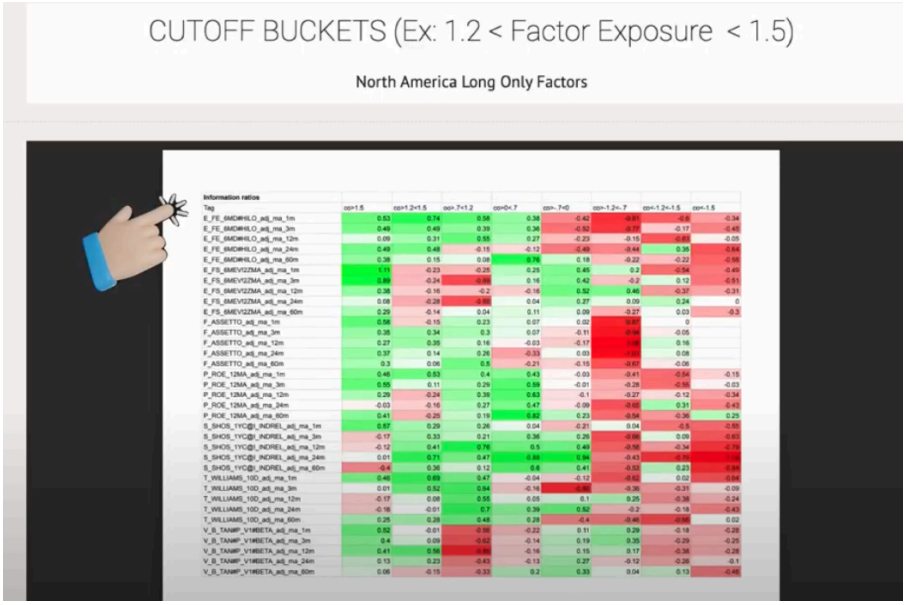
Research Findings. Q1 2023

- Analyzed portfolio performance using transformations and cutoffs approach
- Investigated the impact of Kurtosis, Skew, and Average factor exposure on returns
- Experimented with different cutoff ranges for portfolio constituents, both overlapping and non-overlapping
- Identified the optimal tile size for the portfolios.

Link to Video:



1) Experimented with two portfolio creation approaches, namely the quantile approach and the cutoff approach. The quantile approach involves arranging the factor scores in a cross-section in rank order and creating buckets of the same size.
   Excel Data

Tag	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10
COMBO_US_LONG_ONLY_ma_1m	0.63	0.57	0.39	0.19	0.23	-0.01	-0.05	-0.66	-0.42	-0.59
COMBO_US_LONG_ONLY_ma_3m	0.24	0.93	0.38	-0.29	0.64	-0.2	-0.08	0.1	-0.89	-0.47
COMBO_US_LONG_ONLY_ma_12m	0.27	0.32	0.31	0.38	-0.27	0.04	-0.25	-0.55	0	-0.29
COMBO_US_LONG_ONLY_ma_24m	-0.06	0.49	0.03	0.49	0.12	-0.09	0.18	-0.46	-0.33	-0.2
COMBO_US_LONG_ONLY_ma_60m	-0.43	0.56	0.83	0.46	0.21	0.44	0.1	-0.18	-0.33	-0.73
E_SURP_ma_1m	-0.23	0.05	0.22	0.48	0.56	0.25	0.02	0.04	0.07	-0.78
E_SURP_ma_3m	-0.43	0.17	-0.28	1.51	-0.07	0.42	-0.07	0.15	-0.14	-0.62
E_SURP_ma_12m	-0.5	0.09	-0.05	0.07	0.29	0.51	0.5	0.04	-0.1	-0.41
E_SURP_ma_24m	-0.63	0.15	-0.6	0.26	0.76	0.14	0.26	-0.18	0.68	-0.36
E_SURP_ma_60m	-0.78	0.44	0.59	0.07	0.05	-0.13	0.16	0.16	0.28	-0.33
TP_BARRA_GEMLT_MOMENTUM_ma_1m	0.48	0.21	0.31	0.25	0.27	-0.17	0.08	-0.32	-0.41	-0.61
TP_BARRA_GEMLT_MOMENTUM_ma_3m	0.43	0.02	0.16	0.38	0.29	0.13	-0.3	-0.05	-0.35	-0.54

Quantile Approach with Winsorization clip at 3
Quantile Approach with Winsorization clip at 2.5

2) Investigated the use of the cutoff approach, where a range of values for the factors determines its membership in a bucket. Additionally, we experimented with overlapping buckets.
[Overlapping Cutoffs]

Excess returns charts

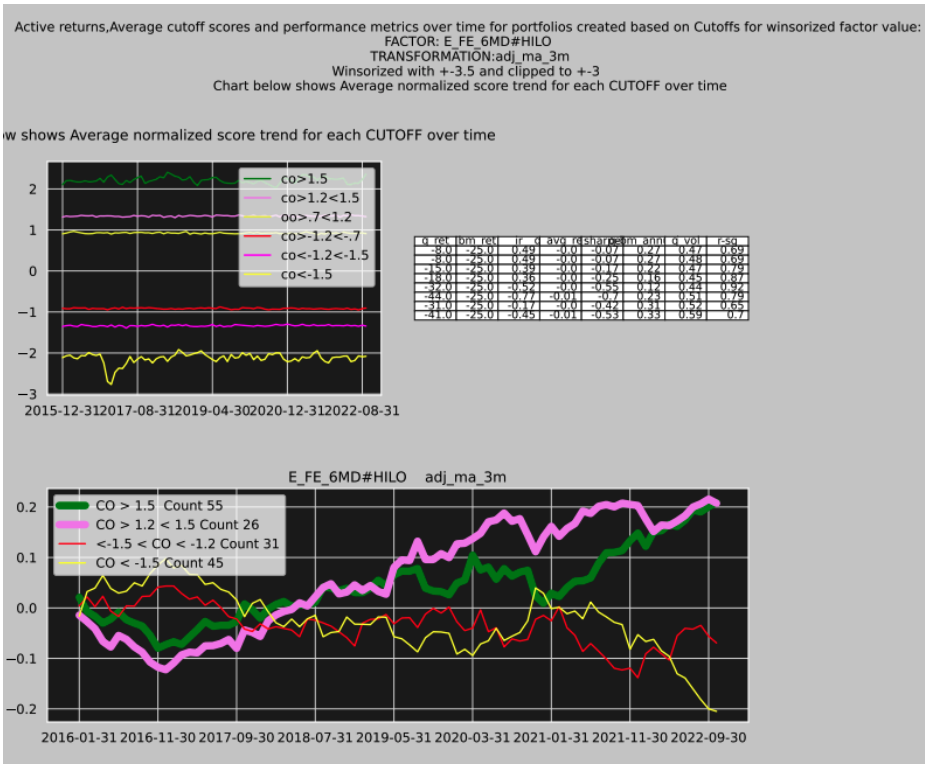
Tag	co>1.9	co>1.5	co>1.2	co>.7	co>0	co<0	co<-.7	co<-1.2	co<-1.5	co<-1.9
E_FE_6MD#HILO_adj_ma_1m	0.65	0.48	0.64	0.64	0.47	-0.75	-0.8	-0.53	-0.43	-0.52
E_FE_6MD#HILO_adj_ma_3m	0.54	0.56	0.61	0.57	0.5	-0.55	-0.62	-0.33	-0.45	-0.8
E_FE_6MD#HILO_adj_ma_12m	0.08	0.1	0.17	0.35	0.32	-0.27	-0.27	-0.38	-0.06	-0.17
E_FE_6MD#HILO_adj_ma_24m	0.21	0.54	0.58	0.28	0.12	-0.39	-0.32	-0.11	-0.64	-0.26
E_FS_6MEV!2ZMA_adj_ma_1m	0.9	0.99	0.75	0.31	0.2	-0.05	-0.54	-0.87	-0.79	-0.53
E_FS_6MEV!2ZMA_adj_ma_3m	0.8	0.79	0.71	0.16	0.23	0.11	-0.46	-0.6	-0.74	-0.67
E_FE_6MD#HILO_adj_ma_60m	0.56	0.35	0.33	0.2	0.4	-0.22	-0.33	-0.47	-0.66	0
E_FS_6MEV!2ZMA_adj_ma_12m	0.48	0.34	0.33	0.13	0.02	0.36	-0.13	-0.49	-0.45	-0.4
E_FS_6MEV!2ZMA_adj_ma_24m	0.15	0.02	-0.05	-0.31	-0.18	0.19	-0.03	0.06	-0.05	-0.13
E_FS_6MEV!2ZMA_adj_ma_60m	0.36	0.4	0.39	0.45	0.39	0.11	-0.35	-0.28	-0.26	-0.7

Cutoffs over values , not buckets	
>1.9	
>1.5	tile1 of 10 tiles
>1.2	tile1-2
>.7	tile 1-4
>0	tile 1-8
<0	tile 9-16
<-0.7	tile 13-16
<-1.2	tile 15, 16
<-1.5	tile 16

[Non Overlapping Cutoffs]

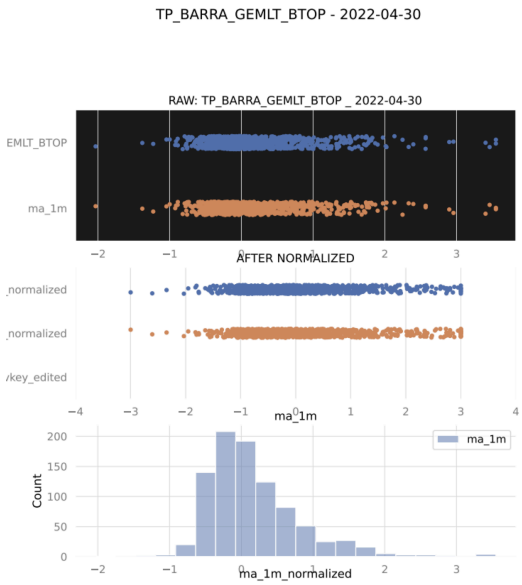
Information ratios

Tag	co>1.5	co>1.2<1.5	oo>.7<1.2	co>0<.7	co>-.7<0	co>-1.2<-.7	co<-1.2<-1.5	co<-1.5
E_FE_6MD#HILO_adj_ma_1m	0.53	0.74	0.58	0.38	-0.42	-0.81	-0.6	-0.34
E_FE_6MD#HILO_adj_ma_3m	0.49	0.49	0.39	0.36	-0.52	-0.77	-0.17	-0.45
E_FE_6MD#HILO_adj_ma_12m	0.09	0.31	0.55	0.27	-0.23	-0.15	-0.63	-0.05
E_FE_6MD#HILO_adj_ma_24m	0.49	0.48	-0.15	-0.12	-0.49	-0.44	0.35	-0.64
E_FE_6MD#HILO_adj_ma_60m	0.38	0.15	0.08	0.76	0.18	-0.22	-0.22	-0.58
E_FS_6MEV!2ZMA_adj_ma_1m	1.11	-0.23	-0.25	0.25	0.45	0.2	-0.54	-0.49
E_FS_6MEV!2ZMA_adj_ma_3m	0.89	-0.24	-0.69	0.16	0.42	-0.2	0.12	-0.51
E_FS_6MEV!2ZMA_adj_ma_12m	0.38	-0.16	-0.2	-0.16	0.52	0.46	-0.37	-0.31



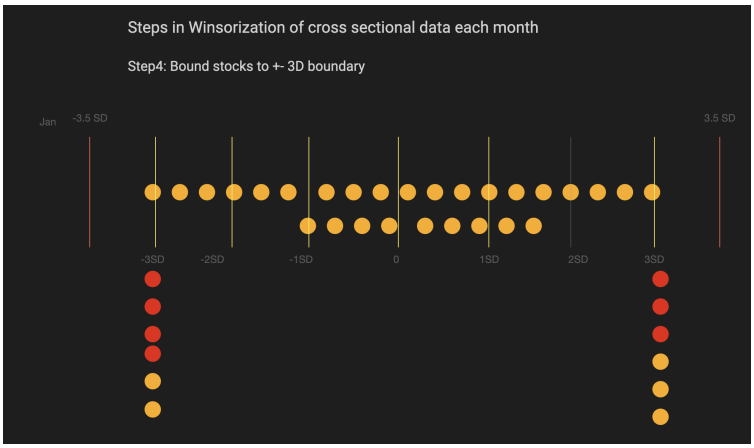
[Cumulative returns, Average factor score and Information table]

3) To model the most suitable cutoffs and transformations, we conducted experiments analyzing the distributions of factors for shortlisted transformations. This study provided new insights into how certain factors follow normal distributions, while others follow exponential distributions.



[Distributions for BARRA and US Long Only factor to demonmstyarte Kurtosis, Skew of Transformed factors scores]

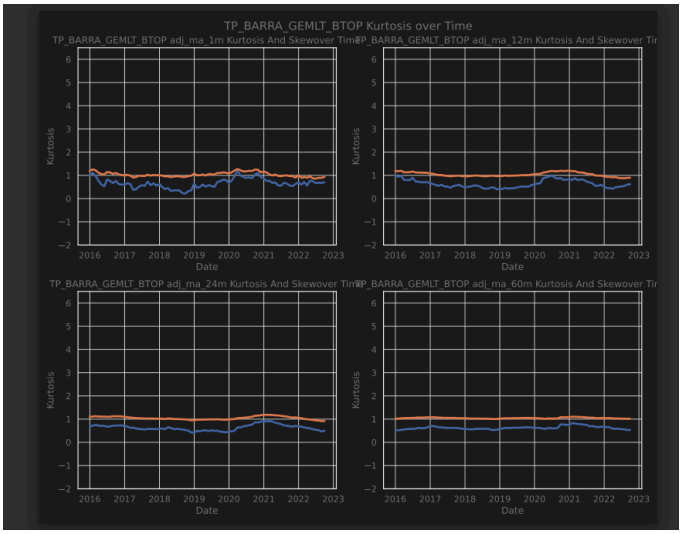
4) We investigated the influence of the winsorization cutoffs. We experimented with cutoffs of 2.5, 3.0, and 3.5 and made several variations to the algorithm for winsorization.



5) Analyzed the impact of changes in average factor scores over time for each bucket and factor, leading to the identification of more volatile factors.

6) Investigated the influence of kurtosis on returns. Kurtosis is a statistical measure that quantifies the degree of peak or tails in a probability distribution. High kurtosis indicates more of the distribution's variance is due to infrequent extreme deviations from the mean, while low kurtosis indicates more of the variance is due to frequent, moderate deviations.Additionally, analyzed skew over time.
A distribution with low kurtosis has a flatter and wider peak compared to a normal distribution. In contrast, a distribution with high kurtosis has a higher and narrower peak with heavier tails compared to a normal distribution. A normal distribution has a kurtosis of 3

Finding: Higher levels of skewness and kurtosis indicate that returns are more volatile and have more extreme values



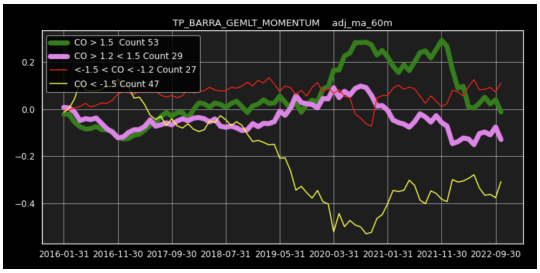
[Skew and Kurtosis Over time for each factor and Trandformation combination]

7) Investigated the impact of using 8, 10, and 16 tiles for the quantile method, which involves having an equal number of stocks in each portfolio.
   10Tiles (10 portfolios each month) with clip of -2.5 to 2.5 for factor exposures
   Excel report Trends files
   16 Tiles (16 portfolios each month)with clip of -2.5 to 2.5 for factor exposure
   Excel reports Trends files
   Revised Cutoffs
   Excel report Trends file

The previous report using the percentile approach for winsorization and a clip interval of +-3 can be found here Link

10Tiles (10 portfolios each month) with clip of -2.5 to 2.5 for factor exposures

Excel report
Trends files



16 Tiles (16 portfolios each month)with clip of -2.5 to 2.5 for factor exposures

Excel report Trends files

Revised Cutoffs

Revised cutoffs
CO > 1.5
1.2<CO<1.5
.7<CO<1.2
0<CO<.7 (similarly on the negative side)

Excel report Trends files

Key Insights:

Winsorization with a clip of +-2.5 and +-3.0 produce similar outcomes.
The top quintile (16 tiles) portfolio demonstrates better results compared to 8 or 10 tiles.
With a cutoff of 1.5, the top portfolio may sometimes be empty if the constituent factor values are not greater than 1.5.