

April 27, 2016

Revenue & Finance Committee
Bilandic Building
Chicago, IL

Honored committee members:

Thank you for the time to address you this morning. My name is Tom Sgouros, and I currently serve as the Senior Policy Advisor to the Rhode Island General Treasurer, Seth Magaziner. I should be clear that I am not here to represent him, but am happy to share with you the same advice I would give him. And he has to pay for it.

For the past 25 years, I have been a freelance policy advisor, working with candidates for office, as well as elected officials in Rhode Island and elsewhere. I help people understand public finance and economic issues, including budgeting, bonding, and fiscal policy. I have worked with officials in quite a few distressed cities, Providence and Central Falls in Rhode Island, but also Reading, Pennsylvania and Vallejo, California, to look at new ways to do their financial business. In addition to this work, I also work as a data scientist and statistics consultant, advising researchers about how best to analyze, model, and understand their data. I work part-time at the Brown University Center for Computation and Visualization, where I help scientists visualize and analyze their data.

It was around the time I began doing policy research that my state suffered its own small-scale banking crisis, when the private deposit insurance company covering a few dozen small banks and credit unions collapsed on January 1, 1991, locking up about a third of the bank deposits in the state. I began my study of the banking industry and its relation to public finance then, and the ensuing years have added a number of new and interesting chapters. I put a number of those chapters together in a book about banks, "Checking the Banks: The Nuts and Bolts of Banking for People Who Want to Fix It," and recently had a couple of articles appear in Law and Society, a law review from Michigan, one about the municipal banking market, and the other called "Predatory Public Finance."

I'm going to make three points here about interest rate swaps, where a municipality or state swaps payments on floating-rate debt for payment on fixed-rate debt.

1. Pricing risk is not a standard part of the public finance tool kit. A sophisticated public finance specialist is not likely to have a sophisticated understanding of probability or risk.
2. Adequately pricing risk requires many trials. A municipality or state who buys only a few swaps is akin to someone who bets big on a single number on the roulette wheel. You might win, but you probably won't.
3. The risks themselves are not completely fair. Not only does the math work against the buyers of swaps, but banks have been caught gaming the standards as well. The house doesn't have to cheat to win at roulette, but they win more that way.

Pricing risk The parties to an interest rate swap are each taking different sides of a bet. One party is betting that interest rates will rise, while the other is betting they will fall. Pricing risk is a tricky business. People write doctoral dissertations about it, and win Nobel prizes in Economics for figuring

out the essential problems involved.

There are two important things to understand about pricing risk. One is that it is fundamentally unlike most other public finance chores. Public finance generally involves filling out a lot of spreadsheets with interest rate payments and capital spend-downs, and trying to predict the future of contractor payments and inflation rates. One can get pretty good at it, and persuade oneself of a certain level of financial sophistication.

But let's compare the governing equations for the two fields. Here is the basic equation for pricing risk. This is the Black-Scholes formula, the basic equation for analyzing the price of derivative investments:

$$\frac{\partial V}{\partial t} + \frac{\sigma^2 S^2}{2} \frac{\partial^2 V}{\partial S^2} + rS \frac{\partial V}{\partial S} - rV = 0 \quad (1)$$

V is the value of the derivative investment, S is the underlying asset price, and r is the risk-free interest rate, and σ^2 is the variance in the stock price.

By contrast, here is the basic accounting equation, and the equation for calculating compound interest, the two comparably important tools for public finance.

$$\text{Assets} = \text{Capital} + \text{Liabilities} \qquad P_n = P_0(1 + r)^n \quad (2)$$

This is not to say that public finance is simple. You need an understanding of net present value, the various kinds of bonds, what a refunding is, and so on. It has its wrinkles. But the necessary sophistication to be good at this kind of finance, has nothing to do with pricing risk, a very different task, involving partial knowledge, advanced statistics, and usually some level of modeling.

Multiple trials There is something even more important than mathematical sophistication necessary to come out ahead in risk, and that is multiple trials. Not only does pricing risk involve some exciting math with exotic symbols, but even when you price the risk properly, sometimes you lose. If you're a bank doing lots of these deals, you win some, you lose some, and on balance you come out ahead if you're doing the math right.

(And getting it right is not easy. The big banks didn't even get it right in 2007-08. A huge part of that collapse was due to the banks mispricing risk, and not understanding the risks they were taking.)

On the flip side, if you are only doing a small number of deals, you cannot win without being very lucky. Would I bet my life on a flip of a coin? Absolutely not. Would I bet my life on the flip of a thousand coins? Much more likely, though I'd still check to see they were fair coins. In other words, this is a seller's game, except for the precious few buyers who can afford to hedge their risk with a lot of deals. The game does not have to be rigged for the house always to win, because the house has the odds *and* plays so many more games than any of the guests.

As big as Illinois is, or Chicago, it will never execute more than a handful or two of such deals. You might say that Illinois has nineteen and isn't that enough? And Chicago has about as many. However—and this is crucial—they were all making the same bet. At least when you're flipping 19 coins, you are making 19 separate wagers. Scientists would say these 19 bets were not even independent, and were all

subject to the same change of conditions, a drop in interest rates. What Illinois did was not 19 different bets, but making the same bet 19 times.

Under these conditions, however sophisticated you are, all you can really do is cross your fingers and hope for the best, just like betting on a single flip of the coin. To stay on the gambling metaphors for a moment longer, it's worth noting that the best marks are the ones who are sure of themselves. There's a reason they are called "confidence games."

Benchmark rates Finally, remember those thousand coins I'd bet my life on? What if they're not fair? It turns out that at least one of the benchmark rates on which the Illinois swaps were based were being gamed by the banks. A conspiracy to game LIBOR has been uncovered, and there's no compelling evidence to say that this is the only such benchmark that is vulnerable. Interest rates have plunged for reasons far larger than the conniving of a small number of bankers, but when the debt is large enough, the movement of only a few basis points can trigger payments in the tens of millions of dollars.

Which brings me to the final point, about decency. Imagine a banker on a cruise, paying another passenger to exchange cabins because his is nearer the lifeboats. This is a sensible hedge: the banker is paying some money to shed some risk, the other passenger is accepting a payment to take it. But now imagine the ship has foundered, the passengers have abandoned ship, and the banker, safe in the lifeboat, sees the other passenger swimming towards him, begging to be thrown a life jacket. What is the banker's responsibility at that point? He could say, "A deal's a deal," and club the guy with his oar, but one can be fairly certain that is not an excuse most people would accept.

And yet that's pretty much what has happened, except that it was also in large part the bankers who sank the ship in the first place. These guys hedged their risk, and then took over the ship and aimed for the iceberg. The crisis years of 2008–09 showed that most of the bond market managed to misprice risk, fairly dramatically. Despite their missteps in other markets, the banks had the better side of the municipal swaps bet, and have profited enormously from these deals, in Illinois, and around the country. But how much is enough?

Yours sincerely,

Tom Sgouros