

What's different between IEF and TLT?

Basics

IEF is iShares 7-10 Year Treasury Bond ETF ([iShares 7-10 Year Treasury Bond ETF | IEF](#)) and TLT is iShares 20+ Year Bond ETF ([iShares 20+ Year Treasury Bond ETF | TLT](#)). The following is a summary of their key facts.

Data as of 9/16/2022	IEF	TLT
Inception date	07/22/2001	07/22/2002
Category	Fixed income	Fixed income
Benchmark Index	ICE US Treasury 7-10 Year Index	ICE US Treasury 20+ Year Index
Capitalization	\$22.3 B	\$24.9 B
Expense ratio	0.15%	0.15%
Return since inception	3.87% (as of 7/30/2022)	5.12% (as of 7/30/2022)

On the surface, they look very similar except for the maturity of the bonds. But for an investor the final test is how they perform. After seeing the numbers, you would be surprised to see how different they are.

Performance

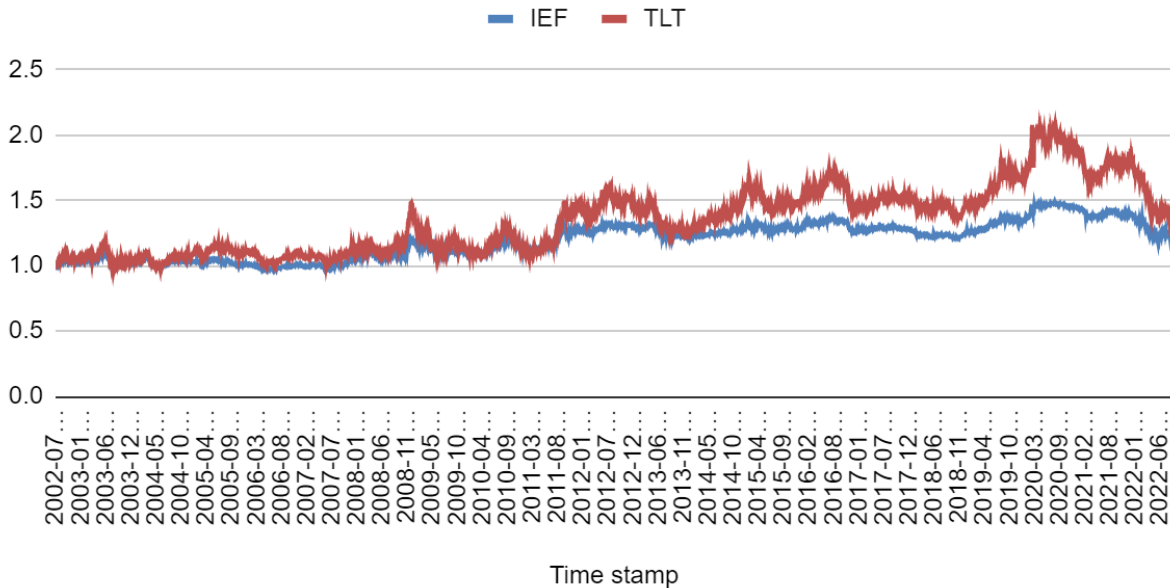
1. Price history

We compare the price multiples of each over their prices on 2002-07-26, when both were first available. As of 2022-09-16, the multiples are 1.192 for IEF and 1.298 for TLT, for an approximate annualized rate of 0.87% and 1.30% respectively. These numbers are different from what are reported in the funds' web pages. We think the difference is mainly due to different time frames of reporting.

It is also interesting to look at the history curves below.

Price History of IEF and TLT

Price=1.00 on 2002-07-26



This shows TLT was higher most of the time but with more volatility.

2. Five year returns

We think for investors, the comparisons should also be made on the basis of returns. For long term investors, assuming holding periods of five years seems reasonable. The results below were calculated from all possible 5 year returns.

A. Summary statistics

	IEF	TLT	Explanation (annualized returns)
Minimum	-1.83%	-3.48%	The minimum of all returns
First Quartile	0.63%	0.99%	One-fourth are below this value
Median	1.61%	2.52%	The middle value
Third Quartile	2.88%	4.81%	One-fourth are above this value
Maximum	6.28%	9.05%	The maximum
Mean	1.81%	2.89%	The average rate of return
St. Dev.	1.64%	2.49%	The standard deviation

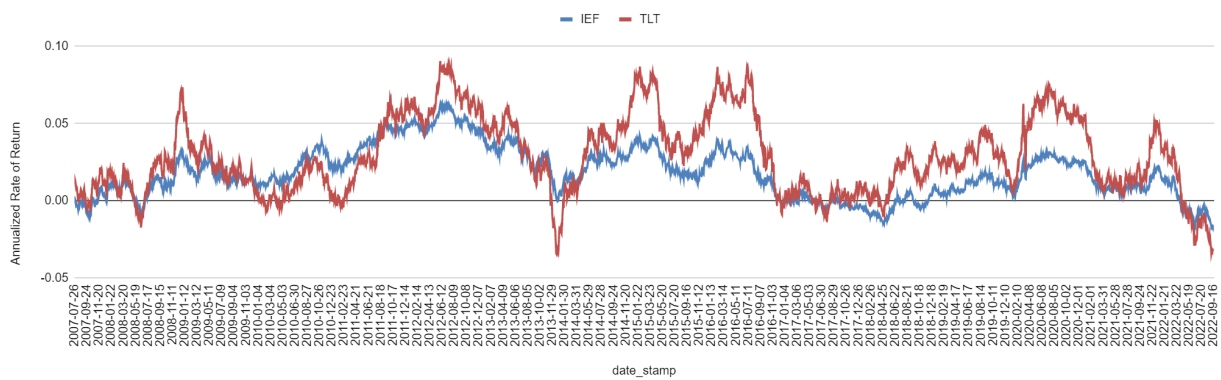
A few observations:

- An investor may lose money on bonds after 5 years. (The probability will be revealed later.)
- The median returns of both securities are below average, implying that more of the returns are below average than those above.
- The common concept that bonds are less volatile is not supported here. The coefficient of variation (= st dev/mean) of both being close to one suggests that the relative volatility is high.

Return History

The following shows the five-year returns throughout the investment time frame.

Five Year Return History of IEF and TLT

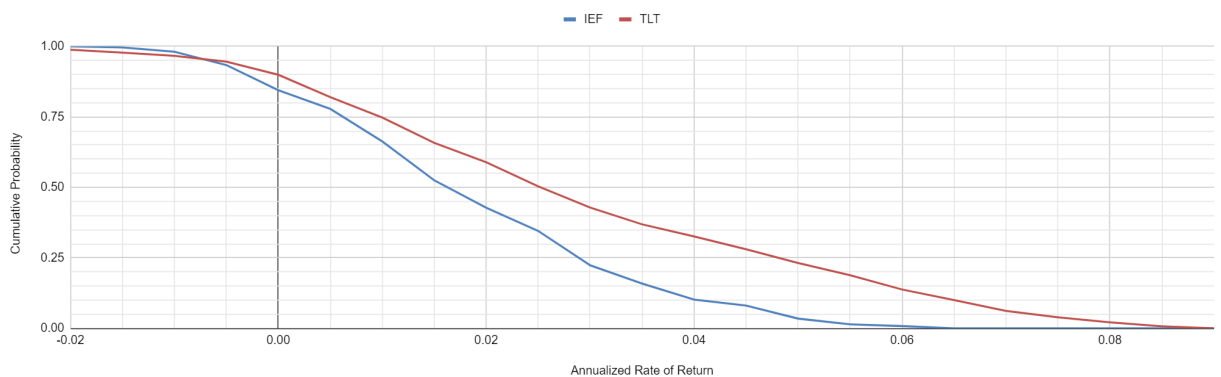


TLT outperformed IEF 79% of the time, but with greater volatility. The coefficient of correlation between the two curves is 0.807.

IRRP (Investment Return and Risk Profile)

Cumulative frequency distributions of the returns are shown below.

Five Year IRRP of IEF and TLT



- The height of a curve shows the relative frequency (probability) that returns are higher than x value. So the height of TLT at 0 returns is the probability of NOT losing money and it is about 90%. The probability of not losing money with IEF is about 85%.
- When a curve lies above the other means that the probability of making the same return is higher. It is clear TLT is above IEF over almost the entire range of returns (except for the small gap at the low end).
- Perhaps this pattern is to be expected since TLT is for the longer term investment.

One-Year Returns

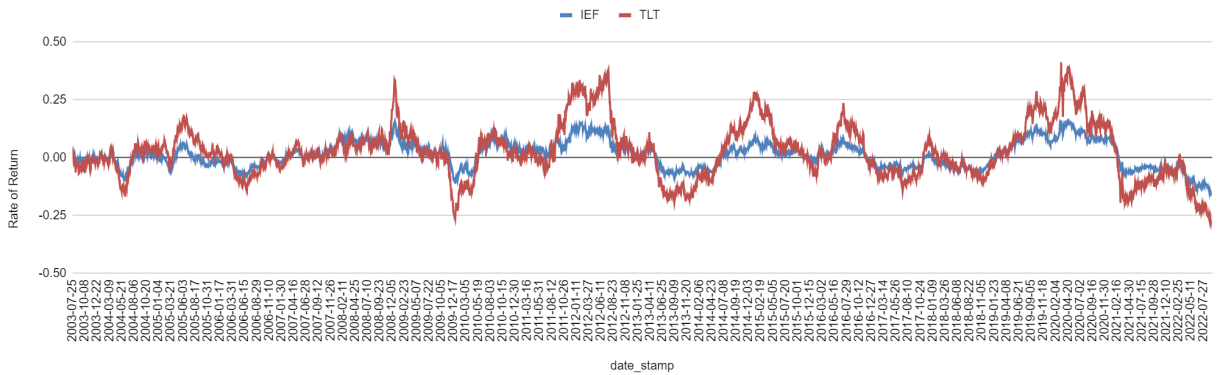
Many bond holders may have a shorter term of investment horizon. The one year returns are presented below.

	IEF	TLT
Minimum	-15.77%	-28.75%
First Quartile	-3.37%	-4.83%
Median	1.55%	1.83%
Third Quartile	5.20%	8.50%
Maximum	16.18%	41.32%
Mean	1.36%	2.67%
St. Dev.	5.72%	11.69%

Compared to five-year returns, these are much more widely dispersed. The tails (minima and maxima) are much longer. The medians and means are lower and the standard deviations are much higher, implying lower returns with greater volatility. Interestingly, TLT still outperforms IEF for the short term.

Return History

One Year Returns of IEF and TLT

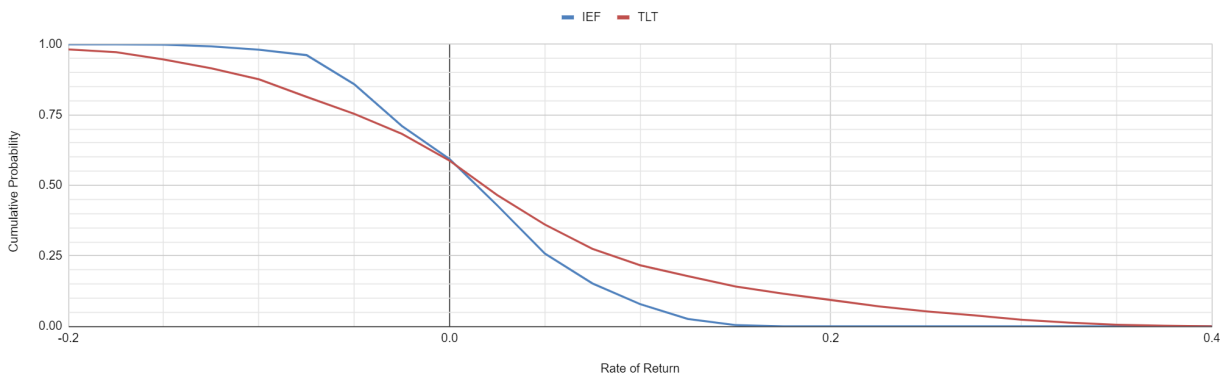


The two series are closer than the five-year ones. The coefficient of correlation = 0.922, with IEF outformed 50.4% of the time.

IRRP

The IRRP graph is also more spread out. Note the change of scale on the x-axis.

One Year IRRP of IEF and TLT



The two curves cross at 0% returns where the height is about 60%, implying both lost money 40% of the time.

Conclusions

Although IEF and TLT both track treasury bonds, it is clear the longer term bonds (TLT) gave better returns, for both short and long investment periods.