

What's Wrong With : 1 to 3 year, 7 – 10 year, 20 year + Bond Indexes

We live in an Index world! Most institutional objectives are based on some generic index(s) such that the methodology of these indexes will dictate the investors' risk/reward behavior. Moreover, Exchange Traded Funds (ETFs) have had explosive growth in the last five years. An ETF is an Index Fund. As a result, it is critical that indexes are designed with proper integrity and methodology. Many fixed income indexes are based on methodologies that could not produce the risk/reward behavior indicated by its summary statistics or labels.

Problem: Bond Market Risk (Systematic Risk)

The market risk or systematic risk that dominates the fixed income market is **interest rate risk**. In Government securities this risk dictates over 98% of the risk/reward behavior. This interest rate risk is quite linear such that a maturity or duration extension (or reduction) should affect total return results significantly. As a result, it is critical that a bond index accurately represent the interest rate risk/reward that it is measuring. Bond indexes with broad maturity ranges (i.e. 1-10 year, 10+ year, 20+ year) tend to produce vague and misleading calculations of interest rate risk which could produce a much different risk/reward behavior pattern than what any investor thought or wanted. The best measurement of the risk/reward of a specific maturity is the Treasury auction issue (key issue) for that maturity.

Problem: Treasury Maturity Indexes

Most generic Treasury indexes are a market-weighted portfolio of seasoned bonds that *distort* the projected risk/reward of any maturity. These indexes tend to be a basket of maturities that are characterized by volatile average maturities; sharp coupon drifts versus the current coupon rate; and reduced liquidity measured by a wider bid/ask spread. The methodologies used by most bond indexes create risk/reward distortions several ways:

Market Weighted This weighting method will skew the data to the largest market weights. The Treasury maturity band indexes are weighted toward old incongruous issues. The Auction issue usually represents a small and declining weight. Most importantly, due to stripping, the market weights used here are erroneous since they use the original issue amount (before stripping) as the amount outstanding. Even on issues where most of the bond has been stripped away the weights used are based on the full original issue size.
Wrong weights = wrong average statistics = wrong risk/reward behavior

Average Coupon Significant coupon drift here versus the current rate suggesting different durations and risk/reward behaviors.

Average Duration Significant volatility in the average duration especially on longer maturity indexes. A 1-year difference in modified duration equals a 1% difference in returns for every 100 basis points move in interest rates.



Composition Issues will roll in and out through time resulting in volatile summary statistics and volatile risk/reward behavior.

Callables Callable bonds violate the integrity of a maturity-defined index as they can be priced to a termination date that is outside the index parameters (i.e. maturity range). Only bullet bonds should be allowed in a maturity index series.

Indexes that do not measure or represent interest rate risk accurately will cause ambiguous risk/reward calculations or behavior patterns. This is the problem with ill-defined basket indexes such as the 1 to 3-year, 7 to 10-year and 20-year + indexes.

Solution : RYAN INDEX

In 1983, Ronald Ryan and his team created the *first daily bond index ... the RYAN Index™*. The RYAN Index™ was designed to monitor interest rate risk and reward as a Treasury yield curve portfolio composed of only auction (on-the-run) issues. By definition, the Treasury yield curve is the on-the-run, single auction issue for each maturity series (i.e. currently = 1, 3, 6 month, 2, 5, 10 and 30-year auctions). Quantitatively, *the Treasury yield curve (auction issue) best represents the risk/reward of any maturity*. Most bonds are priced off of only one bond ... namely, the Treasury auction issue for that maturity area. As a result, the Ryan Index accomplished, for the first time, creating an accurate **baseline portfolio or intrinsic value** that every bond priced off the Treasury yield curve should be measured against. If a bond underperforms the Treasury it is priced off of (i.e. yield spread) then its intrinsic value would be a negative and vice versa. Finally, the Ryan Index™ created an accurate gauge of the relative risk/reward of any bond.

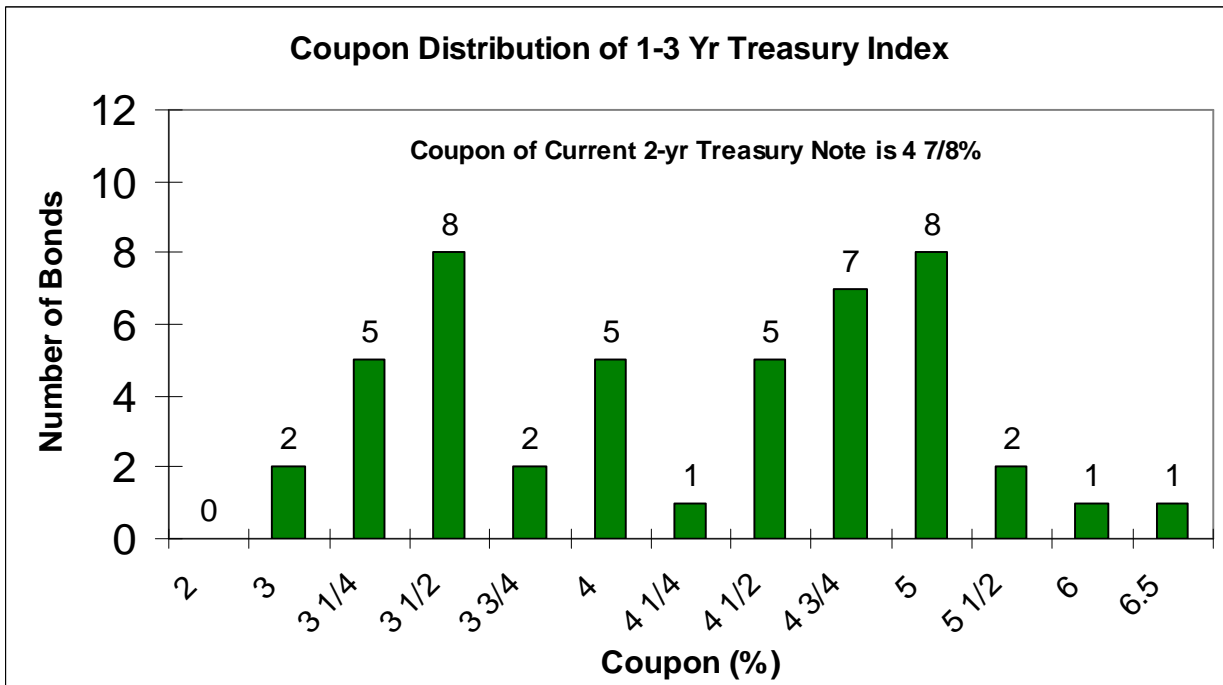
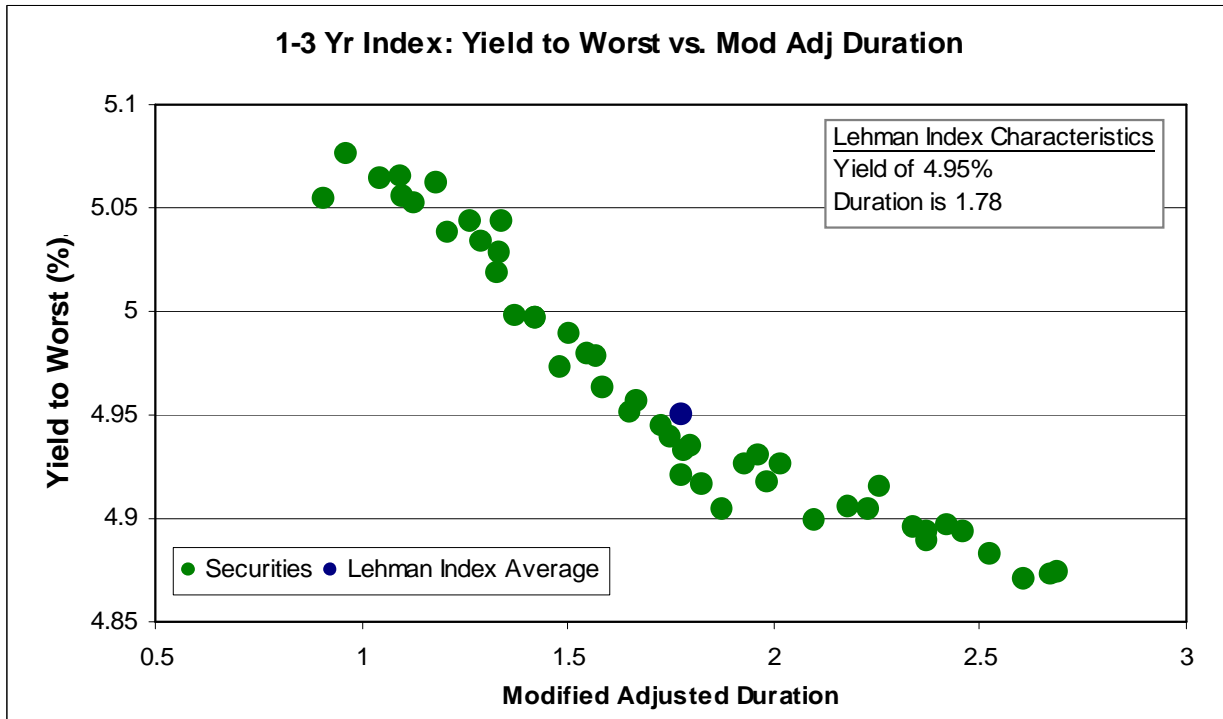
1 to 3-year Index

Given the termination of both the 1-year and 3-year Auction maturity series, *the validity of this index should be questioned* since it could *never* represent with any accuracy the risk/reward of the 1, 2 and 3-year area. With only one Auction issue left in this space, this index currently has 47 issues (large basket) suggesting that this index is filled with old issues. The auction issue has a weight of only **2.32%** of this index. As a result, the average coupon (4.278%) is much lower than the Auction rate of 4.875 %; and the average duration is shorter (1.78 years vs. 1.88 years). The maturity ladder composition of this index is volatile, as **35.1%** of the current composition will roll out of the index at the end of December. Accordingly, with such issue selection volatility, the average coupon and duration will shift dramatically through time resulting in a different risk/reward than the 2-year Treasury Auction issue (the intrinsic average maturity).

(As of 5/31/07)

Index Type	# Issues	Market Value	Average Coupon	Average Yield	Mod Adj Duration	% of Index in the On-the-Run
1 to 3-year Treasury	47	777.2	4.278	4.950	1.779	2.31%
2-yr Tsy. Auction	1	18.0	4.875	4.916	1.883	100.00%

Source for following charts: www.ryanindex.com, Lehman Indices Reports; Lehman U.S. Treasury Index: 1-3 years



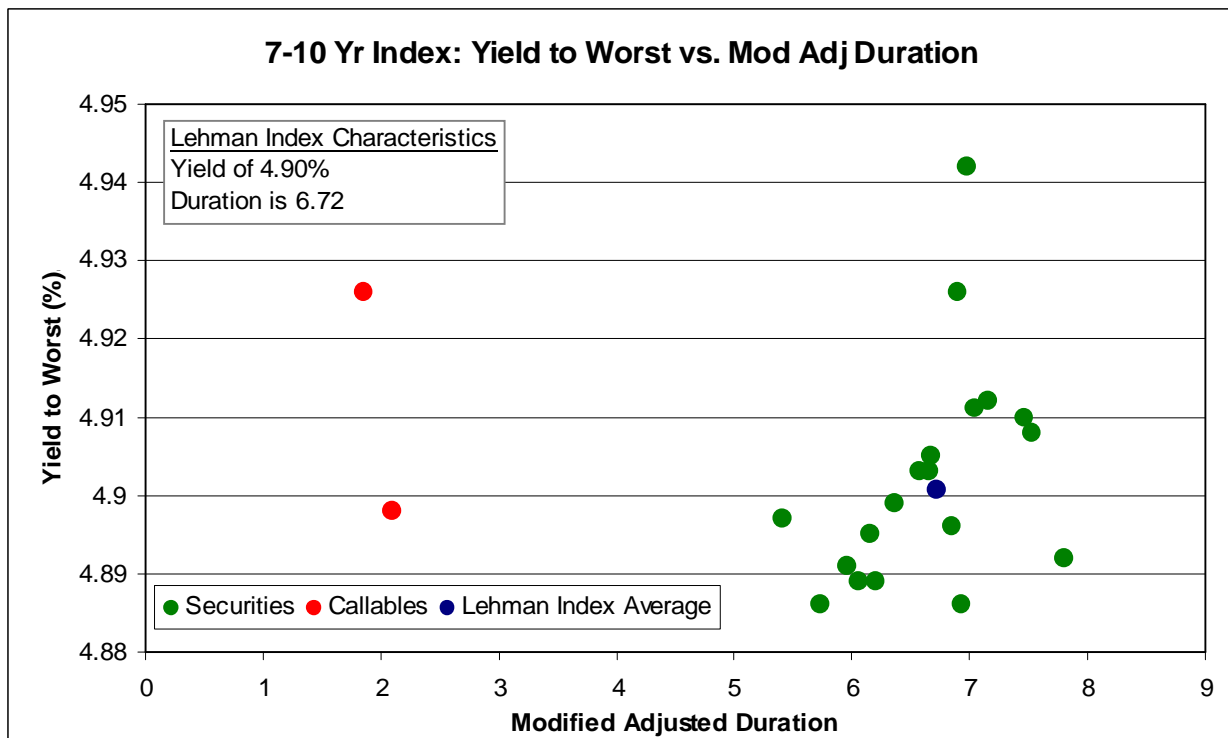
7 to 10-year Index

This index validity should be highly questioned for two reasons. First, it barely has an Auction issue in it. The 10-year Auction will always be at the longest end of this index and currently represents only 3.74% of the weight. Second and more important, this index construction violates the risk/reward integrity of what investors think this index represents since callable bonds are allowed here based on maturity dates instead of workout dates (i.e. call dates). Currently, two issues are in serious call situations with market prices above \$115. These callable issues behave like 2-year maturity bonds, not 7 to 10-year maturity bonds and represent a drag on the overall index duration if not a violation of the risk/reward behavior of a 7 – 10 year maturity index. As the graph depicts succinctly, the modified adjusted duration of the two callable bonds look nothing like ... the other bonds in the index, the index averages (6.719 years) and the 10-year Treasury Auction issue (7.89 years). Moreover, **16.40%** of the current index composition will roll out of the index by the end of 2007.

(As of 5/31/07)

Index Type	# Issues	Market Value	Average Coupon	Average Yield	Mod Adj Duration	% of Index in the On-the-Run
7 to 10-year Treasury	21	336.8	5.471	4.901	6.719	3.74%
10-yr Tsy. Auction	1	12.6	4.500	4.892	7.890	100.00%

Source for following chart: www.ryanindex.com, Lehman Indices Reports; Lehman U.S. Treasury Index: 7-10 years



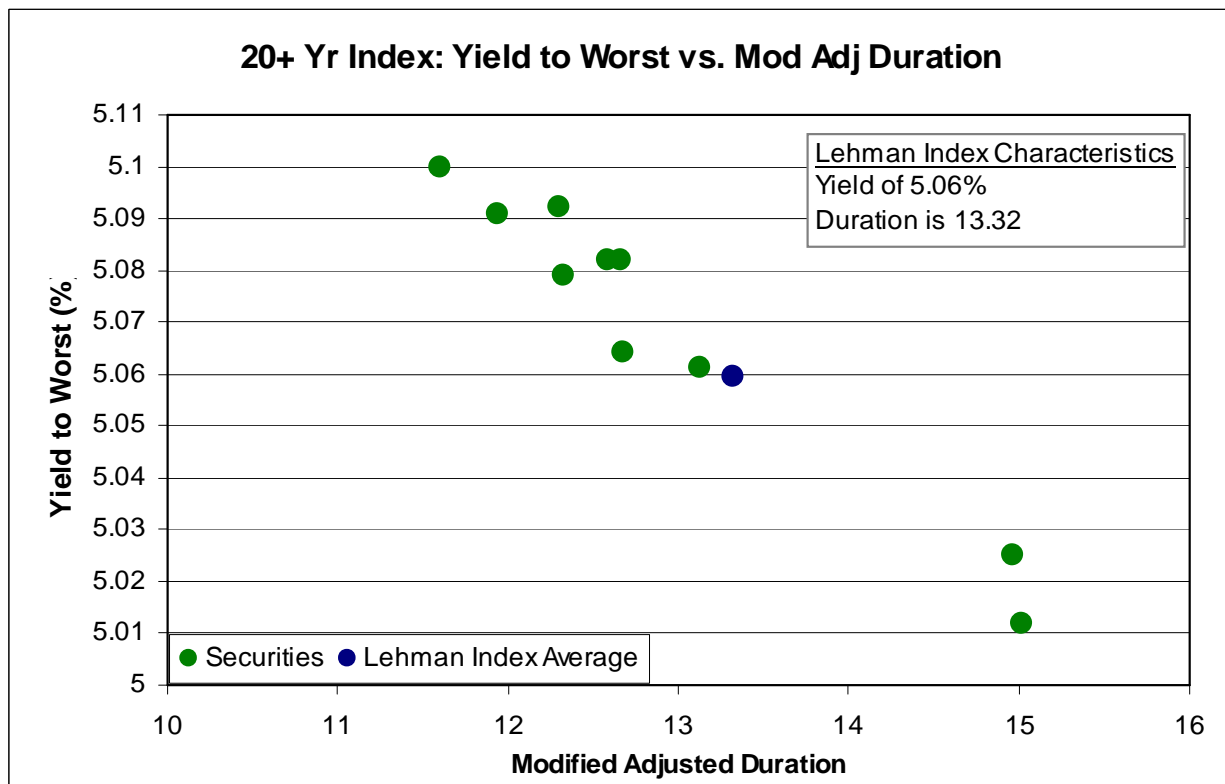
20 + year Index

*This index validity should be questioned due to the lack of auction issues in this space. The 20-year Auction was terminated 1/8/86 and the 30-year was terminated 2/8/01 then reissued in May 2006. As a result, this index methodology is mainly constructed of old 30-year Auction issues whose average modified adjusted duration (13.32 years) is much shorter than a new issue 30-year (15.322). As the graph illustrates there is a very wide spread (over 30% difference) in modified adjusted durations within this index composition. This creates volatility in the interest rate risk profile (average modified duration) of such an index. Approximately **20.41%** of the issues roll out of the current index composition by 12/31/07 suggesting significant drift potential in average coupon and duration.*

(As of 5/31/07)

Index Type	# Issues	Market Value	Average Coupon	Average Yield	Mod Adj Duration	% of Index in Last T-Bond
20-year + Treasury	10	139.8	5.454	5.059	13.319	9.61%
30-yr Tsy. Auction (Last Auction Issue)	1	13.4	4.750	5.011	15.322	100.00%

Source for following chart: www.ryanindex.com, Lehman Indices Reports; Lehman U.S. Treasury Index: 20+ years



Conclusion

*Yield curve benchmarks must be built around the Treasury yield curve (auction issues) or inaccurate risk/reward behaviors will result. Investors who want to buy or diversify interest rate risk should do so through buying exact spots on the yield curve around the Auction issue or STRIP yield curve. Only the Treasury yield curve as an Index series (namely, the RYAN INDEX series) measures the risk/reward of a yield curve accurately (i.e. interest rate risk). Pensions, Mutual Funds and now ETFs are victims of using vague ambiguous yield curve index benchmarks that will produce risk/reward behaviors inconsistent with their objective. If the average duration of the index changes by 1 year or is 1 year different than the Auction issue, it will create a disparity of 1% for every 100 basis points move in interest rates. Historically, 100 basis points is less than the average annual move in interest rates. *Caveat Emptor!**

AME 000147 exp 04/2008

Average coupon- a weighted average of the coupon rates, or stated interest rates, of bonds held in a portfolio.

Average yield- a weighted average of the yields of bonds held in a portfolio.

Caveat Emptor- “let the buyer beware”

Coupon- the interest rate stated on the bond when it’s issued. For example, a 5% coupon bond of \$1,000 will pay \$50 per year. Interest is typically paid two times per year.

Duration- the average life over which a bond makes interest and principal payments. A zero-coupon bond maturing in 5 years also has a duration of 5, because that’s when you’ll get all of your original investment, plus all of your interest back. Securities which pay interest periodically will always have a duration that is less than the maturity.

Interest rate risk- the possibility of a reduction in the value of a security, especially a bond, resulting from a rise in interest rates.

Market value- a security’s last reported sale price or its current bid and ask prices. Also called market price.

Modified Adjusted Duration- a measure of the price sensitivity of a bond to interest rate movements. It is inversely proportional to the approximate percentage change in price for a given change in yield.

Ryan Indexes- The Ryan Treasury Indexes™ were created by Ronald J. Ryan who has calculated and issued U.S. Treasury indexes since 1983. These indexes measure the performance of each Treasury maturity and are considered benchmarks in the industry.

Yield to worst- the lowest of all yield to calls or the yield to maturity.

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