

Mutual Fund Performance

By: Andrew and Will

"The performance represented is historical" and that "past performance is not a reliable indicator of future results and investors may not recover the full amount invested."

Overview of Methodology

Stakeholder: A young professional looking to begin an investment portfolio

Goal: Investigate a particular mutual fund to recommend based off historic performance

1. Formulate basic hypothesis
2. Source API data
3. Cleaned and prepped data
4. Split samples from population
5. Evaluate hypothesis testing
6. Formulated recommendations to stakeholder from testing

Supporting Context

- Mutual Funds provide affordable access to a diversified portfolio of assets with strong returns in the long run
- The S&P 500 index averages an annual return of roughly 8%
- The S&P 500 index is the benchmark for movement of the XLV fund
- The XLV healthcare contains roughly 10% of S&P 500 equities
 - Includes Johnson & Johnson - 9th heaviest weighted asset in the S&P 500

Gathered Data

Source: https://www.alphavantage.co/query?function=TIME_SERIES_DAILY&symbol=XLV&outputsize=full&apikey={yourkeyhere}

	date	open	high	low	close	volume	day_pct_change	overall_pct_change
0	2019-12-12	100.07	101.28	100.020	100.90	6121346.0	0.829419	233.553719
1	2019-12-11	100.01	100.27	99.820	100.02	6010787.0	0.009999	230.644628
2	2019-12-10	99.69	100.02	99.295	99.93	6027927.0	0.240746	230.347107
3	2019-12-09	100.45	100.47	99.710	99.71	5148857.0	-0.736685	229.619835
4	2019-12-06	100.27	100.75	100.200	100.41	5658514.0	0.139623	231.933884

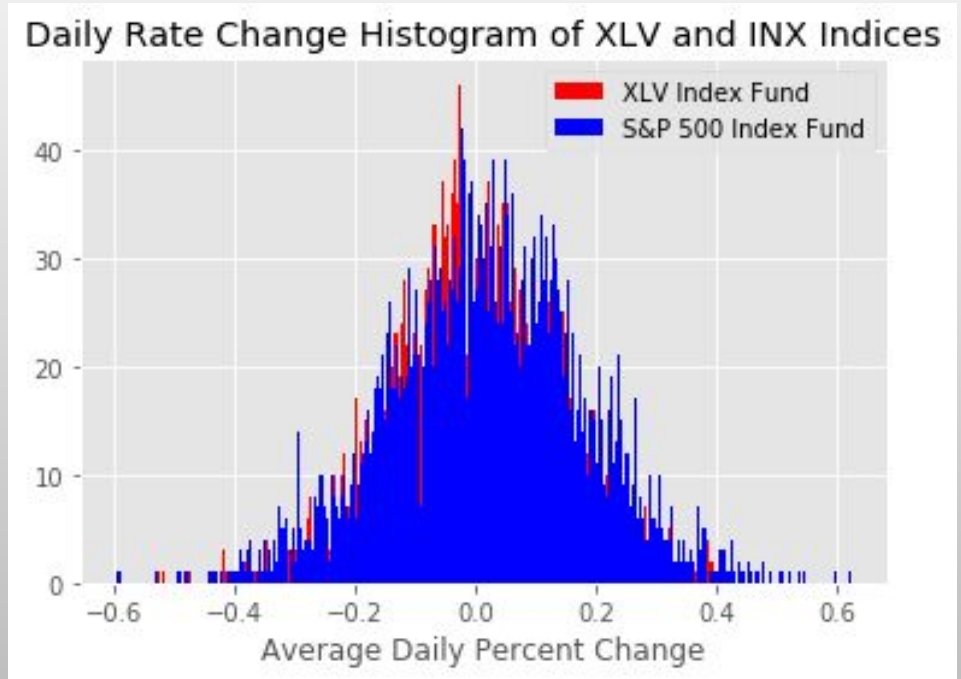
(5034, 8)

```
{
  "Meta Data": {
    "1. Information": "Daily Prices (open, high, low, close) and Volumes",
    "2. Symbol": "XLV",
    "3. Last Refreshed": "2019-12-12 15:22:23",
    "4. Output Size": "Full size",
    "5. Time Zone": "US/Eastern"
  },
  "Time Series (Daily)": {
    "2019-12-12": {
      "1. open": "100.0700",
      "2. high": "101.2800",
      "3. low": "100.0200",
      "4. close": "100.8028",
      "5. volume": "6071039"
    },
    "2019-12-11": {
      "1. open": "100.0100",
      "2. high": "100.2700",
      "3. low": "99.8200",
      "4. close": "100.0200",
      "5. volume": "6010787"
    }
  }
}
```

Index Fund Movements

H_0 : The average daily percent change in the XLV Index Fund **is not different** than that of the S&P 500 (.INX)

H_a : The average daily percent change in the XLV Index Fund **is different** than the average daily percent change in the S&P 500

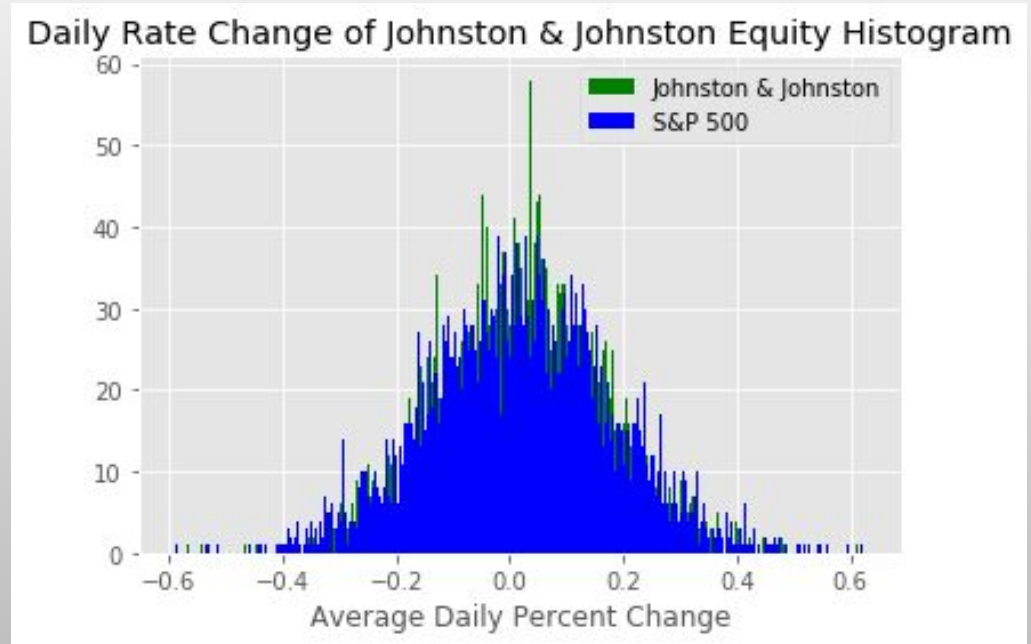


Z-Stat = -0.0018

Component Stock Movements

H_0 : The average daily percent change of the XLV component stock Johnson & Johnson (JNJ) is **not different** than that of the S&P 500 (INX)

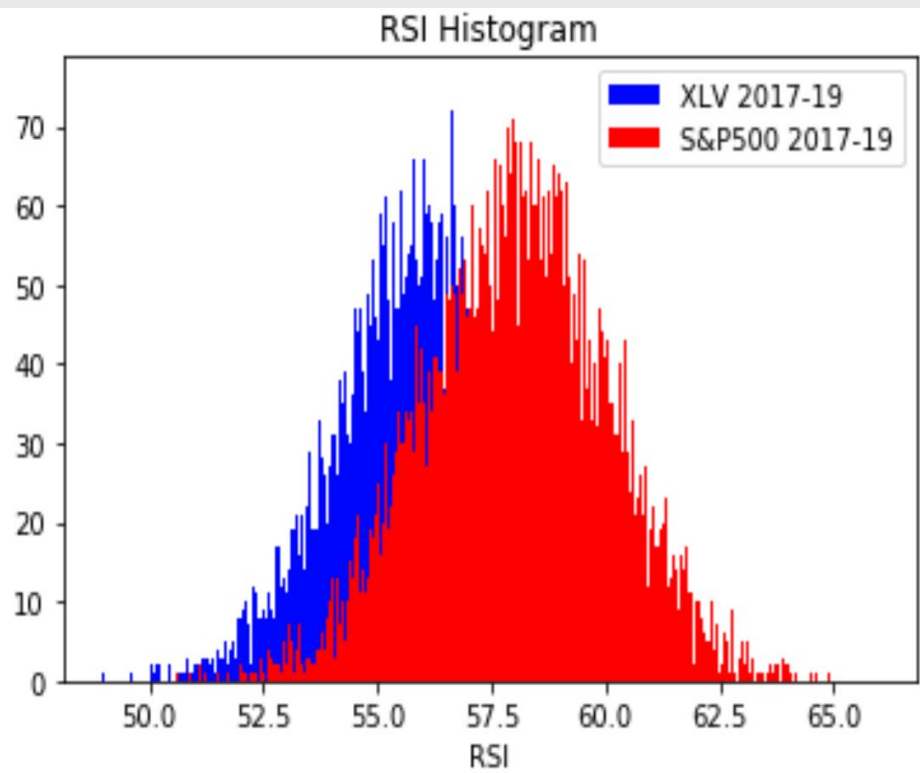
H_a : The average daily percent change of the XLV component stock Johnson & Johnson (JNJ) is **different** than that of the S&P 500 (INX)



Z-stat = 0.00039

Relative Strength Index - Momentum Indicator

XLV vs S&P500

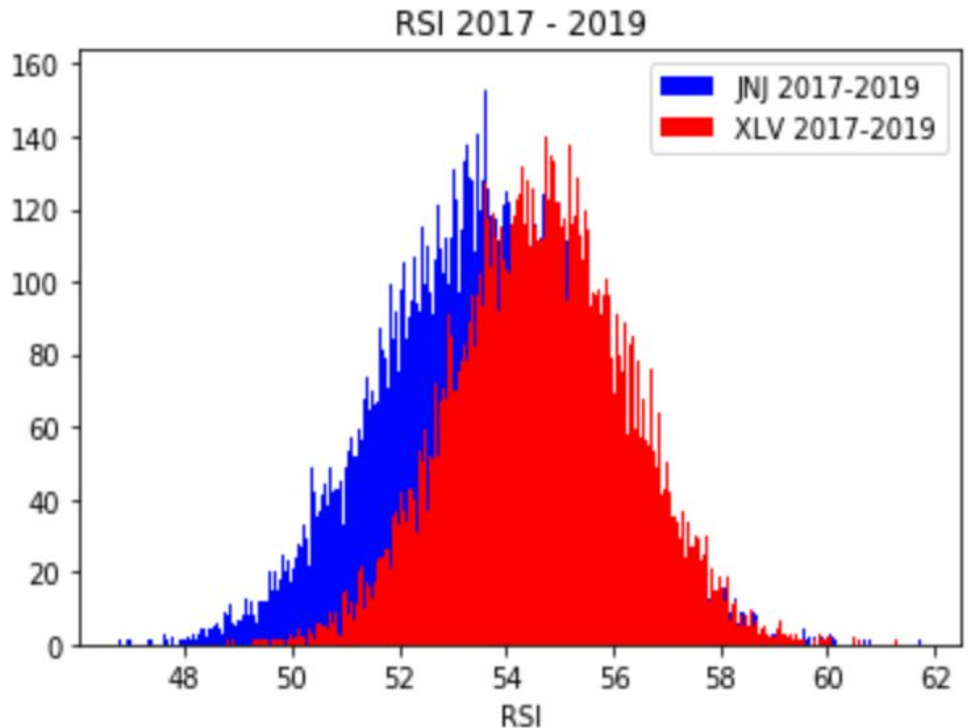


$$RSI_{\text{step one}} = 100 - \left[\frac{100}{1 + \frac{\text{Average gain}}{\text{Average loss}}} \right]$$

- RSI - Momentum indicator on a scale from 1-100
 - Values over 70 - security is overbought
 - Values under 30 - security is oversold
- Average gain/loss calculated on a trailing 14-day period
- Same return as the S&P500, but with a lower average RSI
 - Smaller fluctuations - Less volatile
- Z-stat: -3.55

Relative Strength Index - Momentum Indicator

Johnson & Johnson vs XLV



$$RSI_{\text{step one}} = 100 - \left[\frac{100}{1 + \frac{\text{Average gain}}{\text{Average loss}}} \right]$$

- Johnson & Johnson - largest holding inside of the XLV
- On average JNJ has a lower RSI than the XLV
 - Less volatile - average gain is closer to its average loss
- JNJ and XLV have historically performed better than the S&P500
 - Less susceptible to severe drops
- Z-stat: -4.91

Hypothesis 1 & 2 Actionable Insights

- XLV and S&P 500 trend with each other on average daily % returns
 - S&P 500 averages 8% return annually
 - Close trending = long run performance of both will be similar
- XLV is a strong mutual fund to hold for long term return success
 - Overall return on XLV since 1999 is ~ 230%
- Johnson and Johnson is a strong performing equity within the XLV
 - Close trending with the XLV = strong long run performance