premium are tailor-made for refunding. The original intent of the refunding feature was to enable borrowers to benefit from declining interest rates. However, 5% munis are different: they will be refunded even if interest rates rise, as long as they do not exceed that coupon level.

Prior to 2018, borrowers could realize substantial savings by advance refunding well before the initial call date in Year 10.[2] Not surprisingly, few 5% NC-10 bonds survived to the call date. In a conventional advance refunding transaction, the municipality issued long-term tax-exempt refunding bonds and invested the proceeds in an escrow portfolio of Treasuries to defease the refunded issue to the call date.[3] The transaction saved interest, consistent with the industry's focus on the favorable optics of showing cash flow savings. Unfortunately, little attention was paid to the value of the call option forfeited in the process. The apparent lack of attention to opportunity cost has been pointed out by several authors. For example, in an insightful study of advance refunding transactions executed by Texas school districts,[4] Dzigbede found that the expected loss of option value exceeded savings on the average by 3.28% of the face amount of the refunded bonds. Similar results were obtained by Ang et al.,[5] who found that 85% of advance refundings fail to extract full option value. Part of the inefficiency is attributable to the so-called negative arbitrage: the yield of the short-term Treasury bond escrow portfolio is usually well below the cost of the long-term refunding bonds.[6]

Issuing callable bonds with coupons far above the prevailing market level virtually guarantees substantial savings from refunding them. By convention, savings are reported based on the assumption that the refunded bonds would have stayed outstanding to maturity—not a realistic base case at all, given how deep-in-the money the call option is at the time of issuance. In light of the industry's obsession with showing savings, this kind of thinking would argue for issuing bonds with even higher coupons—why not 6% or 7%?

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

[3] Kalotay A., and L. Raineri (2016). "Don't Waste a Free Lunch: Managing the Advance Refunding Option." *Journal of Applied Corporate Finance, 28(4)*, 118–123.

[4] Dzigbede, K. (2017). "School District Bond Advance Refunding and Option Value Loss." *Municipal Finance Journal, 38(2)*, 39–57.

[5] Ang, A., R. Green, F. Longstaff, and Y. Xing (2017). "Advance Refundings of Municipal Bonds." *Journal of Finance, 72(4)*, 1645–1682.

[6] May, W. (1999). "The Impact of Negative Arbitrage on the Advance Refunding of Tax-Exempt Municipal Debt." *Municipal Finance Journal, 20(1)*, 68–84.

Advance Refunding With Taxable Bonds

With the elimination of advance refunding following the TCJA, the churning by advance refundings came to a brief halt. Today, only a single tax-exempt issue can support a qualifying project.[7] However, there is still an abundance of 5% not-yet-callable bonds outstanding, not to mention those that continue to be issued. With taxable interest rates being well below the customary 5% coupon, municipalities can save interest by advance refunding with taxable bonds. This transaction has become the latest fad in municipal finance. Driven by advance refundings, the volume of taxable munis rose to 16% of total municipal issuance in 2019. The taxable volume in 2020 through August was $81.3 billion, representing 29.2% of municipal issuance during that period (SIFMA). The popularity of this transaction has far-reaching implications for the municipal finance landscape.

The mechanics of advance refunding with taxable bonds are the same as those with tax-exempt bonds, with the exception of the usual investment restriction applicable to tax-exempt bonds. Let's consider, for example, a high-grade $100MM 5% tax-exempt bond with 22 years to maturity and 2 years to call. Currently, the coupon on the maturity-matched optionless taxable refunding bond would be about 3.05%. We assume that the escrow yield is 1% and the transaction cost is 1% of the refunding issue. The size of the escrow at a yield of 1% is about 108% of the original par amount. Current short Treasury yields are actually much lower, contributing to greater inefficiency from negative arbitrage, as explained in May.[8] Grossing up the new par amount in order to have enough proceeds to pay for the escrow portfolio after issuance costs, we arrive at a new issuance size of around $109MM. Despite the negative arbitrage of 2.05% over two years, the transaction generates considerable savings of about 24% of the face amount of the refunded issue on a present value basis, or about $24MM.

Saving 24% of face value is impressive but hardly surprising when we keep in mind that the refunded bonds carry a 5% coupon. However, what if the issuer waited until the call date two years from now, at which time it could refund with tax-exempt bonds? The savings are uncertain, because they depend on the evolution of the tax-exempt rates, but the issuer's current tax-exempt rate provides an indication of what to expect.

Figure 1 shows the tax-exempt Municipal Market Analytics 5% non-call 10 yields in late April 2020, along with the implied optionless par rates based on an interest rate volatility of 25%, which is in line with today's market. According to Figure 1, the 22-year par optionless rate is about 2.55%.

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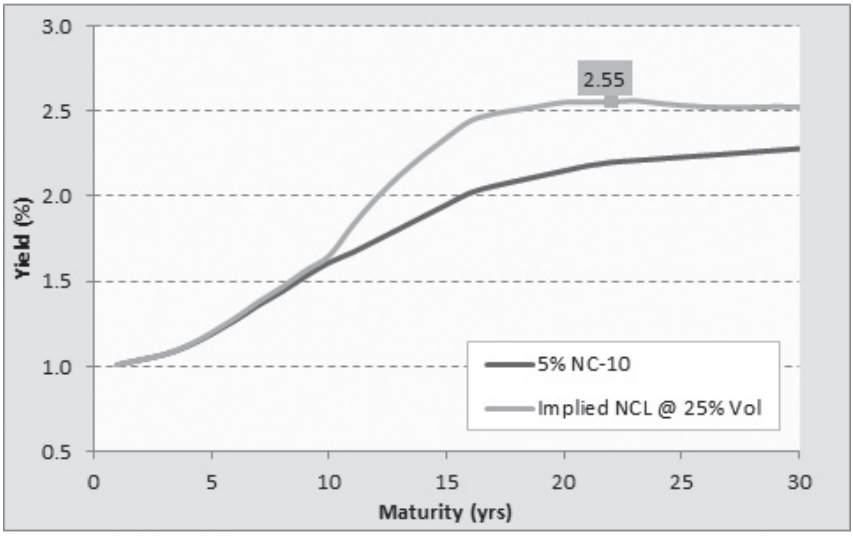
[7] Kalotay, A. (2018). "Life Without Advance Refunding." *Municipal Finance Journal, 39(3)*, 61–70.

[8] May, supra note 6.

Figure 1: Current Tax-Exempt Yield Curves



Source: Municipal Market Analytics, late April 2020.

Recall that the 22-year par taxable rate is about 3.05%, which is 50 basis points higher.

Advance Refund or Wait?

Let's discuss how, at a high level, volatility affects the results of the refunding analysis presented below. To begin, the higher the volatility, the lower will be the implied optionless yield curve. Thus the current volatility cannot be much below 25%, because a lower volatility would reduce the spread between the taxable and tax-exempt rates to an unrealistic level, much tighter than 50 basis points. How about the savings resulting from refunding with an optionless bond? If we discount using optionless tax-exempt rates, the savings will be volatility-dependent: higher volatility reduces the discount rates and therefore increases savings on a present value basis. How about the option value of the outstanding high-coupon tax-exempt bond? We know that the option is deep in the money; nevertheless, its value is volatility-dependent: higher volatility reduces the optionless rates, and thus, the forward refunding rate as of the call date. In turn, the lower forward rate increases the option value.

The choice of the discount rate(s) is a related question that warrants a closer look. The industry practice is to discount tax-exempt bonds with tax-exempt rates and taxable bonds with taxable rates. But what if a transaction entails both tax-exempt and taxable bonds? From the issuer's perspective, the risks of the corresponding cash flows are the same, so the same discount

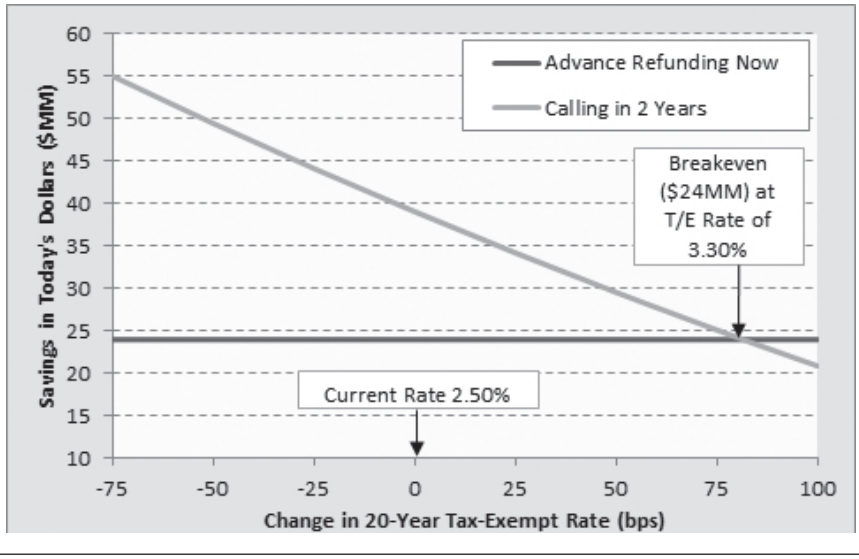
rate is applicable. As shown in Kalotay and Tuckman,[9] the theoretically correct approach for the issuer is to use taxable discount rates. Because in the case under consideration the discount rate has only an insignificant effect, in accordance with industry practice, we use the tax-exempt rates.

The economic analysis of advance refunding requires calculating currently attainable savings and estimating the opportunity cost, i.e., the expected savings from waiting. Calculating savings is the easy part. Estimating the opportunity cost requires modelling the uncertainty of future interest rates.

The opportunity cost is the forfeited option value (as discussed below). But even those who are uncomfortable with options should be able to calculate how the savings would depend on the 20-year tax-exempt rate as of the call date two years from now and determine the break-even refunding rate. As a point of reference, recall from Figure 1 that the current 20-year tax-exempt rate is 2.50%. The results are displayed in Figure 2.

According to Figure 2, the break-even 20-year tax-exempt rate is 3.30%, which is 80 basis points higher than today's 2.50% 20-year rate. In other words, advance refunding today is preferable to waiting only if tax-exempt rates rise by more than 80 basis points within two years. The odds of this happening are rather slim: the probability is less than 15%.

Figure 2: Waiting to Call vs. Advance Refunding Now ($100MM Par Amount)



[9] Kalotay A., and B. Tuckman (1999). "Subsidized Borrowing and the Discount Rate: The Case of Municipal Capital Budgeting and Financial Management." *Municipal Finance Journal, 19(4)*, 38–45.

It is remarkable that the 3.30% break-even 20-year tax-exempt rate is 25 basis points higher than today's *taxable* refunding rate. The primary reason for this is the large negative arbitrage, amounting to roughly 4 points over two years (taxable coupon of 3.05% less escrow yield of 1% until the call date).

Instead of making a subjective decision based on the break-even rate, it is preferable to use a professional option-based approach. The basic idea is to compare the present value savings to the net loss of option value. The latter is the difference between the forfeited value of the option in the refunded bond and the option acquired in the refunding issue, in the case the latter is callable. Initially, the taxable bonds used for advance refunding were non-callable, but recently it became fashionable to issue callable refunding bonds (callable taxable refunding bonds will be discussed in the next section). The call option increases the coupon of the refunding bonds and thus reduces savings. However, the new call option is an asset whose value should be recognized.

The ratio of present value of savings to the net loss of option value is the so-called "refunding efficiency."[10] The net loss of option value in the formula below is the difference between the forfeited option value of the refunded bonds and the acquired option value of the replacement. If the replacement is optionless—as in this case—the latter is zero.

$$\textit{Refunding Efficiency} = \frac{\textit{Present Value Savings}}{\textit{Net Loss of Option Value}}.$$

The maximum attainable efficiency is 100%. Refunding is recommended only when the efficiency is close to 100% because anything below 100% is wasteful to the issuer. As we will see, the efficiency of a typical taxable advance refunding with taxable bonds is markedly below 100%. The implication is that by waiting, the issuer can expect to realize considerably greater savings.

Let's return to the example of refunding with 3.05% optionless bonds. Recall that the savings amounted to $24MM, the value of the forfeited option was about $35MM, and the resulting efficiency was about 70%. In other words, the transaction would waste 30% of the option value, amounting to $11MM.

Figure 3 shows how the coupon of the non-callable taxable refunding bond affects the refunding efficiency when the issuer's tax-exempt borrowing rate is 2.55%. The lower the coupon of the refunding bonds, the greater are the savings and the higher the efficiency. In order to reach 90% efficiency, the

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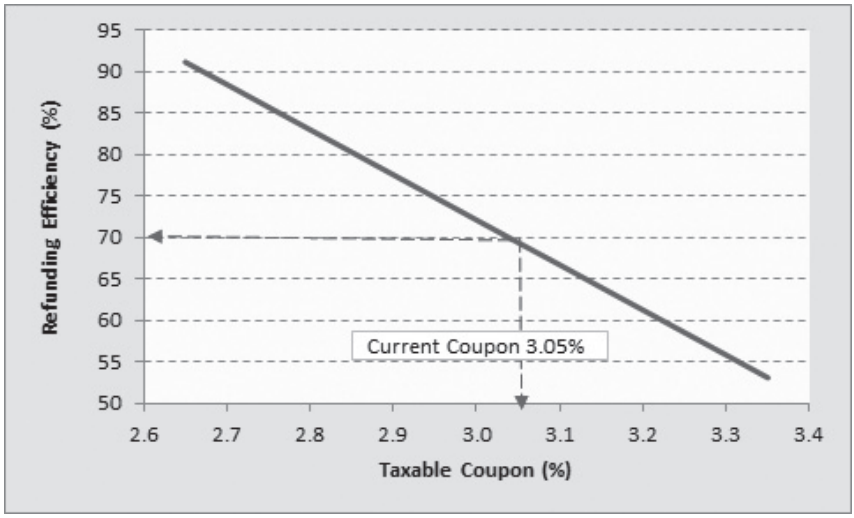
[10] Kalotay, A., D. Yang, and F. Fabozzi (2007). "Refunding Efficiency: A Generalized Approach." *Applied Financial Economic Letters, 3(3)*, 141–146.

Figure 3: Refunding Efficiency with 22-Year Taxable Bullet (T/E Coupon 2.55%)



taxable rate would have to be within 15 basis points of the like tax-exempt rate—unrealistically tight by any measure. However, the efficiency rapidly declines as the taxable rate increases, approaching 50% when the refunding coupon is 3.35%.

Advance Refunding With Callable Taxable Bonds

It is a standard practice in municipal finance to refund long-term tax-exempt bonds with callable bonds. However, in the initial burst of taxable advance refunding activity, the replacement bonds were issued without a call feature. The downside here is that issuers of such bonds cannot take advantage of lower rates until the bonds mature.

Several strategies have been proposed to compensate for the demise of traditional advance refunding. Sobel and League provide a good survey of these alternatives.[11] Forward delivery refundings and rate locks can be expensive and give up the chance of additional savings from a decline in rates. Synthetic selling of call rights is another strategy but suffers from the same drawback. These and other strategies involving derivatives, such as forward starting swaps, all come with myriad risks enumerated in some detail

[11] Sobel, L., and B. J. League (Orrick) (2020). "Update on Tax-Exempt Advance Refunding Alternatives." *Bond Buyer Webinar*, March 31, 2020.

by Sobel and League[12]—basis risk, counterparty risk, pricing transparency, to name a few.

One hybrid approach entails the so-called "Cinderella bonds" issued to raise proceeds for an advance refunding. This is a "one-obligation" structure that pays taxable coupons until the call date of the refunded bond and switches to tax-exempt coupons thereafter. An obvious problem with Cinderella bonds is that tax-exempt bonds are held by taxable accounts, whereas taxable bonds are normally held by non-taxable investors or in tax-deferred accounts.

Callable taxable bonds are superior alternatives to Cinderella bonds. The call option allows the issuer to switch back by refunding with tax-exempt debt. The efficiency calculation of such a refunding requires valuing the call option using the issuer's tax-exempt borrowing rates. The downside of using callable bonds is that they carry a higher coupon or are sold at a lower cost, and in either case, the reported cash flow savings are reduced.

The Issuer's Perspective. In the previous section, we assumed that the refunding bond was optionless and that the issuer's 22-year taxable borrowing rate was 3.05%. A possible alternative is to refund with bonds callable in Year 10 at par. Based on market conditions at the time of writing, the coupon of such bonds sold at par would be roughly 3.25%, i.e., 20 basis points higher. The higher coupon would reduce savings, but the call option would enable the issuer to refund with tax-exempt bonds 10 years from now. For perspective, the issuer's current 12-year tax-exempt borrowing rate is about 2% (see Figure 1).

We can calculate the efficiency of refunding with taxable 3.25% NC-10 bonds using the generalized refunding efficiency formula above. The present value savings would decline from $24MM to $21MM. The value of the call option of the outstanding bonds would remain the same, roughly $35MM. The complicated part is the value of the call option of the taxable refunding bonds, because they would be refunded with tax-exempts bonds, and tax-exempt rates are certain to be lower than like taxable rates. Future taxable rates are therefore irrelevant; only the tax-exempt rates matter.

The value of the call option turns out to be about $7.6MM, and the net loss of option value is therefore $27MM, resulting in an efficiency of roughly 78%. This is higher than the 70% efficiency in case the refunding bond is optionless but is still well below the acceptable minimum. Setting the initial call date to less than 10 years would increase the coupon, resulting in lower savings but also in less option value loss. Importantly, the efficiency would still remain unacceptably low.

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[12] Id.

The Investor's Perspective. The coupon of a 22-year 3.25% callable taxable bond includes a 20 basis point charge for the par call in Year 10—comparable to the premium on similar taxable corporate bonds. The 20 basis point premium is consistent with the notion that the borrower will refund with a like taxable security at the "optimal" time, which is also the most detrimental for the investors. The remarkable aspect of callable taxable munis is that such may not be the case, creating hidden value for the investors.

The issuer of callable taxable bonds may be able to dip into the tax-exempt market to refund. As noted above, tax-exempt rates are always lower than like taxable rates. Due to this spread, the taxable bonds may be called when their "taxable" value is below the call price. Needless to say, investors would more than welcome such calls.

To see this, let's fast forward to the initial call date of our 3.25% 22-year NC-10 bond, with 12 years left to maturity. Suppose that the 12-year tax-exempt rate has increased by 100 basis points, from its current 1.87% level (see Figure 1) to 2.87%. The issuer would refund its 3.25% taxable bonds with 2.87% tax-exempt bonds, saving 38 basis points. How would this call look to the investor? Assuming that the 12-year taxable rate has also increased, going from 2.37% (1.87% + 0.50 bps) to 3.37%, the price of the 3.25% callable taxable bond would be about 98, or 2 points below par. A discount bond being called at par is a bonanza for the investor. As demonstrated by this example, the municipality may call its taxable bonds at par when they would be worth less than par in the taxable market. The potential windfall to investors, which depends on the remaining time to maturity and on the spread between taxable and tax-exempt rates, can be quantified by option-based analytics. The expected windfall for our 22-year NC-10 bond at a 50 basis point spread is about 1.5 points.

The Effect of Volatility. The examples above are based on the assumption that the lognormal volatility of tax-exempt interest rates is 25%, in line with current market conditions. Volatility affects the implied tax-exempt optionless rates shown in Figure 1: the higher the volatility, the lower are the optionless par rates, as well as the corresponding discount rates. Lower discount rates, in turn, increase the present value savings. However, higher volatility also increases option values. But what happens to the efficiency, which is the yardstick used to make a refunding decision? It turns out that the efficiency is remarkably stable. For example, for our featured bond, it is barely above 70%, far short of the acceptable level.

Summary: Taxable Advance Refunding on a National Scale

Currently the volume of high-coupon bonds callable within three years is roughly $400 billion. The results below are based on the assumption that $200 billion (50% of the total) may be advance refunded.

Loss to Municipal Issuers. According to our findings, the refunding efficiency of a typical advance refunding is at most 75% efficient, that is, 25% of the potential savings are wasted. Because the coupons of the refunding candidates are at or near 5%, the option values are quite substantial; we will assume 30% of the outstanding principal (or $60 billion). Based on these assumptions, the typical transaction would leave 7.5% of the principal amount on the table. On the national scale, the loss to municipal issuers comes to $15 billion. In terms of scale, the loss from taxable advance refunding is comparable to the $20 billion loss resulting from the structured synthetic transactions involving swaps more than a decade ago.[13] Who is accountable for the inefficient advance refunding transactions?[14]

Reduced Federal Subsidy. Who is the beneficiary of the considerable waste resulting from advance refunding with taxable bonds? As noted above, a rough estimate of the loss is about 25% of the value of the forfeited call option. The primary beneficiary is the U.S. government, because the volume of tax-exempt bonds declines. The method proposed in Kalotay and Tuckman[15] can be applied to quantify the reduction of the subsidy:

Federal Subsidy of Tax-Exempt Debt = Tax-Exempt Value − Taxable Value.

Consider, for example, a $100 tax-exempt issue whose market value is $105MM, but if the coupons were taxable it would be only $98MM. The resulting subsidy is $7MM.

Let's apply this formula to $200 billion tax-exempt bonds, disregarding optionality in order to simplify the analysis. Assume that the bonds are selling near par, and their average remaining life to maturity is 25 years. The optionless tax-exempt rate is 2.6%, and the taxable rate is 3.2%, 60 basis points higher. It follows that the taxable value of the bonds is roughly 93. The estimated decline of federal subsidy is $14 billion, obtained by applying the 7% discount to the $200 billion principal. The $14 billion decline of federal subsidy is in line with the $15 billion loss to the municipal issuers. A possible explanation for the $1 billion difference is transaction cost. The effect of the reduction of the federal subsidy provides a rich vein for both public policy and academic research.

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[13] Kalotay, A. (2011). Prepared Remarks at SEC Hearing on the State of Municipal Securities Market, Birmingham, AL, July 29, 2011.

[14] It would seem that the primary responsibility lies with the municipal advisors, as they have a fiduciary duty to protect issuers from questionable deals.

[15] Supra note 9. See also Kalotay, A. (2007). "The Right Discount Rate Could Save Your Life." *Financial Engineering News* (January/February 2007).

As stated above, one intent of the TCJA was to limit to one the number of outstanding tax-exempt issues supporting a project. Conventional advance refunding had the result that the defeased tax-exempt issue remained outstanding until the call date, overlapping with the tax-exempt refunding issue during that time. As issuers resort to taxable advance refundings, the TCJA seems to have triggered an unanticipated benefit to the federal government: After the (defeased) refunded tax-exempt issue is called, there is *no federal subsidy* for the project during the remaining time to maturity of the refunding *taxable* issue unless it is eventually refunded with tax-exempt bonds.