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How the Tribune Analyzed CPS' Bond Deals.

When Chicago Public Schools officials embraced auction-rate borrowing over traditional fixed-rate bonds, their goal was to save money for the financially strapped district.

From 2003 through 2007, the district issued auction-rate bonds four times, racking up a total of \$1 billion in auction-rate debt, most of it paired with interest-rate swaps. The district refinanced the bonds in 2008, keeping similar maturity dates.

To assess the long-term success of this strategy, the Tribune conducted its own analysis of the deals and their future trajectory.

First, reporters calculated the total amount the district paid out on these deals, since CPS did not have that information. Reporters then estimated the future payments CPS will make on the refinanced deals.

As a comparison, the reporters estimated how much the district would have paid if it had opted to borrow the same sum through traditional fixed-rate bonds with the same payment schedules.

Because such an analysis requires a variety of nuanced decisions that affect the final numbers, reporters consulted with academics and leading municipal bond experts to ensure that the Tribune's methodology was sound. One was Andrew Kalotay Associates, a debt management advisory firm that advised the city of Chicago on a recent bond issue. Another prominent firm, Municipal Market Advisors, also supported the Tribune's methods.

In the end, the Tribune analysis found that the district could end up paying \$100 million more in today's dollars over the life of the deals than if it had stuck with safer borrowing methods.

The most complex part of the analysis involved constructing the hypothetical fixed-rate alternative to CPS' auction-rate deals. Here are more details about those calculations, as well as the objections raised by CPS officials and the district's longtime financial adviser.

The fixed-rate alternative

To estimate the costs for CPS if it had issued fixed-rate bonds instead of auction-rate securities, Tribune reporters relied on market data provided by Thomson Reuters MMD.

MMD rates are published every business day and are used in the municipal bond market as a benchmark for the return, or yield, that investors will receive.

That data gave the Tribune an idea of what yield investors would have demanded from CPS if the school district had issued fixed-rate bonds. From that information, reporters could construct hypothetical fixed-rate bonds and calculate the interest costs for CPS.

The term "bond" is used colloquially — and throughout the Tribune series — to refer to an issuance of several hundred million dollars in debt, whether auction-rate or fixed-rate. In fact, each of these

bond issues is made up of a series of smaller bonds, with each one coming due in a different year. Investors buy shares of one or more of these bonds in exchange for payments of interest and — when the bond comes due — principal.

The MMD yield curves apply to premium fixed-rate bonds with an interest rate of 5 percent. Borrowers pay 5 percent on the entire bond issue even though the market would accept lower rates, especially for bonds that come due during the early years. In exchange, investors pay more upfront than the face value of a bond.

If CPS had issued premium fixed-rate bonds that delivered the same amount of project money that the district got from the auction-rate bonds, those fixed-rate bonds would have had a lower face value and a lower principal payment than the auction-rate bonds.

The Tribune calculated the lower face value of each of these bonds as follows:

For the four dates on which CPS issued auction-rate bonds, the Tribune obtained MMD yields for each year in which a bond was due.

Reporters used a Microsoft Excel function to convert those yields into prices. The price is the amount, stated as a percentage of the face value, that investors pay to buy shares of a bond on day one.

Reporters divided the face value of each of the auction-rate bonds by the corresponding prices to create smaller fixed-rate bonds — bonds with a lower face value than the auction-rate bonds — that delivered the same project money.

Reporters then calculated the amount of interest CPS would pay on these smaller fixed-rate bonds at an interest rate of 5 percent. This enabled the Tribune to estimate how much CPS would have paid had it used traditional fixed-rate borrowing to bring in the amount of project money that the district obtained using auction-rate bonds.

Adjusting for refinancing

The MMD curves assume that the borrower will reserve the right to refinance the bond at par value — to pay back the principal amount of the old bond using money from a new bond issued at new rates — after 10 or more years.

This is typically part of the contract for fixed-rate bonds, including most fixed-rate bonds issued by CPS, as district officials acknowledged in interviews.

Because refinancing fixed-rate bonds can result in massive savings if rates drop, the right to refinance — or call — bonds has a lasting value. Few municipalities are willing to forgo that right, which is sometimes referred to as the call option.

Pairing auction-rate bonds with interest-rate swaps made it extremely unlikely that CPS could save money by taking advantage of that option, as swaps are costly to terminate when rates drop. But the school district likely would have been able to save money by refinancing if it had issued fixed-rate bonds instead.

Of CPS' four auction-rate bonds, three were issued in 2003 or 2004. If CPS had opted for fixed-rate bonds, the district could have refinanced them at par value in 2013 and 2014, when rates were significantly lower. (The fourth bond was issued in 2007.)

For its analysis, the Tribune assumed that had CPS issued fixed-rate bonds in 2003 and 2004, the district would have exercised its 10-year call option, as was common for municipalities across the country. Reporters used 2013 and 2014 MMD yield curves to create new premium fixed-rate refinancing bonds, then calculated the estimated interest payments from 2013 or 2014 until the final maturity date.

The Tribune did not attempt to determine how much could be saved by refinancing the 2007 bond. However, reporters did another kind of refinancing adjustment when they calculated the fixed-rate alternative for the 2007 auction-rate bond.

The 2007 auction-rate bond was itself a refinancing of a 1997 fixed-rate bond. The terms of the contract for that particular bond said it could be refinanced at par value in 2009. To refinance in 2007, CPS paid a \$5 million premium; CPS opted to do that in order to enter into swap deals that provided \$43 million in upfront cash.

The Tribune's hypothetical fixed-rate scenario assumes CPS would have avoided the premium for refinancing and waited until 2009 to refinance the bonds. Therefore, when totaling the cost of the fixed-rate equivalent, the Tribune calculated the interest on the 1997 bond from 2007 (when the auction-rate bond was issued) until the 2009 call date. Reporters then assumed the bond was refinanced and calculated the new interest payments using 2009 MMD yields.

Rates were particularly low in 2013-14, when three of the hypothetical fixed-rate bonds could have been refinanced. That significantly increased the cost difference between the fixed-rate and auction-rate options.

After reporters adjusted figures for the present value of future dollars, the cost difference between the two borrowing methods amounted to about \$100 million. If reporters had assumed the school district would choose not to refinance the 2003 and 2004 bonds, the estimated savings would have been less: about \$70 million.

The Tribune worked with Andrew Kalotay and others at New York City-based Kalotay Associates to develop its method of calculating the cost of CPS' hypothetical fixed-rate bonds. Concord, Mass.-based Municipal Market Advisors also reviewed the method and found it to be reasonable. Charles Jones, a professor at Columbia Business School, said the Tribune's methodology "makes perfect sense."

Choosing yield curves

Because CPS bought insurance on its auction-rate bonds and on most fixed-rate bond issues during the 2003-09 time period, reporters chose the MMD curves published for insured bonds, which assume the municipality buying the insurance has a rating of A. CPS at the time had slightly better ratings of A+ or AA-.

CPS officials later provided their own estimated yield-to-call values for that time period. For some bonds, those values were nearly identical to the MMD insured yields that the Tribune used.

The Tribune's decision to use MMD yield curves was partly a result of conversations with CPS and with Adela Cepeda of A.C. Advisory, a financial advisory firm that advised the school district on the bond deals.

But CPS officials and Cepeda both questioned the Tribune's use of insured yields. They argued that MMD insured yield curves are lower than what CPS would pay and thus underestimate what the district would have paid for fixed-rate debt.

“The MMDs are just indexes and they provide guidance, but they are not absolute indicators of where a deal should price,” Cepeda said.

So the Tribune did a separate analysis to test the difference between the MMD yields it chose and the yields on CPS bonds issued around the same time as the district’s auction-rate securities. In nearly every case, the Tribune found that the MMD yields were higher than yields on CPS bonds with the same maturities. This suggests that the Tribune’s analysis underestimates the district’s losses on auction-rate securities.

In constructing the three refinancing bonds that would have been issued in 2013 and 2014, the Tribune used a slightly more expensive yield curve. That is because CPS, like many municipalities, has backed away from the use of bond insurance in recent years. So the Tribune opted to use the MMD values for municipalities rated A. CPS had a rating of A+ in 2013, according to its annual financial report.

Calculating costs

When the Tribune calculated the district’s costs on the auction-rate deals, reporters included interest payments on the bonds as well as net payments on the interest-rate swaps. To make those calculations, reporters used information from the swap confirmation documents and data compiled by Bloomberg and the Federal Reserve Bank of St. Louis, then spot-checked the results against paper records from CPS.

Much of the same data went into calculating past and future costs on the debt the district used to refinance the auction-rate bonds after the auction-rate market collapsed in 2008. Two bonds were refinanced with fixed-rate debt, so future costs were simple to determine.

The remaining two were refinanced with variable-rate bonds pegged to the floating London Interbank Offered Rate, or Libor. To calculate future costs to CPS, the Tribune used estimated future rates provided by Andrew Kalotay Associates and derived from the Bloomberg U.S. dollar swap curve.

Reporters also used spot rates provided by Kalotay (also based on the Bloomberg U.S. dollar swap curve) to calculate the present value of future dollars by discounting the cash flows on an annual basis.

This was done for payments from 2014 onward on both the refinancing bonds and the hypothetical fixed-rate alternatives. The Tribune did not adjust the cost of past payments made since the first deal closed in 2003. But based on conversations with experts, reporters believe doing so would have had a minimal effect on the estimated cost difference.

The Tribune’s analysis omitted some minimal costs that would have been incurred both on the hypothetical fixed-rate bonds and on the auction-rate bonds.

One was the cost of insurance on the initial bond issues. Documents showed that insurance costs were slightly higher when CPS issued auction-rate bonds than when it issued fixed-rate bonds; so to the extent that the omission of this cost affected the comparison, it made the auction-rate bond option look slightly better than it otherwise would have.

The Tribune also left out the issuance costs on both the initial bonds and any refinancing bonds. With one exception, all the bonds — whether fixed- or auction-rate — would have been refinanced once, so it was assumed the costs on both sides would be roughly equal.

The 2007 bond issue incurred two sets of issuance costs in the auction-rate scenario but only one set in the fixed-rate scenario, so again the omission would have made the auction-rate option look better.

Challenges, objections

In response to the Tribune's questions, both Chicago Public Schools and A.C. Advisory did analyses that compared the cost of the four auction-rate bond deals with what the school district would have paid for fixed-rate debt.

CPS' analysis covered a different time period than the Tribune's. While Tribune reporters looked at the cost of the deals through the final maturity dates, from 2030 to 2034, the school district's analysis ended at the present day.

For that 11-year period, CPS found, the costs associated with the auction-rate bonds were \$30 million less than what fixed-rate bonds would have cost during the same period.

Several key factors helped determine that finding. One is that during the past 11 years, the school district has received or paid out several lump sums associated with its auction-rate deals. As mentioned above, the interest-rate swaps associated with the 2007 bond delivered a \$43 million upfront payment to CPS.

The district also paid about \$20 million in swap termination payments in 2008 when it refinanced its auction-rate bonds after the market collapse. Together, these one-time payments provided a net benefit to the district of about \$23 million.

CPS applied that benefit in its entirety to the initial 11-year period of the deals — even though the terms of the deals dictate that the school district will be paying the higher rates associated with the \$43 million gain until 2030.

Another important factor in CPS' \$30 million finding is that its analysis captures all the low payments the district made on its auction-rate deals from 2003 to 2007, before the deals blew up. But the analysis captures less than seven years of the much longer period the district will spend paying the higher rates it agreed to when it refinanced the deals in 2008.

CPS declined to address the question of whether auction-rate bonds or fixed-rate bonds would cost more over the life of the deals.

"We only looked at it through current day because we think that's the appropriate approach," said CPS Treasurer Jennie Huang Bennett.

If CPS wanted to end the deals today, however, it would have to pay \$126.5 million to extricate itself from swap deals, according to valuations of the swaps in the district's 2013 annual financial report.

A.C. Advisory, which advised CPS on the auction-rate deals, chose — like the Tribune — to analyze the costs of the deals through maturity.

The company hired a New York City-based firm, Stanley P. Stone & Associates, which provides support services to municipal advisers and underwriters, to compare the cost of the school district's auction-rate deals with what fixed-rate bonds would have cost.

The firm's findings omitted one of the four deals, the one in 2007 that involved a refinancing of older debt. Cepeda said a comparison was inappropriate in that case because the school district "believed

it could not” refinance those bonds at a fixed rate under terms of a 1997 intergovernmental agreement.

Cepeda later acknowledged that the district “may have been technically able” to issue fixed-rate debt but chose not to.

On the other three deals, Stone & Associates found that the school district had saved \$64 million by issuing auction-rate debt rather than fixed-rate debt.

But the firm’s analysis showed different costs for the auction-rate bonds than the payment amounts calculated by CPS or by the Tribune. In the case of one bond, Stone’s cost-to-date was \$20 million less than what the school district reported.

The firm’s estimate of what CPS would have paid for fixed-rate debt, meanwhile, was much higher than the Tribune’s estimate.

Stone’s analysis assumed that if CPS had issued fixed-rate bonds in 2003 and 2004, it would not have chosen to take advantage of historically low interest rates by refinancing 10 years later. This increased the firm’s estimated fixed-rate costs significantly.

CPS made the same assumption, showing no refinancings in 2013, though it had little effect on an analysis that ended in 2014.

Kalotay said any analysis “should have used the call option. Why would you disregard it?”

Matt Fabian of Municipal Market Advisors also said that assuming the bonds would be refinanced — as the Tribune did in its analysis — was the correct approach.

“That’s exactly what you should do,” he said. “That’s what would happen.”

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