Kepler Fi Case Study

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This case study analyzed the tracking error generated from a custom index of the twenty-five largest stocks by market capitalization in the Russell 1000. Market capitalization data was captured as of 3/31/2019. Russell 1000 constituents and market capitalization data was captured with a Bloomberg Terminal.

Upon loading the Russell 1000 data to python via the read_csv function, the 25 largest companies by market capitalization were set into a new dataframe named new_index with the nlargest function. Next a new column was added to the new_index dataframe which captured the percent of the companies market capitalization, against the sum of the indexes market capitzlization. Next the April time period was loaded into python, since the focus was the Russell 1000 return for April 2019. A new dataframe was created, named rui_daily, which stored the monthly returns for ^RUI. An additional column was created to capture the daily percent change in closing price.

Next a dataframe was created for each of the 25 companies from the custom index, which stored the market data for the month of April 2019. An additional column was created to capture the daily price change by percent. Another column was added to each, which applied the custom index's portfolio weighing to the daily closes for each individual stock. An empty list named new_index_return was created, and the sum of each stocks weighted close was added to the list for every day in April 2019. This was then added to the rui_daily dataframe under the column name new_index_close. Another column was created to capture the daily percent change.

Next, the tracking error object was created, and a new column was created in the rui_daily dataframe capturing the daily tracking error (subtracting the daily percent change of ^RUI from the daily percent change of the custom basket. The tracking error for the entire portfolio for the month was captured by taking the standard deviation of the daily tracking errors. The tracking error came in at .0054.

Date	High	Low	Open	Close	Volume	Adj Close	pcnt_change	new_index_close	new_index_pct_change	daily_tracking_error
2019-04-01	1589.719971	1572.420044	1572.420044	1588.650024	0	1588.650024	NaN	18158.390745	NaN	NaN
2019-04-02	1589.890015	1583.719971	1589.900024	1588.569946	0	1588.569946	-0.000050	18056.347192	-0.005675	-0.005624
2019-04-03	1598.859985	1587.979980	1589.119995	1592.479980	0	1592.479980	0.002461	18042.171871	-0.000730	-0.003191
2019-04-04	1596.430054	1588.130005	1592.520020	1595.109985	0	1595.109985	0.001652	18084.180784	0.002328	0.000677
2019-04-05	1603.079956	1595.849976	1595.849976	1602.880005	0	1602.880005	0.004871	18161.420287	0.004271	-0.000600
2019-04-08	1604.560059	1596.030029	1602.430054	1604.560059	0	1604.560059	0.001048	18144.095112	-0.000954	-0.002002
2019-04-09	1603.030029	1591.900024	1603.030029	1594.420044	0	1594.420044	-0.006319	18137.207461	-0.000380	0.005940
2019-04-10	1601.640015	1594.359985	1594.359985	1600.930054	0	1600.930054	0.004083	18116.784240	-0.001126	-0.005209
2019-04-11	1603.699951	1597.969971	1601.520020	1601.270020	0	1601.270020	0.000212	18282.610446	0.009163	0.008941
2019-04-12	1613.250000	1602.510010	1602.510010	1611.959961	0	1611.959961	0.006676	18536.738729	0.013900	0.007224
2019-04-15	1613.000000	1605.920044	1612.000000	1610.819946	0	1610.819946	-0.000707	18551.897384	0.000818	0.001525
2019-04-16	1616.290039	1607.930054	1612.020020	1611.339966	0	1611.339966	0.000323	18727.434307	0.009462	0.009139
2019-04-17	1617.219971	1603.880005	1612.349976	1606.520020	0	1606.520020	-0.002991	18644.267599	-0.004440	-0.001449
2019-04-18	1610.599976	1601.400024	1606.640015	1608.930054	0	1608.930054	0.001500	18603.329399	-0.002197	-0.003697
2019-04-22	1611.089966	1604.130005	1608.410034	1610.270020	0	1610.270020	0.000833	18536.160301	-0.003611	-0.004443
2019-04-23	1626.280029	1610.579956	1610.579956	1625.089966	0	1625.089966	0.009203	18748.976903	0.011476	0.002272
2019-04-24	1627.170044	1621.270020	1625.010010	1621.910034	0	1621.910034	-0.001957	18648.369929	-0.005361	-0.003404
2019-04-25	1626.060059	1613.260010	1621.469971	1620.500000	0	1620.500000	-0.000869	18794.406420	0.007831	0.008701
2019-04-26	1626.359985	1616.300049	1620.459961	1625.119995	0	1625.119995	0.002851	18944.191254	0.007970	0.005119
2019-04-29	1634.010010	1629.410034	1629.540039	1630.400024	0	1630.400024	0.003249	19171.426079	0.011995	0.008746
2019-04-30	1633.010010	1620.030029	1630.420044	1631.869995	0	1631.869995	0.000902	19171.043622	-0.000020	-0.000922
2019-05-01	1636.180054	1619.400024	1634.959961	1619.489990	0	1619.489990	-0.007686	19214.826840	0.002284	0.009970

Figure 1 rui_daily DataFrame

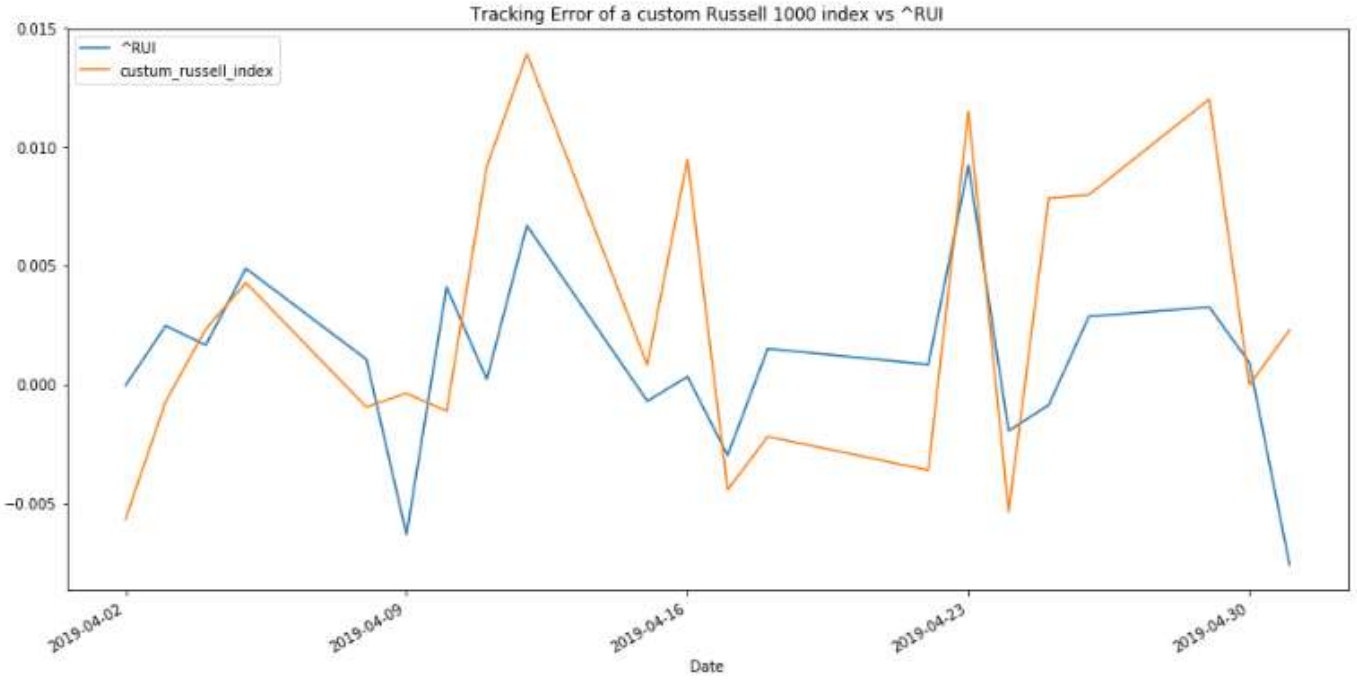

Figure 2 – Daily Tracking Error

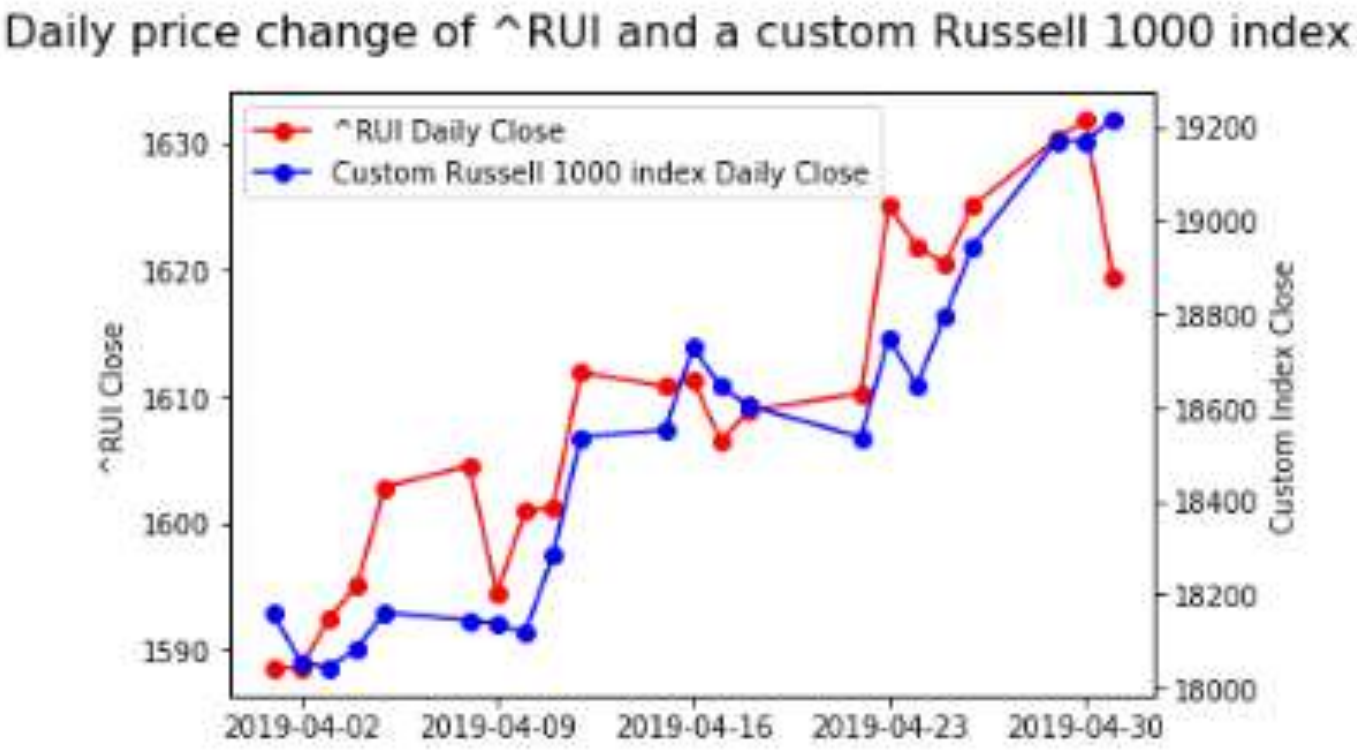

Figure 3 – Daily Close for ^RUI and custom Russell 1000 index