

Bond Index Recommendation:

BAG THE AGG!

by
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The first bond index was invented by Arthur Lipson in the summer of 1973 as the head of fixed income research at Kuhn Loeb. I started working for Art in the summer of 1977. I consider Art a quantitative genius who taught me much about bond math and index construction. Lehman Bros. acquired Kuhn Loeb at the end of 1977. It was considered one of the best mergers of fixed income and kitchen staffs in Wall Street history.

The original [Kuhn Loeb bond indexes](#) were:

- **Kuhn Loeb Bond Index**
All investment grade corporate bonds with minimum outstanding par value = \$1m
- **Government/Agency**
All publicly issued debt of the U.S. Government and its agencies.
- **Long-Term Corporate**
All investment grade corporate bonds with a minimum maturity of 20 years.

Shortly after the merger with Lehman, Art decided to be a bond salesman since that was where the big commissions were, and I became the head of fixed income research. Thanks to a recommendation from Carl Heidt of the Hartford Fire Insurance Group, we merged two of our indexes together to create... the **Lehman Government Corporate Index (LGC)**. I quickly proceeded to go on the road to pension consultants promoting our index(es) as the proper fixed income benchmark(s). Management was confused as to where the trades were, and I said... just wait. Just like a farmer who tills the soil and plants the seeds, the harvest will come later. And boy was I right as the Lehman Govt./Corporate index became the fixed income benchmark chosen by pension consultants for asset managers to manage against. As a result, my primary job became teaching and servicing our clients on how to beat our index(es).

Shortly thereafter I designed a mortgage-backed index, a Floater index, GIC index, and Sectors index series. When we merged the mortgage-backed index into the Government/Corporate index we got... **the AGGREGATE or AGG**. This soon replaced the LGC and became the primary fixed income benchmark throughout America and still is to this day. The Lehman investment bankers embraced these bond indexes as a way to win clients suggesting that any issuance of the client bonds would result in inclusion in our indexes which would provide an incentive to buy these new issues. Few practitioners have ever witnessed how a bond index is created or maintained. I always questioned why asset managers didn't come visit our process. I thought it was educational and good marketing. Moreover, bond math can be quite difficult especially as a bond index with thousands of bonds in its portfolio. Here are some of the peculiarities or structural flaws of the AGG:



1. Market Weighted

Traditional bond indexes use *market weighting* as their preferred valuation. In order to market weight a bond index you need two data requirements: **end of day pricing** of all bonds in the index and the **current amount outstanding**. Since there is no bond exchange end of day pricing is difficult. Different market vendors will all have different prices for the same bonds. This leads to different risk/reward behaviors. But the more difficult data, believe it or not, is the amount outstanding. As simple as it sounds, we do not know the amount outstanding for many issues at month-end index rebalancing and calculation. Treasuries and Agencies are stripped thereby reducing the float on these bonds. Such information is provided delinquently (Treasuries) or not at all (Agencies). As a result, traditional bond indexes leave the original amount issued as the amount outstanding. A \$10 billion Treasury issue may have only \$4 billion left in float. Since bond indexes do not include STRIPS, they are overweighting Treasuries and Agencies coupon issues by not changing the original amount outstanding. This will skew the returns of the index accordingly. Corporate bonds have tenders, sinking funds, and puts which could affect the amount outstanding. Usually, such information is only reported annually in the 10-k. As a result, corporate bonds are never correctly updated if they face any of the principal reduction features. Mortgage-backed securities have monthly payments of principal (as regular amortizations and prepayments). Such information is reported *after* the end of the month several weeks delinquent. As a result, bond indexes have to use a previous month's data. This may be exaggerated with prepayments being seasonal. Since prepayments affect total returns not only is the amount outstanding incorrect but the prepayment used for the current month is not accurate. Both inaccuracies can lead to erroneous return calculations however small or large they may be. In truth, it is **Mission Impossible** to update accurately the amount outstanding of most bonds which in turn affects the accuracy of the risk/reward calculations.

2. Investable Bond Portfolio

Given the enormous size of the AGG and most bond indexes (in number of issues) it is impossible to purchase such a portfolio. Most bonds in the AGG (and large bond indexes) are not liquid. What do Index Funds and especially ETFs do to *duplicate* these illiquid bond indexes? Wall Street provides *replication* or stratified sampling strategies that supposedly get you close to the risk/reward behavior of such indexes. In these replication models they only buy the most liquid securities and try to match the average duration of the index benchmark. Investors will then be faced with some degree of tracking error since you cannot purchase the index portfolio. Tracking error tends to measure the average *monthly* total return differences. However, a five-basis point monthly tracking error could be a 30 basis points annual return difference. Usually, the difference between median and first quartile performance versus the AGG is less than 30 basis points. The question remains why not build the index the way replication models work with only the most liquid issues?

3. Index Portfolio Averages

Summary statistics are critical data for bond asset managers. Most investors will build their bond portfolios around the average yields and durations displayed by the index benchmarks.

Index funds try to match these averages while active bond managers will try to tilt their portfolio longer or shorter than this average duration + outyield the index average YTM. Unfortunately, portfolio averages are misleading, if not erroneous, data. To prove this accusation please input any bond index's posted average price, coupon and maturity into a bond calculator and see if you get the average YTM. **NO** ...so what happened? A classic was the Lehman Aggregate reported averages as of July 1990:

Average Coupon = 9.13%
Average Price = 100.00
Average YTM = 8.57%

How could a bond at par have a YTM that is 0.56% less than the coupon? Bond math is not linear, but the index averages are. An average duration of 10-years does not mean the index portfolio has an interest rate sensitivity = 10 years. The index portfolio is a term structure of all maturities and durations. As the yield curve changes shape and slope so does the risk/reward behavior even if the average duration is unchanged. Portfolio averages are not indicative of the true risk/reward of the index portfolio ... **Caveat Emptor!**

The AGG has served investors well for the last 40+ years but it is time to put it in a financial museum as a... time that was. Liability driven objectives need a benchmark that best represents their unique liability cash flows. It is critical that all of the asset decisions (asset allocation, asset management, performance measurement) are in harmony with the true liability objective. Generic indexes are not in sync with this objective and have misled assets as to the proper goal and focus... to fund liabilities in a cost-efficient manner with prudent risk. Liability objectives are cash flow driven objectives and not return driven objectives!

Solution: Custom Liability Index (CLI)

Most institutional objectives are liability driven (Pensions, OPEB, SFA grants, Lotteries, etc.). Yet it is hard to find the liability objective in anything the asset side does (asset allocation, asset management (other than LDI), performance measurement). There seems to be a definite disconnect here. If all asset managers outperform their generic index benchmark but lose to liability growth... did the client win or lose? Clients lost and may have to pay a penalty (higher contribution costs). **The true objective of liability driven clients is to fund their unique and proprietary liabilities in a cost-efficient manner with prudent risk.** Similar to snowflakes... no two liability cash flow schedules are alike. As a result, it is impossible for any generic index to properly represent the client liability objective. **Only a Custom Liability Index could be the proper benchmark for a liability objective.** Ron Ryan and his team developed the first CLI in 1991... it remains as one of the key products of Ryan ALM.

Liabilities are the realm of actuaries. They are usually difficult and tedious calculations. As a result, actuarial projections are produced annually months after the end of the fiscal year. This is not in harmony with active asset management which needs to monitor their objective often in detail. The

Ryan ALM CLI is a *monthly report* that provides all the calculations and data needed for successful asset liability management (ALM). Our CLI will take the annual actuarial projections and convert them to monthly NET liability cash flows. Assets need to know what they are funding. Usually it is **(benefits + expenses) – contributions = net liability cash flows**.

Ryan ALM will then price the CLI using our proprietary **ASC 715 discount rates**. Ryan ALM is one of a few ASC 715 vendors providing such rates since the inception of FAS 158 in 2008. In addition to a monthly net liability cash flow schedule, our CLI will provide numerous statistics based on ASC 715 discount rates: average duration, YTM, growth rate, interest rate sensitivity, etc.

Solution: Cash Flow Matching (CFM)

The value in bonds is the certainty of their cash flows. They may be the only asset class with such value. Ryan ALM has recommended consistently to **use bonds for their cash flow certainty value**. We do not consider bonds as performance or Alpha assets. We view bonds as liquidity or Beta assets. Bonds have always been the chosen asset class for cash flow matching of liabilities. In the 1970s it was called Dedication. CFM has a long success record of being the core portfolio to defease and fully fund the liability objective. With interest rates higher today than in the last 20+ years, CFM should be in vogue. We urge clients and their consultants to use CFM as the bond allocation to fully fund the net liability cash flows chronologically.

We call the Ryan ALM CFM model... **Liability Beta Portfolio™ (LBP)**. Our LBP is a **cost optimization model** composed of investment grade bonds skewed to A/BBB issues at the lowest cost to fully fund net liabilities. The LBP will cash flow match monthly liabilities **chronologically** based on the CLI data. We recommend funding 1-10 years as the target area to fund given the certainty of these liability cash flows and to buy time for the performance assets to grow unencumbered. The LBP will provide the liquidity needed to fully fund these net liabilities in a cost-efficient manner. The LBP should also outyield traditional bond management which will enhance the ROA. The LBP should reduce funding costs by 2% per year, reduce the volatility of the funded ratio and contributions and reduce asset management costs (fee = 15 bps).

Benefits

The benefits of the Ryan ALM process are numerous:

- CLI benchmark provides all the data and calculations needed for efficient ALM
- LBP de-risks the plan by **cash flow matching** benefit payments with certainty
- LBP provides liquidity to fully fund liabilities so no need for cash sweep
- Eliminates interest rate risk since it is funding benefits (future values)
- Reduces funding costs by >2% per year = 20% on 1-10 years
- Reduces asset management costs (Ryan ALM fee = 15 bps)
- Enhances ROA by out-yielding active bond management
- Reduces volatility of the funded ratio + contributions
- CLI + ASC 715 discount rates provided at no cost
- Buys time so Alpha assets grow unencumbered