



PERSPECTIVE

Financial Intelligence through Artificial Intelligence

BY JUSTIN MARLOWE



Here's a quick pop quiz: throughout 2023, municipal bond investors were most upbeat about which city?

An obvious guess is a AAA-rated city like Charlotte, North Carolina, or Columbus, Ohio. Or a growing but affordable hub like Oklahoma City, Oklahoma. Or a tech hub like Boston, Massachusetts.

But in fact, the CMF Muni Index from the University of Chicago's Center for Municipal Finance tells us the answer is...Chicago, Illinois. According to the data, the prices of Chicago general obligation bonds throughout 2023 improved more than any other big city. Even more surprising is that the worst performer was San Francisco, California. Prices on its bonds fell more than any

other big city during that same period. Why are investors so optimistic about a city that just earned back a BBB credit rating, but so pessimistic about a AAA-rated city with one of the strongest local tax bases in North America?

Because in the municipal bond market, headlines matter. Chicago has made its required pension contributions for three consecutive years. Most local government chief finance officers would not call that an inspiring accomplishment, but it's a welcome change for Chicago that's enticed bond investors looking for a bargain. Meanwhile, the steady stream of bad news about San Francisco's dying, crime-ridden downtown has sent many investors streaming for the exits.

Critics of the municipal bond market say this type of reactive, news-driven, emotional investing is a chronic problem. When bad news swamps otherwise sound financial fundamentals, taxpayers suffer undeservedly through higher borrowing costs.

And yet, we can't blame municipal investors for trading on news when other meaningful information is so hard to find. Audited financial statements often arrive six or more months after the fiscal year ends. That's a sharp contrast with the market for other fixed-income investments like corporate bonds, where investors have easy access to timely, frequent, digital, comparable financial information. Fair or unfair, that's the quality of financial information many investors expect from municipal issuers.

The challenge, then, is clear: how can the municipal market supply more financial information, in a fast and efficient way, about the enormous variety of issuer governments? Like many other challenges today, the first thought is artificial intelligence (AI).

AI is the science of making machines that can think like humans. Since the November 2022 release of ChatGPT—one of the first large-scale AI tools made available to the public—AI has captured our collective imagination. More than any other technology today, it has the potential to transform our everyday lives. That's why it's no surprise that the federal government has asked for

a pause on new AI development, and GFOA has launched several initiatives to explore its potential across our profession.

Some recent research from the University of Chicago's Center for Municipal Finance zeroed in on the lack of financial information in the municipal bond market. Those researchers asked: can AI reliably summarize the narrative portion of local government financial statements? Municipal credit and buy-side analysts sort through mountains of annual comprehensive financial reports (ACFRs) every day to find relevant information about a local government's financial performance and fiscal health. This task seems like a good candidate for AI to scale up quickly and cheaply.

To test this claim, these researchers focused on the two main narrative parts of local government annual comprehensive financial reports (ACFRs)—the Letter of Transmittal (LOT) and the Management's Discussion & Analysis (MD&A). They first analyzed the LOTs and MD&As for the 50 largest

U.S. cities across the past four years. They calculated their length, the level of education required to read them, and the number of words that convey “positive” sentiment (words like “able” or “accomplish”), “negative” sentiment (words like “abandon” or “abrogate”), and “uncertainty” (words like “ambiguous” or “anticipate”).

Then they asked ChatGPT to summarize those same LOTs and MD&As and performed that same analysis on those summaries. Three main findings emerged from this exercise.

First, ChatGPT is quite good at summarizing and simplifying these statements. The average MD&A is 5,581 words long and requires the reading skill of someone with a Ph.D. The average ChatGPT summary of an MD&A is 535 words long and requires the reading skill of a typical college graduate. We see similar patterns in the LOTs and their summaries.

Second, the summaries tell the same story as the originals, but with more clarity and emphasis. If an MD&A tells

a positive story, the summary tells a slightly more positive story. If a LOT conveys negative sentiment, the summarized LOT is slightly more negative. Of particular note is that negative sentiment is more likely to appear in longer statements—the proverbial “beat around the bush” approach to breaking bad news. ChatGPT eliminates the boilerplate language and superfluous words that often surround negative sentiment.

Third, and perhaps most important, the summaries are salient. These researchers used a statistical technique known as an “event study” to see if the CMF Muni Index for an individual city responds to the sentiment conveyed in that city's LOT or MD&A. The results show it does not; however, the results show that a city's index does respond to the sentiment communicated in the summaries. In particular, prices on a city's bonds tend to increase when the summarized LOT and MD&A convey more positive sentiment, and vice versa. All this suggests investors do respond to the story that's told in these narratives, but only if someone takes the time to read and summarize that story. For generations, that someone was a person. Going forward, that someone might be AI.

If the municipal market can produce this information at scale, all issuers will benefit. Moreover, these results suggest some obvious next questions for state and local finance practitioners. Can you rewrite your LOT and MD&A with an eye toward the most favorable AI-generated summary? How can local finance staff use AI to evaluate the financial performance of their peer jurisdictions? How might state auditors and other regulators use AI to summarize and better understand broad trends in local government financial health? The brave new world of AI is full of several challenges and opportunities. ■

Justin Marlowe is a research professor at the University of Chicago, Harris School of Public Policy, and a fellow of the National Academy of Public Administration.

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