

Retirement Investment Portfolios: SPY Vs. QYLD

Cody Caudillo¹ College of Integrative Sciences and Arts, Arizona State University, Polytechnic

> Advisor: Dr. Yun Kang² ¹cacaudi1@asu.edu, ²yun.kang@asu.edu



Conclusive Information

QYLD outperformed SPY at an almost 3:1 ratio, earning a prospective \$61,750.87

QYLD fluctuates at a lower magnitude than SPY exhibiting a smaller standard

With an overlay of the gamma distribution CDF, QYLD surpassed SPY by an

approximate 7% larger potential for a positive return percentage on any given

SPY has a more positive skewness than QYLD. This suggests that SPY is more

SPY is overall more volatile and has enough negative return percentages to weight

likely to take a few large returns and many small losses than QYLD is.

its mean months into negative values. Thus, SPY is riskier than QYLD.

for the total time frame horizon. QYLD's growth rate is estimated to be an

Interpretations & Conclusions

approximate 81% larger than the growth rate on SPY.

deviation and more stable return pattern in aggregate.

Category

Simulated Investment

Volatility of Monthly

Percentages

Positive Return

Probability (CDF)

Skewness of Return

Return Percentages

Percentage Distribution

Introduction and Objectives

Reason for Interest

- Individual and Commercial investors alike aim for the least risk and the highest return. It is not always clear which equity is "better", only which one is more popular based on trading volume.
- Different equities within the stock market operate differently from one another. For instance, an ETF such as SPY gets most of its returns from the various companies that it is comprised of while an income dividend stock may choose an alternate pathway to achieve monetary gain, QYLD for instance, writes covered call index options on the NASDAQ 100 Index fund.
- Mapping historical risk, performance, and returns aids in solidifying which equity an investor should choose for the largest financial gain.
- A diverse portfolio is common for retirement and long-term investors. Since most dividend income stocks don't vary in share price drastically through the years, we should wonder why an investor should want them in the portfolio at all.

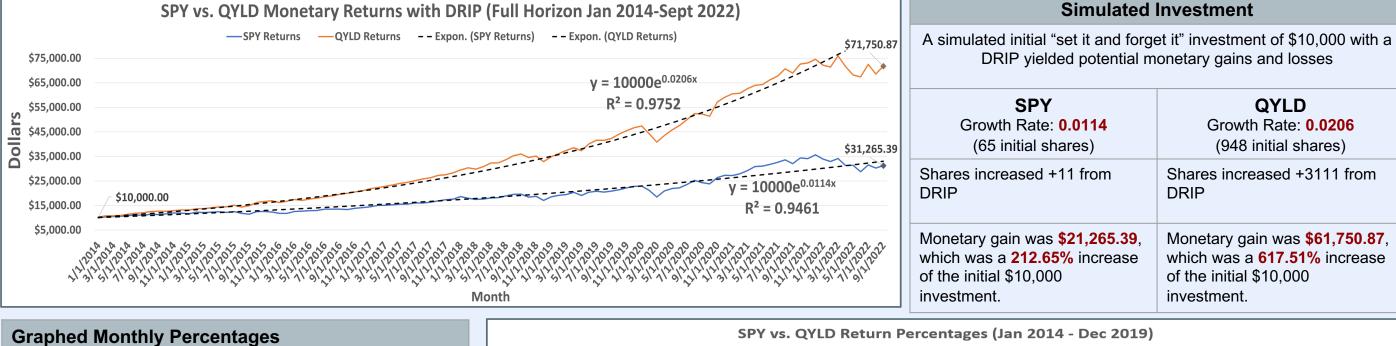
Background Information

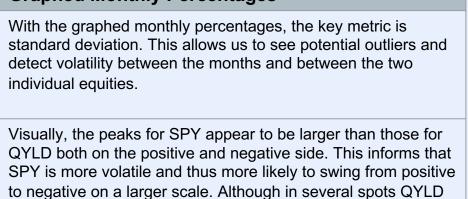
- The S&P500 is an index fund that tracks the top 500 highest grossing companies in the United States. An index fund means there are multiple companies considered for a weighted average within the fund. In this case, 500 companies rotated throughout time, based on their gross revenue.
- SPY is an Exchange Traded Fund (ETF) that is listed on the market at 10% the price of the S&P500 Index. SPY otherwise mimics the S&P500 throughout each trading day
- Both equities distribute dividends to their shareholders. A dividend is a form of payment per share (PPS) usually given as a monetary amount or share amount. The amount and frequency of distributions are decided by the board of directors for the respective company. They decide how much revenue they've made, how much of it to give to the shareholders, and how often to distribute.
- QYLD is considered an "income dividend stock". That is, the overall share price does not alter much through the years. Most capital gains
- While SPY has an approximate 1.65% annual dividend yield per an investor's total funds (TD Ameritrade, 09/01/22), it is only allocated every quarter. QYLD on the other hand has an approximate 12.94% annual dividend yield per an investor's total funds (TD Ameritrade, 09/01/22) and allocates funds every month. Therein, QYLD distributes much higher amounts of capital gains to its investors.
- In a "set it and forget it" style of retirement investing it is common to set up what is called a Dividend Reinvestment Program (DRIP). This program automatically invests the funds gained from dividends to buy more shares of the respective stock, should there be enough in the brokerage account to cover the cost. Although some brokers allow for "partial" shares to be bought, this analysis has been configured in consideration of "whole" shares only.

Purpose and Research Questions

- This project aims to compare the stocks, SPY and QYLD, respectively.
- The goal of this research is to determine the best overall equity between the two with the hypothesis being that QYLD outperforms SPY regardless of market conditions throughout the years. The goal is to prove that income dividend stocks are just as viable as ETFs.
- An evaluation will aim to examine which equity contains the least amount of risk, the highest potential for positive returns, the least volatility, and overall best relative performance for an investor from January of 2014 through September of 2022.

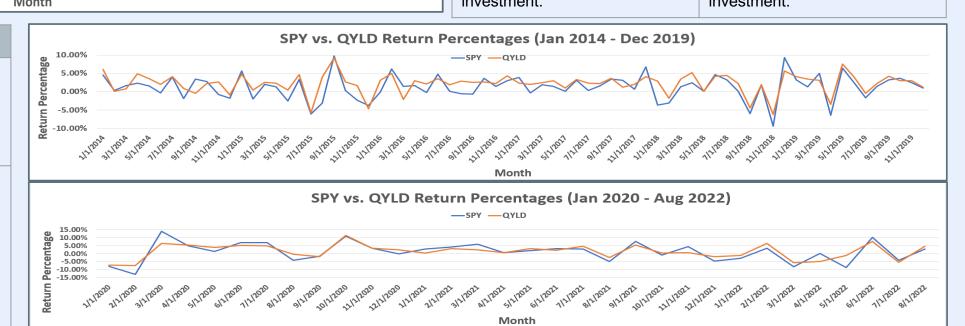
Results

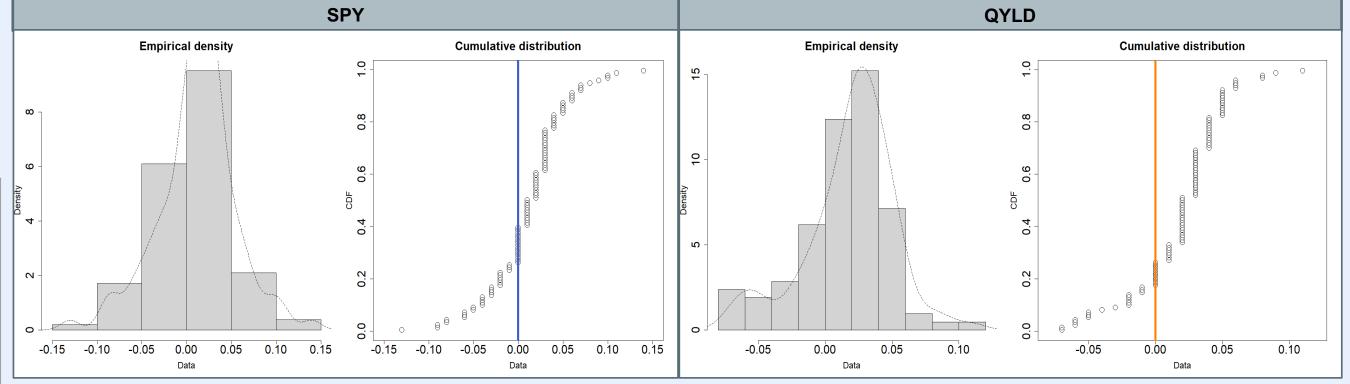




seemingly mimics SPY, its outliers and standard deviation are

smaller by comparison and thus it appears to be more stable.





Methods

Return Percentage	$\frac{P_{t+1} - P_t + D_t}{P_t}$	 Allows for a more comparable metric to be used instead of share price. 	$ullet$ P_t : The Current Adjusted Close Price.
Mean	$\frac{1}{n} \left(\sum_{i=1}^{n} x_i \right)$	Allows for cost analysis and further comparison between outliers.	• P_{t+1} : The Next Month's Adjusted Close Price • D_t : Applicable Dividend Payments
Standard Deviation	$\sqrt{\frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1}}$	 Tracks volatility of return percentage. Showcases outliers due to economic crisis, national disasters, recessions, etc. 	 n: The Total Number of Samples i: The unique element number from the sample set.
Skewness	$\left(\frac{n}{(n-1)(n-2)}\right) \sum_{i=1}^{n} \left[\frac{x_i - \bar{x}}{\sigma}\right]^3$	 Used to assess risk of financial equities. Allows insight into patterns for returns. Positively Skewed: Investors can expect recurrent small losses and a few large gains. Negatively Skewed: Investors can expect a few large losses and recurrent small gains. ***This leads to a bias towards positively skewed distributions.	 X: The value of the sample element. X̄: The selected variable's arithmetic mean value. σ: The selected variable's standard deviation.

Data Sources: https://finance.yahoo.com/

https://stockanalysis.com/etf/gyld/dividend/

Testing the Assumption of Normality

A Shapiro-Wilks test for normality with both data sets revealed that both SPY and QYLD do not have a normal distribution. The tests yielded p-values of 0.0263 and 0.0001 respectively, rejecting the hypothesis that the distributions are normal. The graphics shown above are the real distributions.

Seasonality of Return Percentage Means (By Month)

The mean return percentage by month paired error bars, helps reinforce the volatility of SPY that. The peaks have more amplitude with the SPY curve. While QYLD does change as well through the seasons, note that the pattern is much milder.

Additionally, QYLD has had enough positivity throughout the full horizon such that the mean values are all positive where SPY is not. This helps reinforce that QYLD has a higher probability of a positive return percentage.

Distributions with Curve Overlay

Both are negatively skewed distributions. Skewness calculations show SPY is -0.3231 and QYLD's value is -0.6780. The CDFs show us the probability of a positive return percentage. SPY has an approximate 75% probability to have a positive return percentage in any given month and QYLD has an approximate 82% probability of having a positive return percentage in any given month.



outperform one of the most popular retirement ETFs regardless of market conditions, and despite a low share price increase or decrease through the years.

This analysis suggests that **QYLD has outperformed SPY** in almost every category. Both

stocks exhibit a very minor negative skewness with SPY only slightly more positive. QYLD,

however, has been categorized as less risky, less volatile, yielding a higher probability of a

as compared to the other, the evidence is compounding.

positive return on any given month, and has returned an approximate 3-fold return compared

to the investment simulation. While it can never be said with 100% certainty that one is better

It is suggested then, given these metrics, that the average long-term investor consider QYLD

for their portfolio after performing their own respective research. It appears in this instance to

Further Work & Considerations

- A consideration for future predictions can be made by use of regression techniques. • The study can be expanded to include various other ETFs and Income Dividend Stocks not only to yield a risk and volatility analysis, but an ETF vs. Income Dividend Stock analysis as well.
- Further analysis of seasonality pertaining to SPY may help one predict which months are best for swing trading or simply the purchasing of more shares.

******Disclaimer: I am not a professional financial advisor and nothing within this poster should be construed as financial advice. It is advisable for one to do their own research before investing. Thank you.

Citations & Acknowledgements

- Wong, W. (2019, January 7). GRA 19703 biopen.bi.no. Retrieved September 5, 2022, from https://biopen.bi.no/bi-xmlui/bitstream/handle/11250/2625322/2287709.pdf?sequence= Research center. Individual - Treasury Bills In Depth. (n.d.). Retrieved September 5, 2022, from https://www.treasurydirect.gov/indiv/research/indepth/tbills/res tbill.htm
- tes/TextView?type=daily_treasury_bill_rates&field_tdr_date_value=202
- Yahoo! (n.d.). Yahoo Finance Stock Market Live, quotes, Business & Finance News. Yahoo! Finance. Retrieved September 5, 2022, from https://finance.yahoo.com • Team, C. F. I. (2022, May 7). Skewness. Corporate Finance Institute. Retrieved September 28, 2022, from https://corporatefinanceinstitute.com/resources/knowledge/other/skewnes
- Team, C. F. I. (2022, August 3). Standard deviation. Corporate Finance Institute. Retrieved September 28, 2022, from https://corporatefinanceinstitute.com/resources/knowledge/standard-deviation

- Adkins, W. (2019, February 1). How to calculate dividends paid to stockholders with retained earnings. Small Business Chron.com. Retrieved September 28, 2022, from https://smallbusiness.chron.com/calculate-dividends-paid-stockholders-retained-earnings-10472.html
- QYLD dividend history, dates & yield. Stock Analysis. (n.d.). Retrieved October 24, 2022, from https://stockanalysis.com/etf/qyld/dividend/
- Alpha, S. (2011, May 10). Skewness and kurtosis: What commodities investors need to know. Nasdaq. Retrieved October 5, 2022, from https://www.nasdaq.com/articles/skewness-and-kurtosis-what-
- Hayes, A. (2022, September 8). Dividends: Definition in stocks and how payments work. Investopedia. Retrieved October 5, 2022, from https://www.investopedia.com/terms/d/dividend.aa
- Nickolas, S. (2022, October 9). Spy ETF: What the SPDR S&P 500 ETF trust is and what it holds. Investopedia. Retrieved October 5, 2022, from
- Kenton, W. (2022, October 23). S&P 500 index: What it's for and why it's important in investing. Investopedia. Retrieved October 5, 2022, from https://www.investopedia.com/terms/s/sp500.asp

