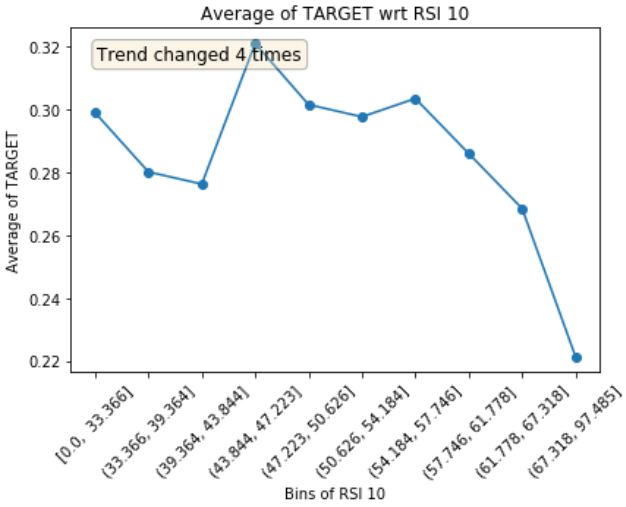
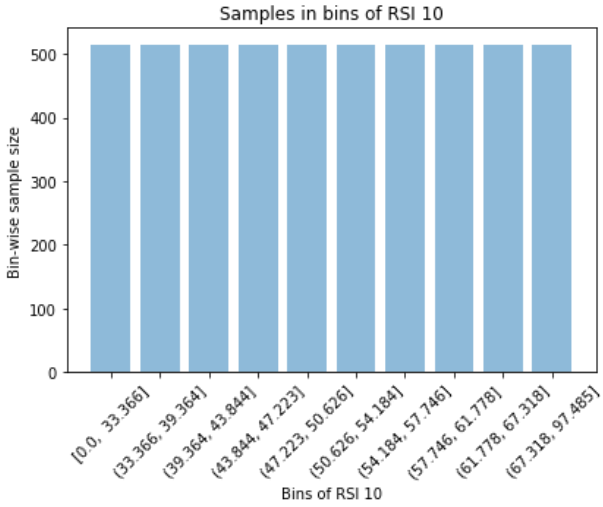
```
stock_symbols = ["KR", "WMT", "KO", "NVDA", "F", "XOM", "AMD"]

STEP ONE DONE
BASELINE TRIAL
Mean Accuracy: 79.67640094711902%
Mean Precision: 73.98373983739837%
Mean Recall: 48.468708388814846%
Mean AUC: 70.64489822132849%
BASELINE TRIAL w/ THRESHOLDING
Mean Accuracy: 75.33543804262057%
Mean Precision: 84.23913043478272%
Mean Recall: 20.639147802929475%
Mean AUC: 59.5063377825639%
XGBClassifier(base_score=0.5, booster='gbtree', colsample_bylevel=1,
              colsample_bynode=1, colsample_bytree=1, eval_metric='auc',
              gamma=0, gpu_id=-1, importance_type='gain',
              interaction_constraints='', learning_rate=0.300000012,
              max_delta_step=0, max_depth=6, min_child_weight=1, missing=nan,
              monotone_constraints='()', n_estimators=100, n_jobs=4,
              num_parallel_tree=1, objective='binary:logistic', random_state=
0,
              reg_alpha=0, reg_lambda=1, scale_pos_weight=1, subsample=1,
              tree_method='exact', use_label_encoder=False,
              validate_parameters=1, verbosity=None)
STEP TWO DONE
```

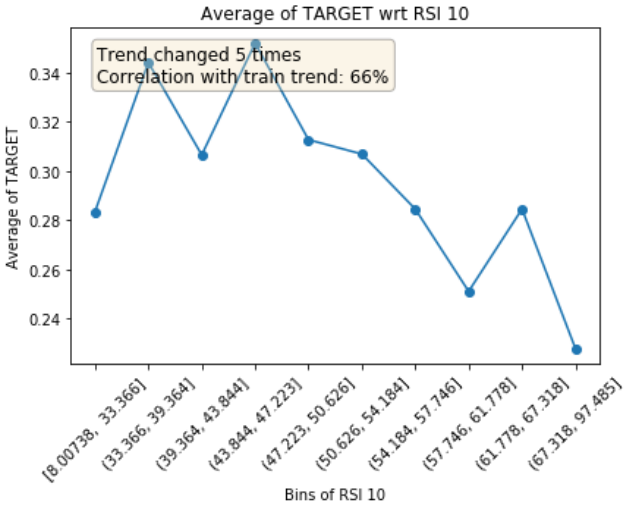
Plots for RSI 10

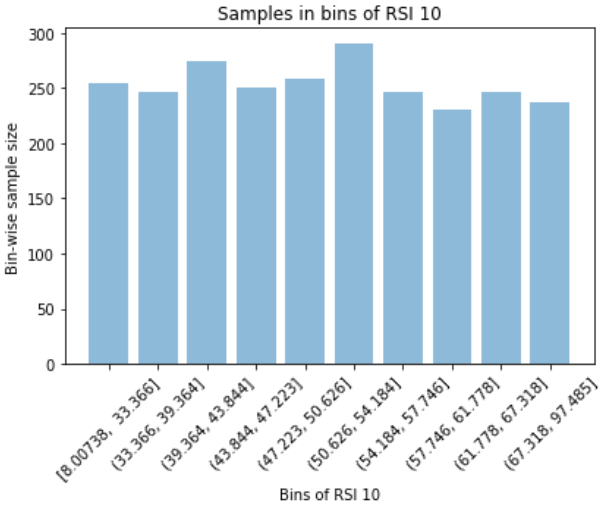
Train data plots





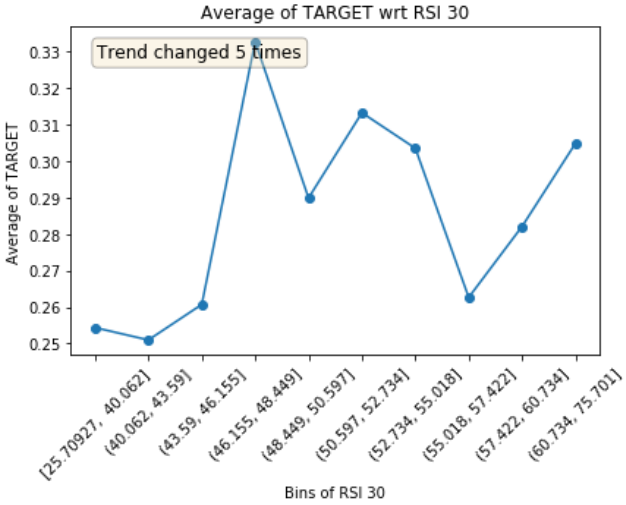
Test data plots

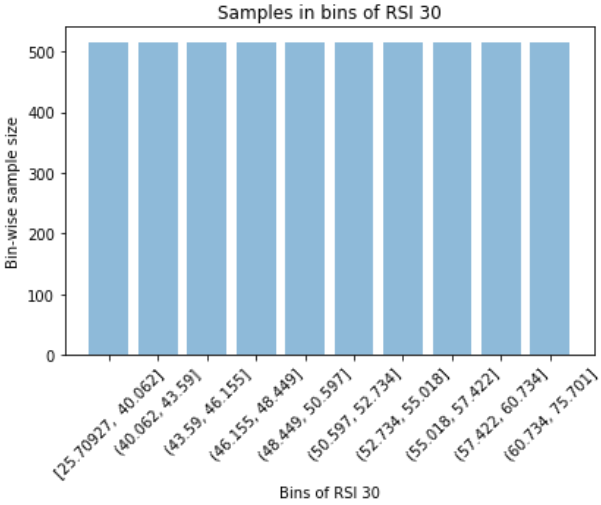




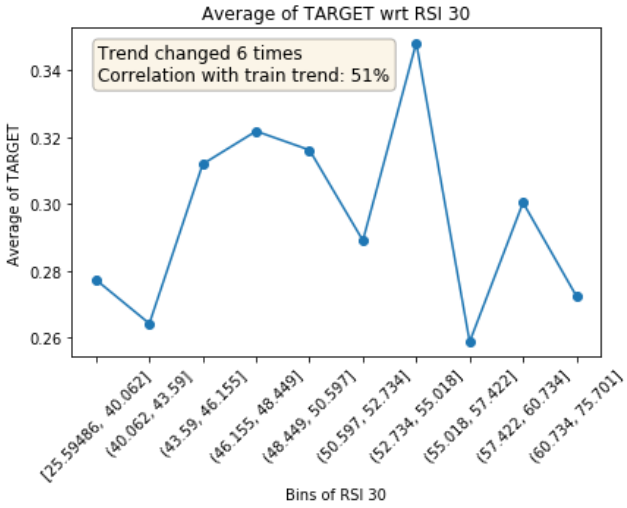
Plots for RSI 30

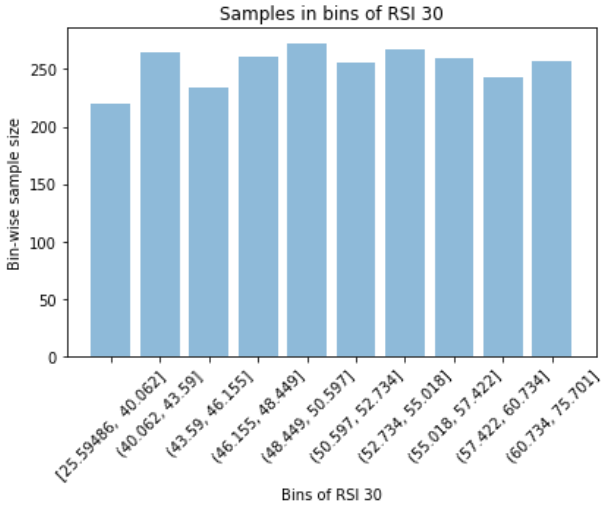
Train data plots





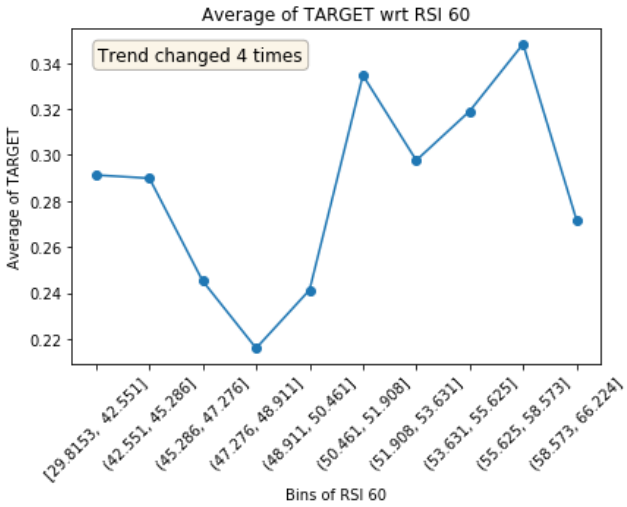
Test data plots

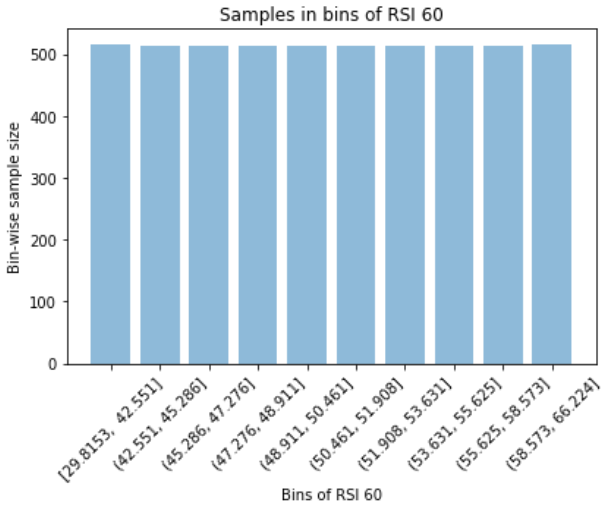




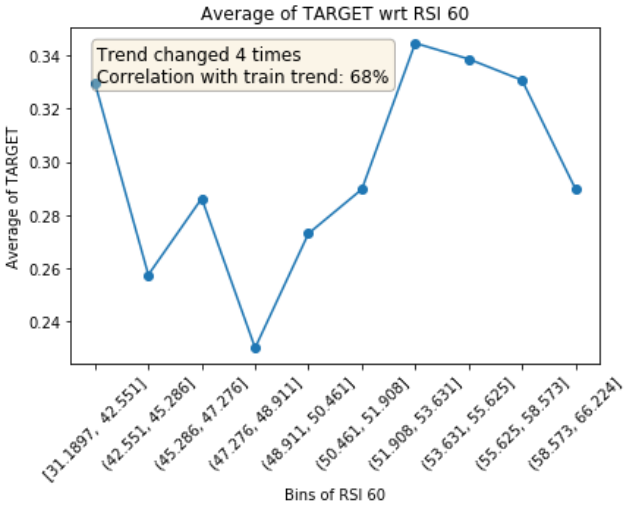
Plots for RSI 60

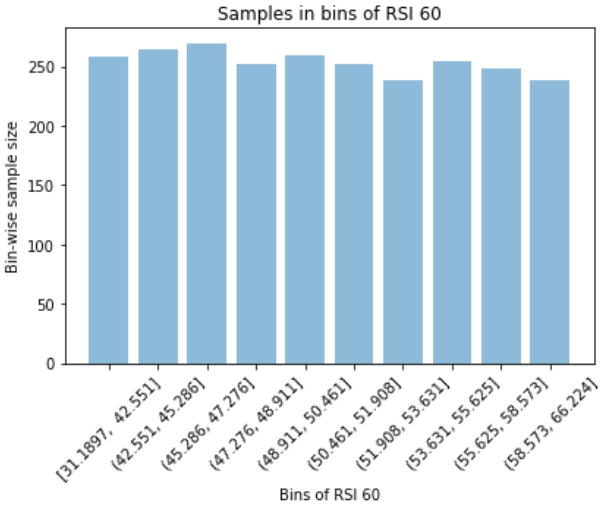
Train data plots





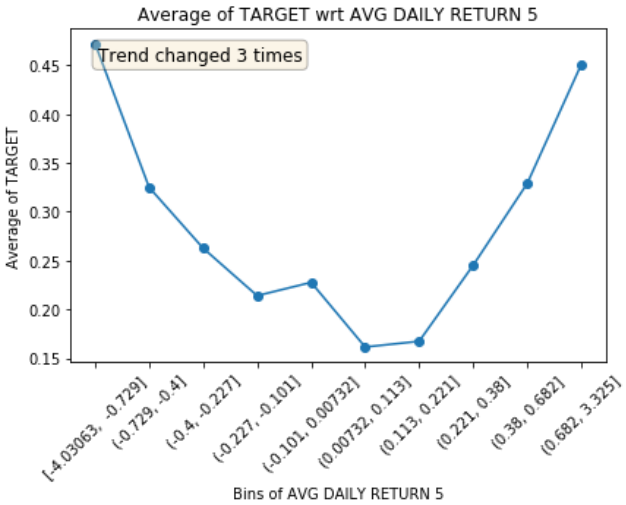
Test data plots

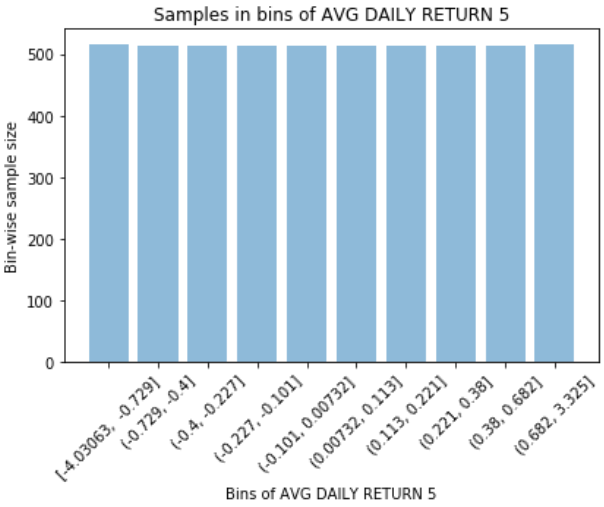




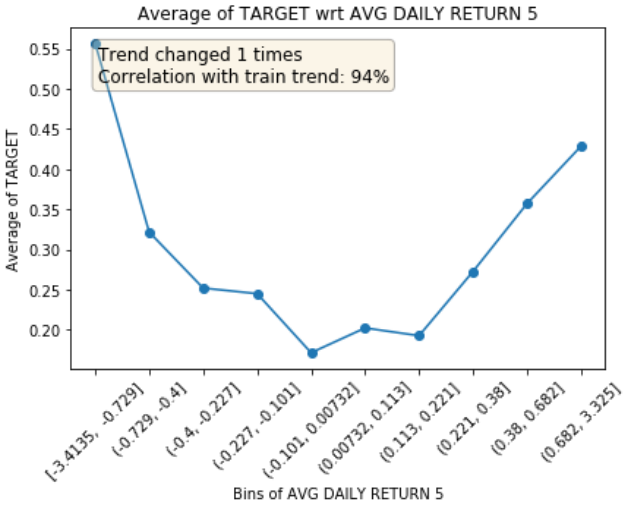
Plots for AVG DAILY RETURN 5

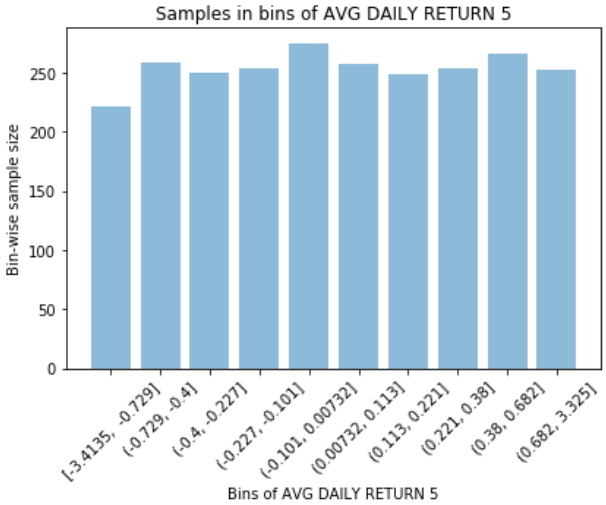
Train data plots





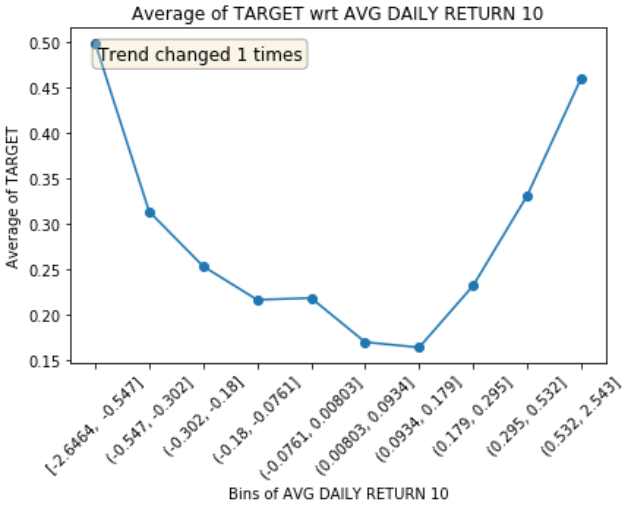
Test data plots

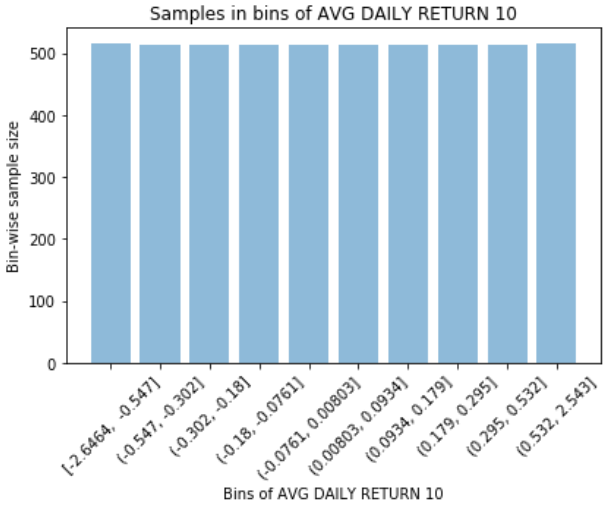




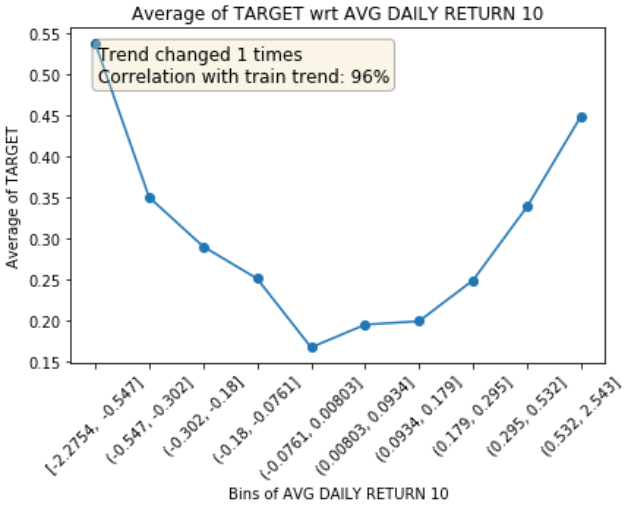
Plots for AVG DAILY RETURN 10

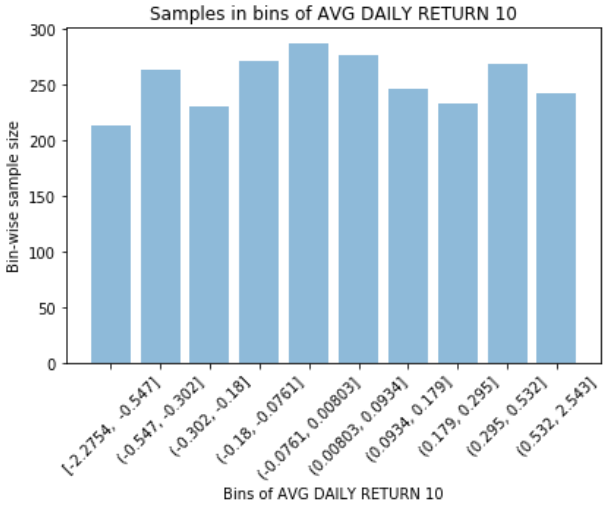
Train data plots





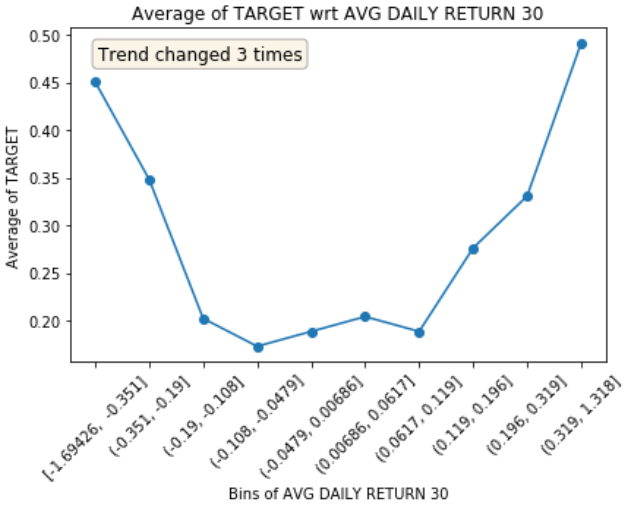
Test data plots

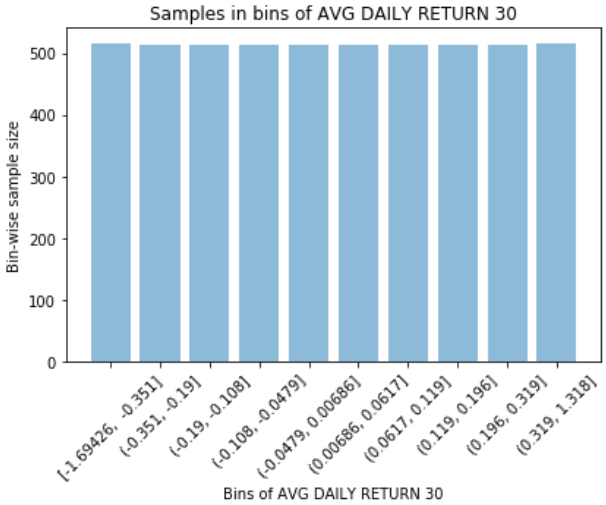




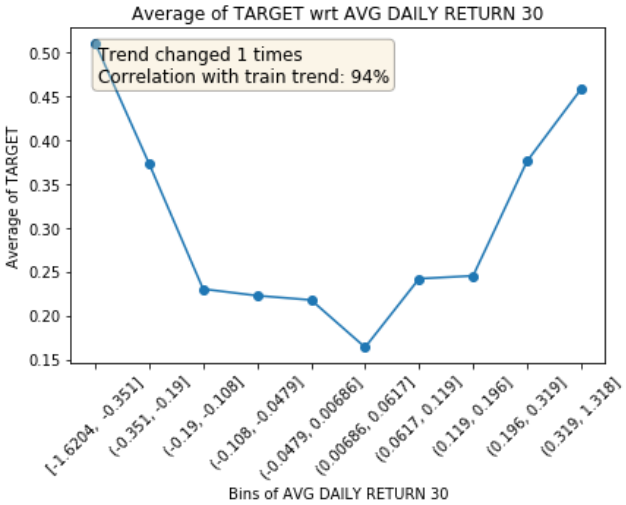
Plots for AVG DAILY RETURN 30

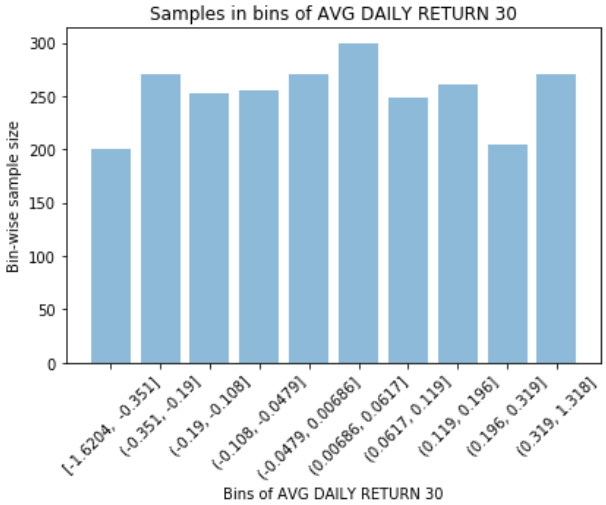
Train data plots





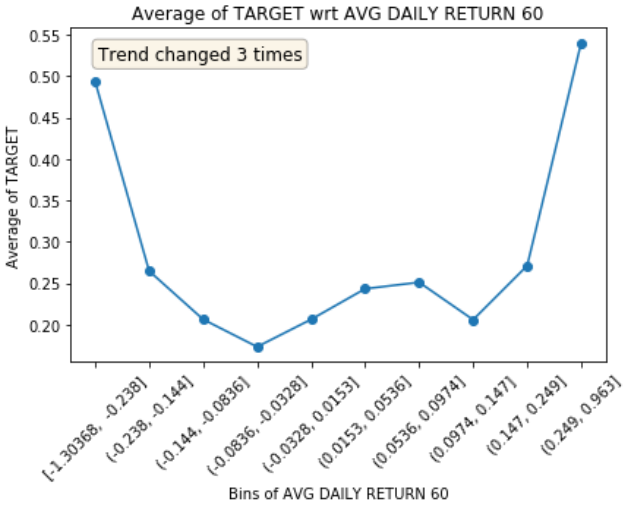
Test data plots

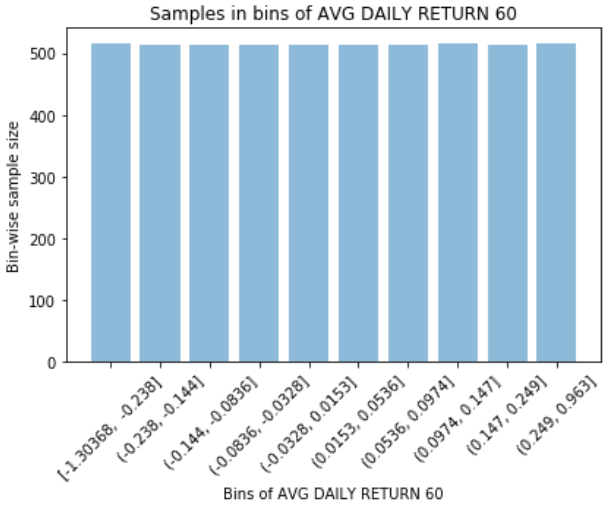




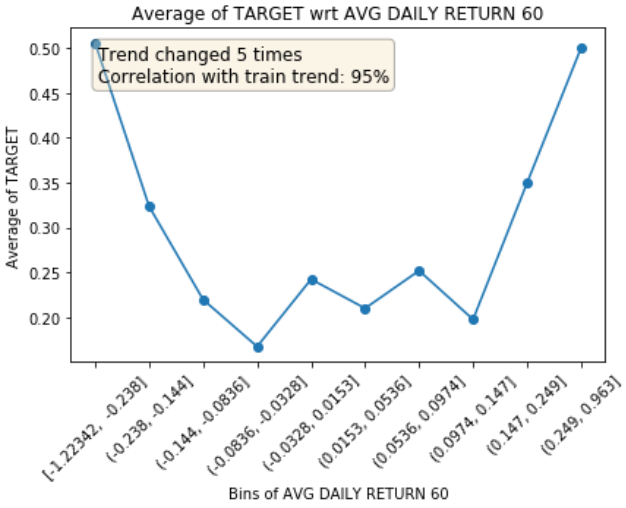
Plots for AVG DAILY RETURN 60

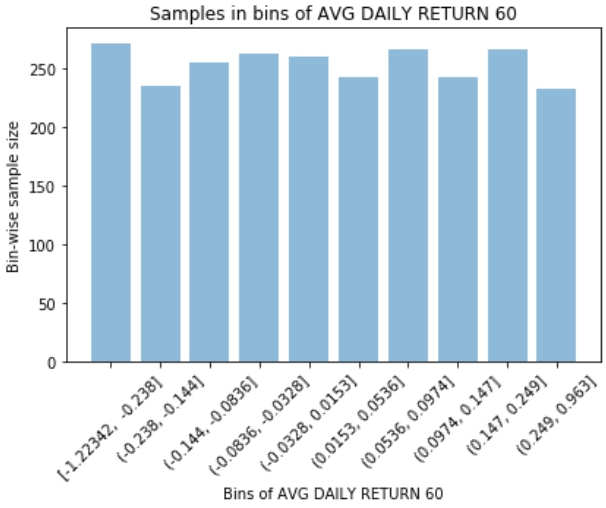
Train data plots





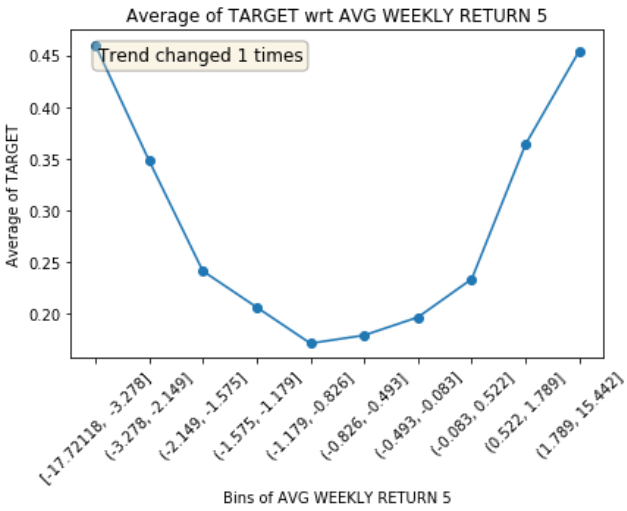
Test data plots

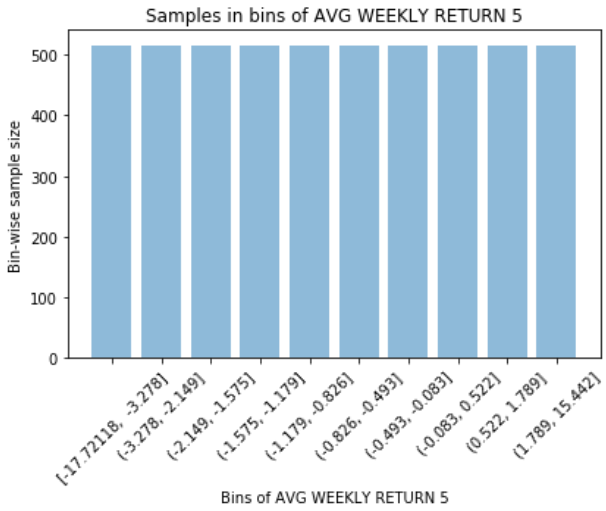




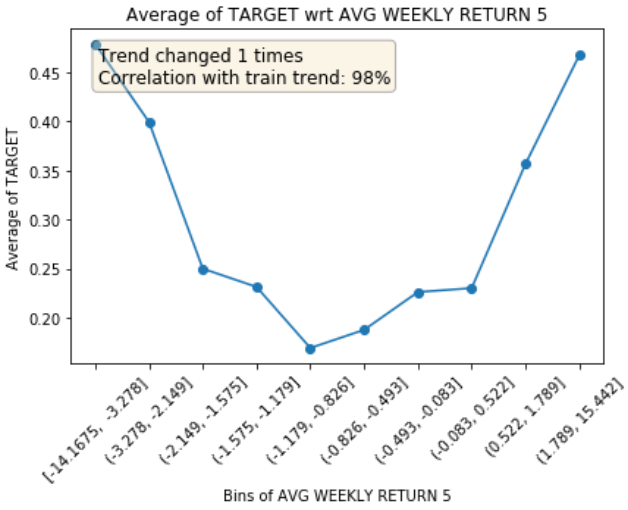
Plots for AVG WEEKLY RETURN 5

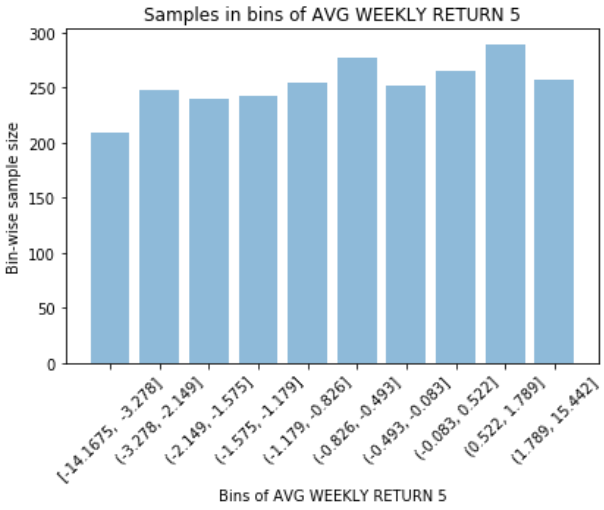
Train data plots





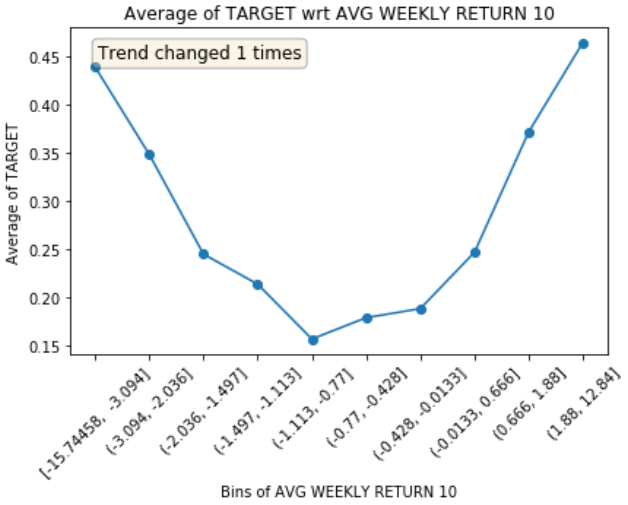
Test data plots

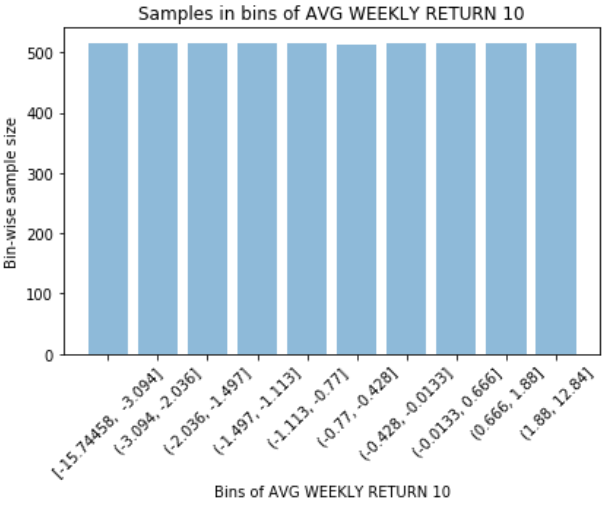




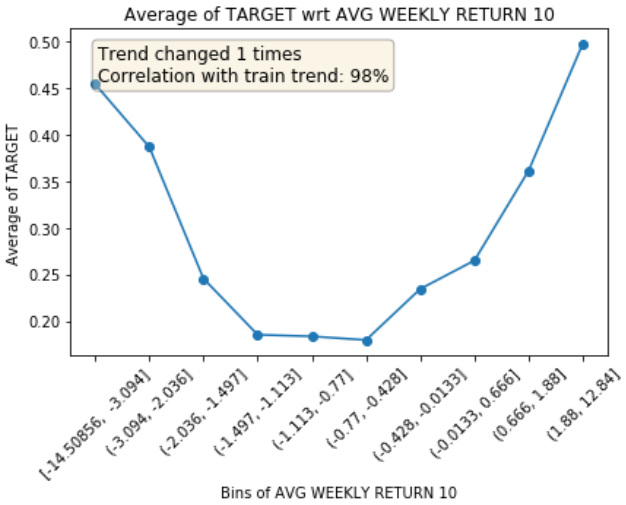
Plots for AVG WEEKLY RETURN 10

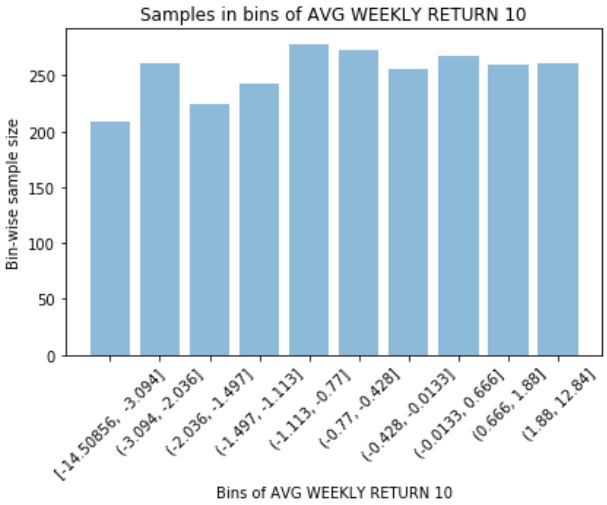
Train data plots





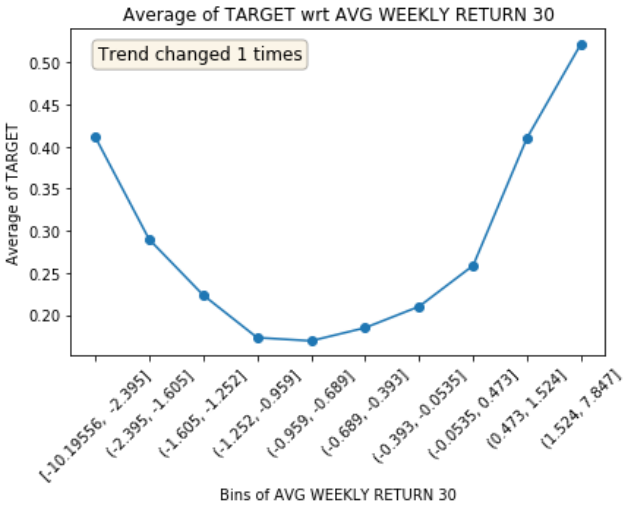
Test data plots

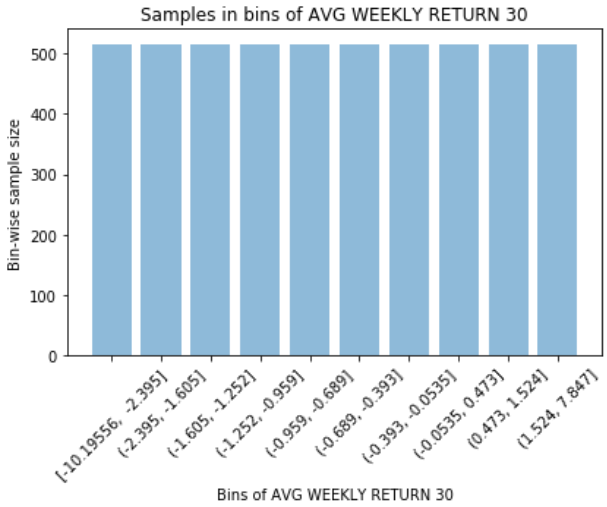




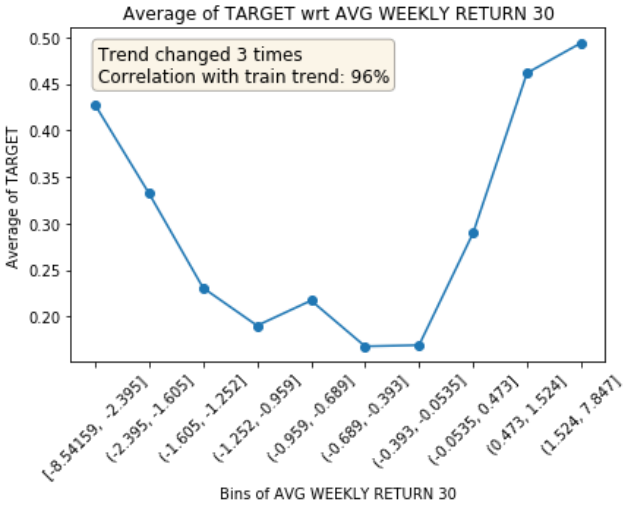
Plots for AVG WEEKLY RETURN 30

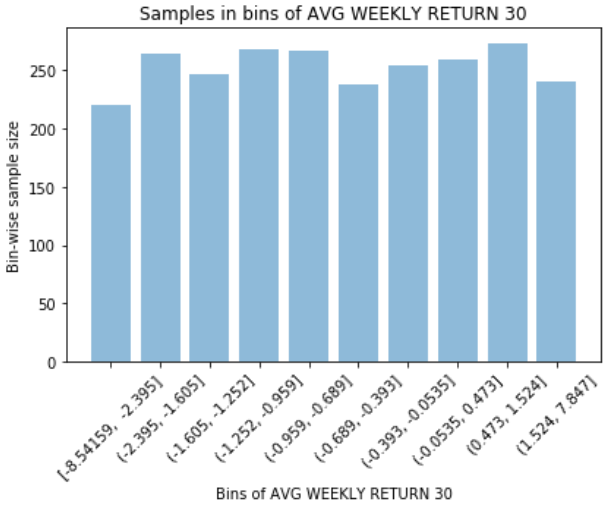
Train data plots





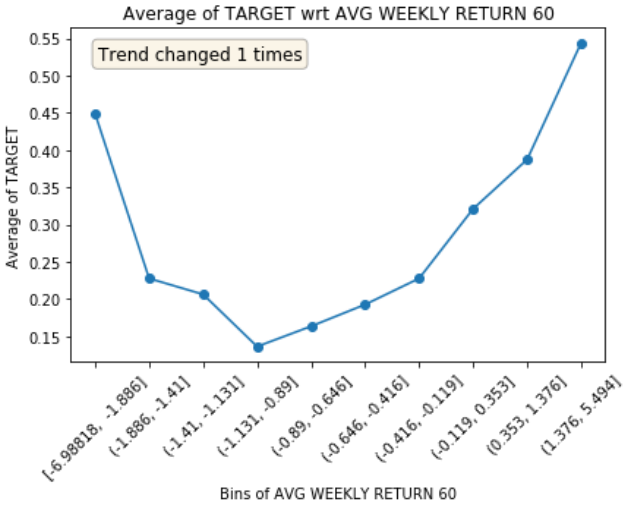
Test data plots

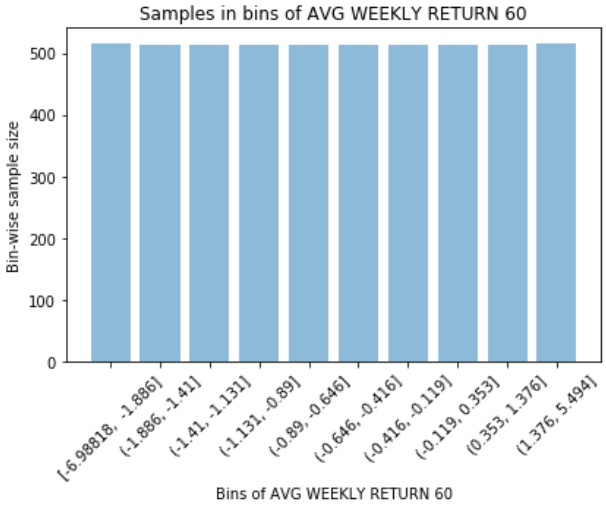




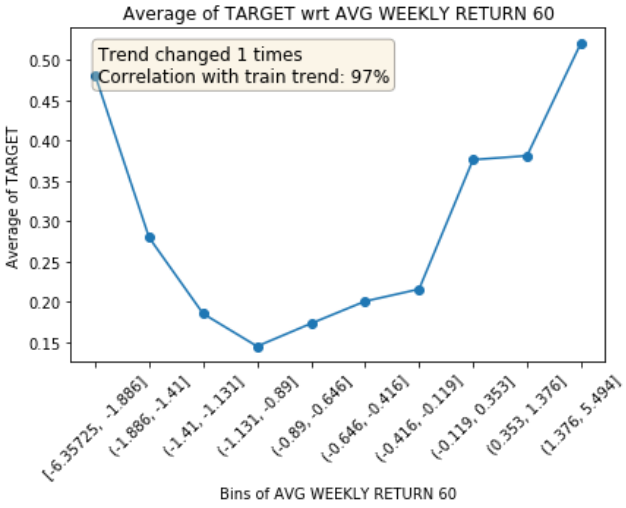
Plots for AVG WEEKLY RETURN 60

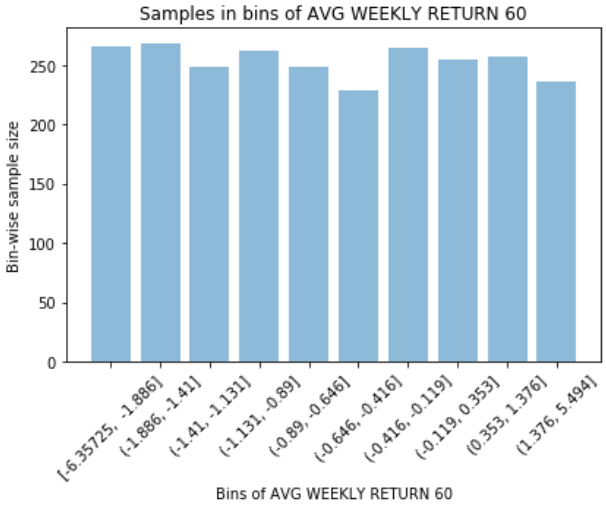
Train data plots





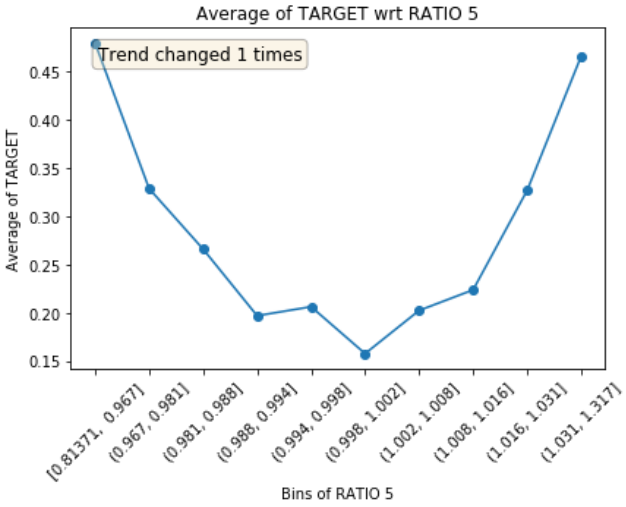
Test data plots

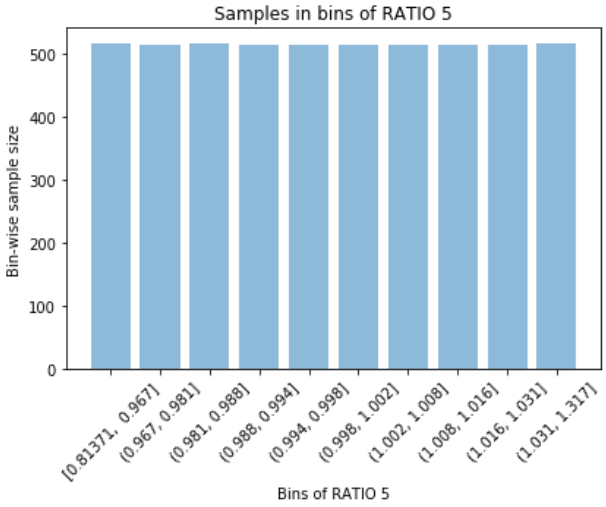




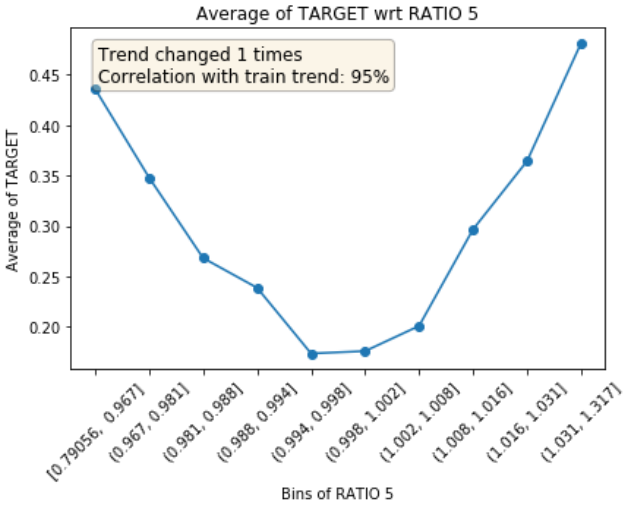
Plots for RATIO 5

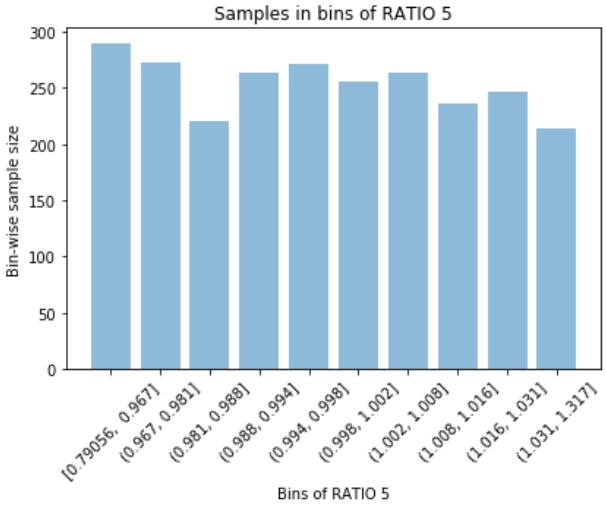
Train data plots





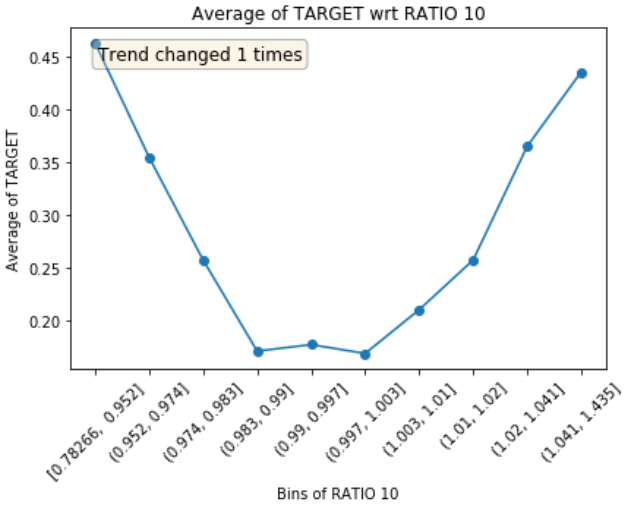
Test data plots

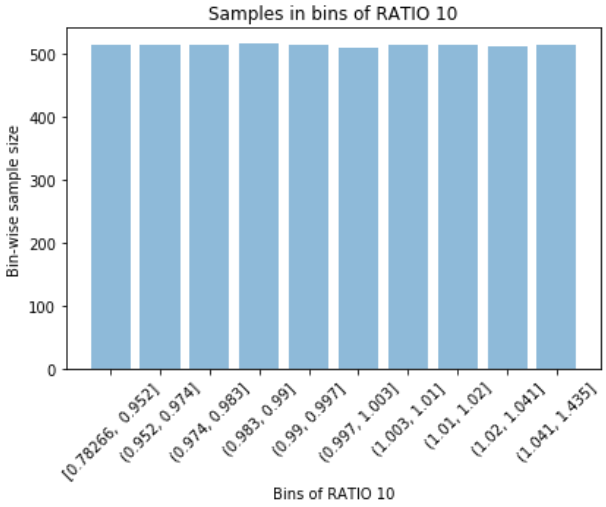




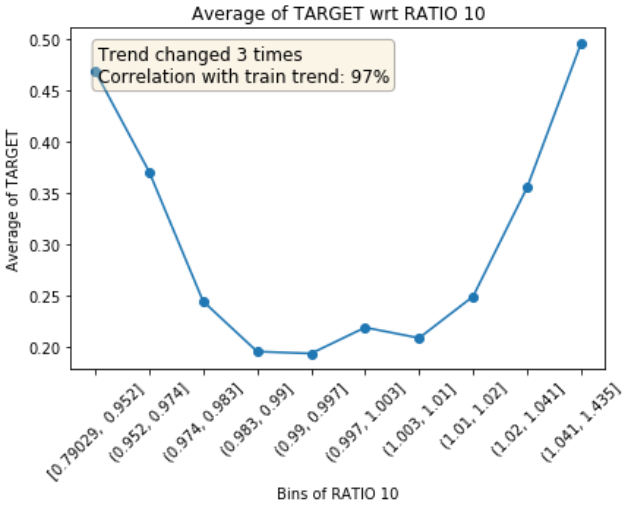
Plots for RATIO 10

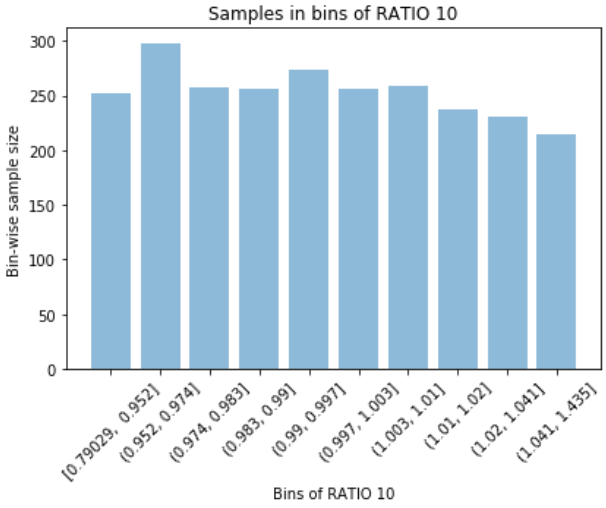
Train data plots





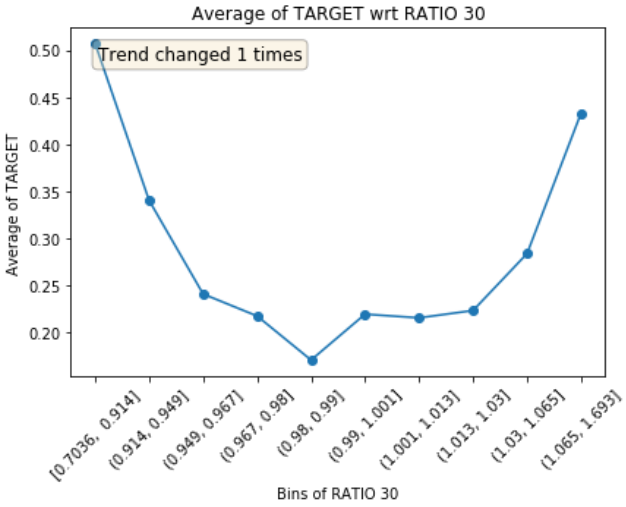
Test data plots

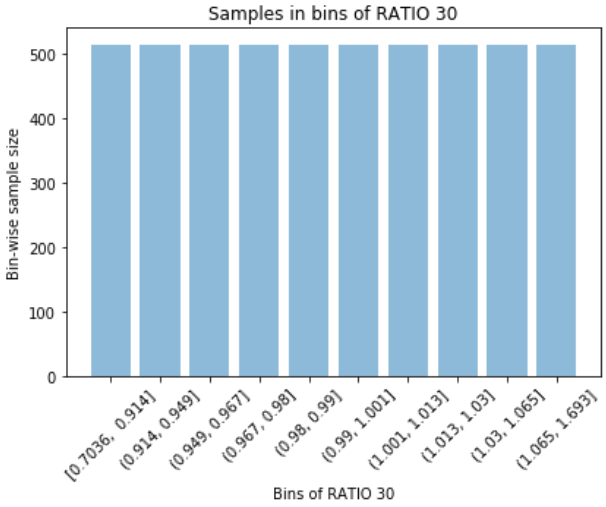




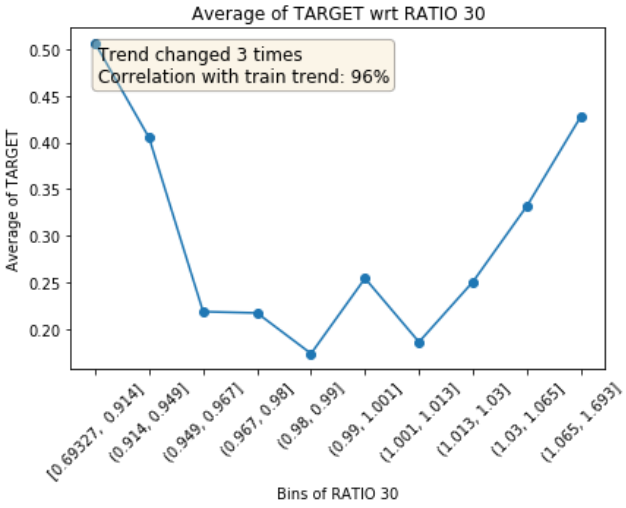
Plots for RATIO 30

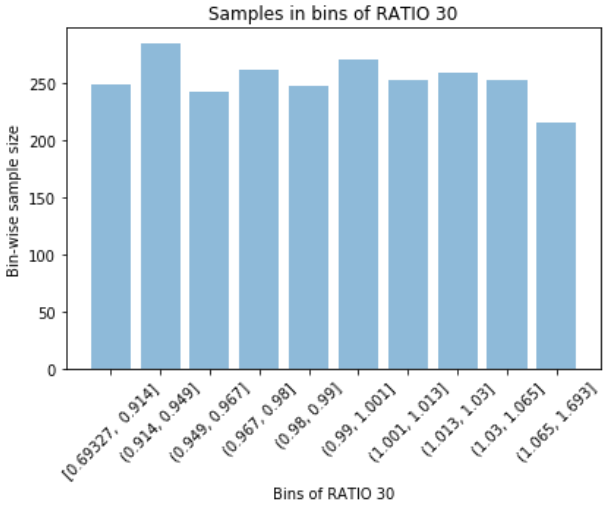
Train data plots





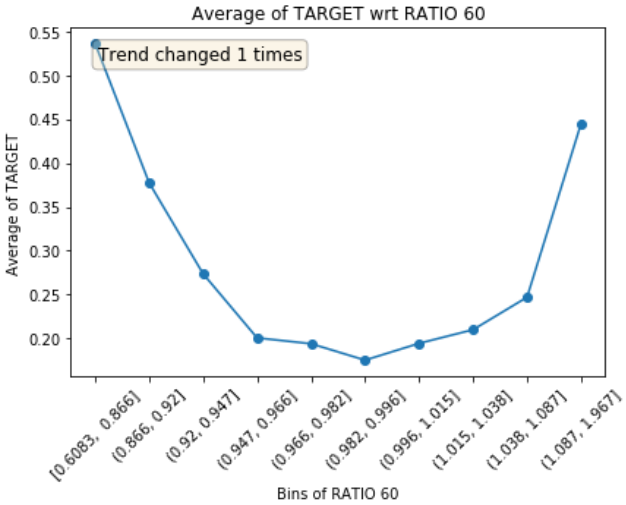
Test data plots

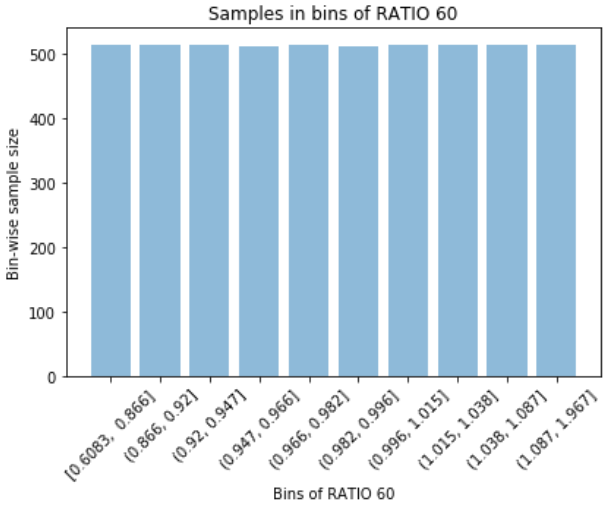




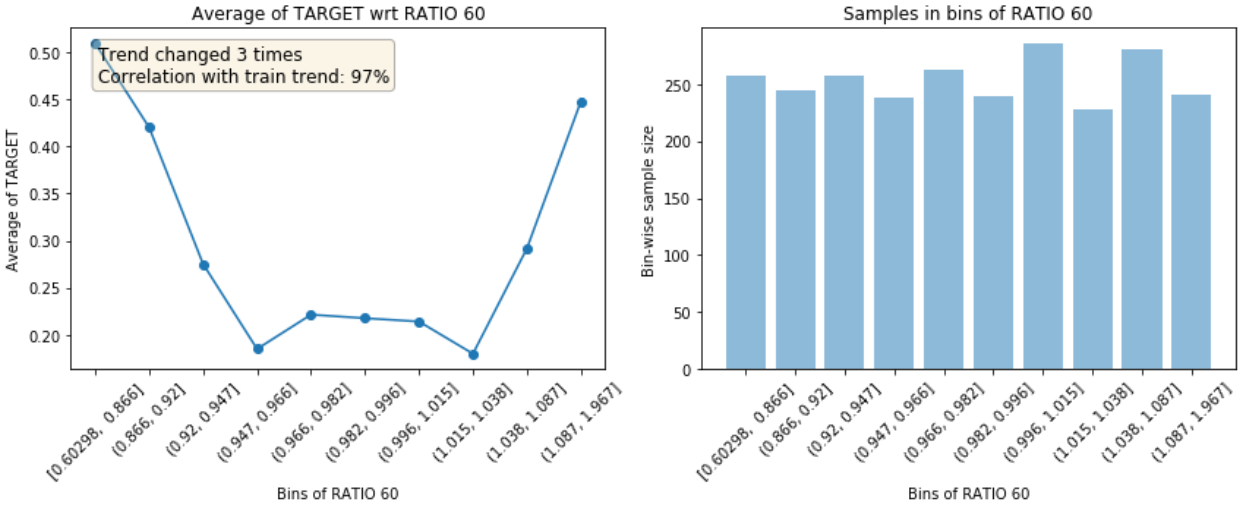
Plots for RATIO 60

Train data plots



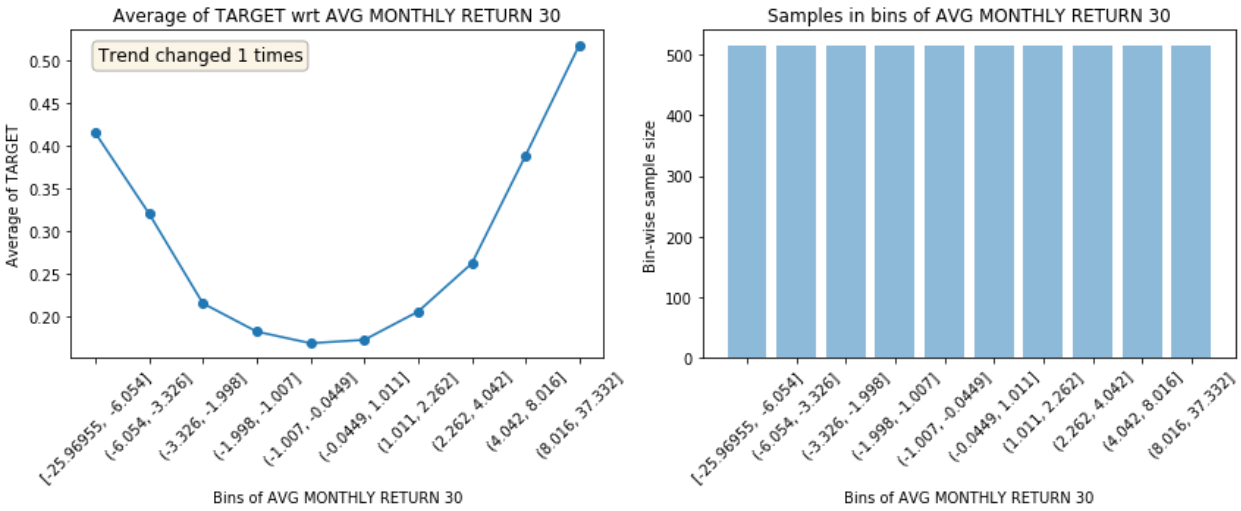


Test data plots

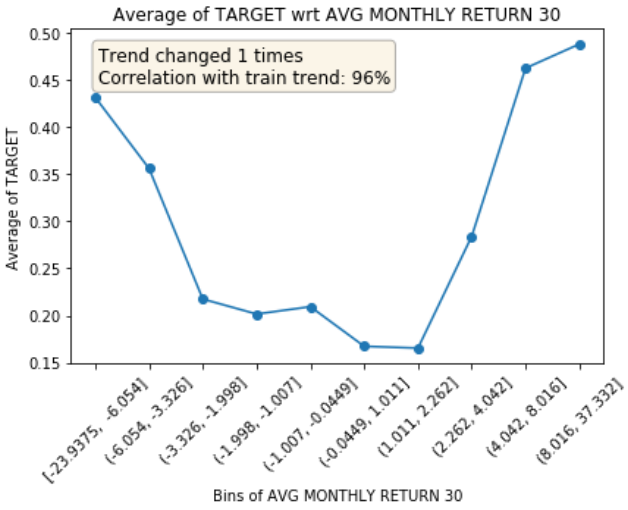


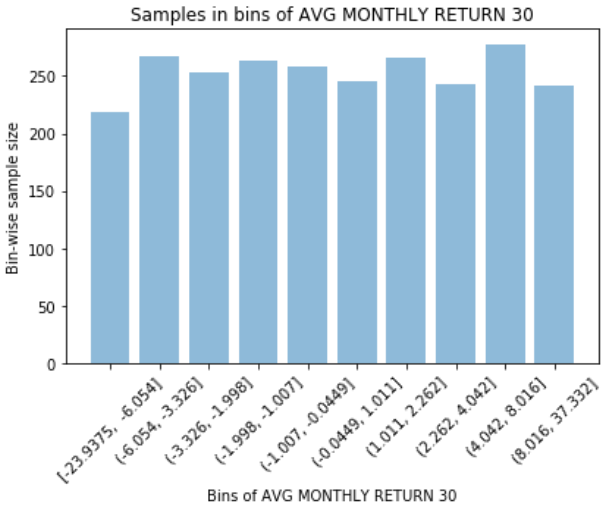
Plots for AVG MONTHLY RETURN 30

Train data plots



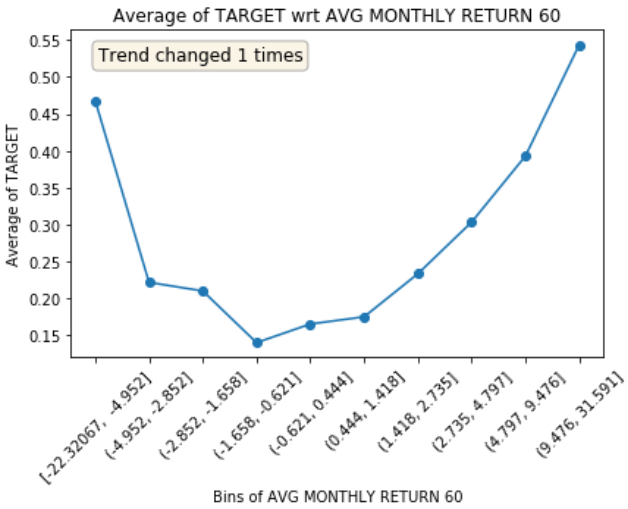
Test data plots

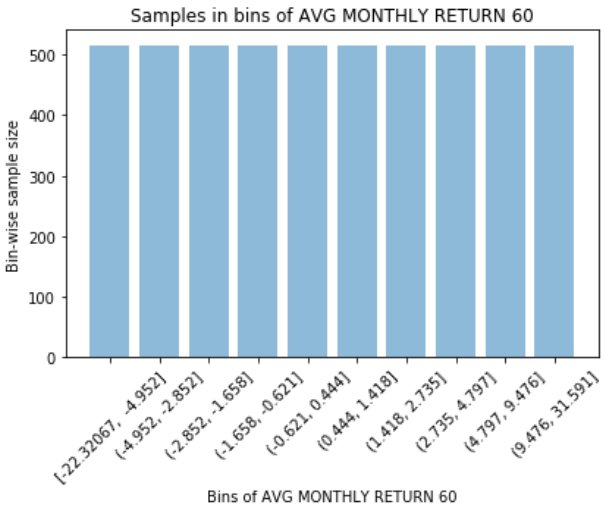




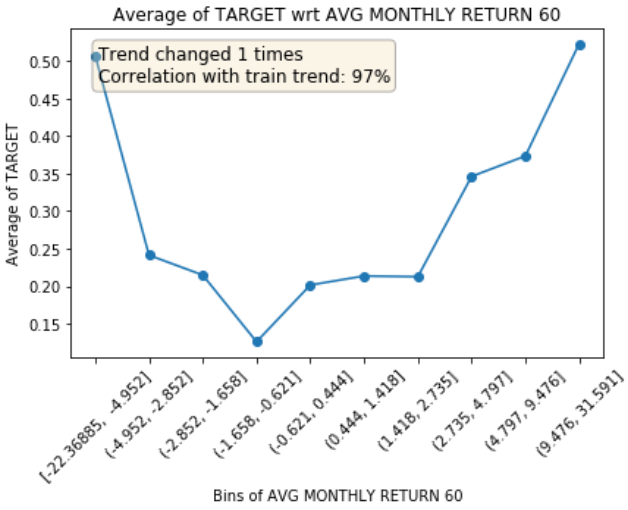
Plots for AVG MONTHLY RETURN 60

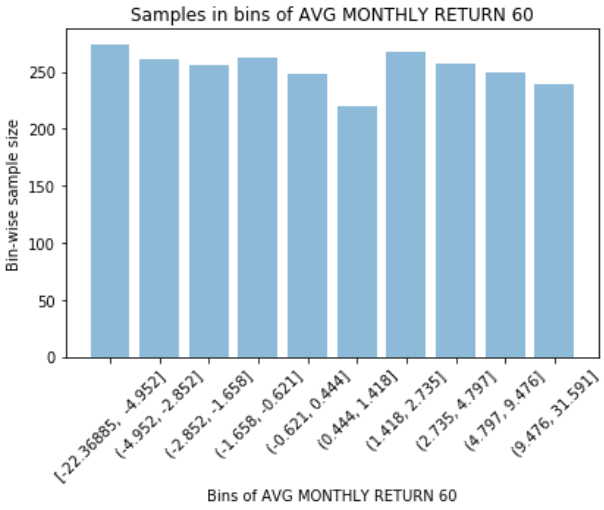
Train data plots





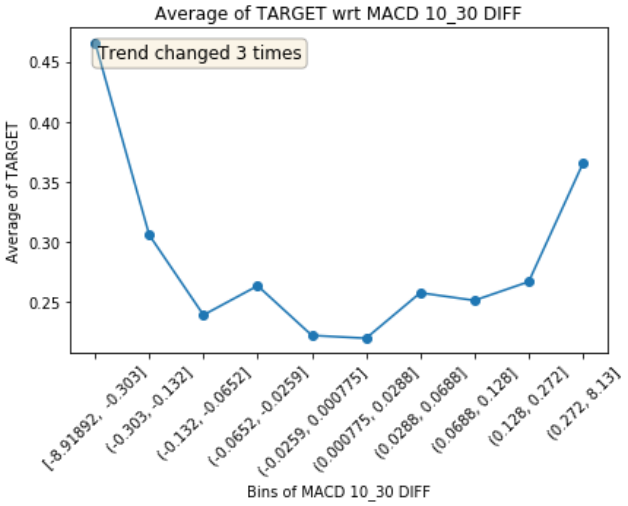
Test data plots

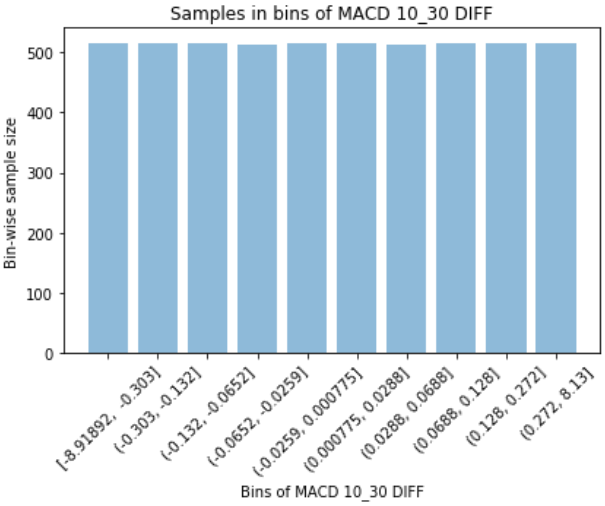




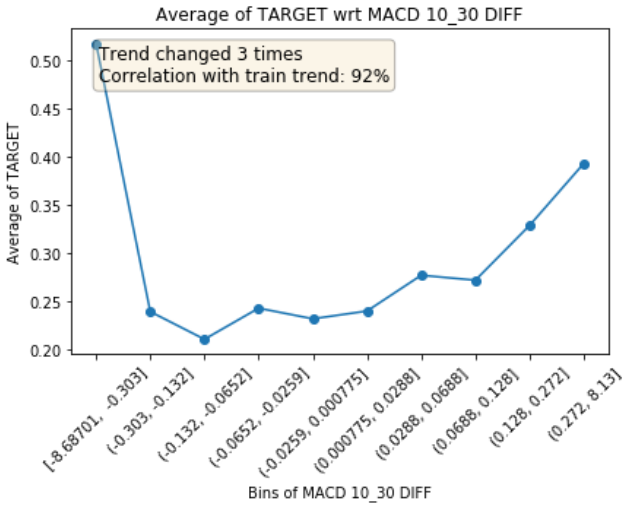
Plots for MACD 10_30 DIFF

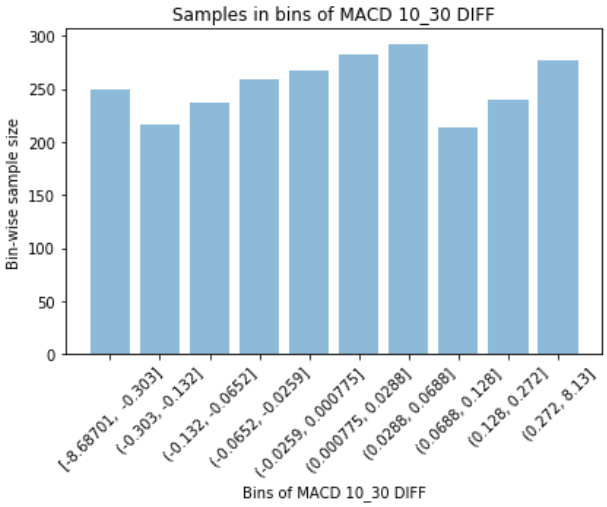
Train data plots





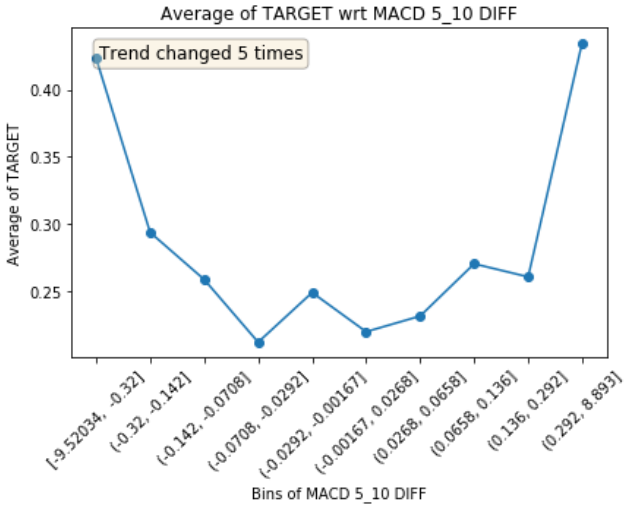
Test data plots

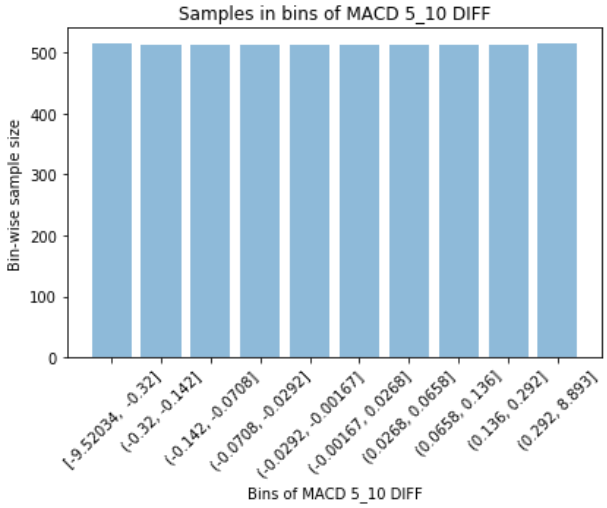




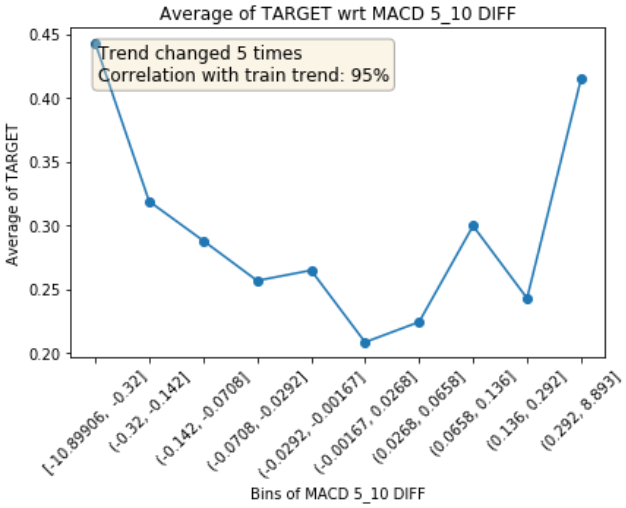
Plots for MACD 5_10 DIFF

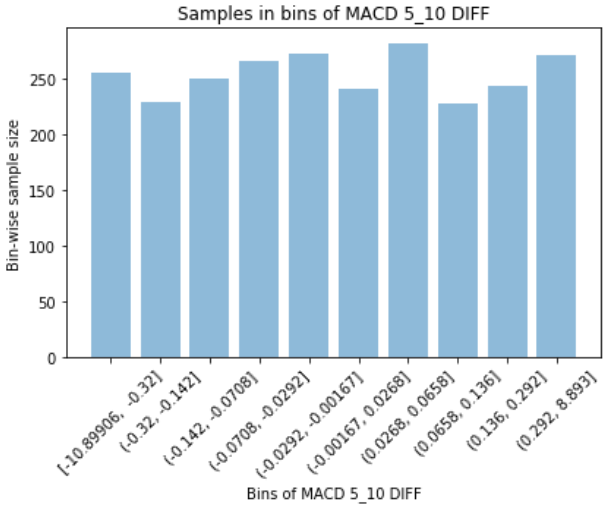
Train data plots





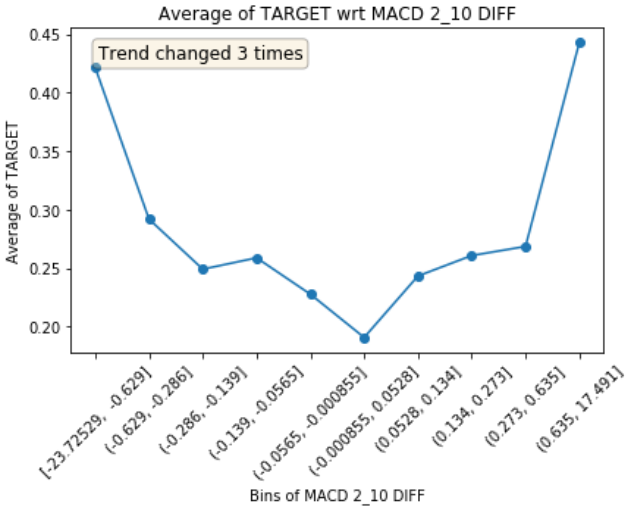
Test data plots

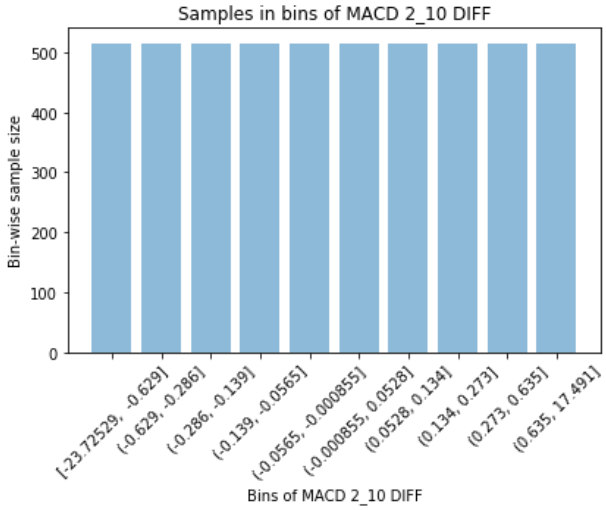




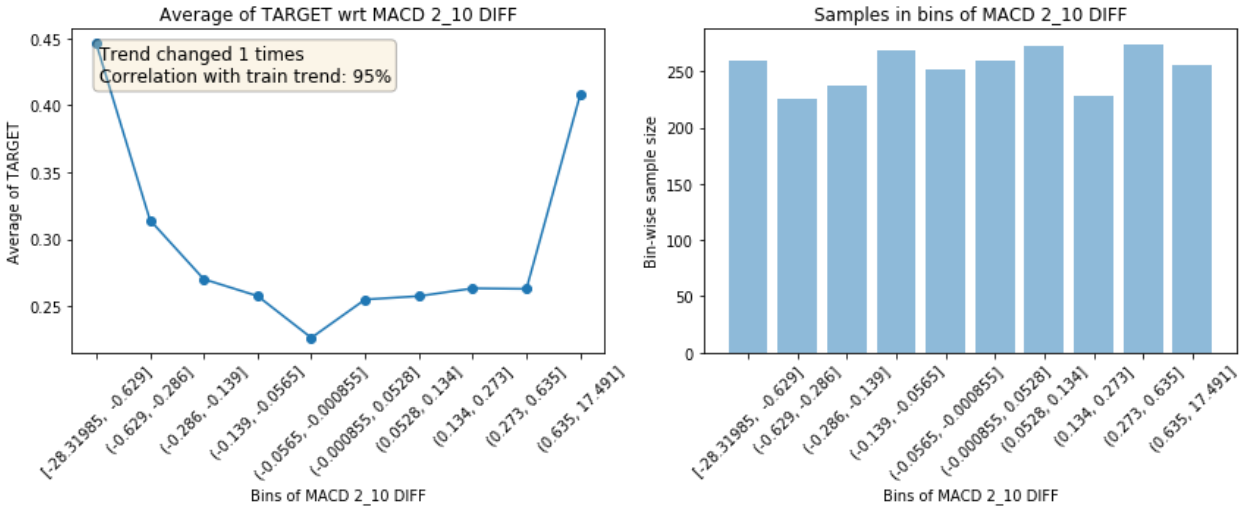
Plots for MACD 2_10 DIFF

Train data plots



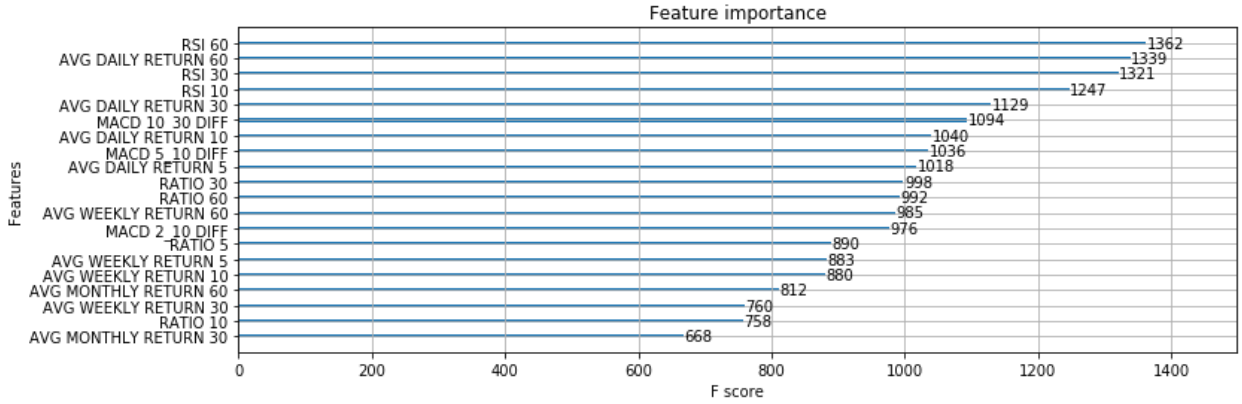


Test data plots



STEP THREE DONE

STEP FOUR DONE



Thresh=0.039, n=20, AUC: 70.64%

Thresh=0.039, n=20, Precision: 73.98%

Thresh=0.039, n=19, AUC: 70.76%

Thresh=0.039, n=19, Precision: 72.83%

Thresh=0.042, n=18, AUC: 70.46%

Thresh=0.042, n=18, Precision: 72.71%

Thresh=0.044, n=17, AUC: 72.07%

Thresh=0.044, n=17, Precision: 75.20%

Thresh=0.045, n=16, AUC: 70.67%

Thresh=0.045, n=16, Precision: 71.24%

Thresh=0.046, n=15, AUC: 71.32%

Thresh=0.046, n=15, Precision: 74.26%

Thresh=0.047, n=14, AUC: 70.28%

Thresh=0.047, n=14, Precision: 72.08%

```
Thresh=0.047, n=13, AUC: 70.34%
Thresh=0.047, n=13, Precision: 72.98%
Thresh=0.047, n=12, AUC: 69.65%
Thresh=0.047, n=12, Precision: 71.43%
Thresh=0.047, n=11, AUC: 70.51%
Thresh=0.047, n=11, Precision: 70.78%
Thresh=0.048, n=10, AUC: 71.64%
Thresh=0.048, n=10, Precision: 73.28%
Thresh=0.048, n=9, AUC: 70.68%
Thresh=0.048, n=9, Precision: 70.26%
Thresh=0.049, n=8, AUC: 70.28%
Thresh=0.049, n=8, Precision: 72.08%
Thresh=0.051, n=7, AUC: 67.97%
Thresh=0.051, n=7, Precision: 67.40%
Thresh=0.051, n=6, AUC: 67.47%
Thresh=0.051, n=6, Precision: 65.56%
Thresh=0.056, n=5, AUC: 65.09%
Thresh=0.056, n=5, Precision: 61.48%
Thresh=0.057, n=4, AUC: 65.18%
Thresh=0.057, n=4, Precision: 60.62%
Thresh=0.064, n=3, AUC: 62.33%
Thresh=0.064, n=3, Precision: 57.48%
Thresh=0.065, n=2, AUC: 58.38%
Thresh=0.065, n=2, Precision: 52.16%
Thresh=0.067, n=1, AUC: 56.47%
Thresh=0.067, n=1, Precision: 50.61%
-----------------ROUNDING THRESHOLD OF 0.85----------------------
Thresh=0.039, n=20, AUC: 59.51%
Thresh=0.039, n=20, Precision: 84.24%
Thresh=0.039, n=19, AUC: 59.99%
Thresh=0.039, n=19, Precision: 86.10%
Thresh=0.042, n=18, AUC: 59.92%
Thresh=0.042, n=18, Precision: 89.20%
Thresh=0.044, n=17, AUC: 59.07%
Thresh=0.044, n=17, Precision: 84.09%
Thresh=0.045, n=16, AUC: 58.48%
Thresh=0.045, n=16, Precision: 82.35%
Thresh=0.046, n=15, AUC: 60.25%
Thresh=0.046, n=15, Precision: 84.34%
Thresh=0.047, n=14, AUC: 58.94%
Thresh=0.047, n=14, Precision: 83.91%
Thresh=0.047, n=13, AUC: 59.69%
Thresh=0.047, n=13, Precision: 83.25%
Thresh=0.047, n=12, AUC: 58.84%
```

```
Thresh=0.047, n=12, Precision: 83.33%
Thresh=0.047, n=11, AUC: 59.38%
Thresh=0.047, n=11, Precision: 86.29%
Thresh=0.048, n=10, AUC: 58.31%
Thresh=0.048, n=10, Precision: 84.91%
Thresh=0.048, n=9, AUC: 57.79%
Thresh=0.048, n=9, Precision: 83.12%
Thresh=0.049, n=8, AUC: 57.82%
Thresh=0.049, n=8, Precision: 83.66%
Thresh=0.051, n=7, AUC: 56.73%
Thresh=0.051, n=7, Precision: 77.70%
Thresh=0.051, n=6, AUC: 56.45%
Thresh=0.051, n=6, Precision: 75.68%
Thresh=0.056, n=5, AUC: 55.52%
Thresh=0.056, n=5, Precision: 73.13%
Thresh=0.057, n=4, AUC: 56.67%
Thresh=0.057, n=4, Precision: 80.00%
Thresh=0.064, n=3, AUC: 53.27%
Thresh=0.064, n=3, Precision: 79.71%
Thresh=0.065, n=2, AUC: 51.95%
Thresh=0.065, n=2, Precision: 69.23%
Thresh=0.067, n=1, AUC: 50.82%
Thresh=0.067, n=1, Precision: 77.78%
STEP SIX DONE
     train-auc-mean  train-auc-std  test-auc-mean  test-auc-std
0          0.741829       0.007984       0.686024      0.020872
1          0.773635       0.007475       0.717522      0.014718
2          0.790222       0.008168       0.732448      0.016751
3          0.799320       0.004562       0.738844      0.018797
4          0.805411       0.006389       0.741325      0.018218
..              ...            ...            ...           ...
418        0.999992       0.000009       0.827162      0.016496
419        0.999993       0.000008       0.827041      0.016431
420        0.999993       0.000008       0.827119      0.016519
421        0.999993       0.000008       0.827228      0.016536
422        0.999994       0.000008       0.827293      0.016598

[423 rows x 4 columns]
Ideal n_estimators:  423
TEST EVERYTHING
CV Results:  {'mean_fit_time': array([16.76007781, 15.66889038, 21.51966572,
22.52267404, 20.63653355,
       18.10925579, 18.68397489, 16.27410522, 16.38635178, 15.27526889,
       18.65773764, 17.57460818, 16.38191381, 15.12434869, 17.80302525,
```

```
       16.3342658 , 21.18753443, 18.12214637, 24.89375787, 17.84702654]), 'std_fit_time': array([0.15433338, 0.05543416, 2.27735764, 0.19730806, 0.59824181,
       0.267138  , 1.58218745, 0.20161951, 0.17383814, 0.1116582 ,
       0.26959938, 0.26434294, 0.14402768, 0.11347623, 0.07486513,
       0.14235638, 1.10908054, 0.88377866, 0.83209054, 2.15584233]), 'mean_score_time': array([0.02136941, 0.01588535, 0.02263904, 0.02264056, 0.01849031,
       0.01930766, 0.01491747, 0.01536527, 0.01441431, 0.01464391,
       0.01657004, 0.01496282, 0.01406593, 0.01385684, 0.01361613,
       0.02628245, 0.01314597, 0.01824627, 0.01509523, 0.01488862]), 'std_score_time': array([0.00609969, 0.00206662, 0.00948033, 0.0062157 , 0.00257502,
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       0.0037581 , 0.0012672 , 0.00143876, 0.00153093, 0.00089035,
       0.02592408, 0.00100779, 0.00425709, 0.00281484, 0.00131982]), 'param_gamma': masked_array(data=[0.0, 0.0, 0.0, 0.0, 0.1, 0.1, 0.1, 0.1, 0.2, 0.2, 0.2,
                  0.2, 0.3, 0.3, 0.3, 0.3, 0.4, 0.4, 0.4, 0.4],
             mask=[False, False, False, False, False, False, False, False,
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                   False, False, False, False],
       fill_value='?',
            dtype=object), 'param_max_depth': masked_array(data=[9, 9, 10, 10, 9, 9, 10, 10, 9, 9, 10, 10, 9, 9, 10, 10,
                  9, 9, 10, 10],
             mask=[False, False, False, False, False, False, False, False,
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                   False, False, False, False],
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            dtype=object), 'param_min_child_weight': masked_array(data=[1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2, 1, 2,
                  1, 2],
             mask=[False, False, False, False, False, False, False, False,
                   False, False, False, False, False, False, False, False,
                   False, False, False, False],
       fill_value='?',
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```

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       0.84775587, 0.84021154, 0.84676227, 0.84085728, 0.84609463,
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       14, 8, 13], dtype=int32)}
Best Params: {'gamma': 0.0, 'max_depth': 10, 'min_child_weight': 1}
Best Score: 0.8532413778922946

```
     train-auc-mean  train-auc-std  test-auc-mean  test-auc-std
0          0.839919       0.011052       0.716472      0.020346
1          0.874891       0.004405       0.751550      0.020589
2          0.890851       0.006147       0.769049      0.019923
3          0.900714       0.006324       0.776501      0.018615
4          0.906352       0.005415       0.777858      0.017175
..              ...            ...            ...           ...
319        1.000000       0.000000       0.849917      0.011771
320        1.000000       0.000000       0.849927      0.011910
321        1.000000       0.000000       0.850087      0.011989
322        1.000000       0.000000       0.850114      0.012113
323        1.000000       0.000000       0.850167      0.012203

[324 rows x 4 columns]
Ideal n_estimators:  324
XGBClassifier(base_score=0.5, booster='gbtree', colsample_bylevel=1,
              colsample_bynode=1, colsample_bytree=0.8, eval_metric='auc',
              gamma=0.0, gpu_id=-1, importance_type='gain',
              interaction_constraints='', learning_rate=0.1, max_delta_step=0
,
              max_depth=10, min_child_weight=1, missing=nan,
              monotone_constraints='()', n_estimators=324, n_jobs=4, nthread=
4,
              num_parallel_tree=1, objective='binary:logistic', random_state=
27,
              reg_alpha=0, reg_lambda=1, scale_pos_weight=1, seed=27,
              subsample=0.8, tree_method='exact', use_label_encoder=False,
              validate_parameters=1, ...)
STEP SEVEN DONE
AUC: 73.31869341532285
Precision: 78.1496062992126
Accuracy: 81.64956590370956
ROUNDING THRESHOLD OF 0.85
AUC: 62.800132633026976
Precision: 85.53719008264463
Accuracy: 77.1507498026835
STEP EIGHT DONE

AAPL
AAPL
Standard Threshold
Accuracy AAPL: 69.56937799043062%
Precision AAPL: 53.431372549019606%
Recall AAPL: 32.831325301204814%
AUC AAPL: 59.75367106574968%
```

Rounding Threshold: 0.85
Accuracy AAPL: 69.47368421052632%
Precision AAPL: 58.0246913580247%
Recall AAPL: 14.156626506024098%
AUC AAPL: 54.69402152790684%
X
X
Standard Threshold
Accuracy X: 53.59168241965973%
Precision X: 54.94736842105263%
Recall X: 48.51301115241636%
AUC X: 53.679582499285104%
Rounding Threshold: 0.85
Accuracy X: 51.51228733459357%
Precision X: 55.41125541125541%
Recall X: 23.79182156133829%
AUC X: 51.99206462682299%
TGT
TGT
Standard Threshold
Accuracy TGT: 64.0%
Precision TGT: 29.596412556053814%
Recall TGT: 22.99651567944251%
AUC TGT: 51.209922322027936%
Rounding Threshold: 0.85
Accuracy TGT: 71.52380952380952%
Precision TGT: 41.42857142857143%
Recall TGT: 10.104529616724738%
AUC TGT: 52.36550202985648%
INTC
INTC
Standard Threshold
Accuracy INTC: 67.16417910447761%
Precision INTC: 33.093525179856115%
Recall INTC: 16.25441696113074%
AUC INTC: 51.686765267268974%
Rounding Threshold: 0.85
Accuracy INTC: 70.54726368159204%
Precision INTC: 35.55555555555556%
Recall INTC: 5.6537102473498235%
AUC INTC: 50.81854487436743%
JNJ
JNJ
Standard Threshold
Accuracy JNJ: 89.40936863543789%
Precision JNJ: 27.027027027027028%
Recall JNJ: 11.494252873563218%
AUC JNJ: 54.23874654851345%
Rounding Threshold: 0.85
Accuracy JNJ: 91.0386965376782%
Precision JNJ: 42.857142857142854%
Recall JNJ: 3.4482758620689653%
AUC JNJ: 51.50067424388365%