



A Tale of Two Alphas: How Technology Enables Optimal Investing

Municipal bond managers must navigate a challenging course as they triangulate how quickly to deploy capital in different environments while also achieving best execution. Too often, when market technicals sour or liquidity dries up, speed and execution come at each other's expense. But with the right technology, investors don't have to sacrifice either source of alpha.

A Fast-Moving, Fragmented Market Requires a Tech Solution

The municipal market's migration toward separately managed accounts (SMAs) has accelerated a trend toward smaller trade sizes (less than \$100,000) and more fragmented trading making it increasingly difficult to systematically evaluate and execute in a timely fashion (*Display, next page*).

In essence, this morning's universe of bonds available for sale looks very different than this afternoon's universe. When thousands of bonds pass by in minutes, your portfolio manager needs a systematic way to view the entire landscape while also synthesizing it quickly to find the best deals—and avoid the bad ones.

To this end, technology is critical. Calibrating aggressiveness in execution (trading alpha) while efficiently funding SMAs (speed alpha)

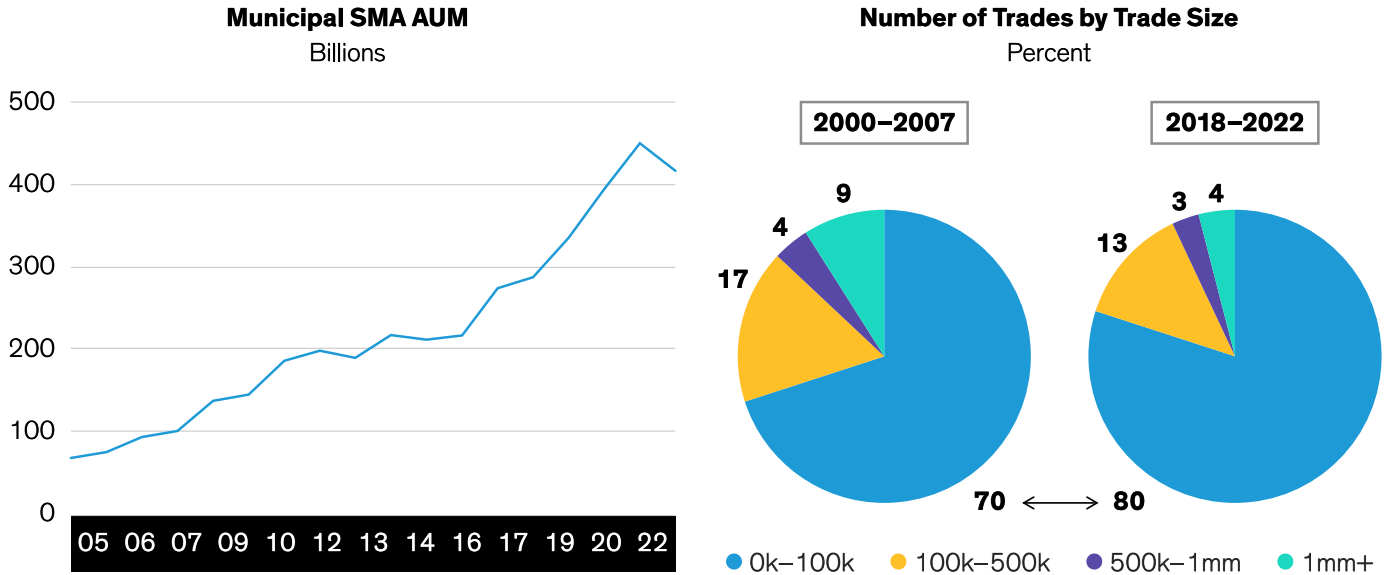
is a complex undertaking that requires digital tools to inform portfolio management, research and trading.

AB's Technological Advantage

Beyond investing quickly and achieving best execution, AB's Muni Portfolio Management Team consistently calibrates for the optimal level of each alpha. This is made possible by three integrated processes:

Aggregating the Data: To separate the information from the chaos, we developed ALFA, or Automated Liquidity and Filtering Analytics, a proprietary liquidity tool that continuously monitors hundreds of thousands of messages, offerings and broker-dealer inventories. ALFA's live feed enables us to see what bonds are available to be bought and sold from one minute to the next and, critically, across all sources of liquidity. Given this data, we can divide the market into

SUBSTANTIAL FLOWS INTO MUNI BOND SMAS HAVE DRIVEN NEED FOR SMALLER TRADE SIZES



Current analysis does not guarantee future results.

As of December 31, 2022 | Source: Bloomberg, Morningstar, Municipal Securities Rulemaking Board and AllianceBernstein (AB)

bonds that are expensive (offered at a premium) versus those that are cheap (offered at a discount), in real time (*Display below*).

Evaluating the Universe: All bonds identified by ALFA as cheap are then filtered through AbbieOptimizer, which proposes trades that fit the unique needs of each client portfolio. As a part of this process, our quantitative model determines the relative value for each bond, using AB's fundamental research inputs—which are digitized through

AbbieOptimizer—to pinpoint the securities and issuers that our credit analysts view positively. This optimization process allows us to quickly reduce an overwhelming universe of bonds to only the best opportunities—bonds we like fundamentally and want to purchase for client portfolios.

Direct Connectivity: Our order/execution management system, AbbieX, helps ensure that we get the most attractive prices for

ALFA Data Filter Inquiry: Splitting the Market to Target Cheap Bonds

Offer Type	Total Size (USD Millions)	No. of CUSIPs	Percent of Market (Par Amount)	Percent of Market (CUSIPs)
Discount	872	20,977	15	47
Premium	4,875	23,438	85	53
Total	5,747	44,415	100	100

Discount Bucket	Total Size (USD Millions)	No. of CUSIPs	Percent of Market (Par Amount)
\$(0.0–0.50)	Discount	668	14,069
\$(0.5–1.0)	Discount	152	5,072
\$(1.0)+	Discount	51	1,836

Past performance does not guarantee future results. For informational purposes only. There can be no assurance that any investment objectives will be achieved.

As of May 31, 2023 | Source: Bloomberg and AB

AbbieX Found the Same Bond Offer Across Multiple Platforms: Each at a Different Price

Source	CUSIP	Quantity	Offer Price	Bond IDC Price	Bond discount
Dealer via Bloomberg	768262DM6	165,000	115.66	115.89	-0.23
Dealer via Bloomberg	768262DM6	165,000	115.73	115.89	-0.16
Dealer Direct	768262DM6	165,000	115.56	115.89	-0.33
Tradeweb	768262DM6	165,000	115.73	115.89	-0.16
The Muni Center	768262DM6	165,000	115.72	115.89	-0.17

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As of May 31, 2023 | Source: Bloomberg and AB

every trade by electronically connecting directly with the venue that provides the most attractive price for any particular bond (*Display above*). This provides us with a major advantage over managers who manually compare across one, two, or even three venues. Not only is it taking too long but they may still be overpaying since they're not looking at venues four, five, or six.

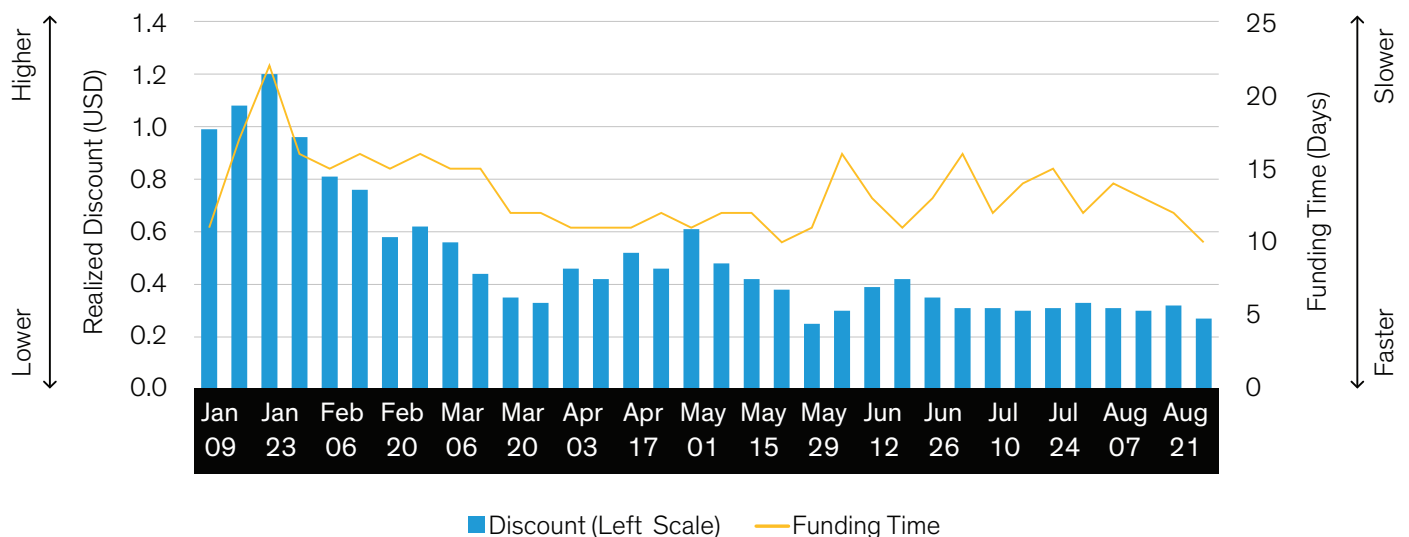
Though each component of our technological advantage is individually important, the seamless integration across all three components allows us to make decisions quickly and on a large scale to meet the needs of every client.

Calibrating Funding Time to Maximize Alpha

It doesn't always pay to invest quickly. That's why one of the key benefits of AB's optimization technology is the ability to speed up and slow down the investment process. Generally, when we extract a larger liquidity premium (larger discounts) from the market, funding times are slower. Conversely, when we require a smaller liquidity premium from the market, funding times are faster as we place a greater emphasis on earning additional income sooner (*Display below*).

While speed alpha and execution alpha are made possible with advanced technology, AB's municipal investment team steers the optimal course. Every day, the team evaluates and analyzes a variety of factors—current valuations, new-issue supply, secondary-market

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trading trends, investor demand, the interest-rate environment and more—and calibrates investment time and pricing accordingly. The resulting optimized balance between speed and execution underpins our investment process and is a key differentiator for our clients' portfolios.

The way an investor interacts with the market, trades and builds portfolios should evolve with the rise of technology. Make sure your manager is on the right side of disruption.

AB's Custom Municipal SMA Solutions

Whether it's personalizing portfolios to meet client preferences or proactively screening for attractive tax harvesting opportunities, AB seeks to build better outcomes through the customization of high-quality targeted duration and ladder portfolios.

There is no assurance that a separately managed account will achieve its investment objective. Separately managed accounts are subject to market risk. The market values of securities owned will fluctuate so that your investment, when redeemed, may be worth more or less than its original cost.

Speed alpha: AB utilizes technology to remove operational friction from the traditional fixed-income SMA investment process. This can include direct integration of real-time bond liquidity and proprietary optimization of portfolios based on account customizations.

Through the automation of many traditionally manual aspects of fixed-income SMA investing, AB may be able to fund portfolios more quickly than the typical industry average. AB measures this benefit by comparing AB investment time of a portfolio relative to an assumed industry average of 50 days. AB's process may result in a faster than typical funding time, generating additional income on a relative basis, which we call "Speed Alpha." We seek to utilize competitor yield proxies that are consistent with the client portfolio being analyzed. For example, intermediate-duration strategies are compared against intermediate benchmarks. The competitor yield proxy will change based on the AB account strategy and the appropriate representative benchmark.

Note that actual funding times can and will vary based on portfolio-management discretion, account strategy, portfolio size, market liquidity and technicals, among other factors. For example, a portfolio focusing on a particular specialty state may have a smaller liquid investable universe of bonds, which may result in longer funding times. In addition, funding speed is ultimately at portfolio-management discretion, and there will be environments where investing more slowly is intentionally pursued.

There is no guarantee AB funding times will be faster than industry average or competitors or that Speed Alpha will be generated. Additionally, Speed Alpha will vary among strategies, portfolios and market environments.

Trading alpha: AB utilizes technology to systematically screen for fixed-income liquidity ingested into our proprietary optimization process. On average, AB sees 50,000+ unique offers and bid-wanted daily across a large variety of venues and liquidity providers.

The ability to aggregate fixed-income liquidity within an optimization allows AB to quickly and efficiently curate attractive trade opportunities in a highly fragmented market. One attribute (among many) utilized in liquidity screening is offer price levels and identification of bid wanteds. This can include systematically curating liquid universes of bonds offered to AB at levels deemed cheap or attractive based on portfolio-management discretion.

Our real-time liquidity screening process may allow AB to capture "Trading Alpha" on behalf of clients. Trading Alpha is measured as the difference between a third-party pricing service mark (end of day) relative to the executed AB price. This is tracked across all trades executed by AB.

There is no guarantee that AB execution will result in Trading Alpha. Additionally, Trading Alpha will vary among strategies, portfolios and market environments.

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