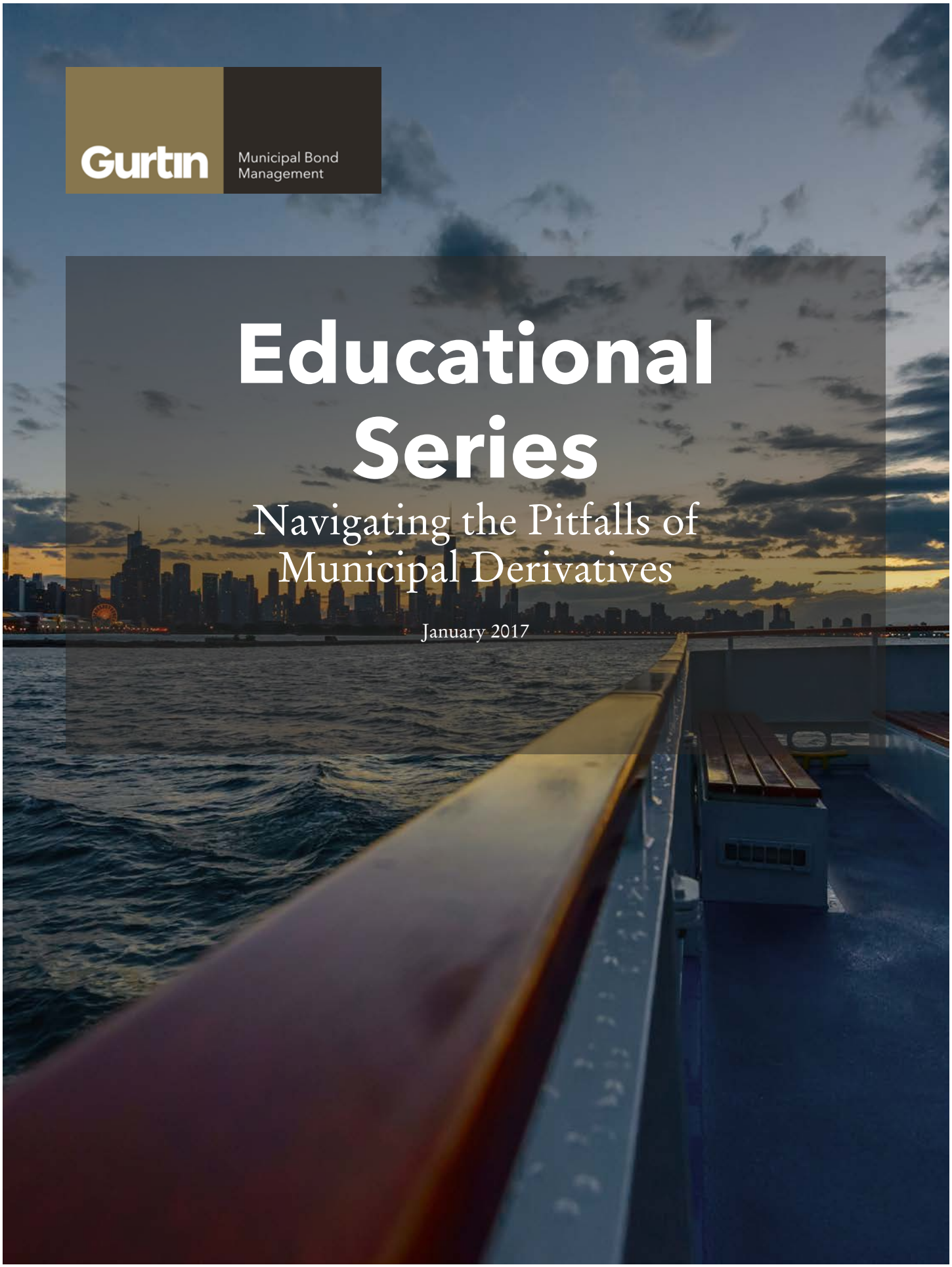


Gurtin Municipal Bond Management

Educational Series

Navigating the Pitfalls of Municipal Derivatives

January 2017

Introduction

Though municipal derivatives are not inherently risky, ignorance of their related risks – and how to mitigate those risks – can be dangerous as a result of being highly opaque and misunderstood, not being reflected in credit ratings or market pricing, and having a potentially dramatic impact.

Derivatives are Highly Opaque and Misunderstood

Derivatives continue to be one of the most misunderstood financial instruments in the already opaque municipal asset class, with many market participants – including issuers, credit analysts, and investors – either not realizing that municipal derivatives even exist, or misunderstanding how their underlying risks can affect municipal bonds' credit quality. Unfortunately for municipal investors, information regarding derivatives is often scarce, and many issuers' sole knowledge on derivatives comes from the very bankers who are selling them the derivatives, causing a clear conflict of interest and perpetuating the opacity.

Derivative Risk is not Reflected in Credit Ratings or Market Pricing

Though ratings agencies are often viewed as the arbiters of credit quality, their analyses almost universally fail to mention or gloss over the details surrounding municipal derivatives, and their credit ratings frequently fail to incorporate municipal derivatives' underlying risks. Further, because derivative risk is rarely accounted for in credit ratings, municipal derivatives are frequently mispriced and do not appropriately compensate bondholders for the risks to which they are exposed.

The Impact of Derivative Risk Can Be Dramatic

The potentially dramatic impact of derivative risk can be seen in many cases, but is especially well-illustrated by the city of Chicago. Having entered into various derivative agreements in order to borrow at lower interest rates, Chicago ultimately found itself facing general obligation (GO) debt with a negative total value of $147.3 million and termination triggers/debt acceleration totaling $2.2 billion following downgrades and falling interest rates – paying the long-term price for its short-term solution and leaving its bondholders to deal with the consequences (see case study for more information).

With ratings agencies, issuers, and credit analysts all struggling to understand the risks of municipal derivatives, municipal bond investors are left perilously in the dark. In an effort to empower municipal bond investors with a better understanding of derivatives and the hazards that often accompany them, the following municipal derivatives overview seeks to highlight the major risks of derivatives and help arm municipal bond investors with the tools to identify a municipal manager or broker capable of navigating these potential pitfalls.

What are Municipal Derivatives?

Types of Municipal Derivatives

Though derivatives are a very broad category of financial instruments that can take many different shapes and forms, derivatives in the municipal market typically refer to interest rate swaps. At its most basic level, an interest rate swap is simply an exchange of cash flows (interest payments) based on a principal or notional amount between two "counterparties," which are most commonly a public debt issuer and a bank.

There are three major types of interest rate swaps that an issuer may enter into, including:

- **Floating-to-fixed rate swap**: The issuer pays a fixed rate, and the bank counterparty pays a floating rate.
- **Fixed-to-floating rate swap**: The issuer pays a floating rate, and the bank counterparty pays a fixed rate.
- **Basis swap**: Both the issuer and the bank counterparty pay floating rates, usually based on different indexes.

As floating-to-fixed rate swaps make up the vast majority of municipal swaps, this municipal derivative overview will primarily focus on that category.

Why Enter Into a Swap?

There are three primary reasons public debt issuers enter into swaps: 1) to lower overall interest costs, 2) to provide additional cash flow, or 3) to hedge basis risk created by another swap.

Using Swaps to Lower Overall Interest Costs

The primary reason public debt issuers enter into swaps is to lower their overall interest costs on a specific bond issuance. For floating-to-fixed rate swaps, the issuer issues floating-rate bonds, usually based on the Securities Industry and Financial Markets Association (SIFMA) Municipal Swap Index, and then enters into a swap where it "exchanges," or pays a fixed interest rate to a bank counterparty, while receiving a floating rate from the bank counterparty. The issuer then passes the floating rate from the bank onto bondholders for payment on the underlying bonds it issued (see Figure 1 below). The basic rationale for entering into a swap agreement like this is that the fixed rate paid to the bank counterparty would be less than the rate the issuer would pay had it issued fixed-rate bonds without a swap. However, like most securities in the financial markets, paying a below-market rate often translates into either receiving a lesser return or undertaking additional risk, and municipal derivatives are no different.

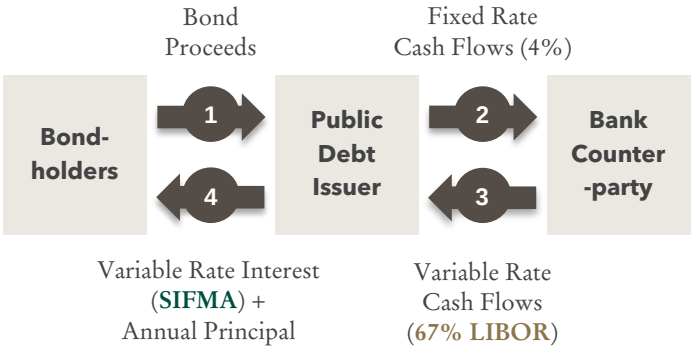
As an example of a floating-to-fixed rate swap, suppose that an issuer determines that it is necessary to construct a new city hall and public service facility with a 30-year useful life. The issuer decides to issue bonds to finance the facilities, and engages an underwriter in facilitating the bond issue. The underwriter informs the issuer that, given the bond structure and the issuer's credit quality, the issuer has two options: 1) issue fixed-rate bonds at a 4.5% interest rate, or 2) issue variable, or "floating," rate bonds and synthetically fix the interest rate at 4%. The issuer prefers to pay a 4% interest rate rather than a 4.5% interest rate, and enters into a floating-to-fixed rate swap agreement as follows:

1. The issuer issues variable-rate bonds and commits to repaying bondholders semi-annual variable rate interest payments based on SIFMA and annual principal payments over a 30-year period. The bond proceeds are transferred from bondholders to the issuer.
2. Under the swap agreement, the issuer pays a bank counterparty fixed cash flows based on a 4% interest rate and agrees to receive a London Interbank Offered Rate (LIBOR)-based floating interest rate in exchange.
3. In return, the bank counterparty pays the issuer variable cash flows based on the historic trading

relationship between the LIBOR and the SIFMA index (67% of one-month LIBOR).

4. The issuer uses the 67% of LIBOR cash flows to make the SIFMA rate interest payments to its bondholders.

Figure 1: Floating-to-Fixed Rate Swap



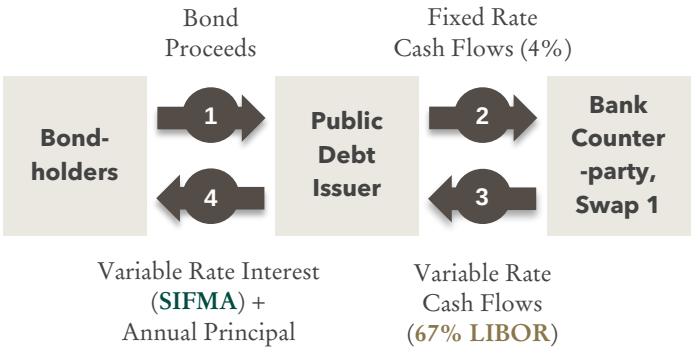
Using Swaps to Hedge Basis Risk

Using the floating-to-fixed rate swap example, the risk of SIFMA moving in a different direction or at a different velocity than LIBOR – diverging to the point that 67% of LIBOR no longer approximates SIFMA and therefore no longer covers the issuer's interest payments to its bondholders, forcing the issuer to pay more than the fixed rate portion of the swap – represents the issuer's basis risk. In certain market conditions, the difference between the floating rate swap payment and the floating rate bond payment could be considerable, leading some issuers to choose to enter into a second swap. This second swap is intended to hedge against any difference between the floating rate paid on the bonds and the floating rate received on the swap as follows:

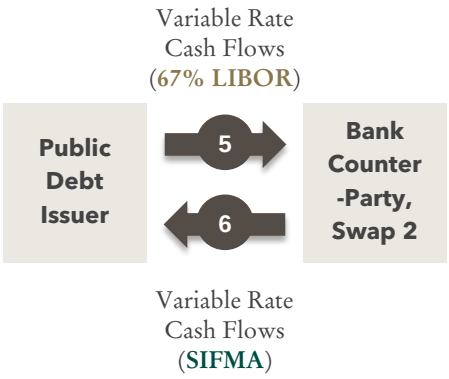
1. The issuer issues variable rate bonds and commits to paying bondholders back over a 30-year period via semi-annual variable rate interest payments based on SIFMA, in addition to annual principal payments. The bond proceeds are transferred from bondholders to the issuer.
2. Under the swap agreement, the issuer pays a bank counterparty fixed cash flows based on a 4% interest rate and agrees to receive a LIBOR-based floating interest rate in exchange.
3. In return, the bank counterparty pays the issuer variable cash flows based on the historic trading relationship between LIBOR and the SIFMA index (67% of one-month LIBOR).
4. The issuer uses the 67% of LIBOR cash flows to make the SIFMA rate interest payments to its bondholders.
5. The issuer pays a bank counterparty interest payments based on 67% of LIBOR (the same rate the issuer is receiving from the bank counterparty in the first swap).
6. The bank counterparty pays the issuer interest payments based on SIFMA (the same rate the issuer is paying to bondholders in the first swap).

Figure 2: Floating-to-Fixed Rate Swap + Basis Swap

Swap 1: Floating-to-Fixed Rate Swap



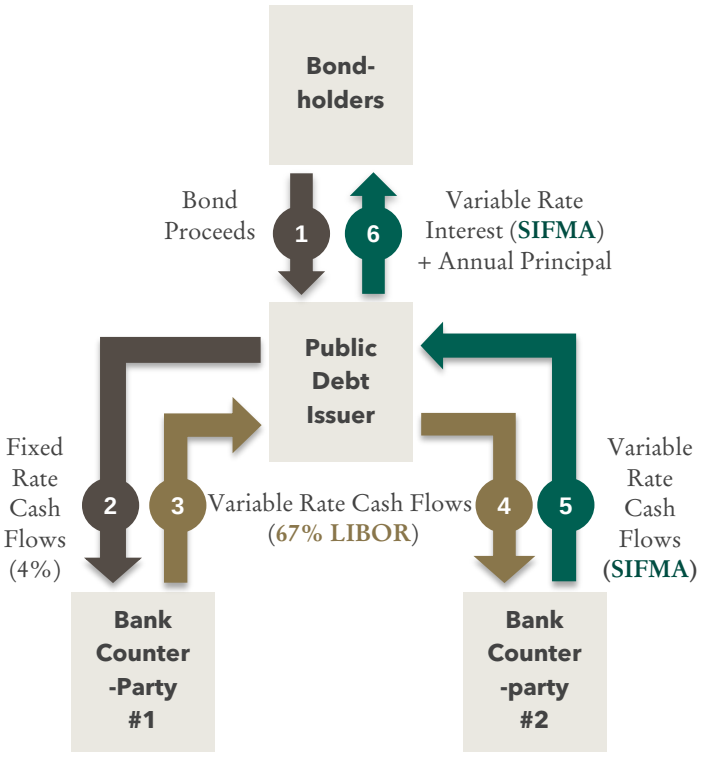
Swap 2: Basis Swap



Using swaps to hedge basis risk as described above allows the issuer to revise its cash flows as follows:

1. The issuer receives bond proceeds from bondholders for issuing variable-rate bonds based on SIFMA.
2. The issuer pays bank counterparty #1 fixed cash flows based on a 4% interest rate.
3. Bank counterparty #1 pays the issuer variable cash flows based on 67% of one-month LIBOR.
4. The issuer forwards the cash flows that were originally used to pay its bondholders in the first swap (67% of LIBOR) to bank counterparty #2.
5. Bank counterparty #2 pays the issuer interest payments based on SIFMA.
6. The issuer uses the cash flows it receives in the second swap (SIFMA) to pay its bondholders.

Figure 3: Revised Cash Flows



The issuer is now using the SIFMA rate cash flows from the bank counterparty in the second swap to make its SIFMA rate bondholder payments in the first swap, and is simply forwarding the 67% of LIBOR payments from the bank counterparty in the first swap to the bank counterparty in the second swap – synthetically removing its basis risk as demonstrated in Figure 3.

Using Swaps to Provide Additional Cash Flow

Though much less common, public debt issuers sometimes enter into swaps as a way to generate additional cash flow. To accomplish this, the issuer may enter into a basis swap in which they "bet" that they will receive more cash flow from the bank counterparty than they are required to pay to the bank counterparty based on the difference in rates between the floating rate index paid by the bank counterparty and the floating rate index paid by the issuer. While these swaps are risky and can quickly turn against the issuer, the value of basis swaps tends to remain relatively low as LIBOR and SIFMA have not historically deviated significantly for extended periods of time.

What Are the Risks of Municipal Derivatives?

The risks embedded in municipal derivatives are varied and often difficult to discern. To fully understand and evaluate the risks that derivatives may pose to a municipal issuer and, consequently, to municipal bond investors, one must first have the ability to fill in the considerable gaps in derivative disclosure and then the expertise to fully assess the risks and their implications discussed below.

Termination Triggers

A typical interest rate swap includes bilateral swap termination triggers that allow the issuer and the bank counterparty to terminate the swap under certain conditions. In most interest rate swaps, the issuer has the freedom to terminate the swap at any time, while the bank counterparty can only terminate the swap if the issuer has breached a certain threshold or set of

Too Little, Too Late: A Case Study on Chicago's Misrepresentative Public Credit Ratings

Over the years, Chicago entered into various swaps contracts and liquidity facility agreements in order to borrow at lower interest rates—an effort that only proved effective in the short-term. Following several successive rating downgrades by Moody's, falling short-term interest rates led to 14 of Chicago's swaps associated with general obligation (GO) debt having a negative total value of $147.3 million as of June 2014.[1] By May 2015, the city further found itself exposed to immediate termination triggers and debt acceleration totaling $2.2 billion in principal, accrued interest, and termination fees.[2]

Notably, the city's swaps contracts and liquidity facility agreements had varying termination triggers. Although Moody's initiated a series of downgrades beginning in March 2014, which placed the city near the termination triggers for several of its swap agreements requiring a bond rating of Baa1 or higher,[3] its series of ratings actions did not mention the swap agreements until its May 2015 downgrade of Chicago's GO debt to Ba1. At that point, some of the termination triggers had already been initiated, making it too late to serve as a warning to investors.

In the aftermath, Chicago finished converting the last of its swap-associated debt to fixed rate debt in May 2016 and paid an additional $100 million to end a corresponding basis swap contract.[4] In the 12

[1] EMMA

[2] Rating Action: Moody's downgrades Chicago, IL to Ba1, affecting $8.9B of GO, sales, and motor fuel tax debt; outlook negative

[3] Watchdog update: Chicago is scrambling to renegotiate swap deals, avoid painful payments, Chicago Tribune

[4] Emanuel gets rare bit of good financial news, Chicago Tribune

thresholds. The most common termination trigger is a public debt credit rating threshold, though termination triggers can be based on almost any measurable metric. Notably, the vast majority of municipal interest rate swaps are "out-of-the-money" for issuers,[5] meaning that if the swap were to terminate, the issuer would owe the market value of the swap to the bank counterparty. In many cases, the amount the issuer would owe the bank counterparty would be significant enough to send the issuer into default, state oversight, or even bankruptcy.

Collateral Posting Requirements

Collateral posting is a feature in some swaps that is designed to limit the amount the issuer could owe the bank counterparty in the case of the swap's termination or other such situations. Collateral posting requires the issuer to deposit funds with the bank counterparty in an amount that either partially or fully offsets the market value of the swap when the value is in favor of the bank counterparty. Frequently, the percentage of the swap market value that an issuer is required to deposit increases as the credit quality of the issuer decreases. As a result, if an issuer experiencing financial troubles were downgraded by a ratings agency, a collateral posting requirement could oblige the issuer to deposit additional funds with the bank counterparty, further exacerbating the issuer's existing financial woes.

months prior, the city had already paid about $260 million to cancel derivative agreements.[6]

March 4, 2014: Moody's downgraded Chicago GO and sales tax revenue debt ratings from A3 to Baa1; water and sewer senior lien revenue debt ratings from A1 to A2; water and sewer second lien revenue debt ratings A2 to A3.[7] The downgrade to Baa1 could have triggered the termination of four swap agreements, costing Chicago $58 million had the bank chosen to terminate them.[8]

February 27, 2015: Moody's downgraded Chicago GO and sales tax revenue debt ratings from Baa1 to Baa2 – two notches above "junk" status.[9] The downgrade to Baa2 moved Chicago closer to termination of 11 swap deals, which would cost an additional $133 million.[10]

May 12, 2015: Moody's downgraded Chicago GO and sales tax revenue debt from Baa2 to Ba1. Debt secured by water and sewer enterprises was downgraded from A2 to Baa1; water and sewer second lien revenue bonds were downgraded from A3 to Baa2.[11]

Cross-Default and Cross-Acceleration Provisions

Cross-default and cross-acceleration provisions are often overlooked interest rate swap provisions.

[5] Given prevailing interest rates from 2000 to 2008 when significant quantities of swaps were issued.

[6] Chicago Water Bond Deal Washes Off Taint of Interest Rate Bets, Bloomberg News.

[7] Rating Action: Moody's downgrades Chicago, IL to Baa1 from A3, affecting $8.3 billion of GO and sales tax debt

[8] Chicago in talks with banks to avert swap payments, Reuters.

[9] Rating Action: Moody's downgrades Chicago, IL to Baa2; maintains negative outlook

[10] Chicago in talks with banks to avert swap payments, Reuters.

[11] Rating Action: Moody's downgrades Chicago, IL to Ba1, affecting $8.9 B of GO, sales, and motor fuel tax debt; outlook negative

Broadly, a cross-default provision would allow the bank counterparty to declare a swap as defaulted if the issuer defaults on unrelated debt. With a cross-default provision, even if an issuer is current on both its swap payments and the underlying bonds, but defaults on an unrelated obligation, the bank counterparty could have the right to declare the swap as defaulted and pursue default remedies. The types of obligations included in a cross-default provision are outlined in the swap schedule, which also includes a threshold amount that denotes what magnitude of default would activate the provision. While cross-default provisions are typically limited to debt obligations, it is important to note that they can be written to include almost any type of obligation. Cross-acceleration works much the same way, except that a cross-acceleration provision would only allow the bank counterparty to declare a swap as defaulted if the issuer defaults on unrelated debt and payments on the unrelated debt are accelerated.

Basis Risk

As mentioned previously, basis risk occurs when the variable rate an issuer pays to bondholders is tied to one index while the variable rate the bank counterparty pays the issuer is tied to a different index. The resulting risk comes from the potential mismatch of cash flows in a swap if the rates of the two indexes diverged significantly, which could force the issuer to pay more than anticipated to make its bondholder payments (see the section "Using Swaps to Hedge Basis Risk" for additional explanation). Given that set bond payments allow an issuer to more effectively budget, the variable nature of the rate on both the bonds and the bank counterparty payments in a swap means that any additional payments in excess of the fixed interest rate that the issuer needs to make will likely be unexpected and potentially significant – putting the issuer at risk of financial hardship to cover expenses for which it may not have budgeted.

Off-Market Swaps

Occasionally, a municipal issuer will request an upfront payment when entering into a swap; this is typically a sign of financial distress and potentially a substantial red flag for the municipal issuer. While there are a variety of reasons that an issuer may desire an upfront payment, issuers most commonly do so to fill budget gaps. Unfortunately, we believe that many issuers that accept upfront payments do not fully understand the implications. While some issuers may believe that the payment is given to them for the "privilege" of their participation in a swap and, consequently, do not think they have to repay the funds, the upfront payment is actually akin to a loan. The typical swap is conducted "on-market," which means that the market value of the swap is $0 on day one. In an "off-market" swap in which there is an upfront payment, the market value is in the favor of the bank counterparty in the amount of the upfront payment on day one. As an example, if a public debt issuer takes an upfront payment of $10 million when entering a swap, the market value of the swap is $10 million on day one in the favor of the bank counterparty. As such, if the swap were then terminated on day two, the issuer would owe the bank counterparty $10 million (in addition to one day of the mark-to-market value of the swap), potentially unbeknownst to the issuer who is likely ill-prepared to cover those costs.

How Do You Mitigate Risks of Municipal Derivatives?

Truly avoiding the risks that swaps pose to municipal obligors is an exceedingly difficult task – particularly given that even with a general understanding of the risks associated with swap agreements, swap disclosures may not be complete enough to allow for a thorough assessment of those risks or their potential implications. Further, investors often cannot rely on ratings agencies, which do not always appear to fully understand the swap agreement themselves and frequently end up publishing even less information than is present in the swap's disclosures. Though many municipal bond investors, brokers, and municipal bond managers choose to simply accept the risks and lack of transparency associated with swaps, we believe there are measures one can take to help mitigate the risks. On the more extreme end of the spectrum, one could choose to avoid all issuers engaged in swap agreements; for municipal bond investors, asset managers, and brokers unable to fully assess the risks that swaps pose to issuers, total avoidance may be the safest and most conservative course of action. Alternatively, municipal market participants with the prerequisite knowledge and expertise can work to incorporate the risks of swaps into their credit analysis and credit risk assessment.

While incomplete disclosures still prove problematic, most issuers will disclose some basic information about the swap, including the type, notional amount, bank counterparty, the floating and/or fixed rates, and mark-to-market value. Though critical information such as cross-default provisions, termination triggers, and collateral posting requirements are often missing, very experienced credit analysts may be able to "fill in the blanks" in the disclosures. More specifically, analysts with substantial experience and specialized knowledge in municipal swap underwriting can identify patterns in termination trigger thresholds, collateral posting requirements, and cross-default provisions that yield insight into the amount of credit risk they are undertaking. For example, bank counterparties usually use collateral posting requirements to decrease the dollar amount of credit risk they are undertaking; therefore, issuers with high credit quality are rarely required to post collateral. Fortunately, we believe that if an investor works with a manager who possesses the necessary knowledge and experience to sift through the highly complex and opaque world of municipal derivatives, it is fairly easy to apply those patterns conservatively and mitigate the risks of municipal derivatives with confidence.

About the Author

Michael Johnson is currently co-chief executive officer, chief risk officer, and a managing partner at Gurtin Municipal Bond Management. Prior to joining the firm, Michael spent three years as director and head of Municipal Credit Risk at Merrill Lynch, where he oversaw the team that managed and reported municipal credit risk as well as mitigated and ultimately approved the municipal credit risk associated with derivative transactions. Michael began his financial services career as a municipal ratings analyst at Moody's Investors Service (Moody's), where he was a member of the Northeast Regional, Housing Finance, Higher Education, and Midwest Regional rating teams. For six of his seven-year tenure at Moody's, Michael was a Rating Committee member and sat committee for every municipal sector in every geographical region. During the last three years of his Moody's tenure, Michael managed the Midwest Regional office as Moody's primary client contact.

Please feel free to contact us at research@gurtin.com for additional information.

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Share the report:

Analysts

Michael Johnson
Managing Partner/Co-CEO
Chief Risk Officer
mjohnson@gurtin.com

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