S&P Dow Jones Indices

A Division of S&P Global

Bond Laddering with the S&P AMT-Free Municipal Series Indices

Contributors

Jason Giordano
Director
Fixed Income Indices
jason.giordano@spglobal.com

EXECUTIVE SUMMARY

- A bond ladder theoretically offers a means to manage cash flows and provide investors with a stream of income.
- Bond laddering with indices can capture the benefits of a traditional bond ladder strategy with additional advantages of diversification and transparency.

Bond laddering is a mechanism widely used by the investment community to mitigate the potential risks related to buying individual bonds. In this paper, we explain the potential risks, return, and diversification of using a ladder strategy in the municipal bond market.

AN EXAMPLE OF BOND LADDERING IN THE MUNICIPAL BOND MARKET

Bond laddering is a strategy that calls for maturity weighting, which involves dividing bond investments among several different bonds with increasingly longer maturities. For example, instead of buying one bond with a six-year maturity, market participants can allocate to six different bonds, where each bond matures at a different year throughout the six-year horizon.

Bond ladders may be constructed to address both interest rate and reinvestment risk. If interest rates rise, the strategy calls for reinvestment of the funds from bonds that are maturing at the bottom of the ladder into bonds earning higher yields, and these are in turn added to the top of the ladder. If rates fall, this strategy seeks to mitigate reinvestment risk, because longer-dated bonds at the top of the ladder, which presumably were purchased when interest rates were higher, should be yielding higher returns.[1]

In its simplest form, the bond ladder may consist of bonds maturing over a period of years (e.g., two to six years). Exhibit 1 shows a conceptual

[1] Over any period of time, interest rates can rise or fall. The laddering of an actual portfolio may not necessarily reflect uniformly increasing or decreasing interest rates.

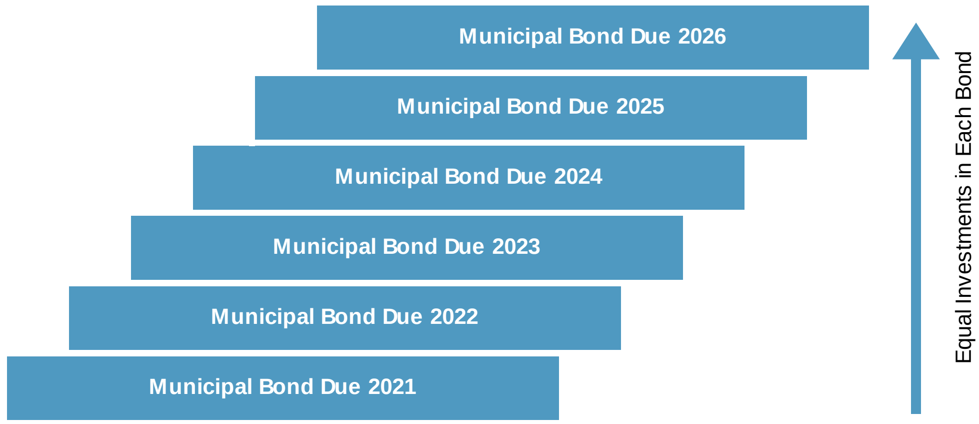
Bond laddering is a strategy that calls for maturity weighting…

…which involves dividing bond investments among several different bonds with increasingly longer maturities.

Investors determine how many rungs their municipal bond ladder should have based on their time horizon.

example of this construction process using theoretical equal investments in six municipal bonds with sequential year maturity dates.

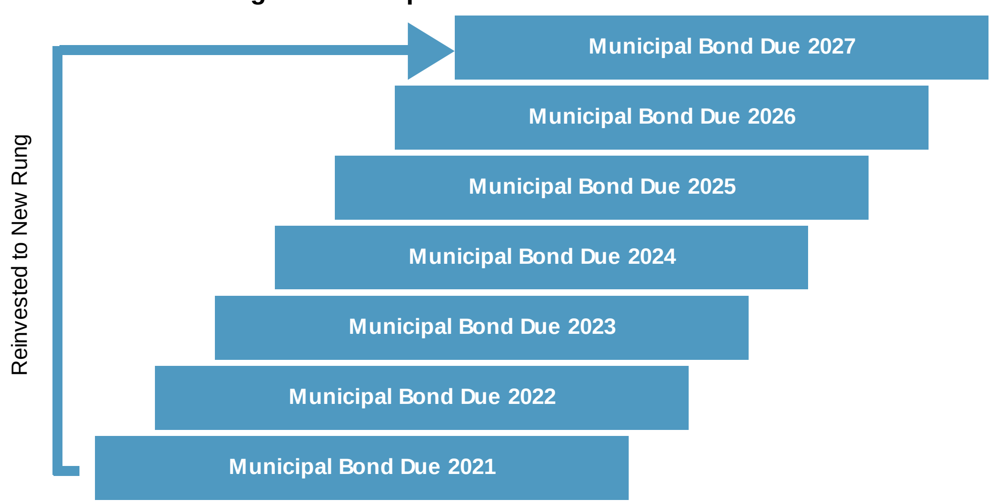
Exhibit 1: Simple Example of a Municipal Bond Ladder



Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

Investors determine how many rungs their municipal bond ladder should have based on their time horizon. The time between maturities is a variable chosen based on the trade-off between reinvestment risk and the lack of access to the money invested. If the goal is to keep the municipal bond ladder in place over time, then as the earliest bond matures, the ladder strategy replaces it with a bond of equal principal at the longer end of the maturity ladder (see Exhibit 2).

Exhibit 2: Continuing the Municipal Bond Ladder



Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

The strategy illustrated in Exhibits 1 and 2 calls for the construction of a diversified portfolio of bonds from different issuers at each rung of the ladder.

BENEFITS OF BOND LADDERING

Potential benefits of a laddered bond portfolio versus investing in a single bond include the following.

Benefits of a laddered bond portfolio include potentially decreased volatility, the option to reinvest into longer-dated bonds, and higher total returns, among others.

- Potentially decreased volatility in the portfolio value as interest rates change.[2]
- The option to reinvest the principal of the maturing bond into longer-dated bonds, which may result in higher yields compared with shorter-term bonds.[3]
- If equal-weighted investments are made each year, the laddered portfolio has potential to provide a higher total return as interest rates change.[4]
- If the portfolio is further diversified by using bonds from different issuers, regions, and purposes, the laddered portfolio may reduce default and liquidity risk.[5]
- Income generation if the ladder portfolio is built using bonds that pay periodic interest or coupons. Market participants have the ability to adjust these cash flows by choosing municipal bonds with different interest payment dates.

BOND LADDERING: A STYLIZED EXAMPLE USING INDEX-BASED PRODUCTS

Over the past decade, innovative approaches in fixed income indexing have allowed investors to replicate the risk/return profile of laddered bond portfolios.

Over the past decade, innovative approaches in fixed income indexing have allowed market participants to use their corresponding index-linked investment products to replicate the risk and return behaviors of laddered bond portfolios. That means, regardless of the size of a portfolio, market participants can use fixed income exchange-traded products (ETPs) to form laddered portfolios, instead of using individual bonds.

Municipal bond ladders built with exchange-traded funds (ETFs) that track the S&P AMT-Free Municipal Series Indices may offer the following.

- **Diversification:** Bonds are typically sold in minimum denominations or multiples of minimum denominations. For corporate bonds and treasury bonds, minimum denominations are typically USD 1,000. For municipal bonds, minimum denominations are higher, at USD 5,000. For market participants with smaller portfolios, these relatively high minimum denominations may limit their ability to diversify.

[2] Cheung, C. S., C. C. Y. Kwan, and S. Sarkar, 2010, "Bond Portfolio Laddering: A Mean-Variance Perspective," *Journal of Applied Finance*, Volume 1, pp. 103-109.

[3] Judd, K. L., F. Kubler, and K. Schmedders, 2011, "Bond Ladders and Optimal Portfolios," *The Review of Financial Studies*, Volume 24, Issue 12, pp. 4123-4166.

[4] Bohlin, Steven and George Strickland, 2004, "Climbing the Ladder: How to Manage Risk in Your Bond Portfolio," *American Association of Individual Investors Journal*.

[5] Scatizzi, C., June 2009, "Laddered Bond Portfolios," *American Association of Individual Investors Journal*.

Constructing a bond ladder via bond funds may mitigate these risks by spreading assets across multiple securities.

- **Lower Trading Costs:** Using funds to construct a laddered portfolio may lower transaction costs because fund managers are better able to pool capital and purchase bonds in larger lots. Additionally, fund managers could have better access to dealer inventory and could perform market surveillance to identify desired bonds.
- **Increased Liquidity:** Individual bonds trade in the OTC market, and daily liquidity can vary dramatically by the name of the issuer (borrower), quality of the bond, and other criteria, such as coupon and maturity. In the event a market participant needs to liquidate one or more rungs of the ladder, an ETF, which trades on an organized exchange, is likely to provide better liquidity than an individual bond trading in the OTC market.

Maturity-date bond index-based products provide an easy way to customize a portfolio while retaining the diversification and liquidity benefits of a fund structure.

MATURITY-DATE INDICES

Maturity-date index-based products provide a means to customize a portfolio while retaining the diversification and liquidity benefits of a fund structure. Market participants can potentially use these products to target maturities and to build laddered portfolios in a similar fashion to using individual bonds.

Each index series year, or tenor, represents a defined risk and return profile. The weighted average coupon of each maturity series index creates a coupon representative of the bonds within the stated maturity year. As the tenor series nears maturity, each bond in the index represents a shorter instrument with lower interest rate risk. As the individual bonds in the index mature, theoretical cash is accumulated in the index. At the end of the calendar year, the index would be 100% cash, which can be used to reinvest further out the curve. Because of this unique index structure, the investor can treat each index series as though it is an individual bond.

Unlike individual bond investing, however, the key benefit of the fund structure is access to the institutional marketplace.

Unlike individual bond investing, one benefit of a fund structure is access to the institutional marketplace. Maturity-date index-based products tend to generate lower turnover than traditional bond funds because bonds will usually be held to maturity, rather than sold once they no longer meet fund criteria. In ETF-based funds, turnover typically will only result from creations and redemptions or from security selection decisions by the fund manager (the latter will generally be absent from an index fund).[6]

[6] A good example would be a bond fund with a maturity range of 7-10 years versus a maturity-date index-based product that matures in 7 years (or 8, 9, or 10 years)—for example a 2027 fund. The two options would be similar in 2024, except that the maturity of the former will be spread over four years versus a maturity of one year for the latter. However, as time progresses, the 7-10 year fund is forced to sell roughly 25% of its portfolio every year because bonds with 7 years to maturity in 2024 will have maturities of 6 years in 2025. The 7-10-year fund then must add new bonds that have now aged and become 10-year bonds, whereas the 2027 fund will not be forced to sell bonds prior to the target date, because it can theoretically hold the same bonds until maturity. Thus, the expected one-way turnover of the 2027 fund may be lower by up to approximately 25% per year than that of the 7-10 year fund.

These indices were designed to reflect the characteristics of a diversified group of bonds that are all high quality, fixed rate, non-callable, and tax exempt…

INTRODUCING THE S&P AMT-FREE MUNICIPAL SERIES INDICES

To assist in evaluating decisions related to laddering municipal bond portfolios, S&P Dow Jones Indices launched a series of indices that seek to track the municipal bond market: the S&P AMT-Free Municipal Series Indices (see Exhibit 3). These indices are designed to reflect the characteristics of a diversified group of bonds that are all high quality, fixed rate, noncallable, and tax exempt.

Exhibit 3: S&P AMT-Free Municipal Series Dec Indices

INDEX NAME	NO. OF CONSTITUENTS	WEIGHTED AVERAGE MATURITY	WEIGHTED AVERAGE COUPON (%)	YIELD TO MATURITY (%)	MODIFIED DURATION
S&P AMT-Free Municipal Series Dec 2021 Index	14,255	0.91	4.58	0.30	0.91
S&P AMT-Free Municipal Series Dec 2022 Index	12,421	1.90	4.56	0.34	1.82
S&P AMT-Free Municipal Series Dec 2023 Index	10,113	2.90	4.57	0.40	2.72
S&P AMT-Free Municipal Series Dec 2024 Index	6,784	4.90	4.55	0.56	4.44
S&P AMT-Free Municipal Series Dec 2025 Index	8,205	3.91	4.49	0.47	3.60
S&P AMT-Free Municipal Series Dec 2026 Index	5,121	5.91	4.51	0.73	5.25
S&P AMT-Free Municipal Series Dec 2027 Index	3,535	6.89	4.43	0.85	6.04
S&P AMT-Free Municipal Series Dec 2028 Index	2,218	7.87	4.14	0.93	6.84

Source: S&P Dow Jones Indices LLC. Data as of July 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes. Average coupon is par weighted.

…and were built with constituents that are investment grade, have a minimum par amount of USD 2 million, and meet bond selection criteria to avoid provisions affecting cash flows.

Exhibit 4: Index Construction of the S&P AMT-Free Municipal Series Indices

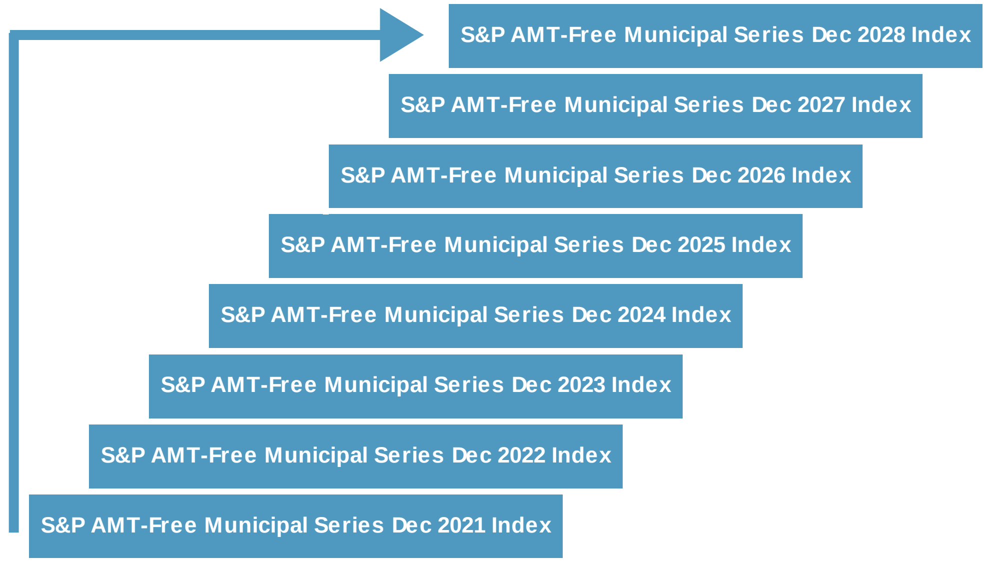
CRITERIA	ELIGIBILITY
Issuers	A U.S. state, federal district, or local government or agency such that interest on the bond is exempt from U.S. federal income taxes as well as the AMT
Credit Quality	Each bond must have a rating of at least BBB- by S&P Global Ratings, Baa3 by Moody's, or BBB- by Fitch.
Par Amount	Minimum maturity par amount of USD 2 million
Maturity Range	Each bond must have an inclusive maturity range of Jan. 1 to Dec. 1 in the respective year of its maturity.
Exclusions	Bonds issued by U.S. territories and the Commonwealth of Puerto Rico

Source: S&P Dow Jones Indices LLC. Table is provided for illustrative purposes.

The S&P AMT-Free Municipal Series Indices are designed to be replicable. As shown in Exhibit 4, the series was built with municipal bond constituents that are investment grade, have a minimum par amount of USD 2 million, and meet bond selection criteria designed to avoid provisions affecting cash flows. As such, they offer a structure intended to reduce the complexity of bond selection and provide concise metrics in a scalable approach.

Bond ladders offer investors a simplified approach when navigating uncertain interest rate environments…

Exhibit 5: Laddering with the S&P AMT-Free Municipal Series Dec Indices



Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

Exhibit 6 shows how the design of the S&P AMT-Free Municipal Series Indices can easily be applied to portfolio construction when evaluating decisions around municipal ladders. For more information on these indices, please see the S&P AMT-Free Municipal Series Methodology.

CONCLUSION

…while also providing predictable levels of income.

Bond ladders offer a simplified approach when navigating uncertain interest rate environments while also providing relatively predictable levels of income. Implementing a laddering strategy using indices can offer additional benefits of diversification and transparency, while minimizing both market and reinvestment risk.

GENERAL DISCLAIMER

Copyright © 2020 S&P Dow Jones Indices LLC. All rights reserved. STANDARD & POOR'S, S&P, S&P 500, S&P 500 LOW VOLATILITY INDEX, S&P 100, S&P COMPOSITE 1500, S&P MIDCAP 400, S&P SMALLCAP 600, S&P GIVI, GLOBAL TITANS, DIVIDEND ARISTOCRATS, S&P TARGET DATE INDICES, GICS, SPIVA, SPDR and INDEXOLOGY are registered trademarks of Standard & Poor's Financial Services LLC, a division of S&P Global ("S&P"). DOW JONES, DJ, DJIA and DOW JONES INDUSTRIAL AVERAGE are registered trademarks of Dow Jones Trademark Holdings LLC ("Dow Jones"). These trademarks together with others have been licensed to S&P Dow Jones Indices LLC. Redistribution or reproduction in whole or in part are prohibited without written permission of S&P Dow Jones Indices LLC. This document does not constitute an offer of services in jurisdictions where S&P Dow Jones Indices LLC, S&P, Dow Jones or their respective affiliates (collectively "S&P Dow Jones Indices") do not have the necessary licenses. Except for certain custom index calculation services, all information provided by S&P Dow Jones Indices is impersonal and not tailored to the needs of any person, entity or group of persons. S&P Dow Jones Indices receives compensation in connection with licensing its indices to third parties and providing custom calculation services. Past performance of an index is not an indication or guarantee of future results.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index may be available through investable instruments based on that index. S&P Dow Jones Indices does not sponsor, endorse, sell, promote or manage any investment fund or other investment vehicle that is offered by third parties and that seeks to provide an investment return based on the performance of any index. S&P Dow Jones Indices makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC is not an investment advisor, and S&P Dow Jones Indices makes no representation regarding the advisability of investing in any such investment fund or other investment vehicle. A decision to invest in any such investment fund or other investment vehicle should not be made in reliance on any of the statements set forth in this document. Prospective investors are advised to make an investment in any such fund or other vehicle only after carefully considering the risks associated with investing in such funds, as detailed in an offering memorandum or similar document that is prepared by or on behalf of the issuer of the investment fund or other investment product or vehicle. S&P Dow Jones Indices LLC is not a tax advisor. A tax advisor should be consulted to evaluate the impact of any tax-exempt securities on portfolios and the tax consequences of making any particular investment decision. Inclusion of a security within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security, nor is it considered to be investment advice.

These materials have been prepared solely for informational purposes based upon information generally available to the public and from sources believed to be reliable. No content contained in these materials (including index data, ratings, credit-related analyses and data, research, valuations, model, software or other application or output therefrom) or any part thereof ("Content") may be modified, reverse-engineered, reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of S&P Dow Jones Indices. The Content shall not be used for any unlawful or unauthorized purposes. S&P Dow Jones Indices and its third-party data providers and licensors (collectively "S&P Dow Jones Indices Parties") do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Dow Jones Indices Parties are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content. THE CONTENT IS PROVIDED ON AN "AS IS" BASIS. S&P DOW JONES INDICES PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Dow Jones Indices Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs) in connection with any use of the Content even if advised of the possibility of such damages.

S&P Global keeps certain activities of its various divisions and business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain divisions and business units of S&P Global may have information that is not available to other business units. S&P Global has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

In addition, S&P Dow Jones Indices provides a wide range of services to, or relating to, many organizations, including issuers of securities, investment advisers, broker-dealers, investment banks, other financial institutions and financial intermediaries, and accordingly may receive fees or other economic benefits from those organizations, including organizations whose securities or services they may recommend, rate, include in model portfolios, evaluate or otherwise address.