

Exceptional & Rich © BSE 30 Mcap Style Simulations

AlphaBlock's "open indexing" is a systematic, scientific, and replicable method grounded in mathematical innovation. This approach enables the construction of smart beta portfolios that are less concentrated, recover more quickly after market declines, and address the limitations of traditional indexing methods. The Exceptional & Rich (E&R) Indices Sandbox is a codebase that implements this methodology through three key steps. First, it downloads Yahoo EOD (end-of-day) closing price data. Second, it generates relative performance rankings, as detailed within the codebase. Third, it creates portfolios based on these rankings, which are then held without rebalancing for three predefined holding periods: one, two, and three years.

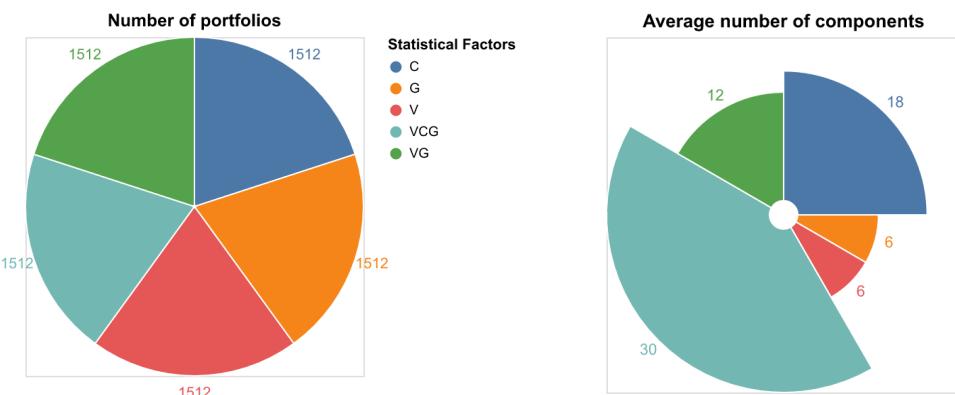
The method evaluates statistical factors using a ranking-based approach. These include Value (V), defined as rankings in the bottom quintile ($<=20$); Core (C), representing rankings in the middle quintiles (21-80); and Growth (G), defined as rankings in the top quintile ($>=80$). Portfolios generated include Value (V), Core (C), Growth (G), Value-Growth (VG), which combines the top and bottom quintiles, and All (VCG), which spans all quintiles. For the All (VCG) portfolios, an unequal weighting scheme is applied, with Value and Growth assigned 40% each and Core only 20%. Among these, the VCG portfolios demonstrate the lowest average tracking error, the highest average information ratio, and superior performance across multiple modern portfolio theory (MPT) statistics.

While the 3N methodology exhibits consistent behavior across various regions and asset classes, the performance of individual styles (V, C, G, VG, VCG) may vary based on factors such as the number of components, the simulation's starting point, macroeconomic conditions, and fundamental drivers. To enhance the process, AlphaBlock employs machine learning to explore diverse models and strategies, paving the way for next-generation asset allocation and absolute return strategies.

1. Input Data

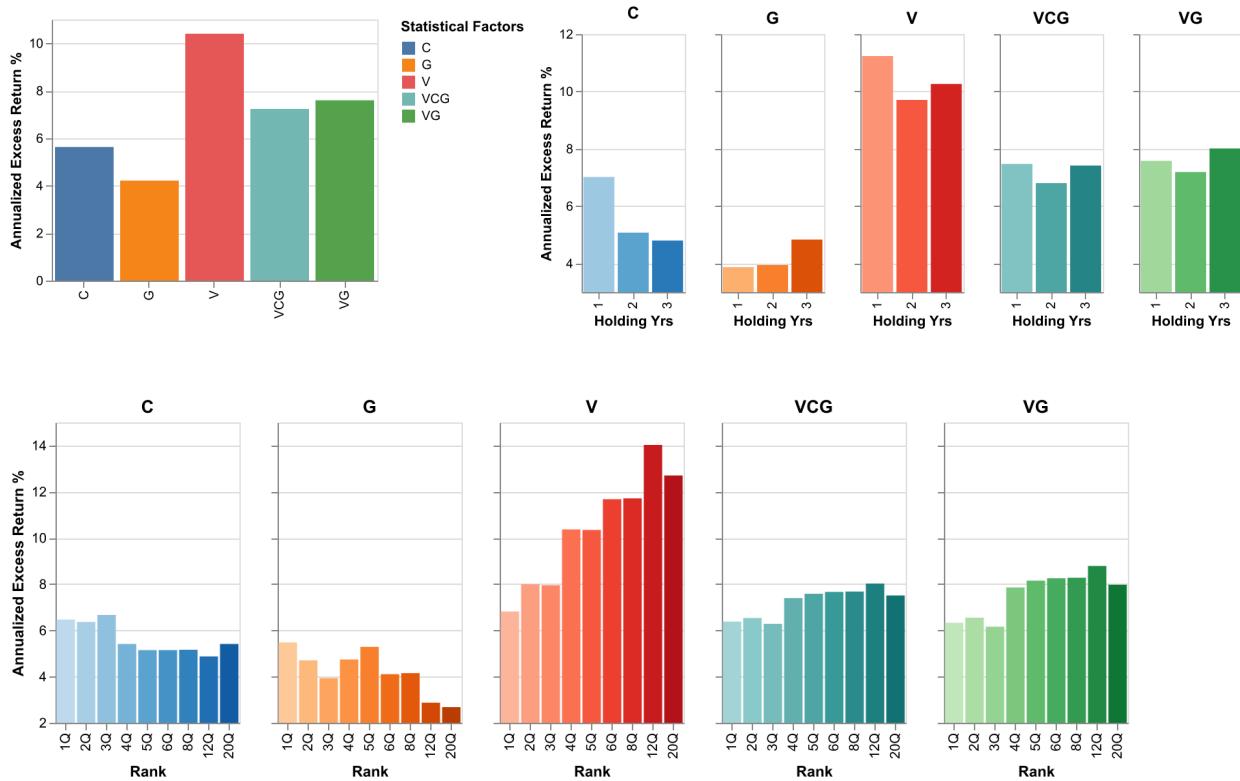
Input data defines the Exceptional & Rich Model, benchmark, inception point, number of components and the number of simulations run.

Group name	Benchmark	Total number of portfolios	Number of components	Portfolios starting year
Exceptional & Rich India 30 Mcap	S&P BSE Sensex	7560	30	2018



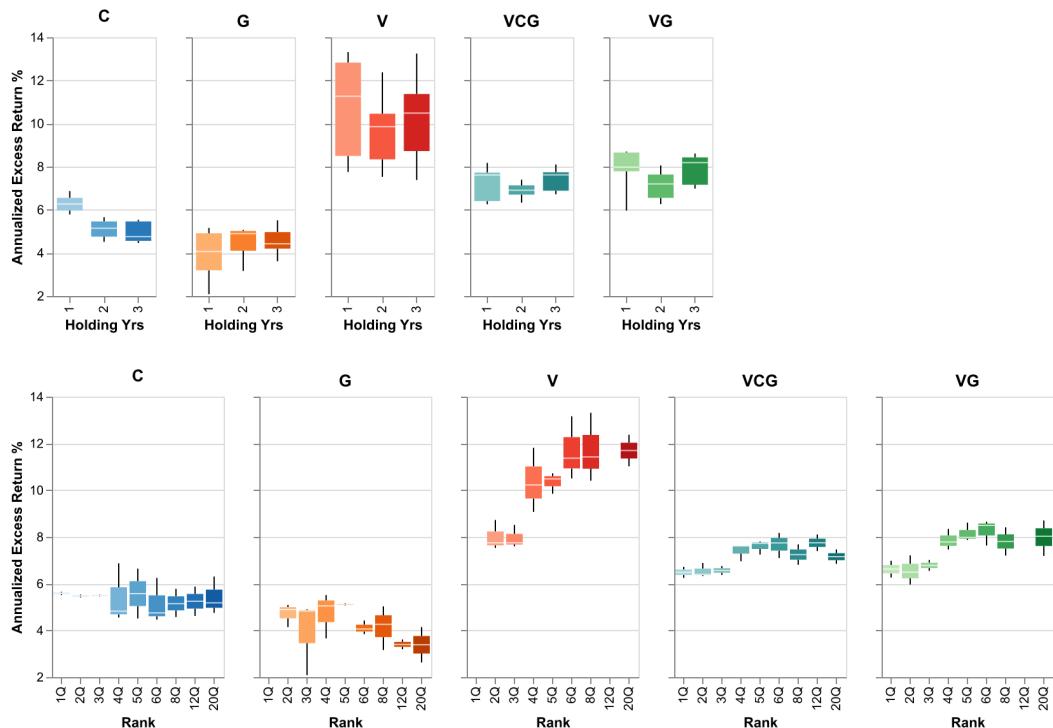
2. Average annualized excess returns histograms for various factors

The histogram illustrates the average annualized excess returns for the various statistical factors, across the three different holding periods and for the respective quarterly proxy ranking periods.



3. Quartile boxplots for annualized excess returns

The boxplots show minimum, first quartile, median, third quartile, and maximum annualized Excess Return for various statistical factors, for different holding periods, and for the respective quarterly proxy rankings. The outliers were removed from the data.

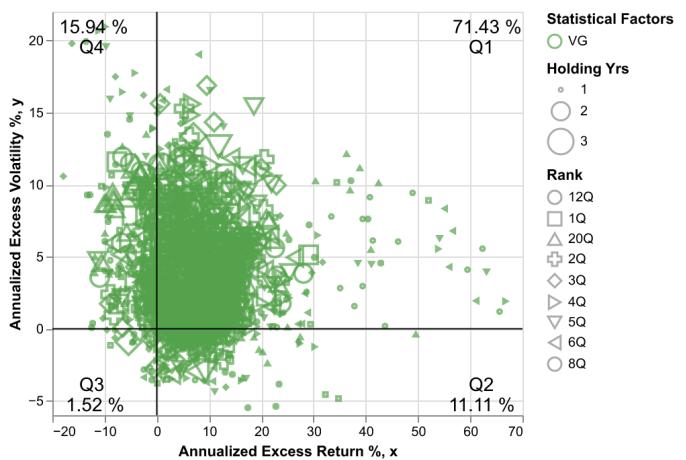
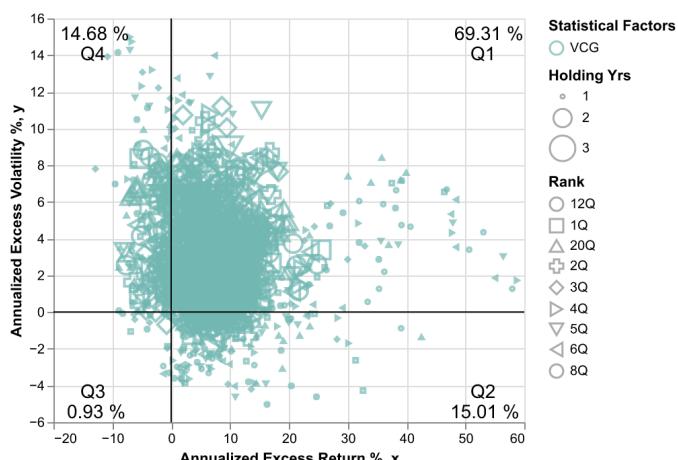
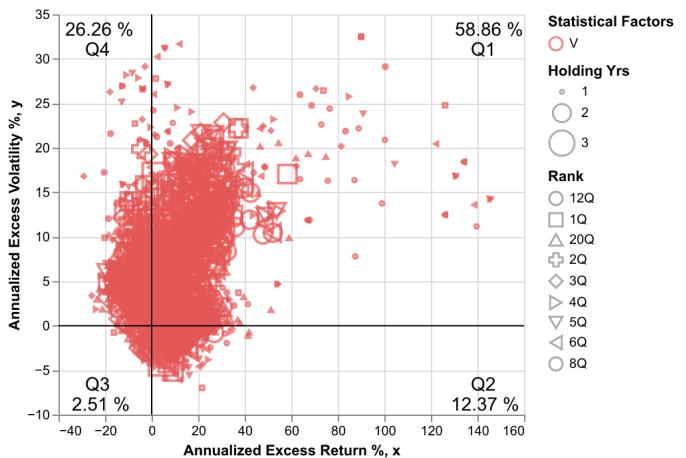
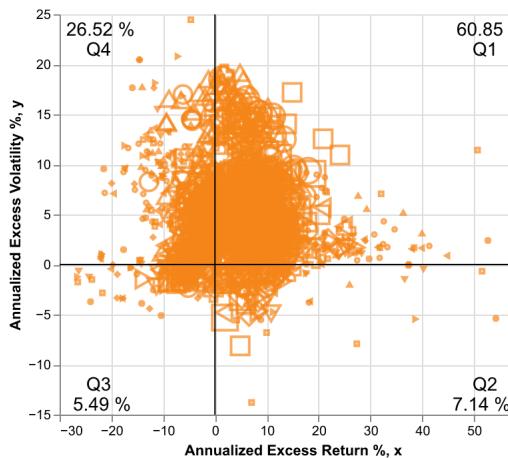
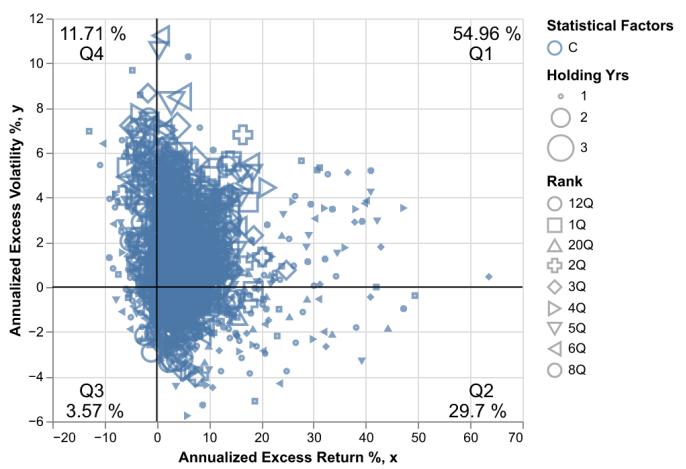
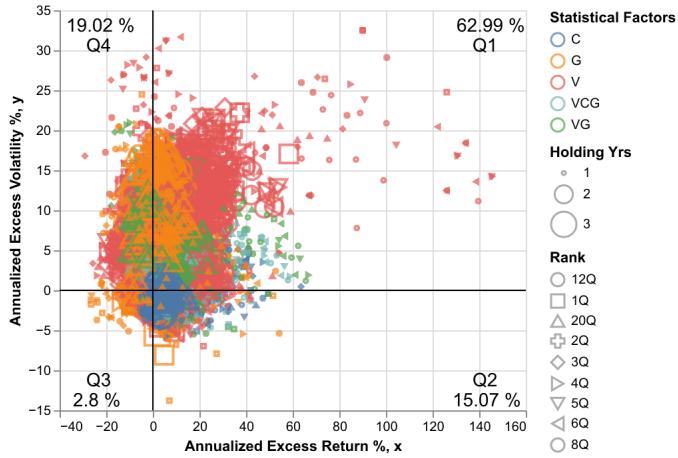


4. Cartesian plots for various statistical measures

The cartesian plots below illustrate annualized excess returns vs. annualized excess volatility, information ratio vs. annualized excess returns, annualized excess volatility vs. information ratio, alpha vs. beta and tracking error vs information ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

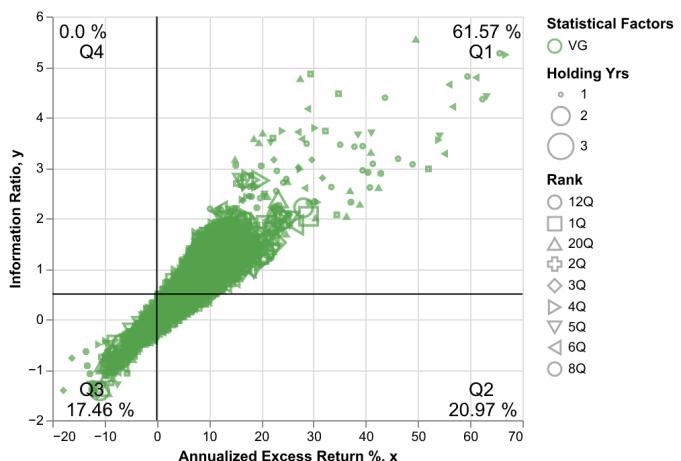
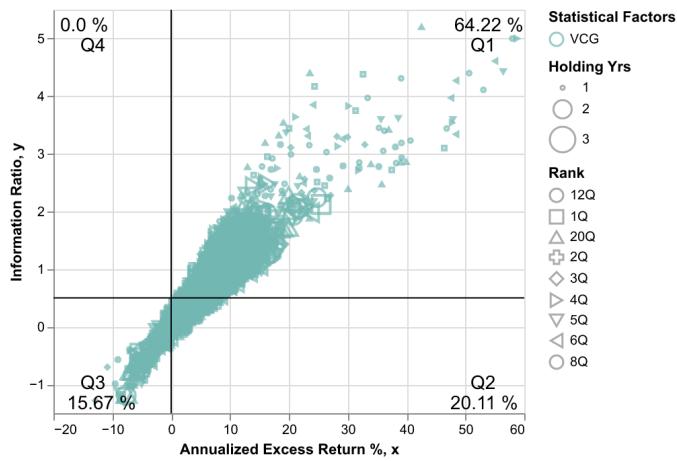
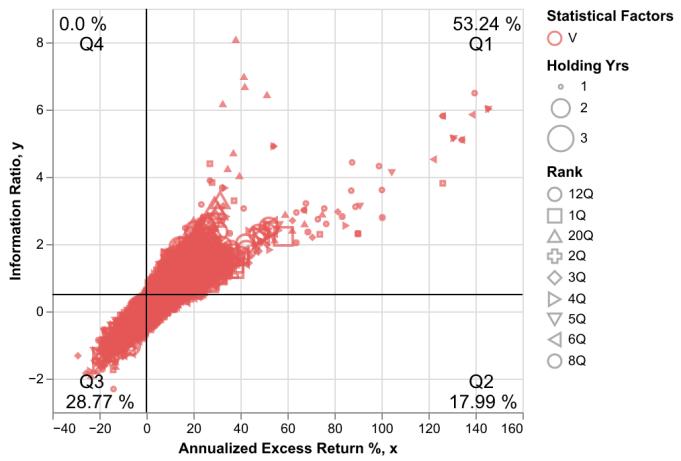
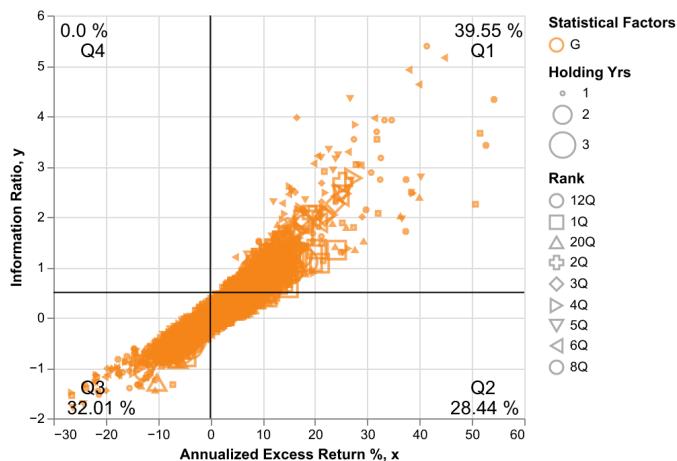
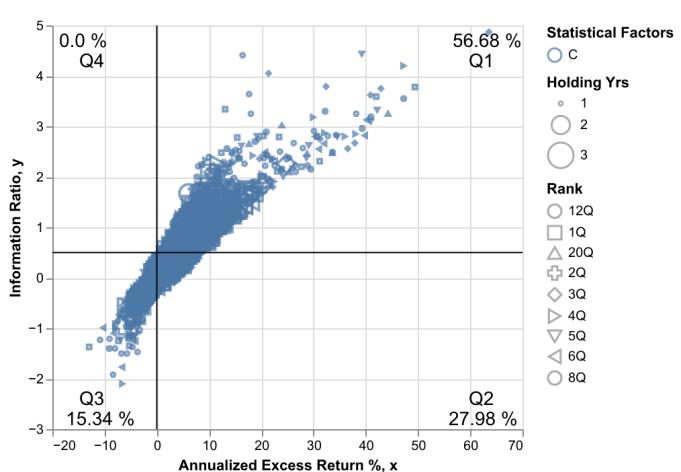
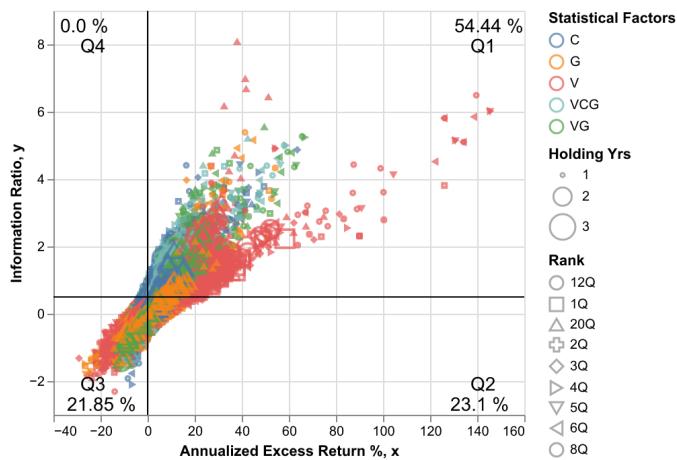
4.1. Annualized excess returns vs. annualized excess volatility

The cartesian chart of annualized excess return vs. annualized excess volatility plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.



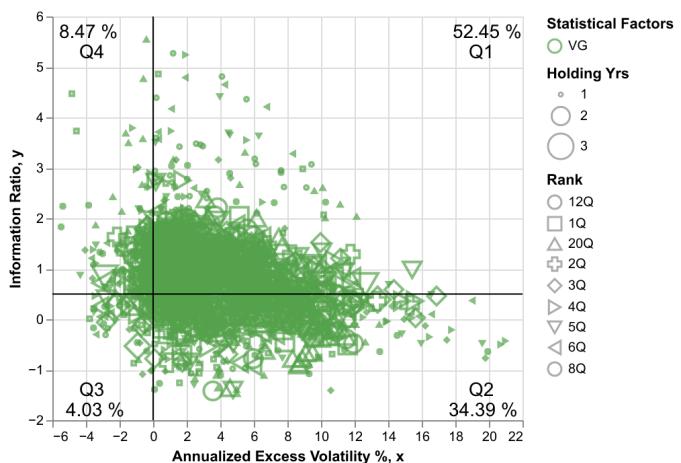
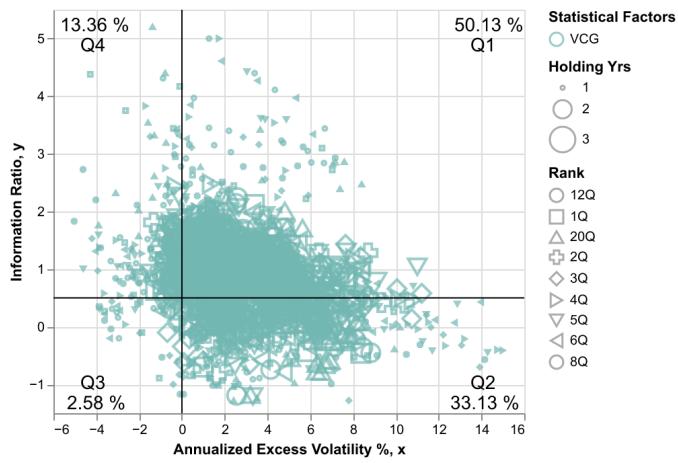
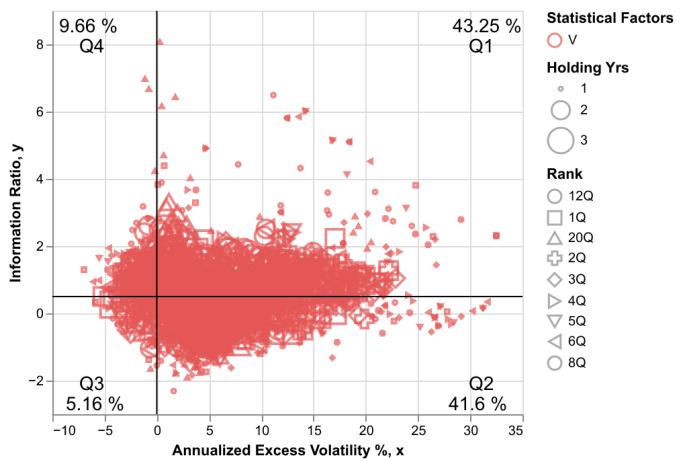
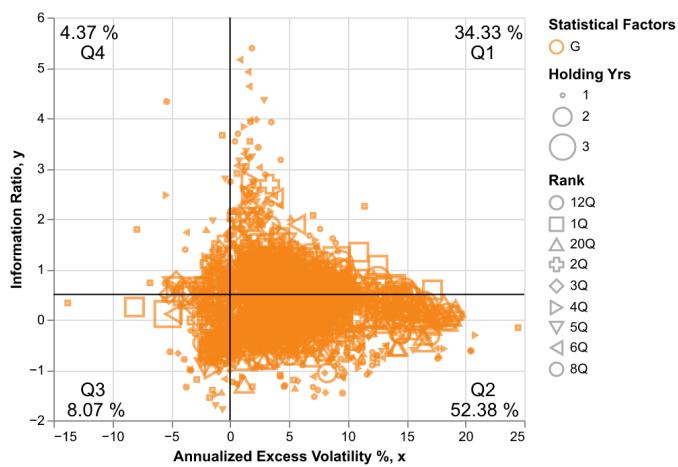
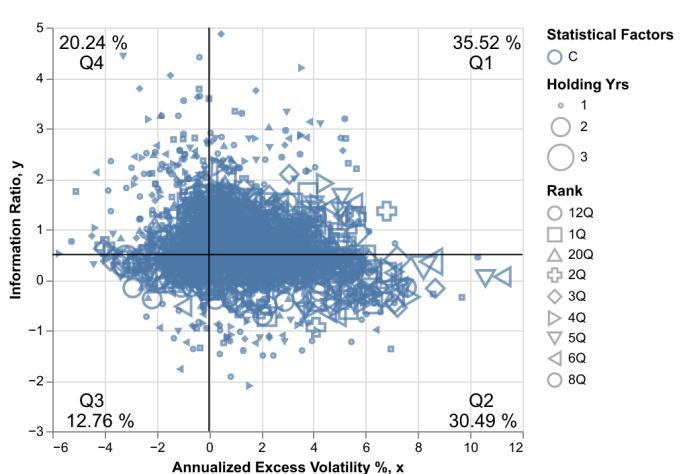
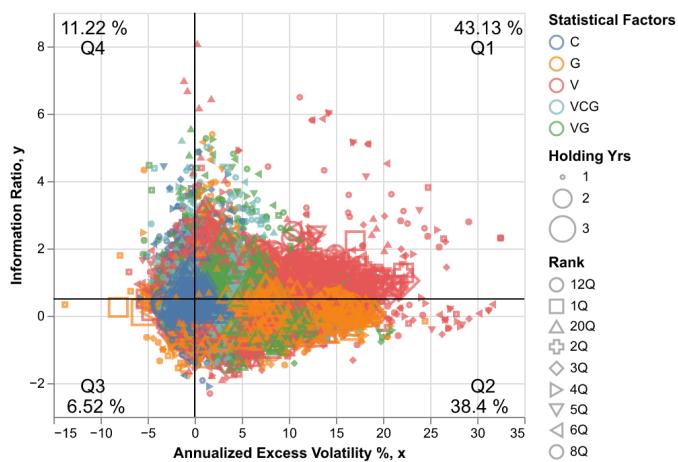
4.2. Annualized excess returns vs. Information ratio

The cartesian chart of annualized excess return vs. information ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.



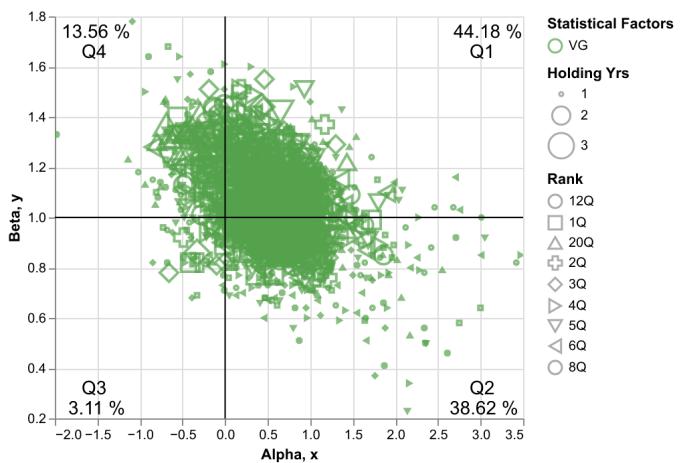
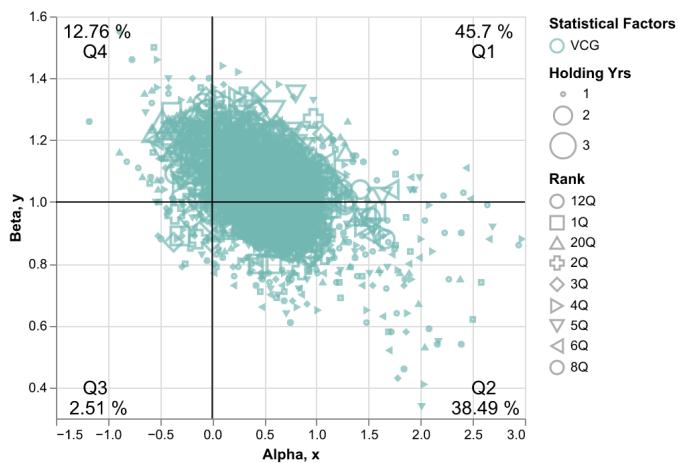
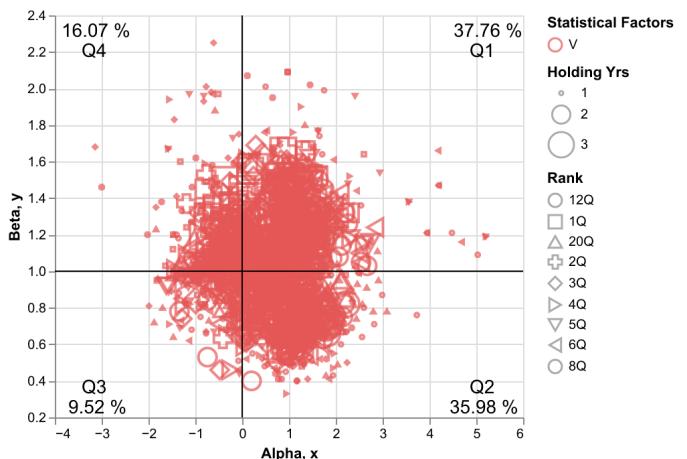
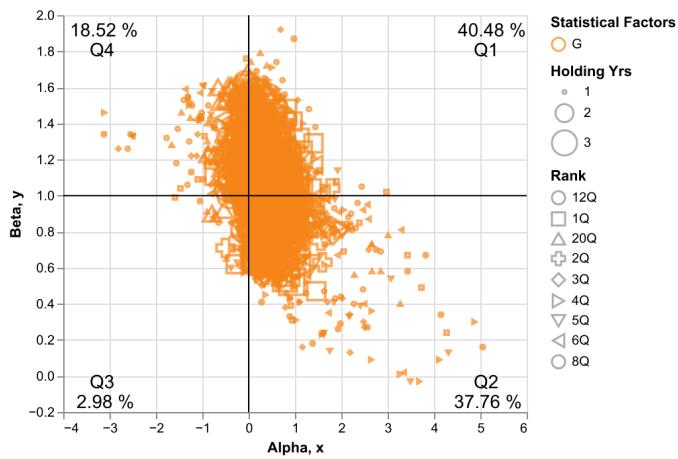
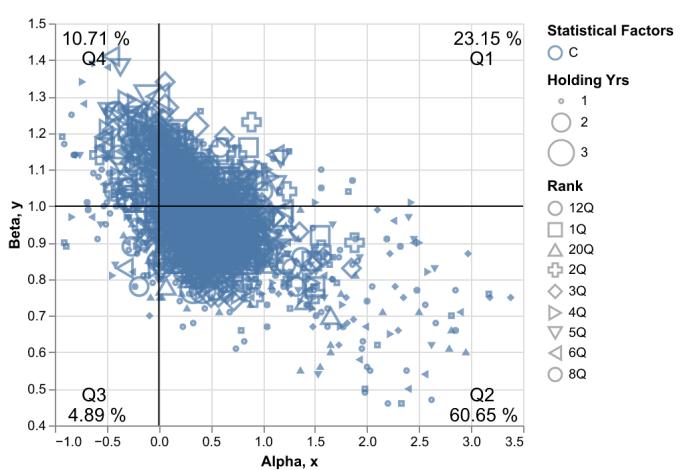
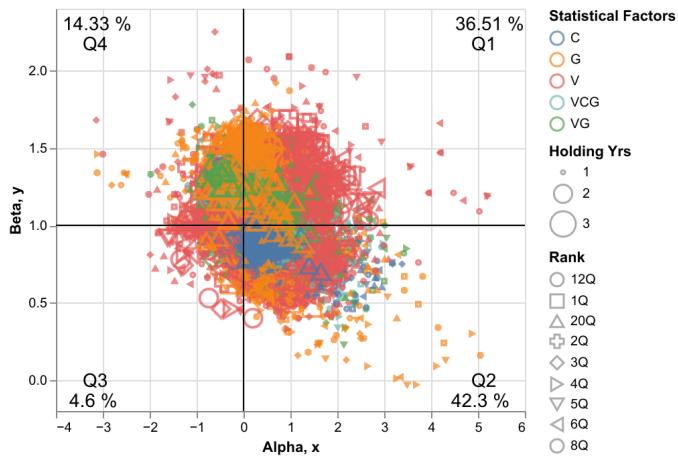
4.3. Annualized excess volatility vs. Information ratio

The cartesian chart of annualized excess volatility vs. information ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.



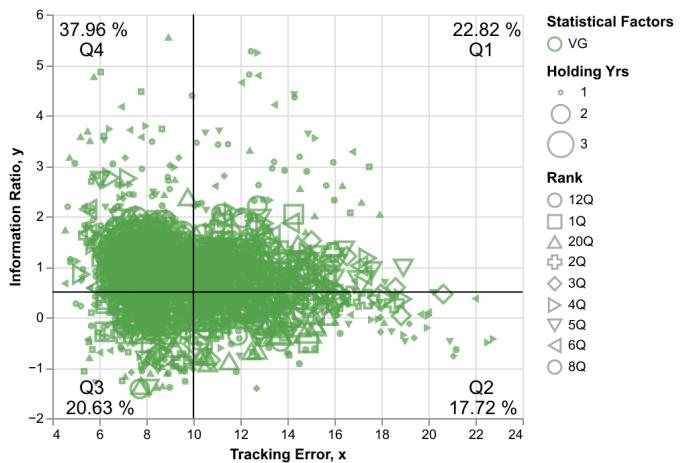
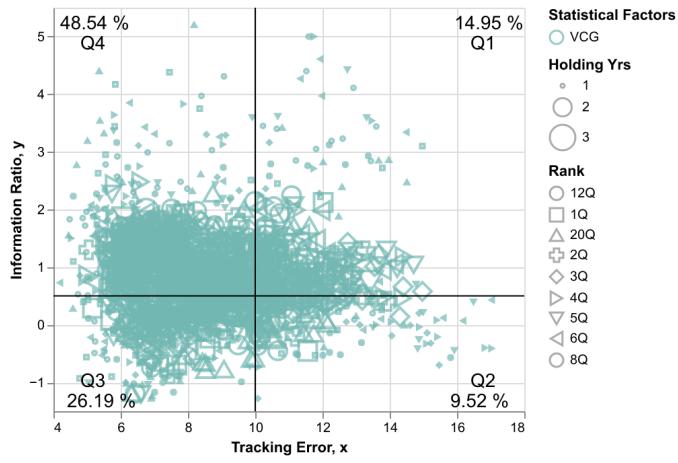
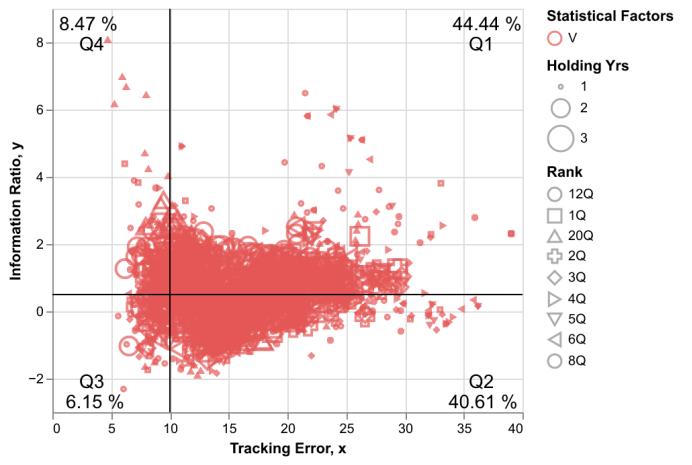
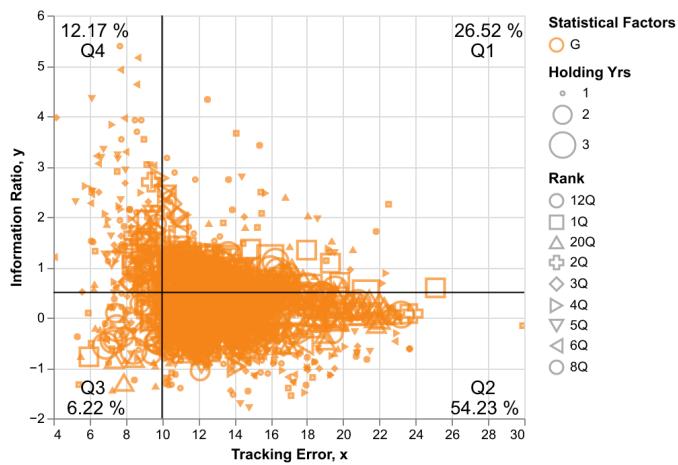
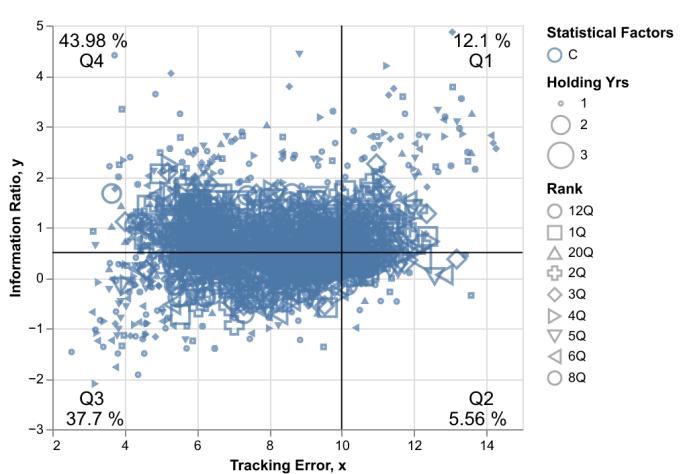
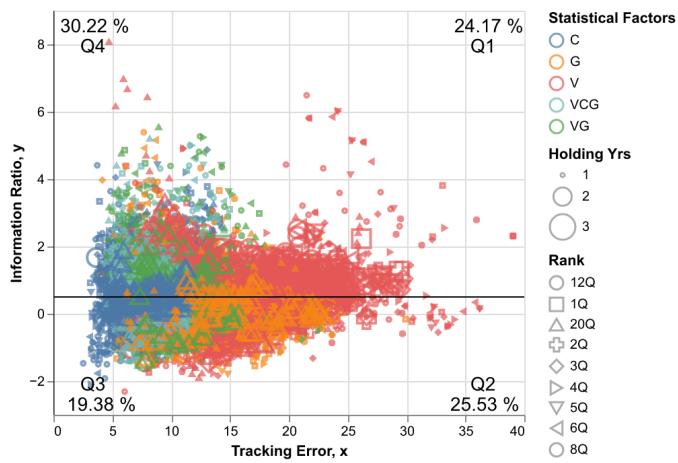
4.4. Alpha vs. Beta

The cartesian chart of alpha vs. beta plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.



4.5. Tracking error vs. Information ratio

The cartesian chart of tracking error vs. information ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.



4.6. Cartesian cluster analysis

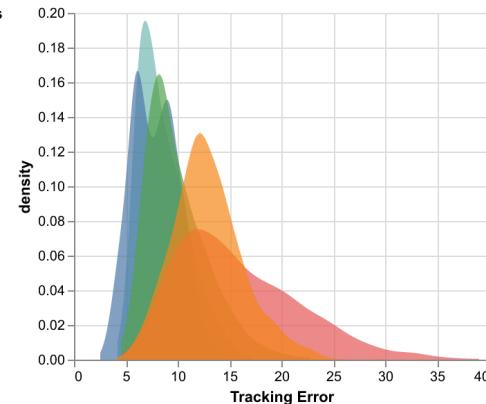
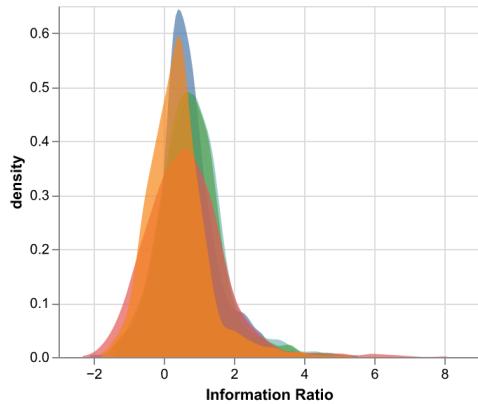
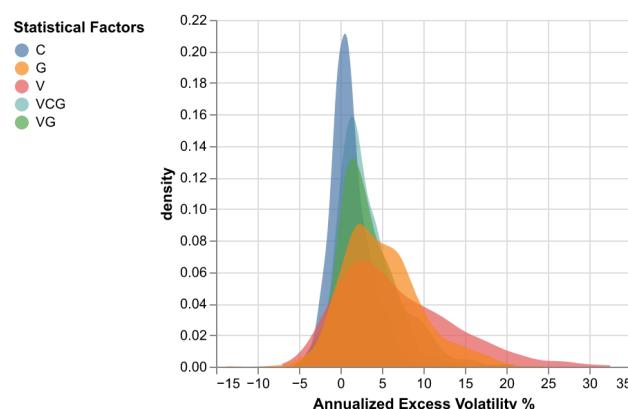
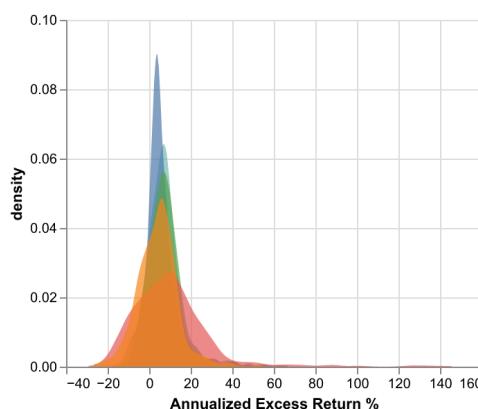
The table below carries the cluster analysis across four quadrants, highlighting positive and negative skew in the dataset, and risk-return characteristics of the various statistical factors. Overall, the VCG factor shows robustness across statistical metrics, while C and V statistical factors are with the most risk and skew.

Statistics	Statistical Factors	Q1	Q2	Q3	Q4	Q1+Q2	Q2+Q3	Q3+Q4	Q4+Q1	Q1+Q3	Q2+Q4
Annualized Excess Return % vs. Annualized Excess Volatility %	C	54.63 %	29.7 %	3.57 %	11.71 %	84.33%	33.27%	15.28%	66.34%	58.2%	41.41%
	G	60.85 %	7.14 %	5.49 %	26.52 %	67.99%	12.63%	32.01%	87.37%	66.34%	33.66%
	V	58.86 %	12.37 %	2.51 %	26.26 %	71.23%	14.88%	28.77%	85.12%	61.37%	38.63%
	VCG	69.25 %	15.01 %	0.93 %	14.68 %	84.26%	15.94%	15.61%	83.93%	70.18%	29.69%
	VG	71.36 %	11.11 %	1.52 %	15.94 %	82.47%	12.63%	17.46%	87.3%	72.88%	27.05%
Annualized Excess Return % vs. Information Ratio	C	56.08 %	27.98 %	15.34 %	0.0 %	84.06%	43.32%	15.34%	56.08%	71.42%	27.98%
	G	38.69 %	28.44 %	32.01 %	0.0 %	67.13%	60.45%	32.01%	38.69%	70.7%	28.44%
	V	52.91 %	17.99 %	28.77 %	0.0 %	70.9%	46.76%	28.77%	52.91%	81.68%	17.99%
	VCG	63.56 %	20.11 %	15.67 %	0.0 %	83.67%	35.78%	15.67%	63.56%	79.23%	20.11%
	VG	60.98 %	20.97 %	17.46 %	0.0 %	81.95%	38.43%	17.46%	60.98%	78.44%	20.97%
Annualized Excess Volatility % vs. Information Ratio	C	35.52 %	30.49 %	12.76 %	20.24 %	66.01%	43.25%	33.0%	55.76%	48.28%	50.73%
	G	34.33 %	52.38 %	8.07 %	4.37 %	86.71%	60.45%	12.44%	38.7%	42.4%	56.75%
	V	43.25 %	41.6 %	5.16 %	9.66 %	84.85%	46.76%	14.82%	52.91%	48.41%	51.26%
	VCG	50.13 %	33.13 %	2.58 %	13.36 %	83.26%	35.71%	15.94%	63.49%	52.71%	46.49%
	VG	52.45 %	34.39 %	4.03 %	8.47 %	86.84%	38.42%	12.5%	60.92%	56.48%	42.86%
Alpha vs. Beta	C	21.16 %	60.65 %	4.89 %	10.71 %	81.81%	65.54%	15.6%	31.87%	26.05%	71.36%
	G	39.42 %	37.76 %	2.98 %	18.52 %	77.18%	40.74%	21.5%	57.94%	42.4%	56.28%
	V	36.51 %	35.98 %	9.52 %	16.07 %	72.49%	45.5%	25.59%	52.58%	46.03%	52.05%
	VCG	43.39 %	38.49 %	2.51 %	12.76 %	81.88%	41.0%	15.27%	56.15%	45.9%	51.25%
	VG	42.06 %	38.62 %	3.11 %	13.56 %	80.68%	41.73%	16.67%	55.62%	45.17%	52.18%
Tracking Error vs. Information Ratio	C	12.1 %	5.56 %	37.7 %	43.98 %	17.66%	43.26%	81.68%	56.08%	49.8%	49.54%
	G	26.52 %	54.23 %	6.22 %	12.17 %	80.75%	60.45%	18.39%	38.69%	32.74%	66.4%
	V	44.44 %	40.61 %	6.15 %	8.47 %	85.05%	46.76%	14.62%	52.91%	50.59%	49.08%
	VCG	14.95 %	9.52 %	26.19 %	48.54 %	24.47%	35.71%	74.73%	63.49%	41.14%	58.06%
	VG	22.82 %	17.72 %	20.63 %	37.96 %	40.54%	38.35%	58.59%	60.78%	43.45%	55.68%

5. Statistical distributions

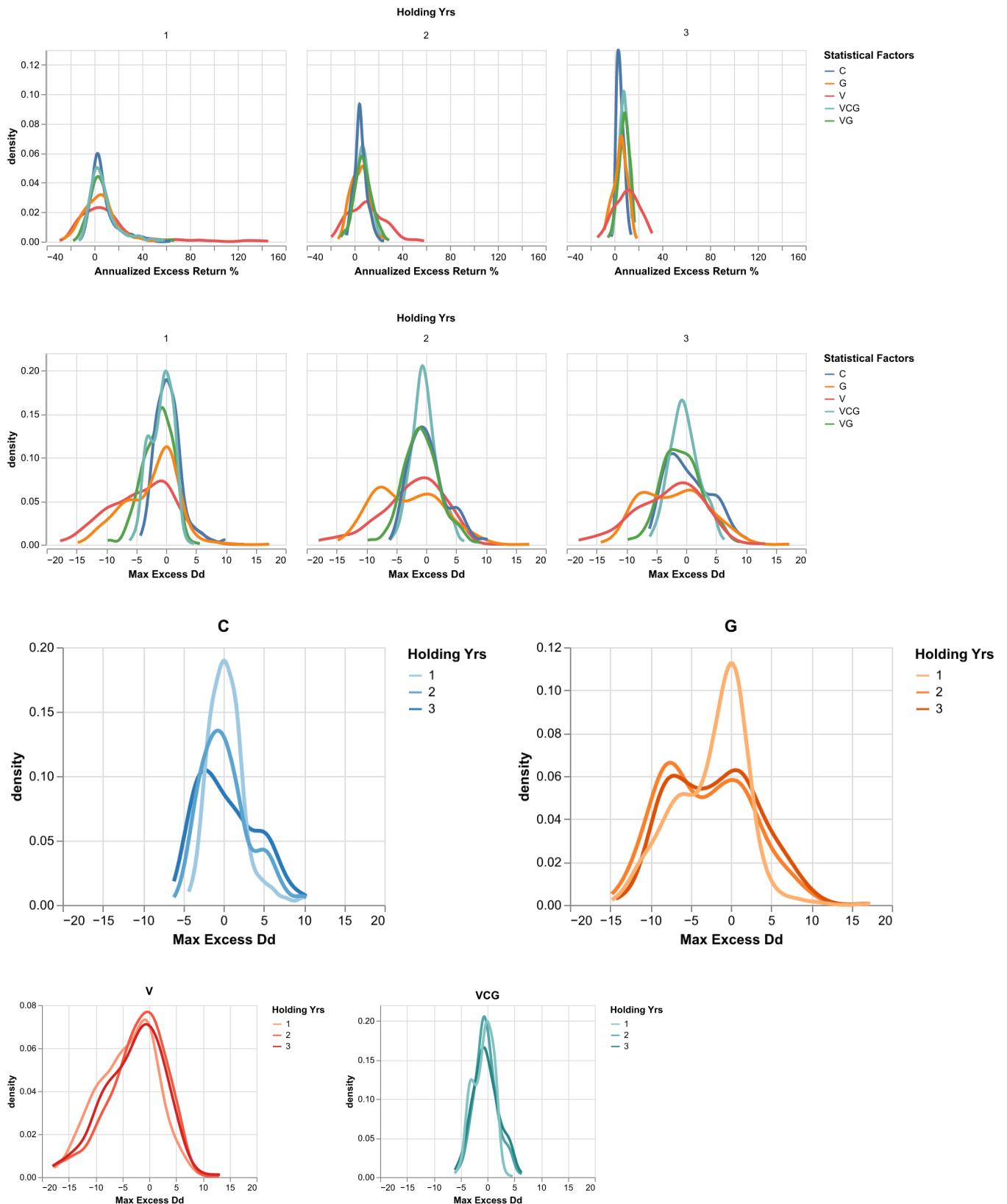
5.1. Area charts

The area charts below showcase the distribution of annualized excess return, annualized excess volatility and information ratio across various statistical factors.



5.2. Line charts

The line charts below showcase the annualized excess return distribution for each holding periods, max excess drawdown distribution for each holding periods and max excess drawdown distribution for each statistical factor. Max excess drawdown represents the difference between portfolio max drawdown and benchmark max drawdown.



6. Modern portfolio theory (MPT) statistics

The table of averaged MPT statistics for each statistical factor and holding periods without outliers.

(**AR** - Annualized Excess Returns, **AV** - Annualized Excess Volatility, **TE** - Tracking Error, **IR** - Information Ratio, **Max Excess Dd** - Maximum Excess Drawdown)

Statistical Factors	Holding Yrs	AR	AV	TE	IR	Alpha	Beta	Max Excess Dd
C	1Y	6.28	0.45	6.97	0.73	0.54	0.92	0.28
C	2Y	5.07	1.36	8.01	0.63	0.42	0.97	0.28
C	3Y	4.97	1.53	8.59	0.59	0.41	0.98	0.47
G	1Y	3.87	4.44	12.34	0.46	0.56	1.01	-2.47
G	2Y	4.49	4.54	12.69	0.4	0.44	1.05	-2.43
G	3Y	4.55	5.56	13.73	0.33	0.37	1.07	-2.24
V	1Y	10.75	7.18	16.05	0.57	0.5	1.03	-4.45
V	2Y	9.62	6.48	15.89	0.58	0.63	1.03	-2.45
V	3Y	10.26	6.97	16.03	0.66	0.73	1.08	-2.94
VCG	1Y	7.23	2.29	8.48	0.85	0.56	0.98	-0.83
VCG	2Y	6.88	2.78	8.51	0.8	0.49	1.03	-0.26
VCG	3Y	7.42	3.04	8.79	0.88	0.52	1.06	-0.26
VG	1Y	7.81	3.47	10.01	0.83	0.57	1.01	-1.48
VG	2Y	7.19	3.6	9.9	0.73	0.51	1.05	-0.81
VG	3Y	7.88	3.88	10.24	0.82	0.56	1.07	-0.7

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