# Are Investment Safe Havens really safe?

ANALYSIS AND PREDICTIVE MODELLING OF RISK ASSETS VERSUS SAFE HAVEN ASSETS

PAUL SILVERBERG

APRIL 2020

# Study Set up

- A common quote in the financial markets is "Flight to safe havens" to describe the situation when there is a market risk situation

- Current study will focus on 3 safe havens

  - Japanese Yen

  - Swiss Franc

  - Gold

- In the initial phase Dow Jones Industrial Average served as proxy for risk assets

- For Classification Modelling selection of Global Indices was also be added

- Timeframe: Weekly Returns March 2005-April 2020
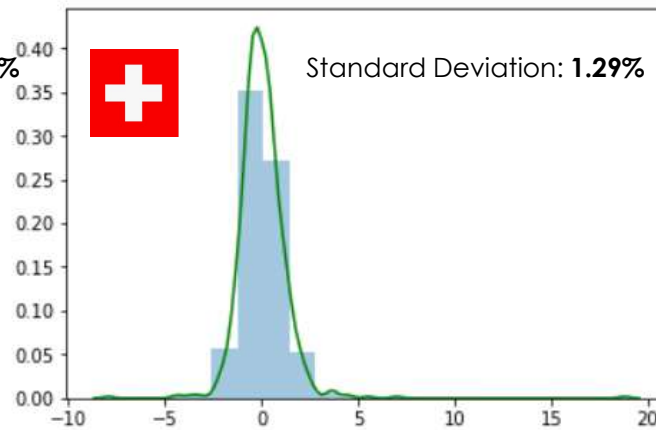
# JPY and CHF Currencies Basket Set up
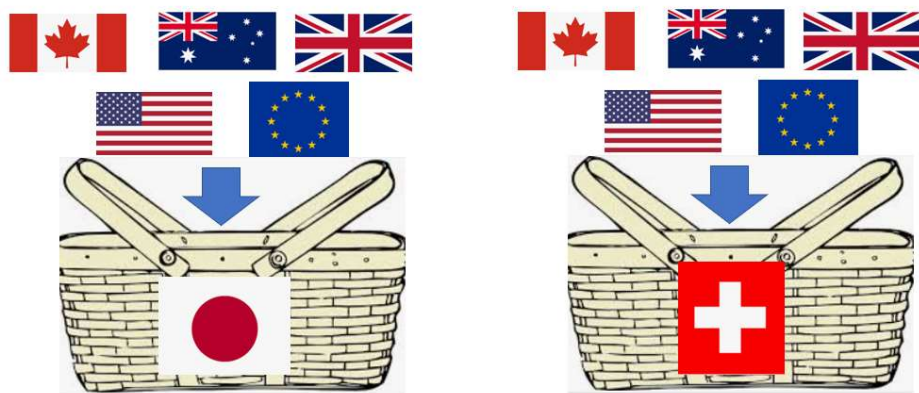


▶ Each of the currency crosses was weight equally

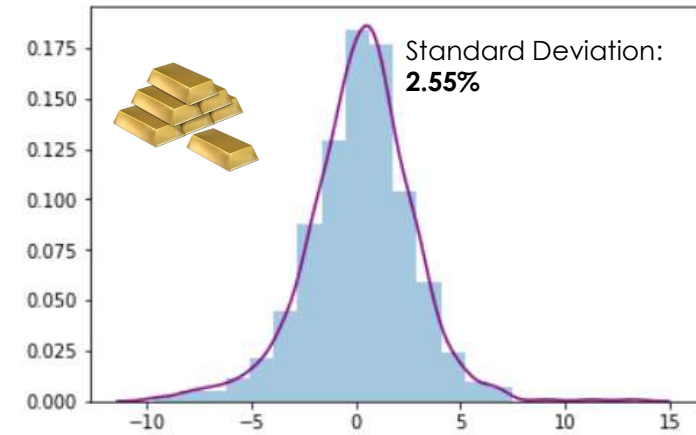▶ JPY crosses returns were inversed (due to how JPY is quoted in the markets)

# Gold is the most volatile safe haven asset



Standard Deviation: **1.66%**
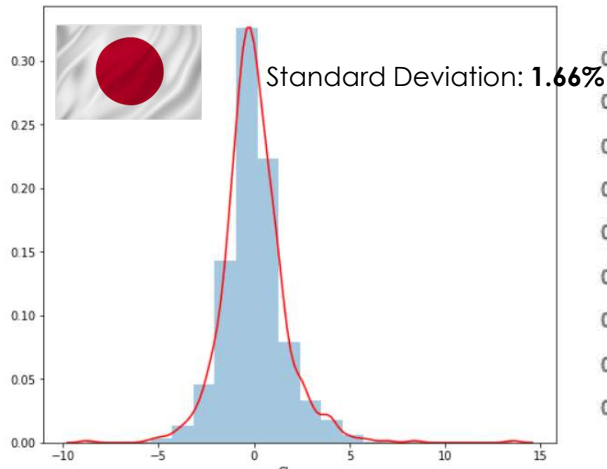
Distribution of % Weekly Change for JPY Basket



Standard Deviation: **1.29%**

Distribution of % Weekly Change for CHF Basket



Standard Deviation: **2.55%**

Distribution of % Weekly Change for Gold

▶ Out of 3 safe havens the right skew indicates that Gold was the best performer over the data set

# Correlation analysis produced surprising outcomes

|  | % Change JPY | % Change CHF | % Change Gold |
|---|---|---|---|
| % Change JPY | 1.000000 | 0.370377 | -0.022765 |
| % Change CHF | 0.370377 | 1.000000 | 0.154073 |
| % Change Gold | -0.022765 | 0.154073 | 1.000000 |

|  | % Change DJIA | % Change JPY | % Change CHF | % Change Gold |
|---|---|---|---|---|
| % Change DJIA | 1.000000 | -0.494618 | -0.295404 | 0.052916 |
| % Change JPY | -0.494618 | 1.000000 | 0.370377 | -0.022765 |
| % Change CHF | -0.295404 | 0.370377 | 1.000000 | 0.154073 |
| % Change Gold | 0.052916 | -0.022765 | 0.154073 | 1.000000 |

▶ It was expected that Safe Havens would have high positive correlation, the data did not support that hypothesis

▶ It was expected that DJIA as a stand in for Risk assets would have strong negative correlation with the safe havens but that was not seen

# Using linear regression to predict Safe Havens behaviour based on DJIA performance was not supported by the data
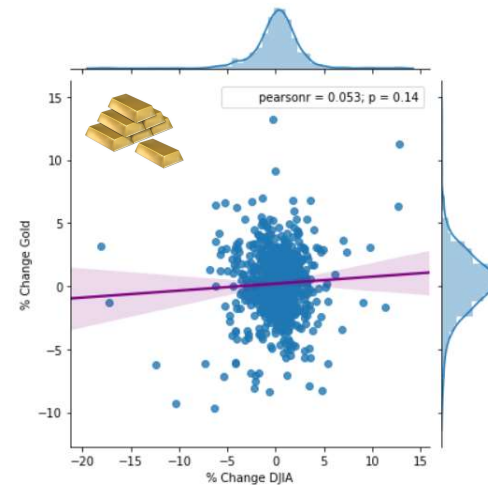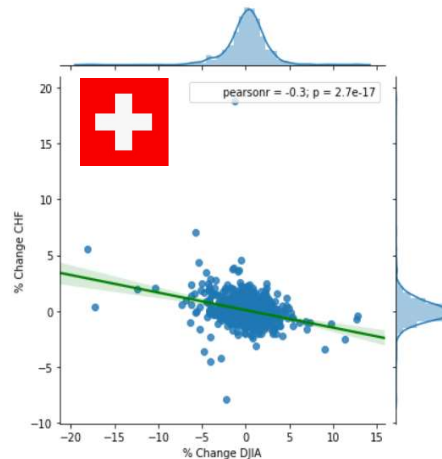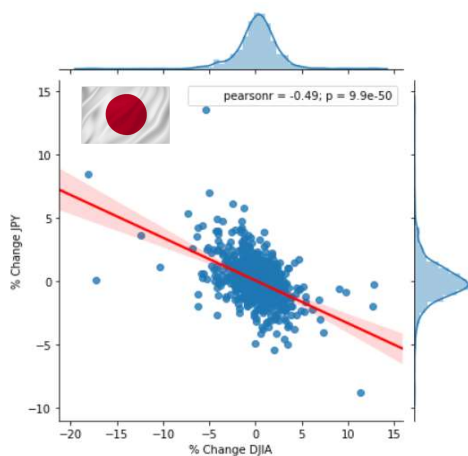
|  | R Squared | MSE |
|---|---|---|
| DJIA vs JPY | -0.04 | 2.87% |
| DJIA vs CHF | -0.28 | 2.15% |
| DJIA vs Gold | -0.12 | 7.28% |



|  | R Squared | MSE |
|---|---|---|
| DJIA vs JPY | -0.04 | 2.87% |
| DJIA vs CHF | -0.28 | 2.15% |
| DJIA vs Gold | -0.12 | 7.28% |

► Linear Regression evaluation by R-Squared and MSE yielded extremely low results (R-Squared was worse than taking a mean result

# Data from the worst performing DJIA weeks vs. JPY Basket didn't support Safe Haven's flight thesis

20% — pearsonr = -0.3; p = 0.00013

10% — pearsonr = -0.24; p = 0.037
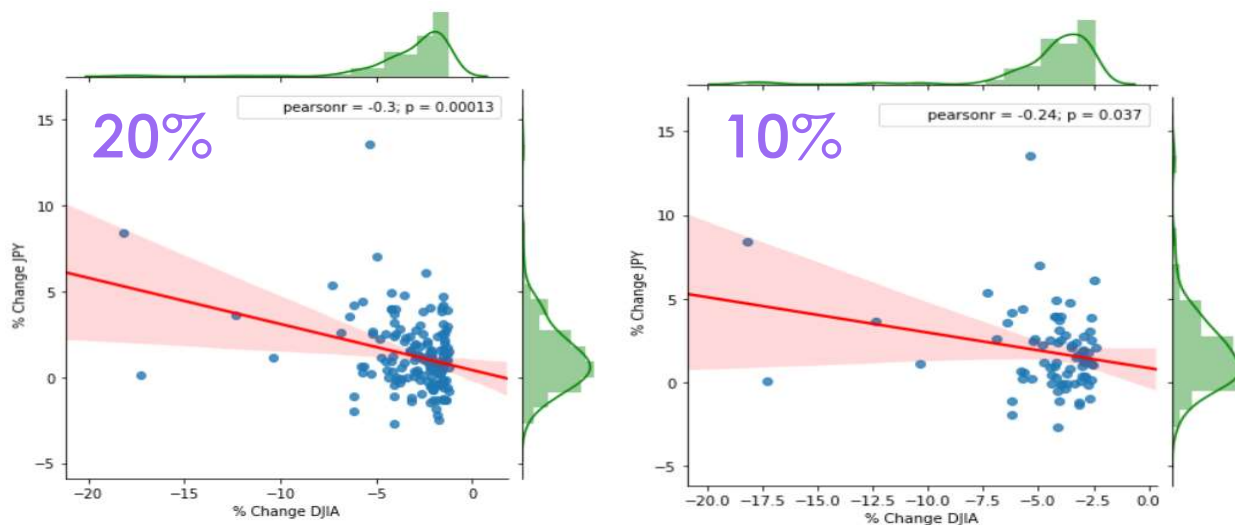
▶ Even when focusing on the worst 20% and 10% weekly returns for DJIA linear regression could not predict the JPY Basket performance

# Preparation for Classification Modelling



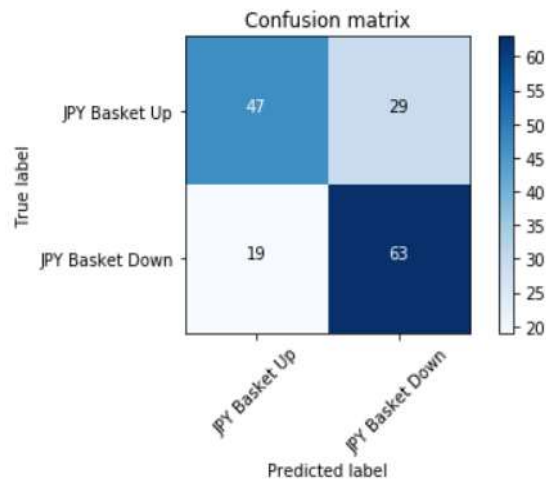Weekly Returns across Global Equities
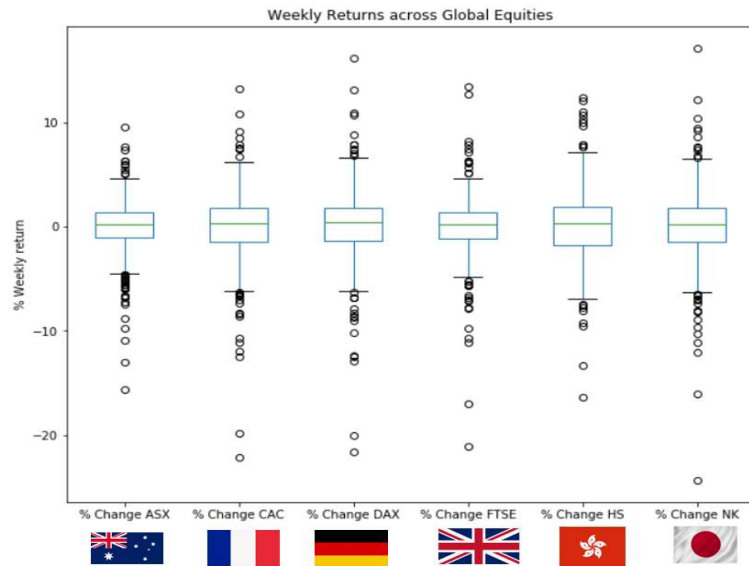
- ▶ Prediction output was simplified
  - ▶ JPY Basket focus
  - ▶ Only higher or lower classification
- ▶ Additional markets were added for multivariate input to the classification algorithms
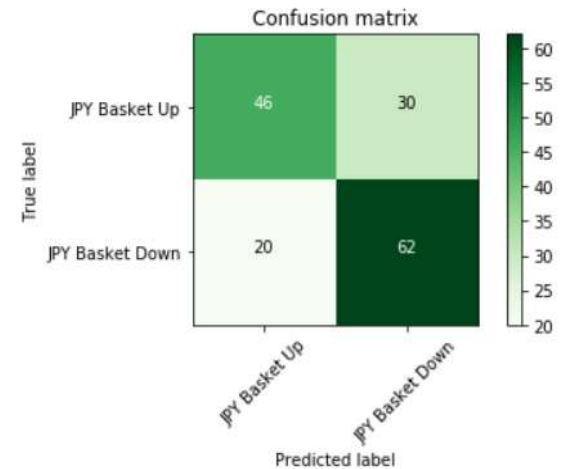
# There was limited difference in prediction totals provided by the three classification algorithms
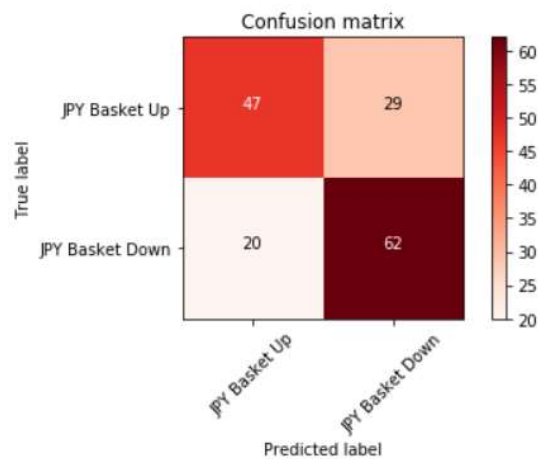


Logistic Regression



Support Vector Machine



K-Nearest Neighbour

# Classification Model Evaluation confirmed how close they were (just under 70% correct)

|  | Jaccard Score | F1 Score | Log Loss |
|---|---|---|---|
| **Logistic Regression** | 0.6899 | 0.6882 | 0.6 |
| **Support Vector Machine** | 0.6962 | 0.6942 | N/A |
| **k-Nearest Neighbour** | 0.6835 | 0.6815 | N/A |

▶ Support Vector Machine has come out as the best model

▶ K-Nearest Neighbour produced the worst result

# Conclusions

▶ There is limited evidence that the flight to safe havens is as significant as is commonly believed in the case of JPY, CHF and Gold

▶ Classification models with risk assets as inputs attain nearly 70% accuracy when classifying if JPY will end up higher or lower for the same week

# Future Research Directions



Stockmarket correlation with JPY Basket
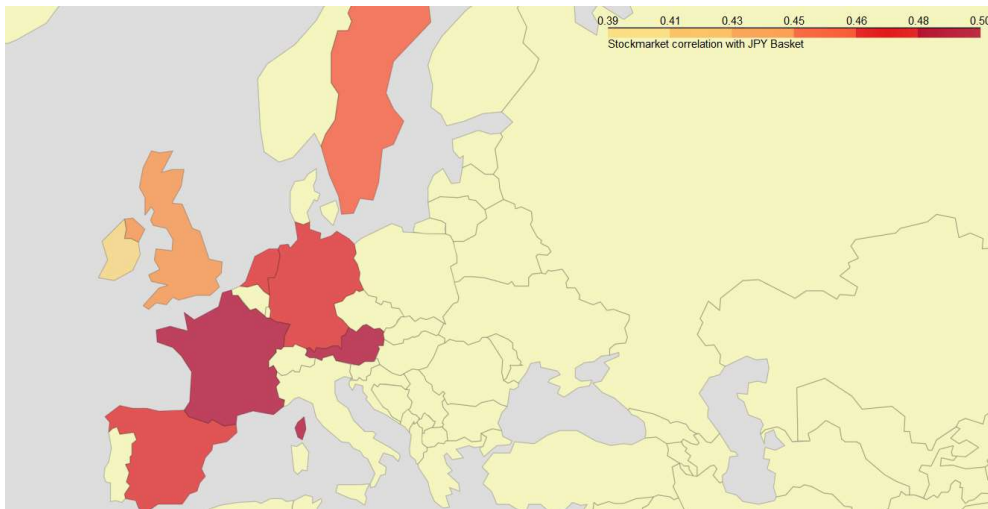
- ▶ Consider increasing the scope of the Risk assets by additional markets and testing agains individual markets
- ▶ Consider looking at more risk assets i.e. Bonds and Money markets