PMA SECURITIES

MUNI BONDS 101

NIC, TIC, AIC & Bond Yield -What's the Difference?

DECEMBER 2019

The Basics

Par Amount, Coupon, Yield & Purchase Price

Below are foundational terms that will be used when discussing different measures of the cost of financing associated with a bond issue.

The **par amount**, also known as the principal amount, is the stated dollar amount of a given maturity or the bond issue.

The **coupon** is the rate at which interest is paid on each maturity of the bond issue. Stated differently, the coupon determines the semiannual interest payment made by the issuer to the investor. It's important to note that the coupon is not a measure of the cost of capital to the issuer.

The **yield** is the annual rate of return on each maturity of a bond issue, and is a function of the coupon and the price of the maturity. For a bond that is not subject to prepayment by the issuer, the yield is the true cost of capital to the issuer, or conversely, the true rate of return to the investor. For a discussion on the yield on callable premium bonds, click here: Muni Bonds 101: "Premium Bonds after the Call Date".

The **purchase price** of a bond issue is the aggregate par amount of all the maturities, plus accrued interest and original issue premium (or less any original issue discount), and less the underwriter's discount. If the price of a given maturity's stated par amount is greater than 100%, the maturity is priced at a premium. Similarly, if the price of a given maturity is less than 100%, the maturity is priced at a discount. The aggregate of the individual maturity's premiums and discounts, if any, determines if the bond issue is being offered at a premium or discount.

TIC vs. AIC

What do they measure? And how are they different?

When a bond issue has a number of different maturities, each with its own combination of coupon, price and yield, there are ways to calculate the average borrowing rate of the entire issue. For the purposes of awarding a bond issue to the best bidder on a competitively sold issue, the **TIC** or "True Interest Cost" is the method most commonly used today. The TIC is defined as the discount rate which equates the principal and semi-annual interest payments on the bonds to the purchase price paid by the underwriter to the issuer.

Prior to the acceptance of awarding bonds based on the TIC, interest cost was measured using the **NIC**, or "Net Interest Cost," which is determined by dividing the total interest payments, less any premium or plus any discount, by the bond years of this issue. Unlike the TIC, the NIC does not take into the account the timing of interest payments and therefore, it is not a present value calculation.

The **AIC**, or "All-Inclusive Cost," is similar to the TIC in that it takes into account the time value of money. The difference between the AIC and TIC is that the AIC also deducts the costs of issuance from the purchase price. Therefore, the AIC is the discount rate which equates the principal and semi-annual interest payments to the net proceeds received by the issuer. For this reason, the AIC provides a more complete measure of the total cost of a bond issue.

There are circumstances in which the AIC and the TIC are very similar in magnitude and times when the AIC can be materially higher. Table 1 below summarizes four hypothetical financings that all have a par amount of $1,000,000 with costs of issuance totaling $25,000, and the same TIC of 3.0% (implying a perfectly flat yield curve). The difference between the scenarios is that the maturity of each issue is varied to be either one, five, 10 or 20 years. As is shown, the AIC is significantly higher than the TIC for the one-year maturity (5.6% vs. 3.0%), and closest in value for the 20-year maturity (3.3% vs. 3.0%). This illustrates that, all things being equal, the impact of issuance expenses on the issuer's total cost of financing (i.e., the AIC) is reduced with longer maturities as the expenses have more years over which they are distributed.

TIC VS. AIC COMPARISON

Maturity	Par	Costs of Issuance	TIC	AIC	Difference TIC vs. AIC
1 Year	$1mm	$25mm	3.0%	5.6%	2.6%
5 Years	$1mm	$25mm	3.0%	3.9%	0.9%
10 Years	$1mm	$25mm	3.0%	3.5%	0.5%
20 Years	$1mm	$25mm	3.0%	3.3%	0.3%

Table 1. Source: PMA Securities, LLC 11/27/19

Another Way to Compare Direct Placement and Public Offering

Another useful application for comparing the TIC to the AIC is when evaluating the cost of a direct placement versus a public offering.

A **direct placement** is a private sale of securities offered to a limited number of investors. A direct placement generally has lower cost of issuance expenses than a public offering due to the absence of an underwriter, rating, certain legal fees and official statement preparation.

Conversely, a **public offering** is a sale of securities to a wide range of investors. A public offering generally has higher cost of issuance expenses because it requires the production of an offering document, underwriting services, and often has credit rating, paying agent, and additional disclosure related legal fees.

For larger and longer dated bond issues, a public offering has historically yielded the lowest cost of financing as measured by both the TIC and AIC. However, as the scenarios provided in Table 1 above illustrate, there are circumstances when additional cost of issuance expenses can have a material impact on an issuer's total cost of financing. This is why we suggest that issuers consult with their financial advisor to analyze the total cost of borrowing for both a direct placement and a public offering.

Bond Yield (Arbitrage Yield)

What is it? And why is it important?

The **bond yield**, also known as the **arbitrage yield**, is calculated for a bond issue in a manner similar to the calculation of the TIC. The bond yield is defined as the discount rate which equates the principal and semi-annual interest payments on a bond issue to the **original issue proceeds**.

There are two key differences between the calculation of the purchase price and the calculation of original issue proceeds. The first difference is that the purchase price factors in the underwriter's discount as part of the calculation, but original issue proceeds does not account for it. The second difference is that the purchase price is not reduced by the amount of "bond insurance premium," or "credit enhancement," but original issue proceeds is reduced by bond insurance, if applicable.

The bond yield is particularly important for tax-exempt, new money financings, as it is the yield used by the U.S. Treasury for the purpose of determining compliance with tax-exempt arbitrage regulations.

Summary

NIC, TIC, AIC and Bond Yield

Tables 2 and 3 (above-right) provide summaries of how NIC, TIC, AIC and Bond Yield are calculated.

NIC, TIC, AIC AND BOND YIELD CALCULATION

Costs Summary Statistics	Premium	Original Issue Discount	Accrued Interest	Bond Insurance*	Underwriter Discount	Issuance Costs
NIC	Yes	Yes	No	No	Yes	No
TIC	Yes	Yes	Yes	No	Yes	No
AIC	Yes	Yes	Yes	Yes	Yes	Yes
Bond Yield	Yes	Yes	Yes	Yes	No	No

Table 2. Source: PMA Securities, LLC. **For some competitive sales, bond insurance can be purchased at the option of the underwriter. As such, bond insurance would be treated as part of the underwriter's discount and would be included as part of the NIC and TIC calculations.

NIC	**Net Interest Cost** (NIC) captures the cost of financing that factors the future debt payments and the underwriter's discount. NIC = Rate which equates the future Principal & Interest payments to the Purchase Price
TIC	**True Interest Cost** (TIC) captures the present value cost of a financing that factors the future debt payments and the underwriter's discount. TIC = Discount Rate which equates the future Principal & Interest payments to the Purchase Price
AIC	**All Inclusive Cost** (AIC) captures the present value cost of a financing that factors the future debt payments and all costs of issuance. AIC = Discount Rate which equates the future Principal & Interest payments to the Net Proceeds
Bond Yield	**Bond Yield** captures the present value cost of a financing that factors the future debt payments and bond insurance, if applicable. Bond Yield = Discount Rate which equates the future Principal & Interest payments to the Original Issue Proceeds

Table 3. Source: PMA Securities, LLC

Next Edition Muni Bonds 101:

How Municipal Bonds are Sold in the Market

If you have questions or would like to discuss the summary rates in more detail, please contact any of PMA's Public Finance advisors below.

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