A DISTORTED LANDSCAPE: HOW DEBT-WEIGHTED BOND INDICES CREATE INVESTOR RISK

Drew Peterson, CFA, CIPM®, Corporate Bond Research Analyst and Macro Strategist

EXECUTIVE SUMMARY

- **The convention of weighting bond indexes by debt outstanding is borrowed from equity indices.**
- **In the bond markets, this approach has the unintended consequence of overweighting the most indebted borrowers.**
- **Fundamental-weighted indices could provide a clearer picture of credit quality; in the meantime, there are compelling reasons for active managers to deviate from "market weights" while constructing portfolios.**

One of the unexpected challenges of managing fixed income portfolios is how much of the capital markets have an equity bias. From regulatory guidance to risk measurement conventions, much of the framework of the markets we trade in appears to have been written primarily with equities in mind. For the most part this rarely rises past the level of mild annoyance, but on occasion the application of an equity framework to another asset class has clear negative consequences for investors. Index construction is a prime example of this, and construction methodologies borrowed from equity indices may be causing bond investors to carry more risk than they realize.

A Brief Overview of Index Construction

Equity indexing is a fairly mature science. The first US equity index dates back to 1884 when Charles Dow began publishing a simple price average of railroad stocks, in what would eventually become the Dow Jones Industrial Average. In 1923 the Standard Statistics Company expanded on this idea by introducing a weekly index that we now know as the S&P 500. This index, rather than simply averaging prices, gave each stock a weight equal to the percentage of the market it represents, measured by shares outstanding times market price, a measure known as market capitalization. Whereas the Dow Jones' price-weighted average is a sensible way to measure how the *average* company in the market did, a capitalization weighted average instead measures how the market *as a whole* did. This is an under-appreciated lesson; how you calculate an average has very important implications for what that average can best measure.
Today, market capitalization weighting is the most commonly used approach for index construction. In addition to measuring the return of the market as if it were a single portfolio (which makes it ideal for portfolio benchmarking), it offers several advantages for equity investors, including the lack of need for ongoing rebalancing. However, among the most compelling is that while stock valuation is a massive subject well beyond the scope of this paper, it would be an extreme but not unfair simplification to say that a company's market capitalization is reflective of the market's belief in the future value of that company. By holding companies at market capitalization weight, an index implicitly assumes the markets are efficient and companies expected to be worth the most will outperform those expected to be worth the least. The market may be wrong, but as a neutral starting point this is a sensible way to invest. This made it an ideal approach for passive investment, and the exponential growth in passive index replication strategies since Vanguard's first index fund was launched in 1975 speaks to the broad acceptance of capitalization-weighting portfolios.

Total return fixed income investment isn't much older than passive equity index replication. Bonds were historically bought for their income rather than as a source of capital appreciation, and concepts as fundamental to active fixed income investment as the yield curve only date back to the early 1970s. The first total return bond indices were published around the same time. With the widespread acceptance of capitalization weighting for stocks, an analogous approach was applied to bond market indexing, where bonds were weighted as a percent of total debt outstanding. But just because this approach makes sense for equities, doesn't mean it can be applied to bonds without issue. If the index construction approach has important ramifications for the intended use of an index, then understanding the ways a debt-weighted index can introduce systemic biases are critically important for fixed income investors.

Differences in Valuation Challenges Require Different Weighting Approaches

The biggest practical difference between stock and bond valuation is that a bond's cashflows are known at the time of purchase, while a stock's future cashflows are unknown. Bond valuation is primarily about determining an appropriate discount rate to calculate the present value of these known future cashflows. Stock valuation, however, first entails estimating what those cashflows *are*, before turning to discount rates. This makes stock valuation more volatile and far more sensitive to changes in a company's business condition than bond valuation. Meanwhile, publicly traded companies rarely issue new stock, while most companies with debt issue or redeem debt routinely. Accordingly, a company's total market capitalization and total market value of debt outstanding behave very differently; capitalization fluctuates widely as the market's assessment of earning potential changes, while the total market value of debt outstanding changes primarily based on how much debt a company chooses to carry.

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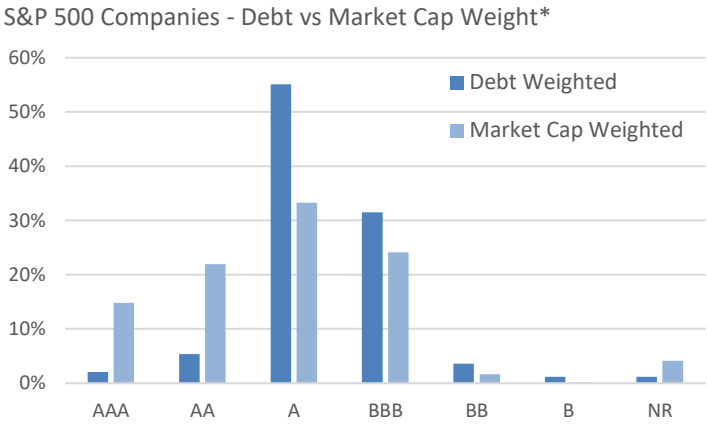
This has far reaching implications for index construction. By overweighting and underweighting companies with high and low earnings potential, respectively, capitalization weighing is in many ways a crowdsourced risk mitigation strategy. Weighting by debt outstanding does the exact opposite; it overweights the most indebted companies and underweights companies with the least debt. This increases, rather than reduces, risk. No one would suggest intentionally overweighting the most leveraged firms over the least leveraged, yet that's exactly how a debt-weighted index is built.

The Impact of a Debt-Weighted Aggregation on Fixed Income Indices

One way to see the way debt-weighting an index overweights risk is to simply take a known index and re-weight its constituents. Equity indices are ideal for this as they have hundreds, rather than tens of thousands, of securities. And, the S&P 500 companies' credit ratings distribution, weighted by each company's debt outstanding, does provide a credit profile that looks broadly like any other broad market corporate bond index. Exposure is primarily A and BBB rated, with small AAA and AA allocations, and very small BB and B positions. This is the landscape of the corporate bond market as investors understand it; despite being an equity index, the credit profile looks entirely normal. However, weighting the S&P 500's credit exposure by the index's original market capitalization rather than debt outstanding, yields a substantially different picture; the exposure to AAA credits jumps from 2.1% to 14.8%, and AA increases from 5.4% to 21.9%. There are still greater exposures to A and BBB rated debt than AAA and AA, but by a much smaller margin than before; A rated exposure decreases from 55.1% to 33.3%, while BBB exposure falls from 31.5% to 24.1%.



Source: Appleton Partners, Bloomberg, S&P, and Moody's

Anecdotal observations offer an even more telling view. Ranked by debt outstanding, the first non-investment grade name in the S&P 500 is the 16th largest position, BB+ rated Charter Communications, with a position size of 0.83%. By market capitalization, Charter is still the largest non-IG name in the index, but its weight falls to 0.19%, making it the 112th largest position. Four of the top 20 positions of the S&P 500 weighted by debt are rated AA- or higher, while 9 are BBB+ or lower; weighted by market capitalization, 12 of the top 20 are AA- or higher and only 3 are BBB+ or lower. There are major sector composition changes too. While US regulatory changes requiring large banks to carry more debt than in years past have led to a greater weighting of financial companies by debt, otherwise debt-intensive industries like communications and industrial names are heavily represented in the top 20. By market capitalization, however, technology and healthcare become the dominant sectors.

*Rank	Name	Market Cap	Rating
1	APPLE INC	7.13%	AAA
2	MICROSOFT CORP	6.71%	AAA
3	ALPHABET INC	4.17%	AA+
4	AMAZON.COM INC	3.67%	AA
5	NVIDIA CORP	2.69%	A+
6	META PLATFORMS INC	2.07%	AA-
7	BERKSHIRE HATHAWAY INC	1.99%	AA
8	TESLA INC	1.71%	BBB
9	ELI LILLY & CO	1.40%	A+
10	UNITEDHEALTH GROUP INC	1.33%	A+
11	VISA INC	1.30%	AA-
12	WALMART INC	1.18%	AA
13	EXXON MOBIL CORP	1.12%	AA
14	JPMORGAN CHASE & CO	1.08%	A+
15	JOHNSON & JOHNSON	0.95%	AAA
16	PROCTER & GAMBLE CO/THE	0.94%	AA-
17	MASTERCARD INC	0.94%	AA-
18	BROADCOM INC	0.93%	BBB-
19	HOME DEPOT INC	0.76%	A
20	ORACLE CORP	0.76%	BBB

*Rank	Name	Debt	Rating
1	JPMORGAN CHASE & CO	7.39%	A+
2	CITIGROUP INC	6.94%	A-
3	GOLDMAN SACHS GROUP INC	6.68%	A
4	BANK OF AMERICA CORP	6.25%	A+
5	MORGAN STANLEY	3.77%	A+
6	WELLS FARGO & CO	2.45%	A+
7	VERIZON COMMUNICATIONS INC	1.47%	BBB+
8	AT&T INC	1.36%	BBB
9	AMAZON.COM INC	1.31%	AA
10	FORD MOTOR CO	1.23%	BBB-
11	BERKSHIRE HATHAWAY INC	1.07%	AA
12	GENERAL MOTORS CO	1.01%	BBB
13	T-MOBILE US INC	0.97%	BBB
14	APPLE INC	0.93%	AAA
15	MICROSOFT CORP	0.90%	AAA
16	CHARTER COMMUNICATIONS INC	0.83%	BB+
17	COMCAST CORP	0.83%	A-
18	ORACLE CORP	0.76%	BBB
19	CVS HEALTH CORP	0.70%	BBB
20	DUKE ENERGY CORP	0.67%	BBB+

Source: Appleton Partners, Bloomberg, S&P, and Moody's

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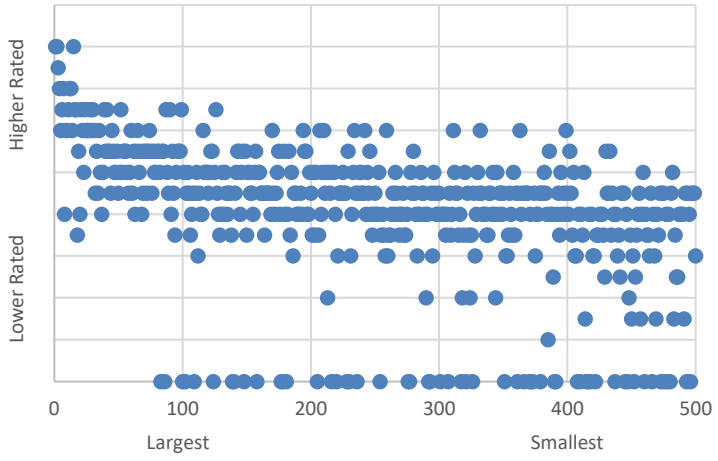
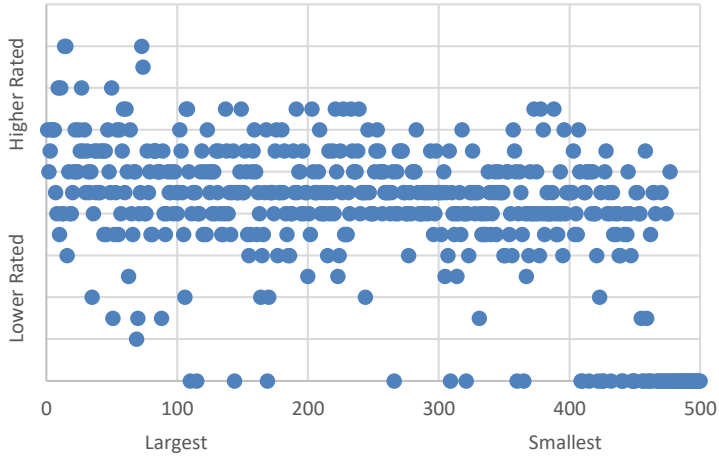
Scatter-plotting the entire constituency of the index by market cap and by debt provides a good visual depiction of this bias; there is a strong upwards rating bias to the largest companies in the index by market capitalization, whereas ranked by debt outstanding there is significantly more diffusion and no discernable trend between rating and position size.

Ratings Distribution by Market Cap Weight*



Ratings Distribution by Debt Weight*

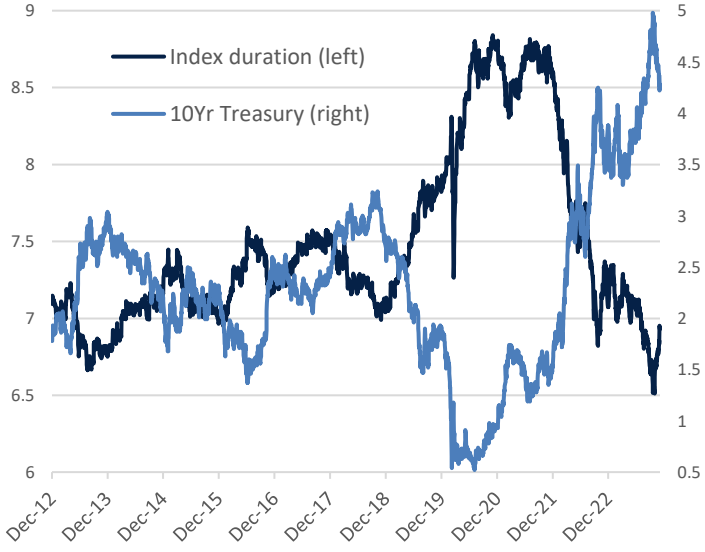


Source: Appleton Partners, Bloomberg, S&P, and Moody's. *See disclosures at end for further information.

Biases Introduced by Debt Weighting Extend Beyond Credit

Credit exposure is by far the most obvious issue introduced by debt-weighting an index, but it is by no means the only one. We would note two additional considerations. First, company actions can change the composition of a debt-weighted index not just at the issuer level, but also at the aggregate one. As companies have a stronger incentive to issue longer debt during periods where rates are low and shorter debt when rates are high, overall index duration has tended to move inversely to rates. This was especially pronounced during and after the Covid-19 pandemic. The Bloomberg US Corporate index had a duration of around 7 years at the end of 2018 when the 10Yr Treasury reached its near-term peak of around 3.25%, but as rates plummeted towards 0.50% in 2020, corporations locked in long-term rates. The index eventually extended to around 8.9 years duration, just in time for what ultimately proved to be a 450bps run-up in the 10Yr Treasury. Very few investors would advocate extending duration at all-time lows in interest rates, but a debt-weighted index construction methodology gives issuer preferences priority over investor ones. The index lengthened in response.

Issuer Incentives Can Impact Duration In Ways That Negatively Impact Investors



Source: Bloomberg, Federal Reserve, Appleton Partners

Second, we have focused on corporate issuance, but it's worth considering that the single largest issuer in the domestic bond market is the US Treasury. Most government/credit indices have between 50-70% exposure to Treasury debt depending on exact construction rules, which creates an oddly bar-belled credit profile; overweighting lower-weighted corporate debt while simultaneously carrying extremely high exposure to debt that trades as a pure interest rate risk, without credit spread. Treasury exposure can make sense for investors in many markets, but not all, and we would argue certainly not at the weights that it's often represented in government/credit indices.

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Implications for Investors

The purpose of this paper isn't to argue that investors should buy bonds in proportion to their equity market weight. Rather, it's to suggest that creating a passive "market weight" portfolio is not a passive approach at all, as the weighting approach itself will impact portfolio characteristics in ways investors do not realize. Simply applying equity investment conventions to the bond markets rather than considering the unique properties of bonds creates a distorted view of the bond market landscape, and being aware of these distortions may offer opportunities for active bond investors. Alternate fundamental-weighting indices – price to book, dividend yield, revenue – exist in the equity world, though are less commonly used as market capitalization weighting is self-rebalancing while alternate measures are not. This isn't a concern in the fixed income space as ongoing rebalancing is required as bonds approach maturity no matter how an index is constructed. Bond indices weighted by revenue, operating cashflow, or free cashflow instead of debt may provide a clearer picture of the credit markets by tilting index composition back towards the strongest firms and away from the most indebted, creating an index more aligned with overall market activity. Fundamental-weighted fixed income benchmarks are not widely available but could be an elegant solution to the low-quality bias imparted by debt weighting.

In the meantime, Appleton's investment process has always been index-agnostic, focused on identifying large, high-quality issuers with strong credit fundamentals that we think offer value, and making no attempt to replicate index credit or sector exposures. This approach has led us to construct portfolios that align with overall economic activity rather than debt outstanding. This has invariably led to mismatches between our strategy and our index, but these mismatches have also generally outperformed across business cycles. We believe this validates the approach of deviating from debt-weighted index replication and is a compelling argument for active fixed income management over passive bond index replication.

*Charts shown above containing ratings distribution data use the SSGA SPDR S&P 500 ETF Trust as a proxy for the S&P 500. Positions and ratings are as of 11/28/2023. Ratings are the highest of Moody's or S&P's senior unsecured debt rating for each issuer, and are presented on a S&P scale.

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