Exceptional & Rich ® Indonesia 30 Factor Simulations

Sandbox

AlphaBlock's "open indexing" is a systematic, scientific, and replicable method, which is based on a mathematical innovation [1][2][3][4][5][6][7][8][9][10] that allows for the construction of smart beta portfolios that are less concentrated, recover faster after a market fall and improve on the limitations of the current indexing methods [11][12][13]. The Exceptional & Rich [E&R] Indices Sandbox is a codebase that executes the following three steps. First; downloads yahoo EOD [end of day] closing price data. Second; generates relative performance rankings [detailed in the codebase]. Third; creates portfolios using these rankings. The portfolios are not rebalanced and are held for 3 holding periods [1, 2, and 3 years].

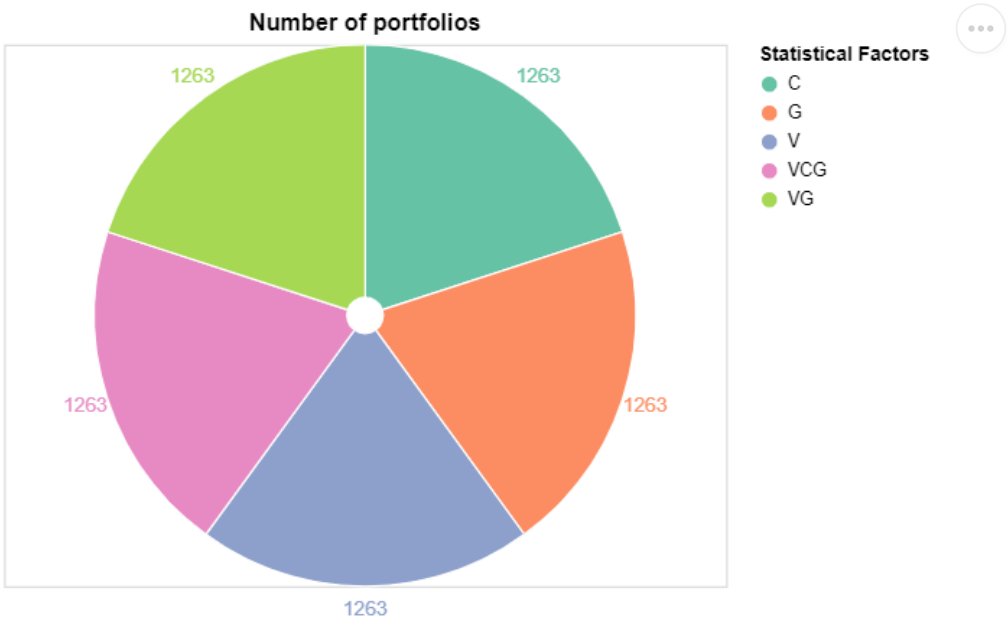
The method tests the following statistical factors. Value - if ranking is equal or below 20 i.e. bottom quintile [V]. Core - if ranking is between 20 and 80 i.e. rest quintiles ignoring top and bottom quintile [C]. Growth - if ranking is equal or above 80 i.e. top quintile [G]. The following types of portfolios are generated: Value [V], Core [C], Growth [G], Value Growth i.e. top and bottom quintile [VG], All quintiles [VCG]. Based on this data the following files are created: Summary Table, Index Drawdown, Index Draw Down Curve plot, and Daily Return. If the input type is All (VCG) the code will generate an unequal weighted portfolio with value and growth having 40% each and core only 20%. All other types of portfolios are equal weighted.

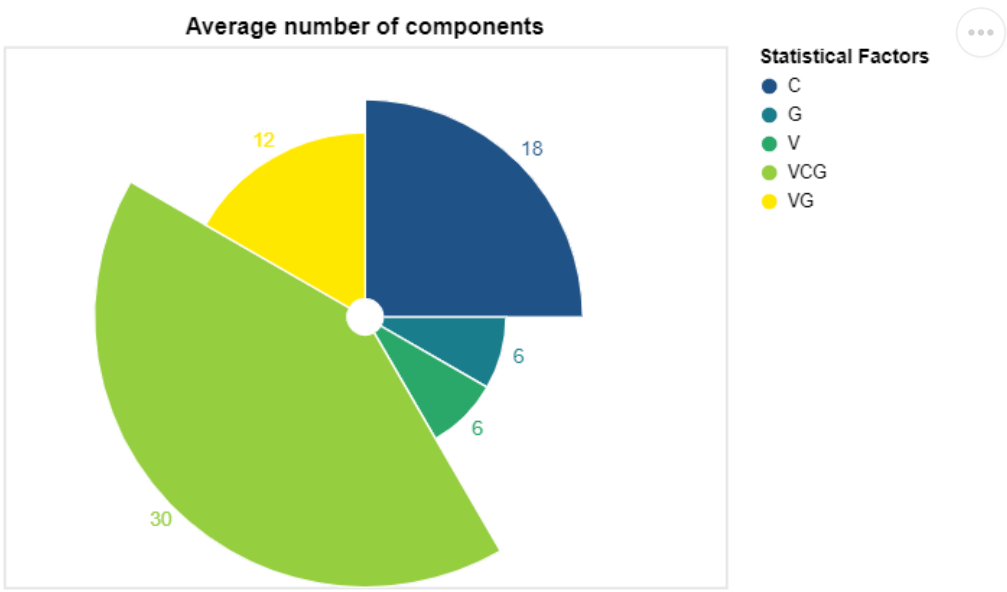
Exceptional & Rich Indonesia 30 consists of the 30 large cap equity in Indonesia. The sandbox studies the following factor portfolios with their respective number of components. The VCG 30, G 6, V 6, VG 12, and C 18. The benchmark for the group is Jakarta Composite Index. 7740 simulations were run. On average, the factor models delivered an annualized excess return up to 20% for the study period of 6 years since 2016. G 6 was the top performer across different periods and rankings. G, VCG, and VG had the highest Annualized Excess Returns and highest Information Ratios among the five factors with Tracking Errors in the range of 12% to 22%. VCG and C had the least Tracking Error, while V 6 had the least Information Ratio among all the factors. The sandbox continued to highlight the poor performance of Value [V], the neutrality of Core [C], and the superior risk-return tradeoff with Growth [G], Value Growth [VG], and the Value Core Growth [VCG] method. The VCG had the highest number of components among all the factors and hence was the best overall factor model to compare with the benchmark.

1: Input Data

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

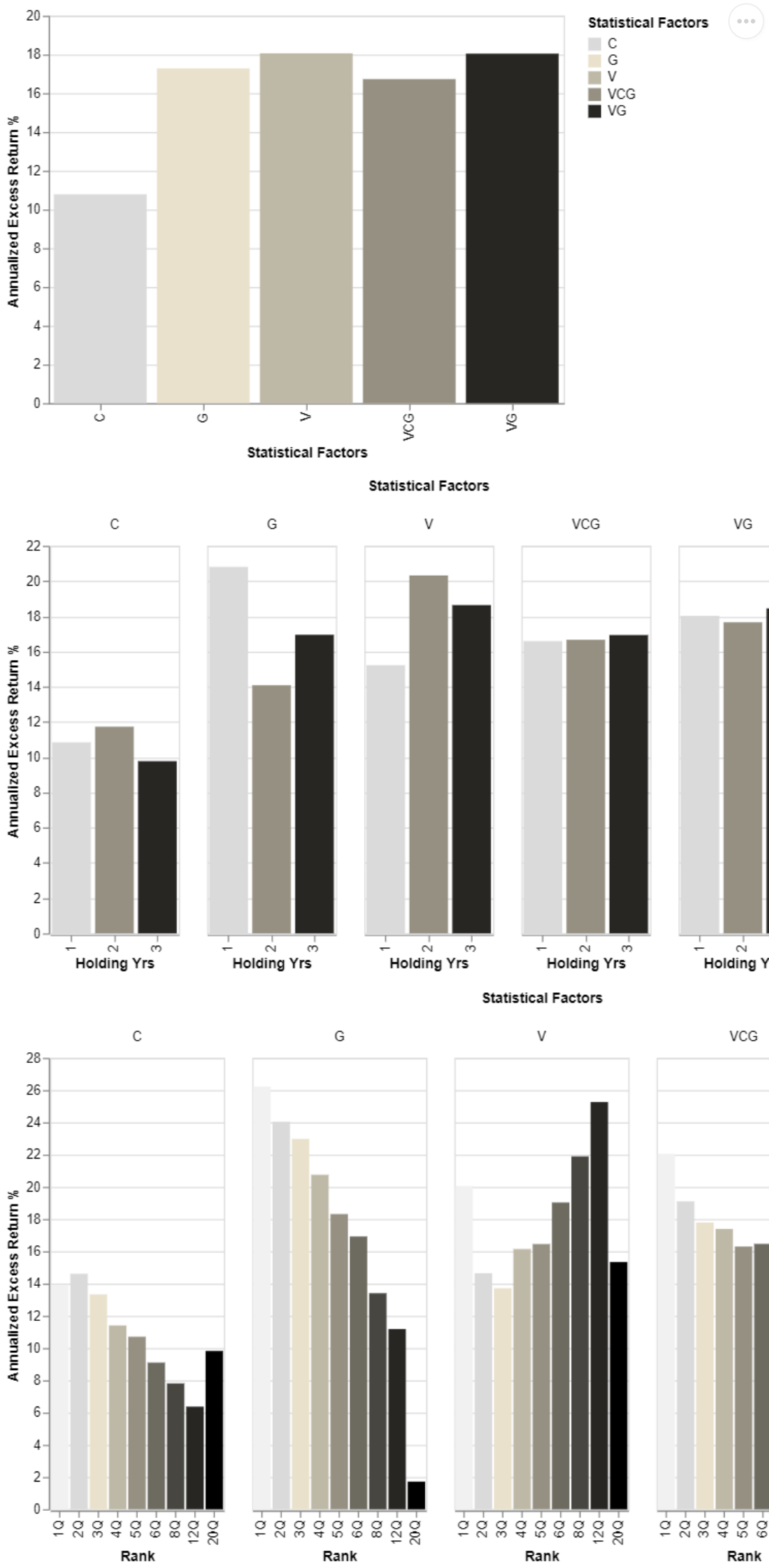
Group name	Benchmark	Total number of portfolios	Number of components	Portfolios starting year
Exceptional & Rich Indonesia 30	Jakarta Composite Index	6315	30	2016





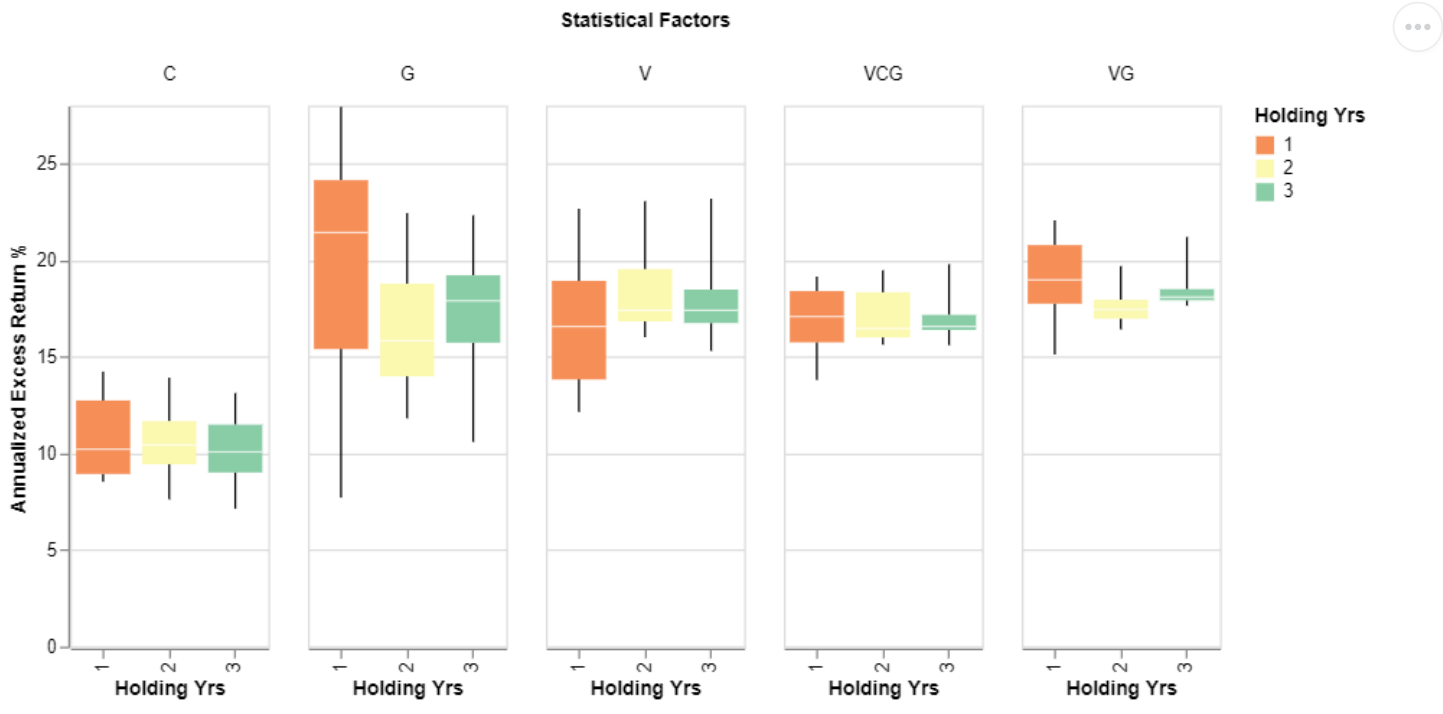
2: Average Annualized Excess Return Histograms for Various Factors

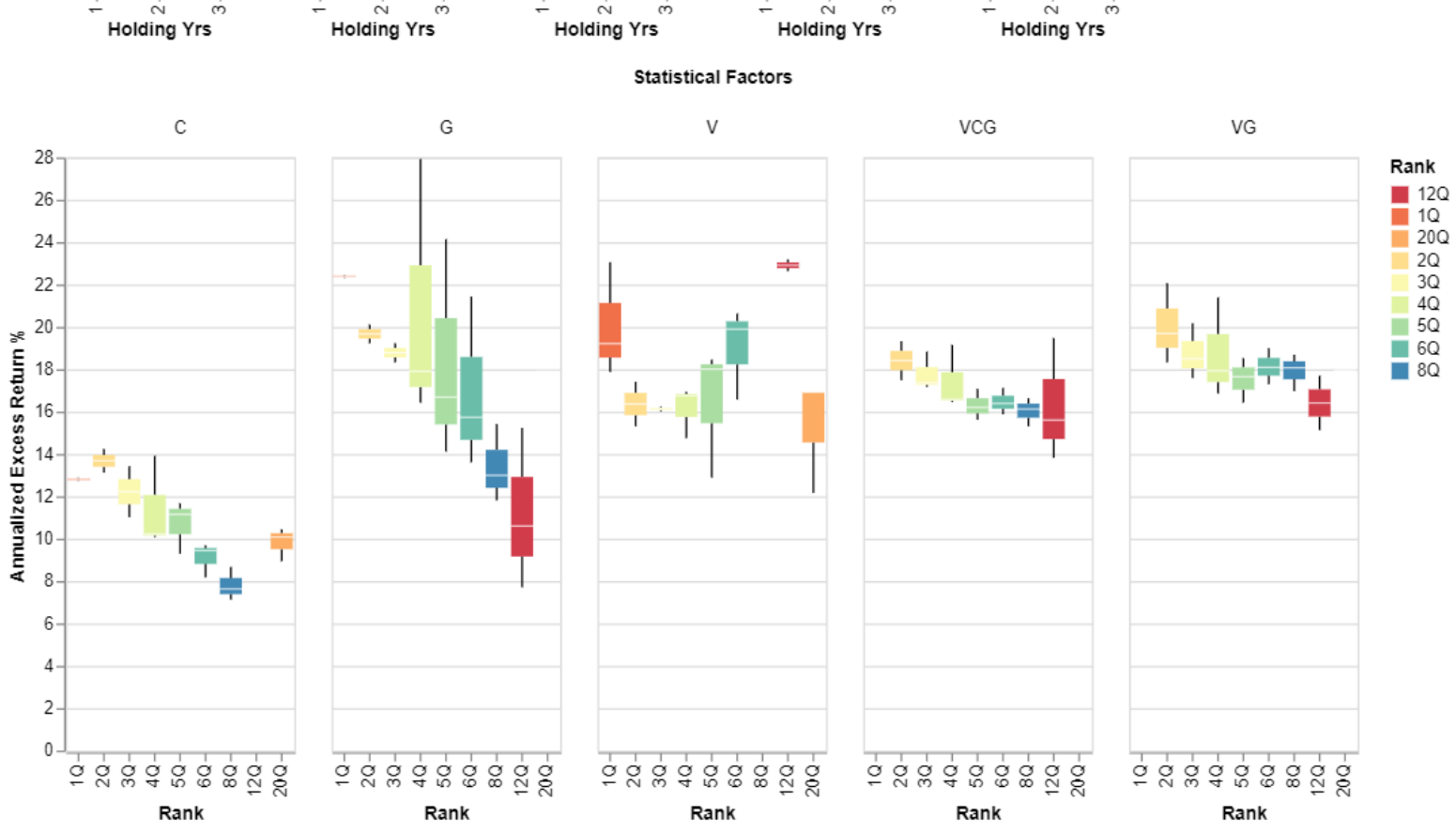
The histogram illustrates the average Annualized Excess Returns for the various statistical factors, across the three different holding periods and for the respective quarterly proxy ranking periods.



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.





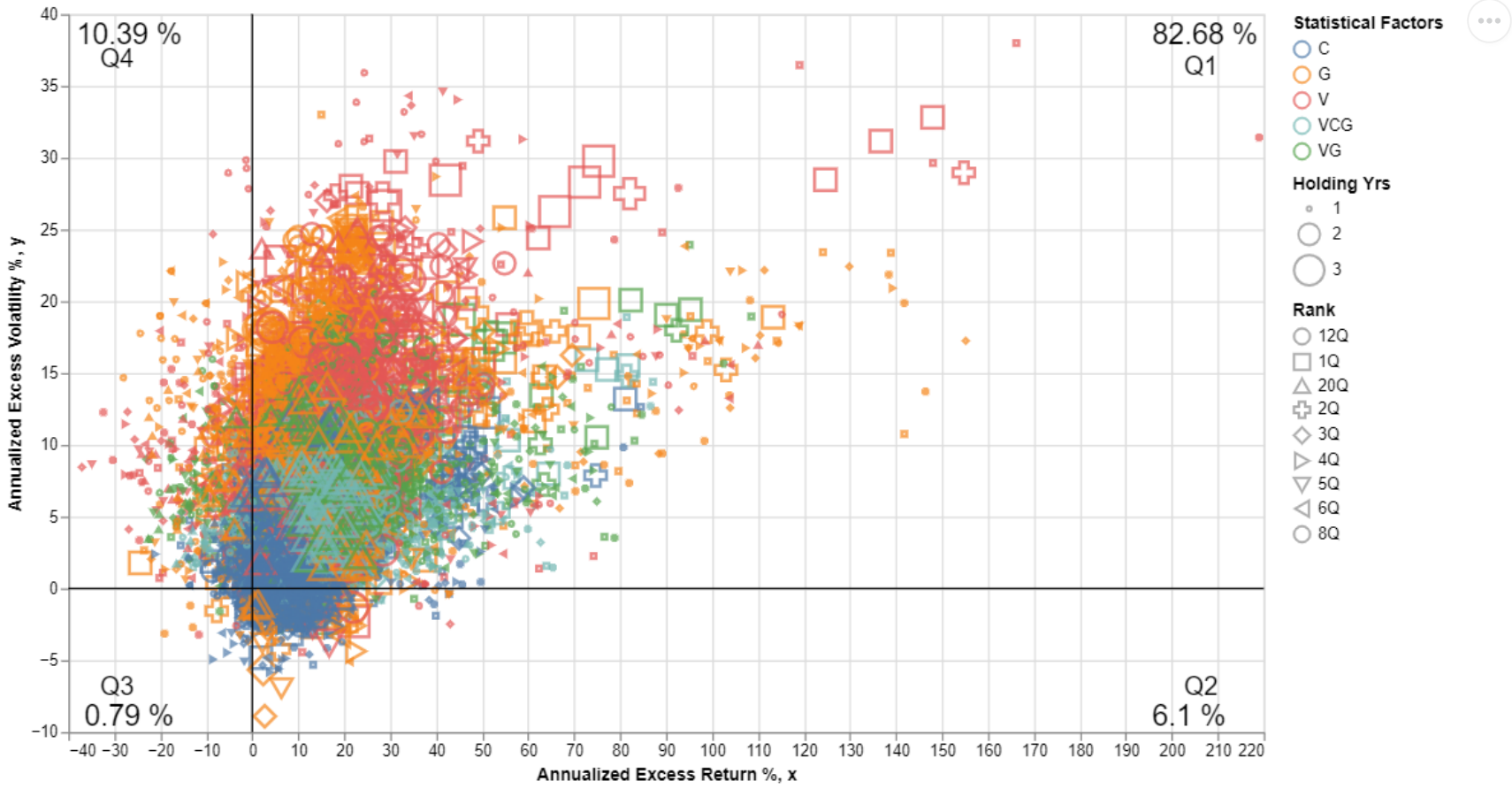
4: Cartesian Plots for various Statistical Measures

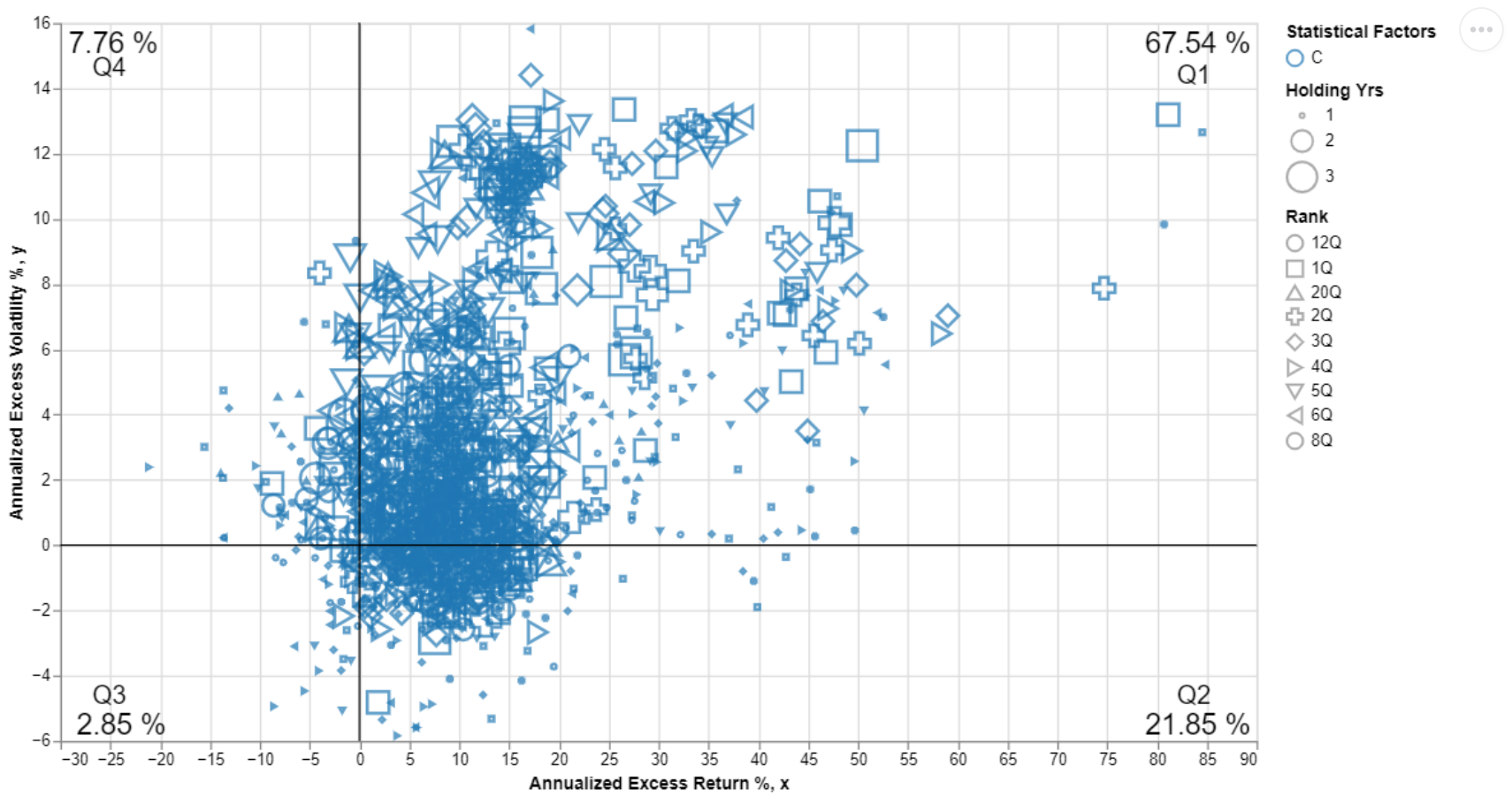
The Cartesian plots below illustrate Annualized Excess Returns vs. Annualized Excess Volatility, Information Ratio vs. Annualized Excess Returns, Annualized Excess Volatility vs. Information Ratio, Alpha vs. Beta and Tracking Error vs Information Ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

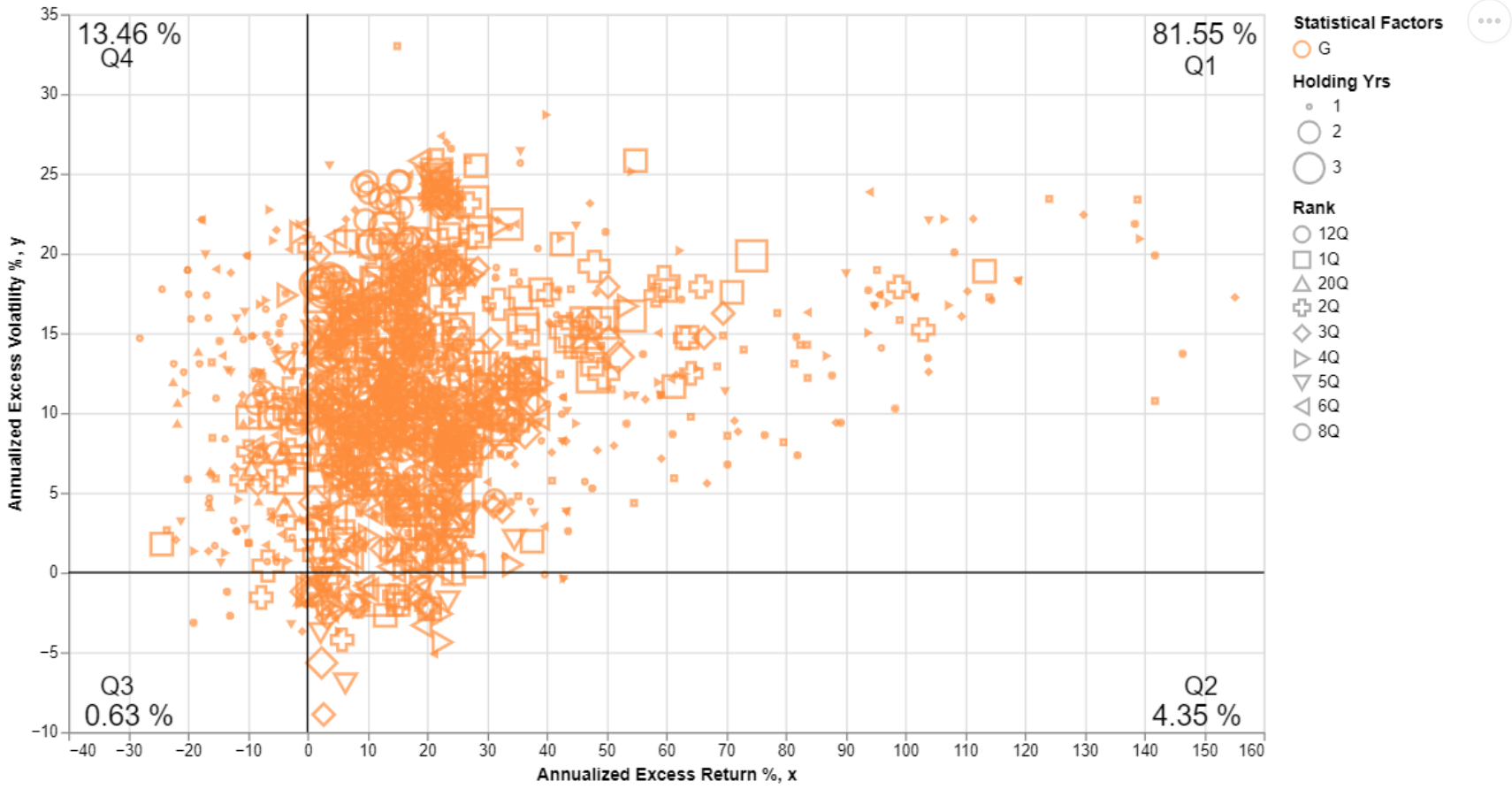
4.1: Annualized Excess Return vs. Annualized Excess Volatility

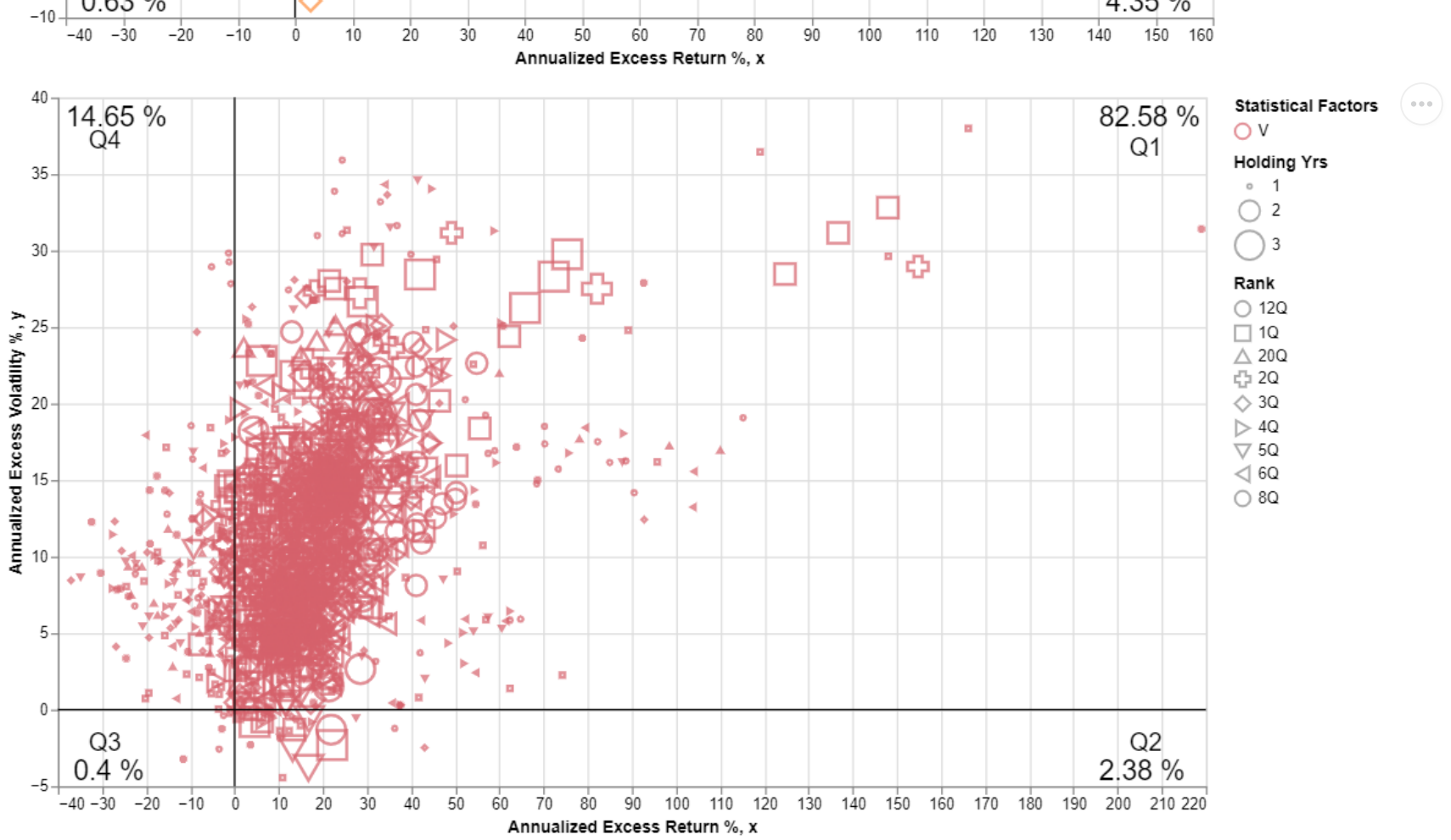
The Cartesian chart of Annualized Excess Return vs. Annualized Excess Volatility plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

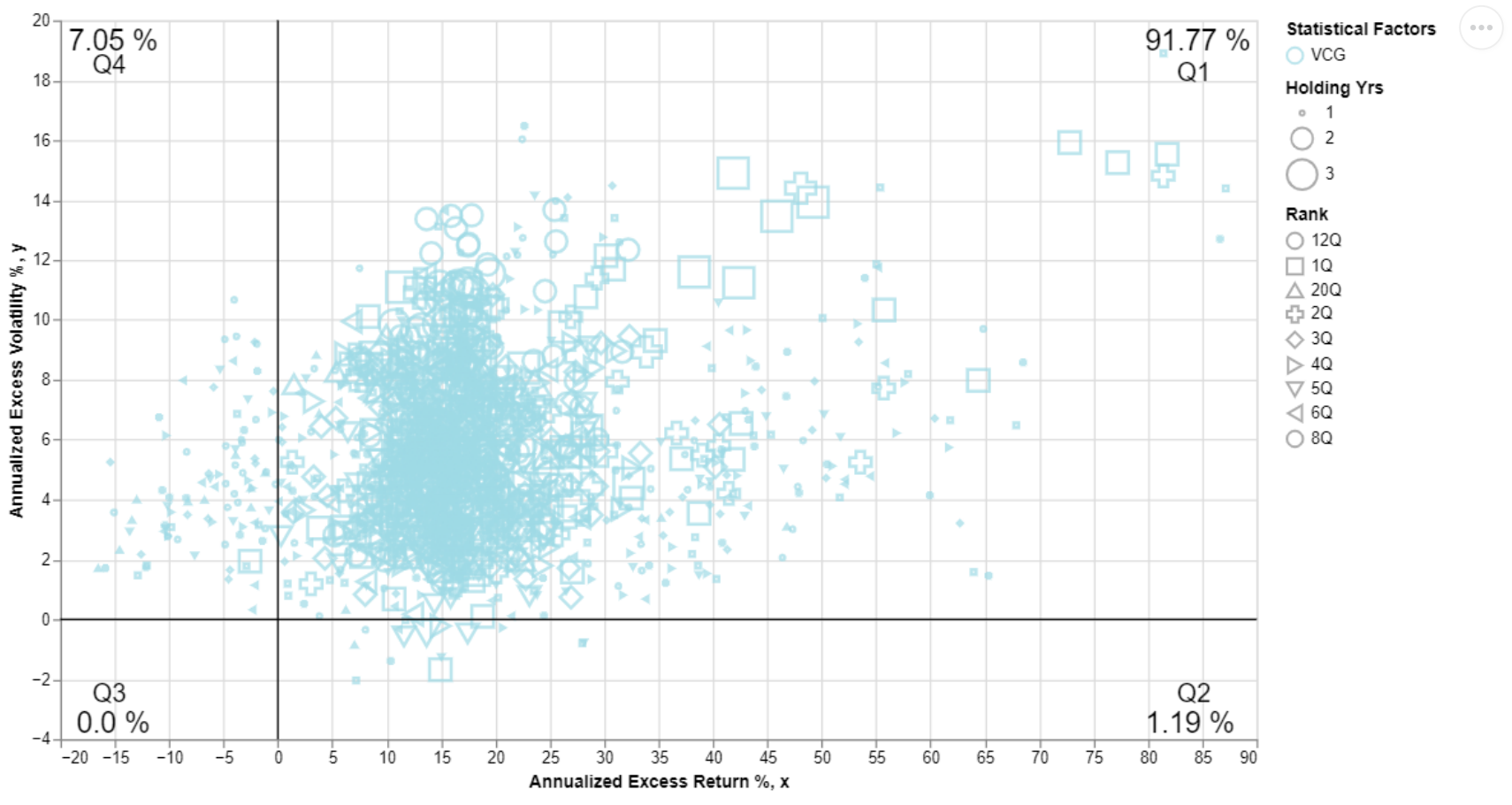
Out[169...

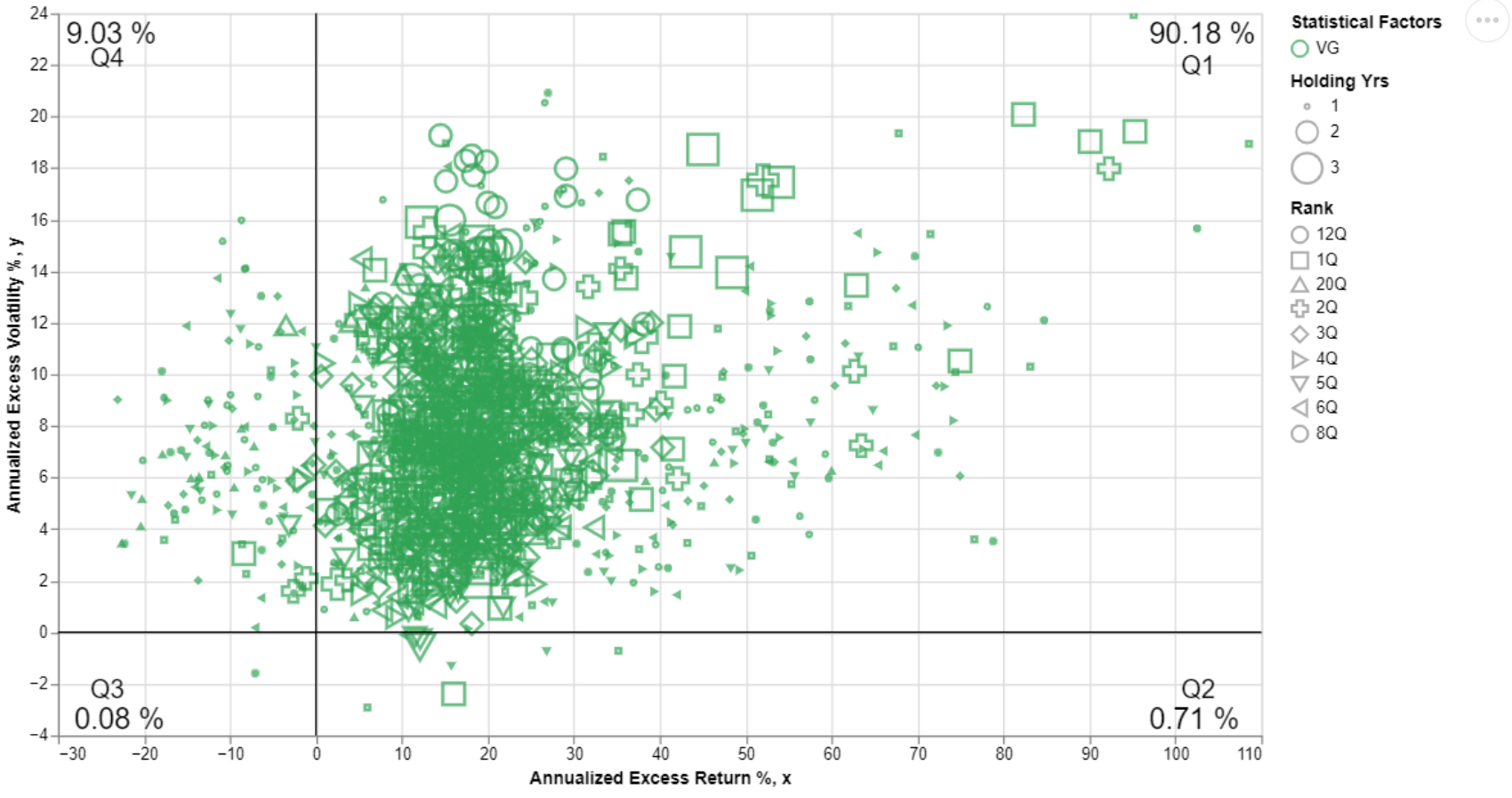





13.46 %
Q4
81.55 %
Q1
Q3
0.63 %
Q2
4.35 %
Annualized Excess Volatility %, y
Annualized Excess Return %, x
Statistical Factors
G
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q


14.65 %
Q4
82.58 %
Q1
Q3
0.4 %
Q2
2.38 %
Annualized Excess Volatility %, y
Annualized Excess Return %, x
Statistical Factors
V
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

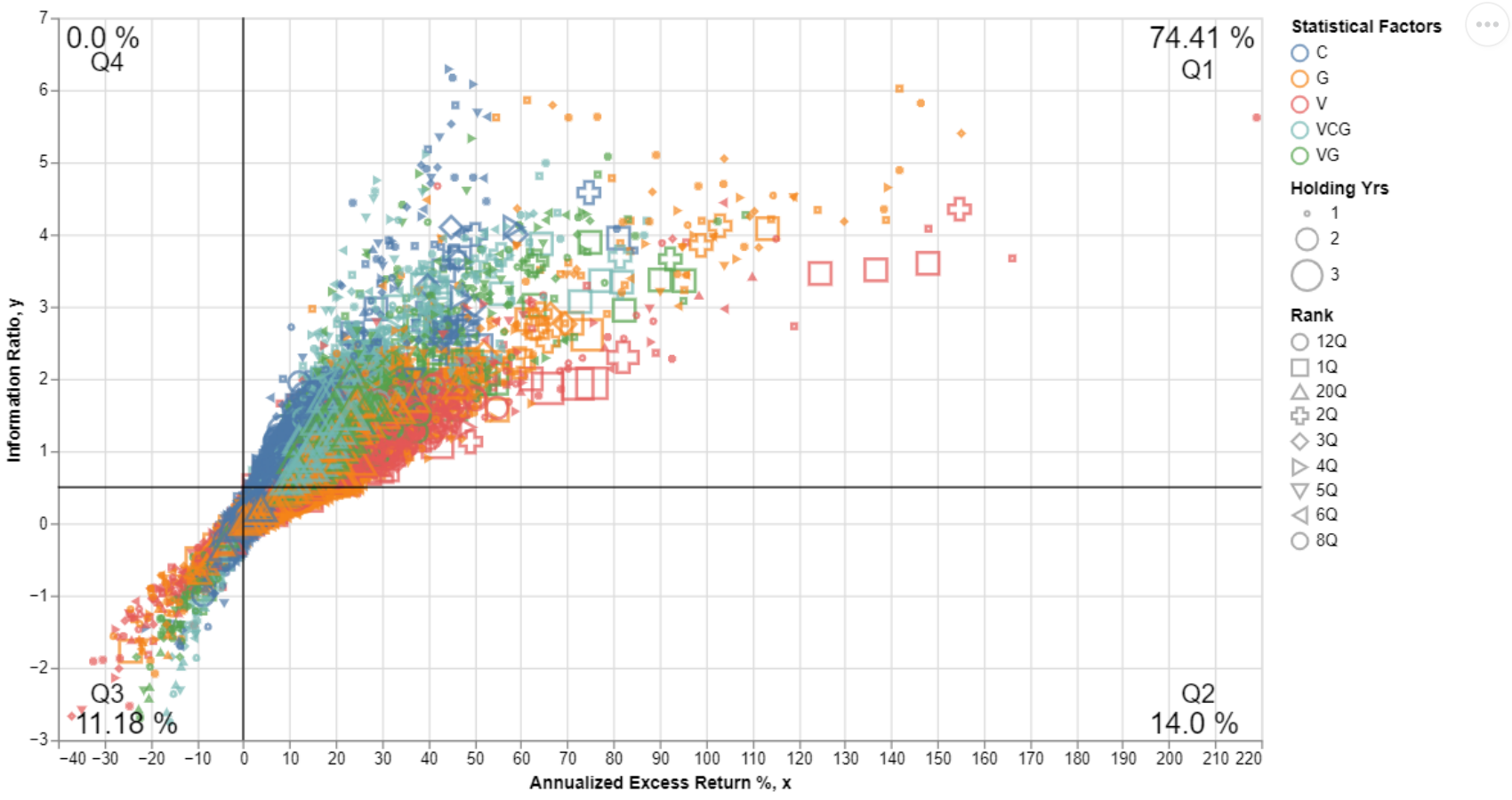

7.05 %
Q4
91.77 %
Q1
Q3
0.0 %
Q2
1.19 %
Annualized Excess Volatility %, y
Annualized Excess Return %, x
Statistical Factors
VCG
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

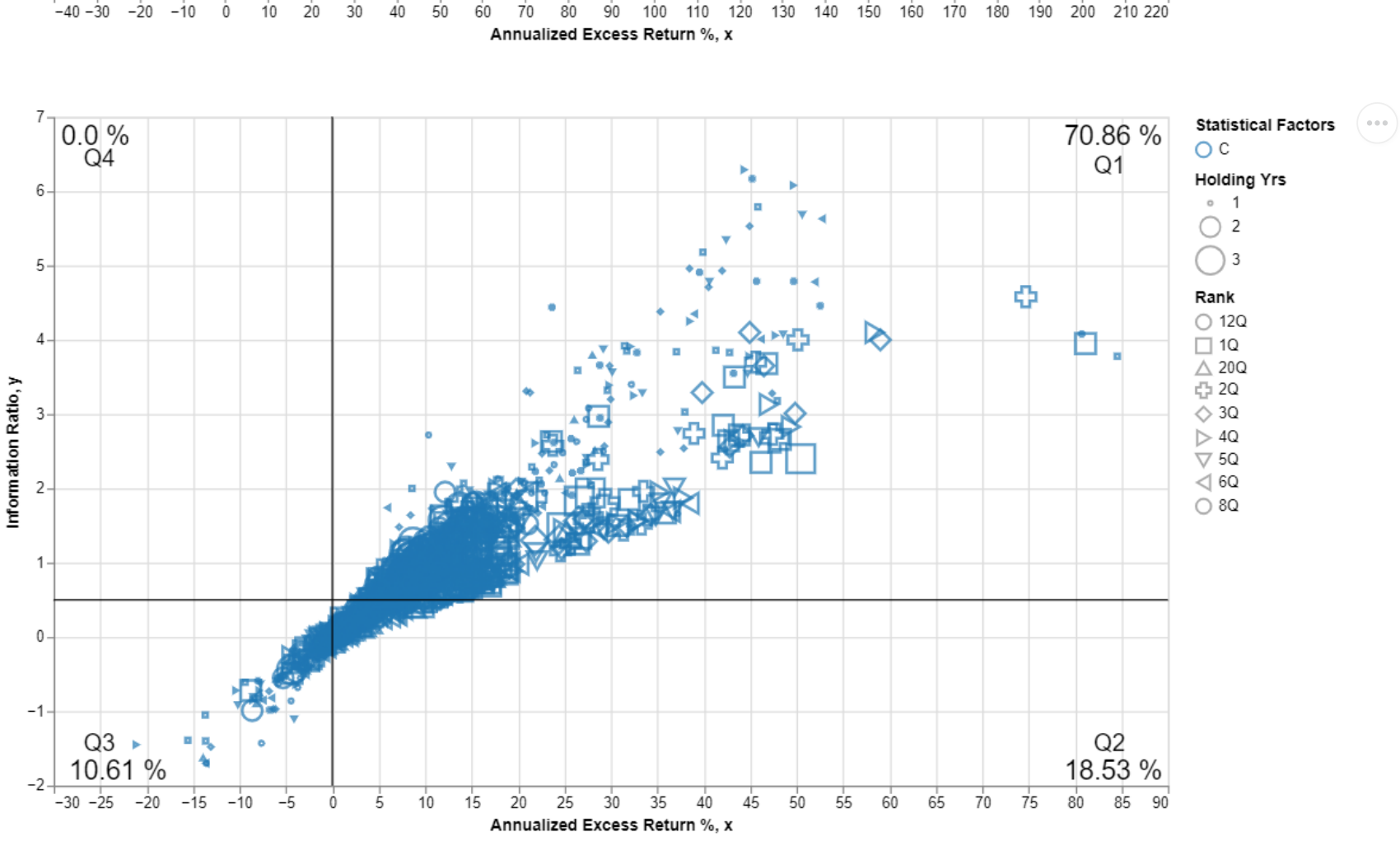


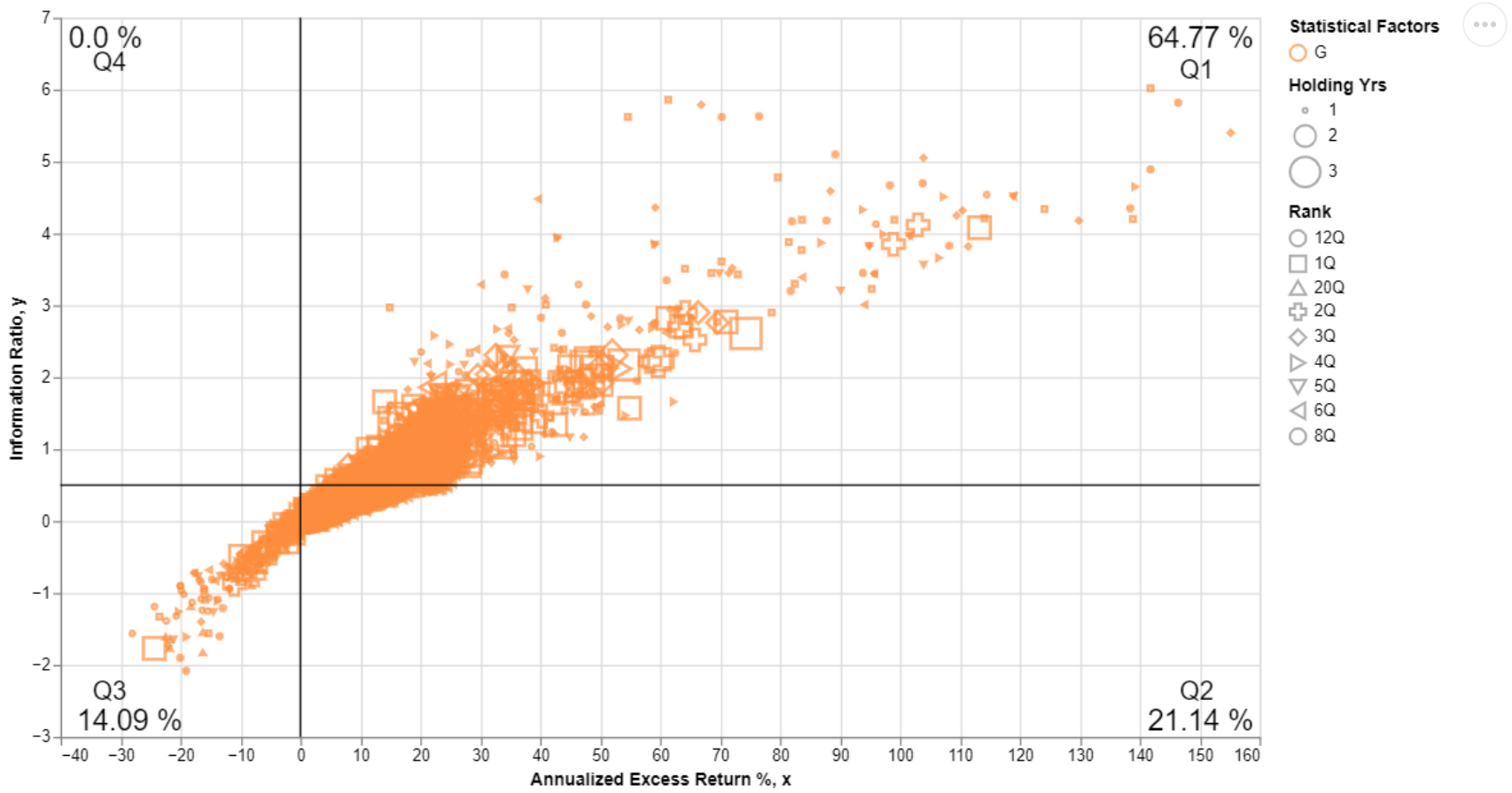
4.2: Annualized Excess Return vs. Information Ratio

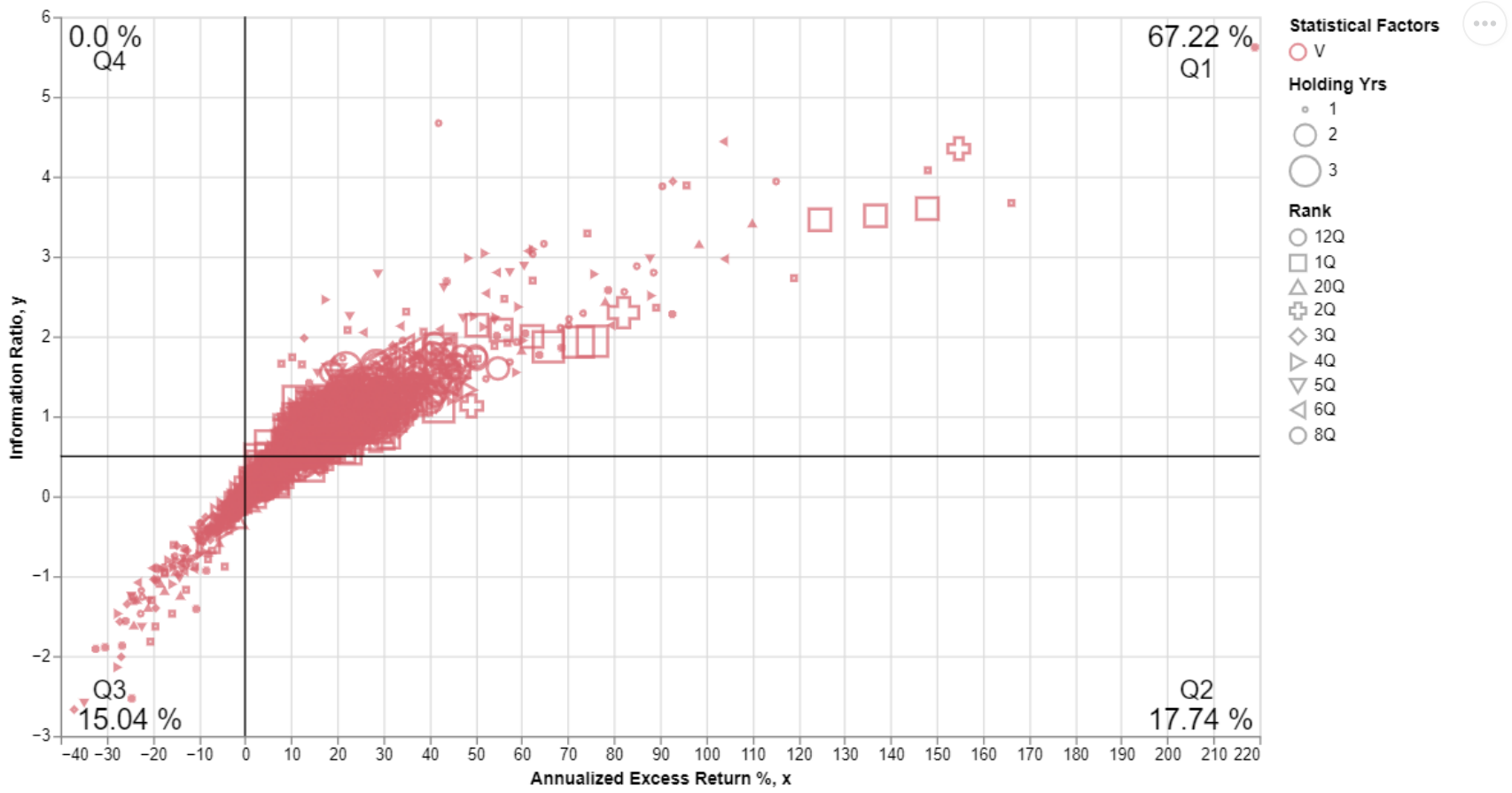
The Cartesian chart of Annualized Excess Return vs. Information Ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

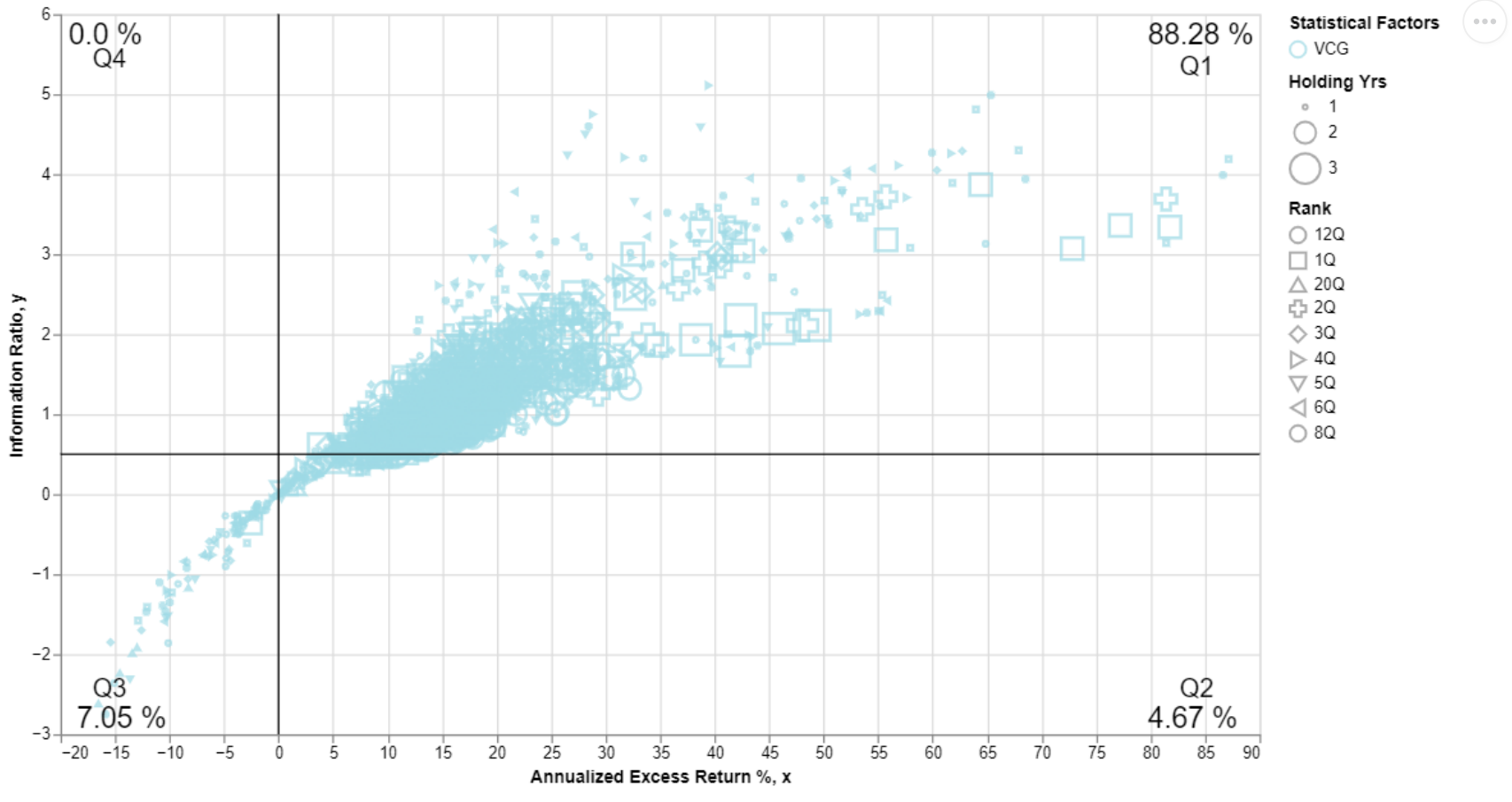
Out[171…

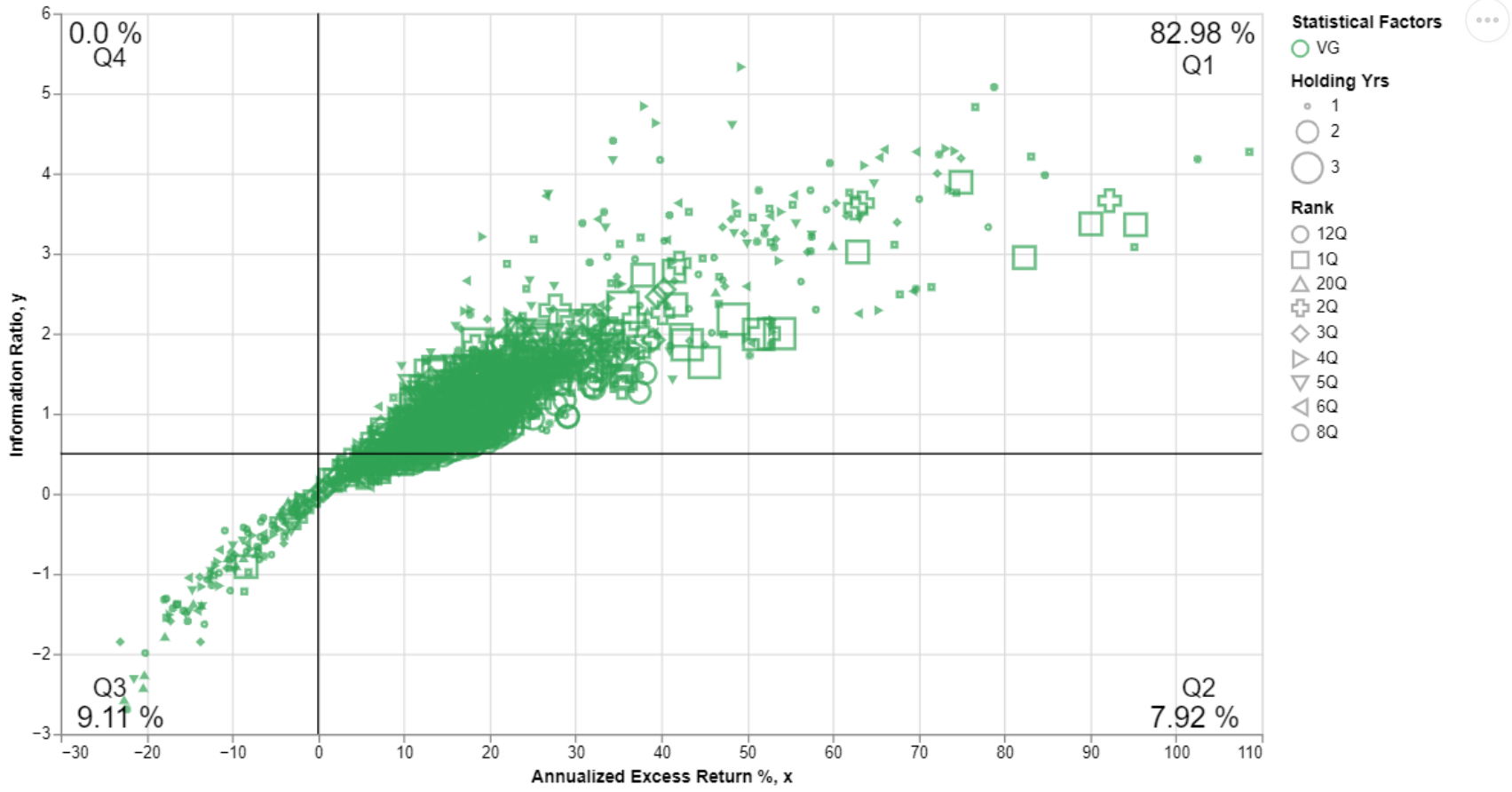





0.0 %
Q4
64.77 %
Q1
Q3
14.09 %
Q2
21.14 %
Information Ratio, y
Annualized Excess Return %, x
Statistical Factors
G
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q


0.0 %
Q4
67.22 %
Q1
Q3
15.04 %
Q2
17.74 %
Information Ratio, y
Annualized Excess Return %, x
Statistical Factors
V
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

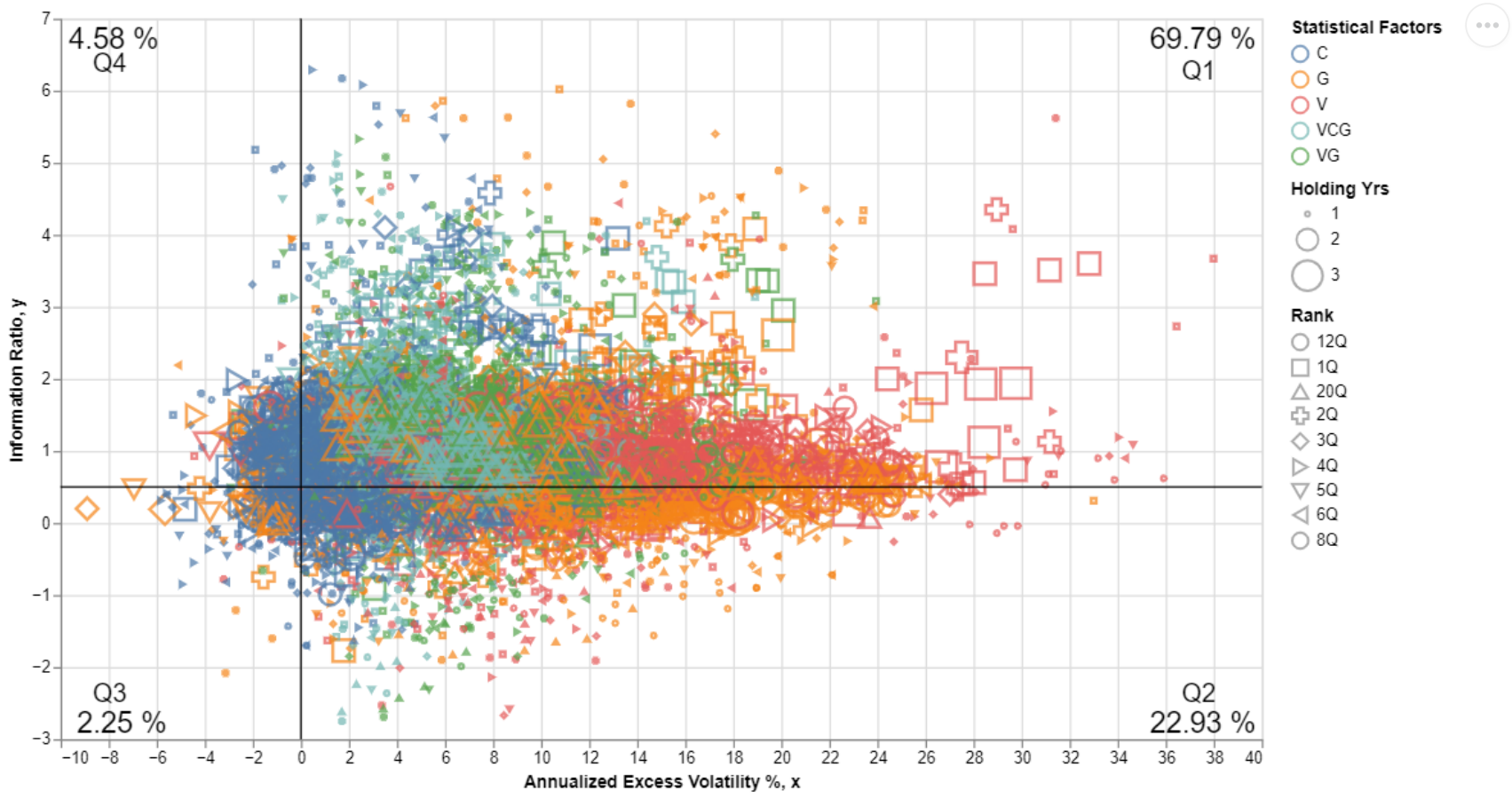

0.0 %
Q4
88.28 %
Q1
Q3
7.05 %
Q2
4.67 %
Information Ratio, y
Annualized Excess Return %, x
Statistical Factors
VCG
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

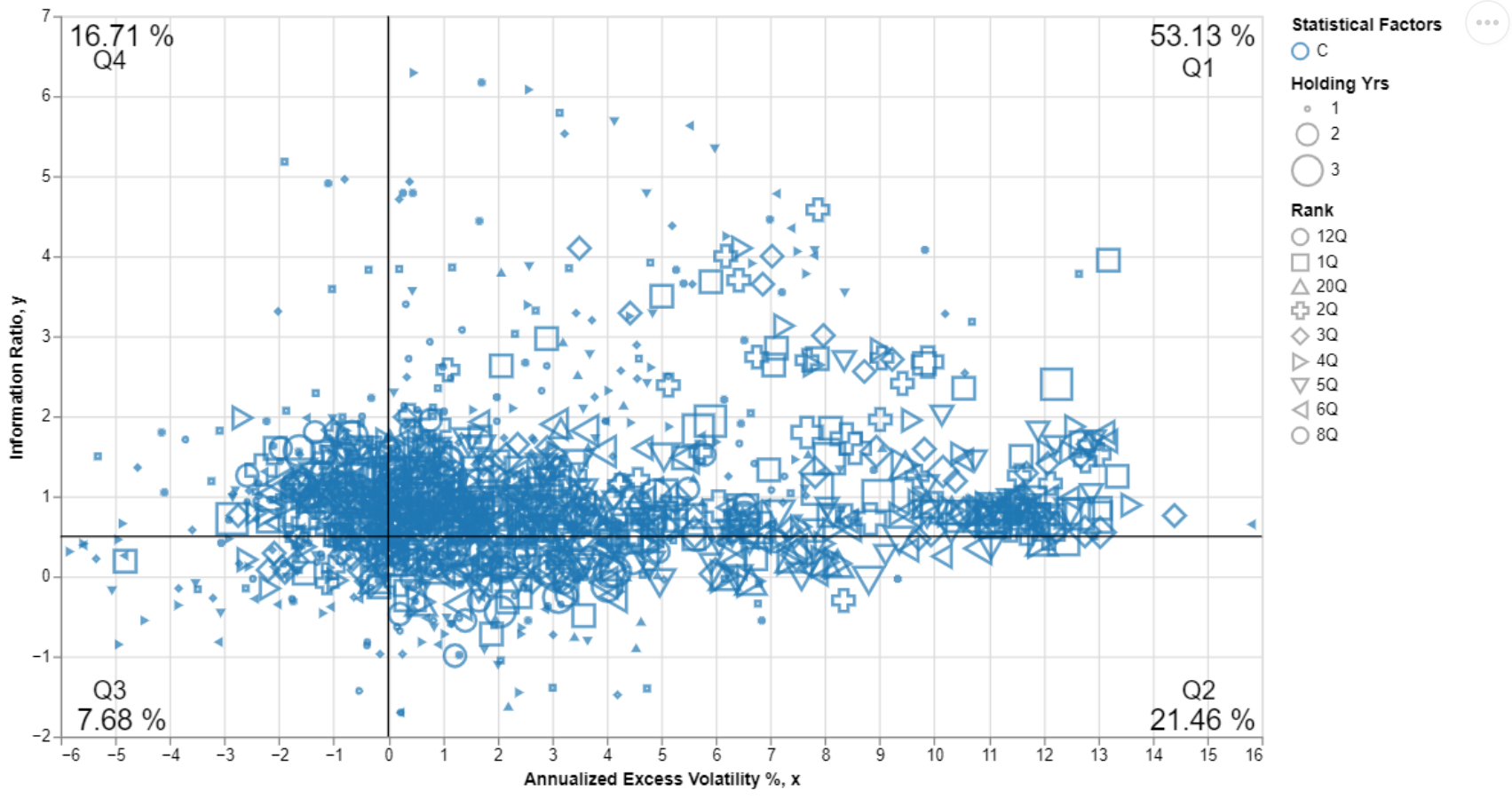


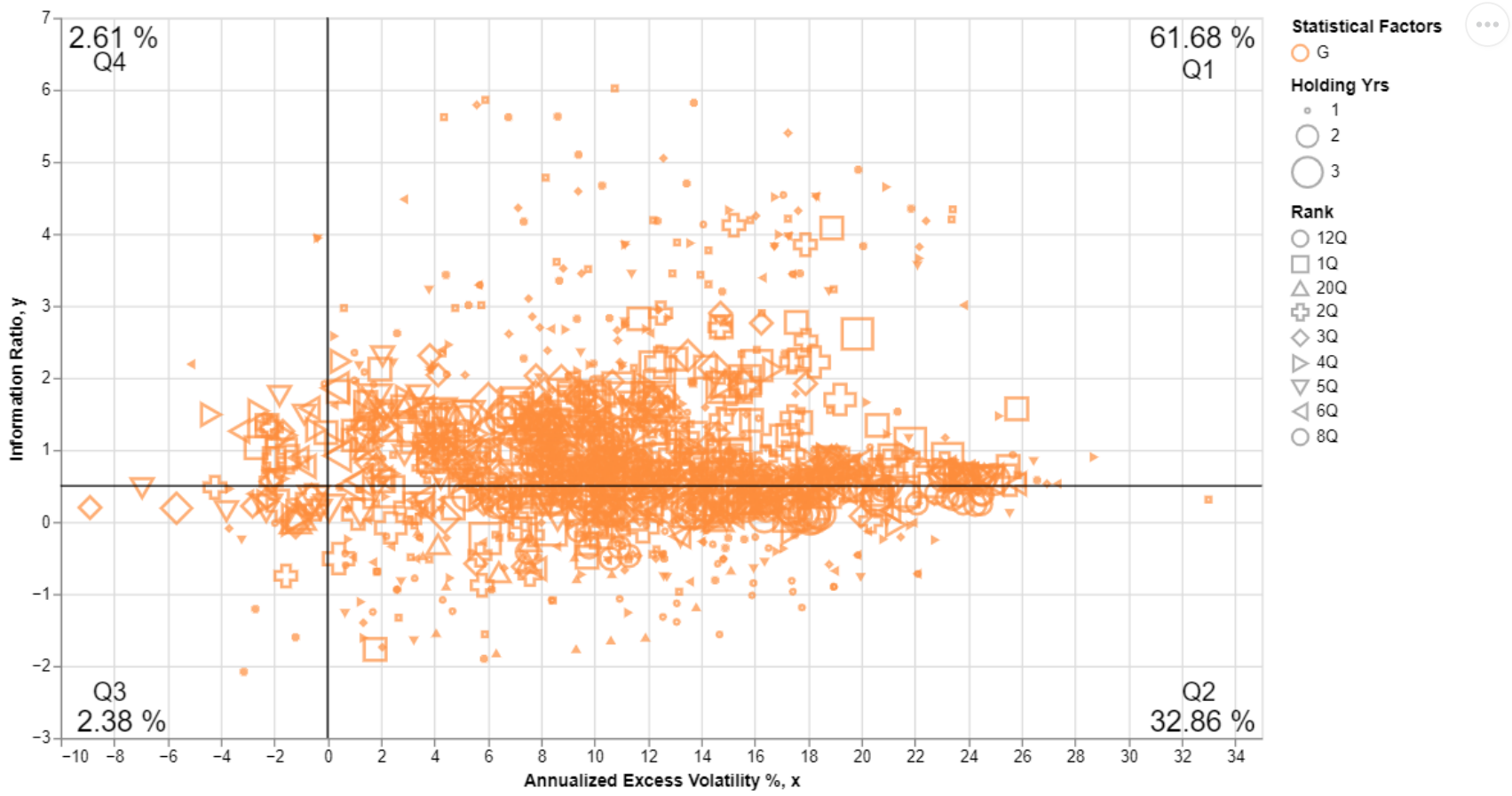
4.3: Annualized Excess Volatility vs. Information Ratio

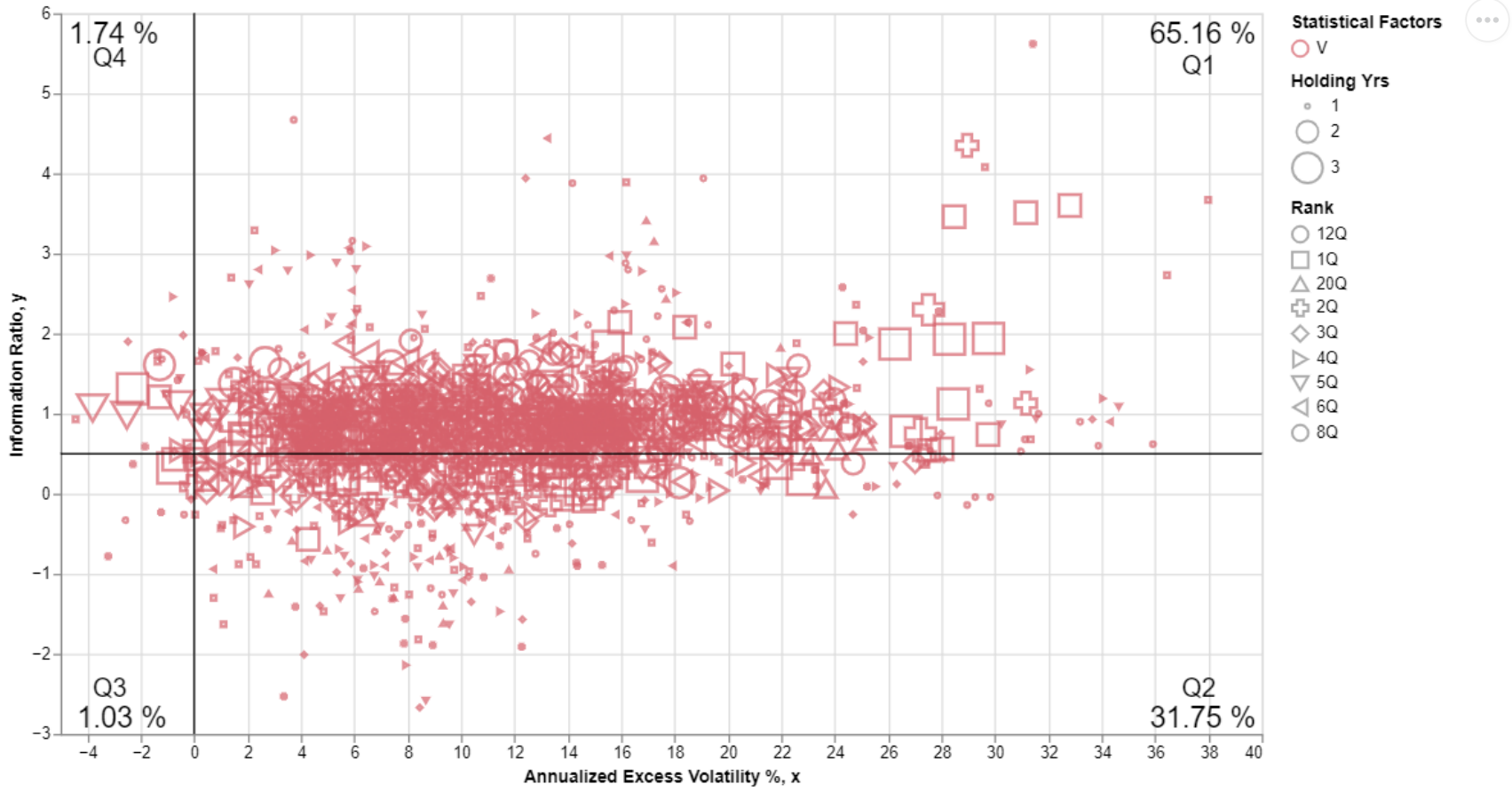
The Cartesian chart of Annualized Excess Volatility vs. Information Ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

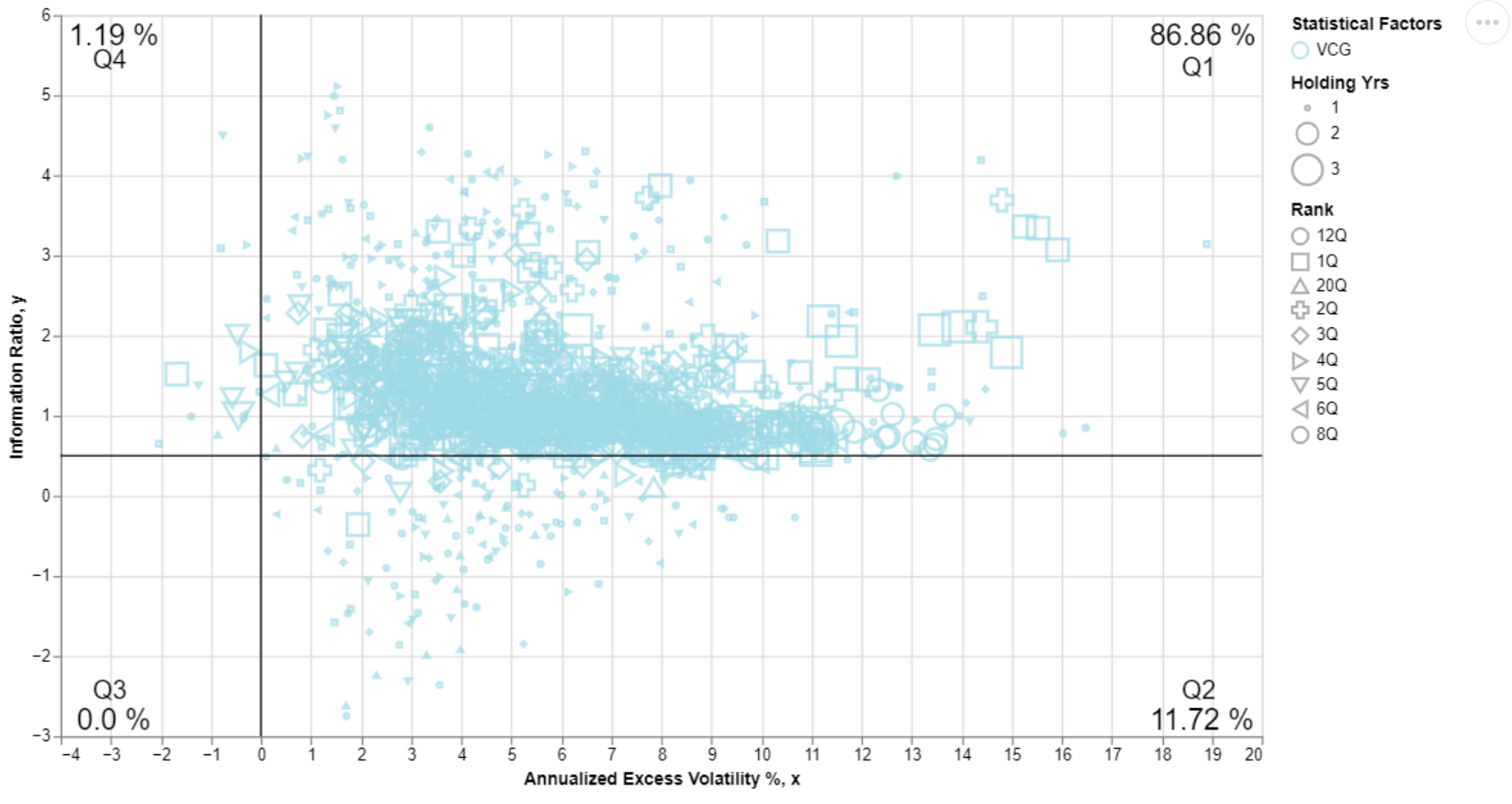
Out[173...

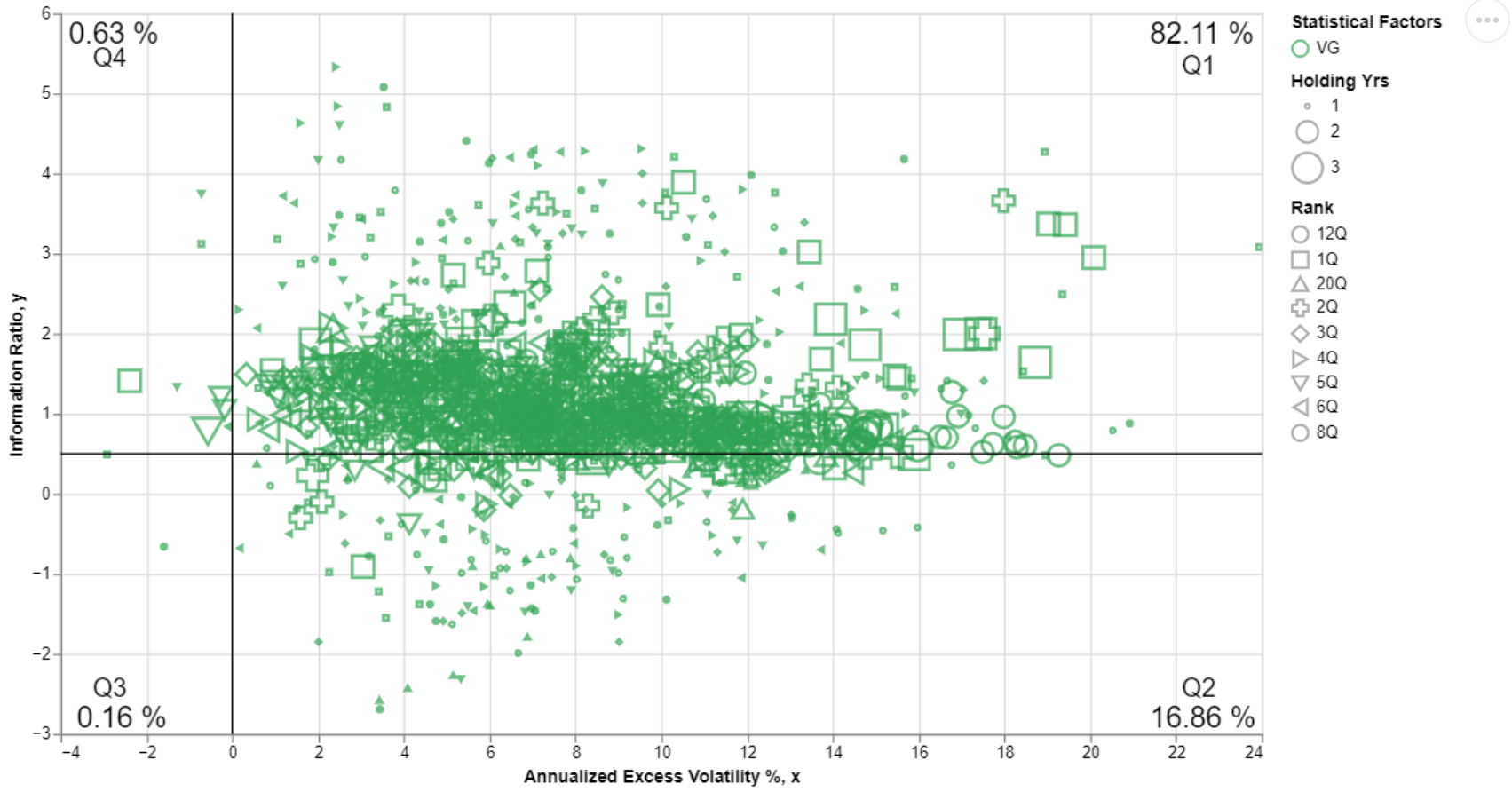





2.61 %
Q4
61.68 %
Q1
Q3
2.38 %
Q2
32.86 %
Information Ratio, y
Annualized Excess Volatility %, x
Statistical Factors
G
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q


1.74 %
Q4
65.16 %
Q1
Q3
1.03 %
Q2
31.75 %
Information Ratio, y
Annualized Excess Volatility %, x
Statistical Factors
V
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

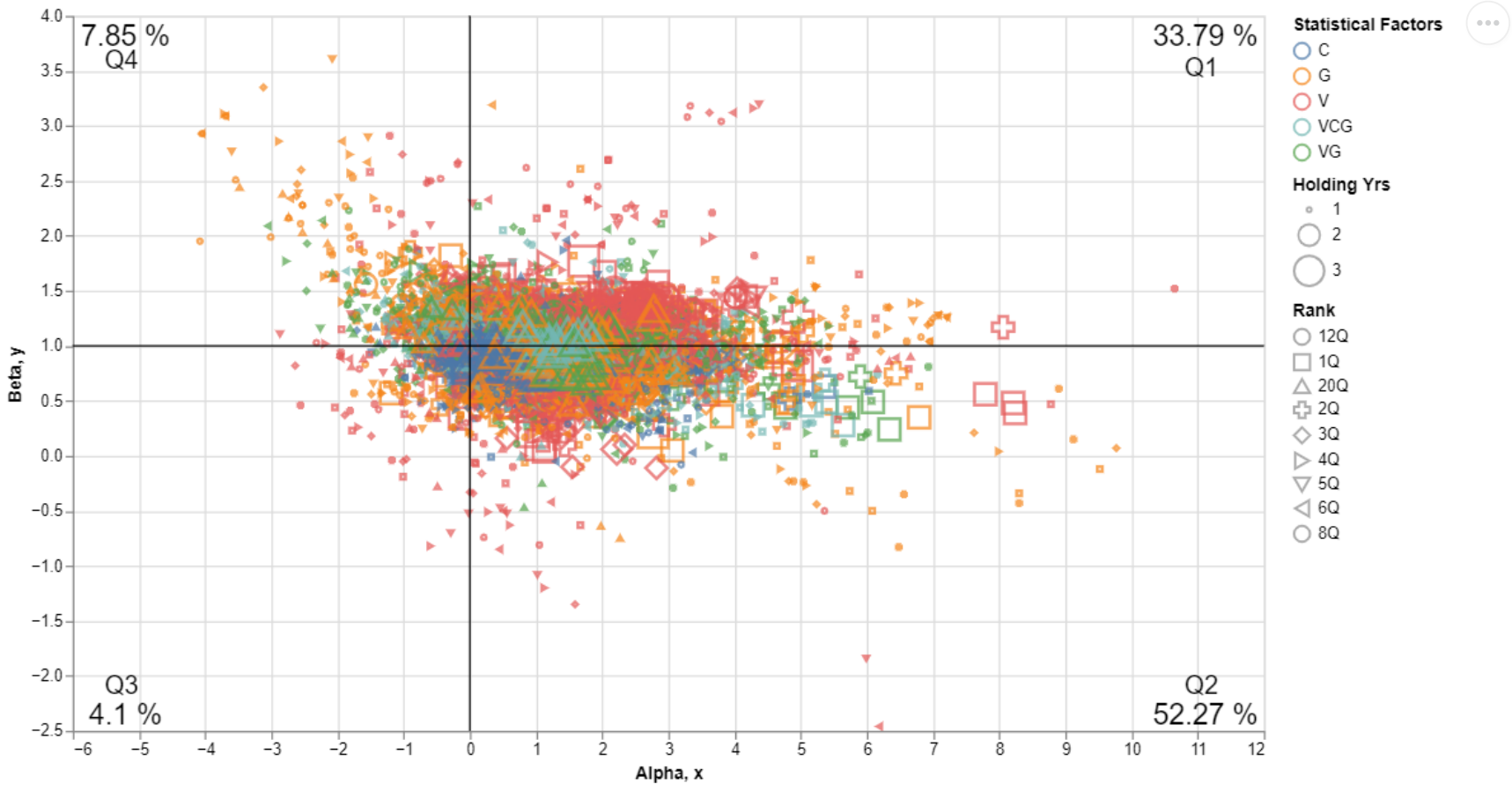

1.19 %
Q4
86.86 %
Q1
Q3
0.0 %
Q2
11.72 %
Information Ratio, y
Annualized Excess Volatility %, x
Statistical Factors
VCG
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

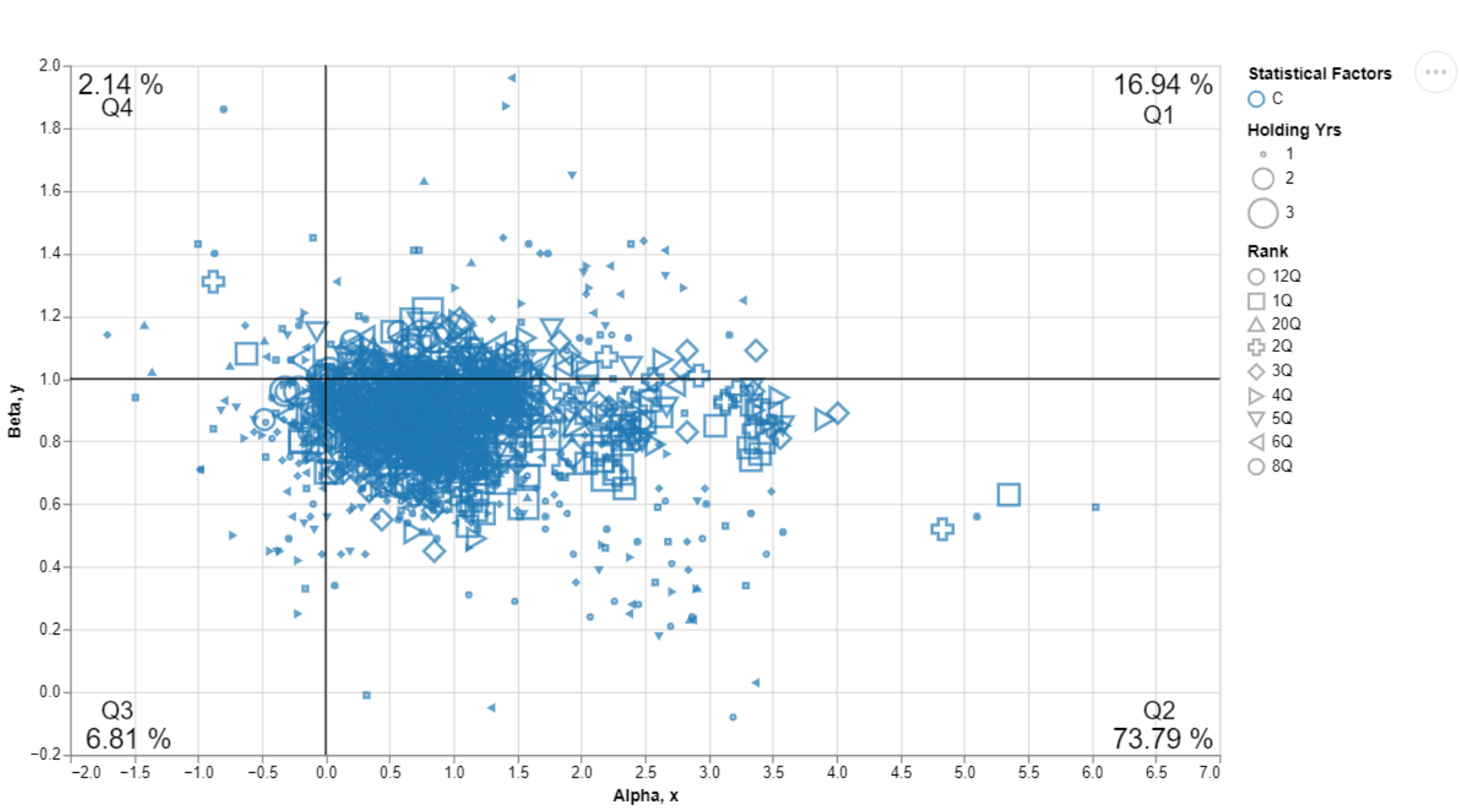


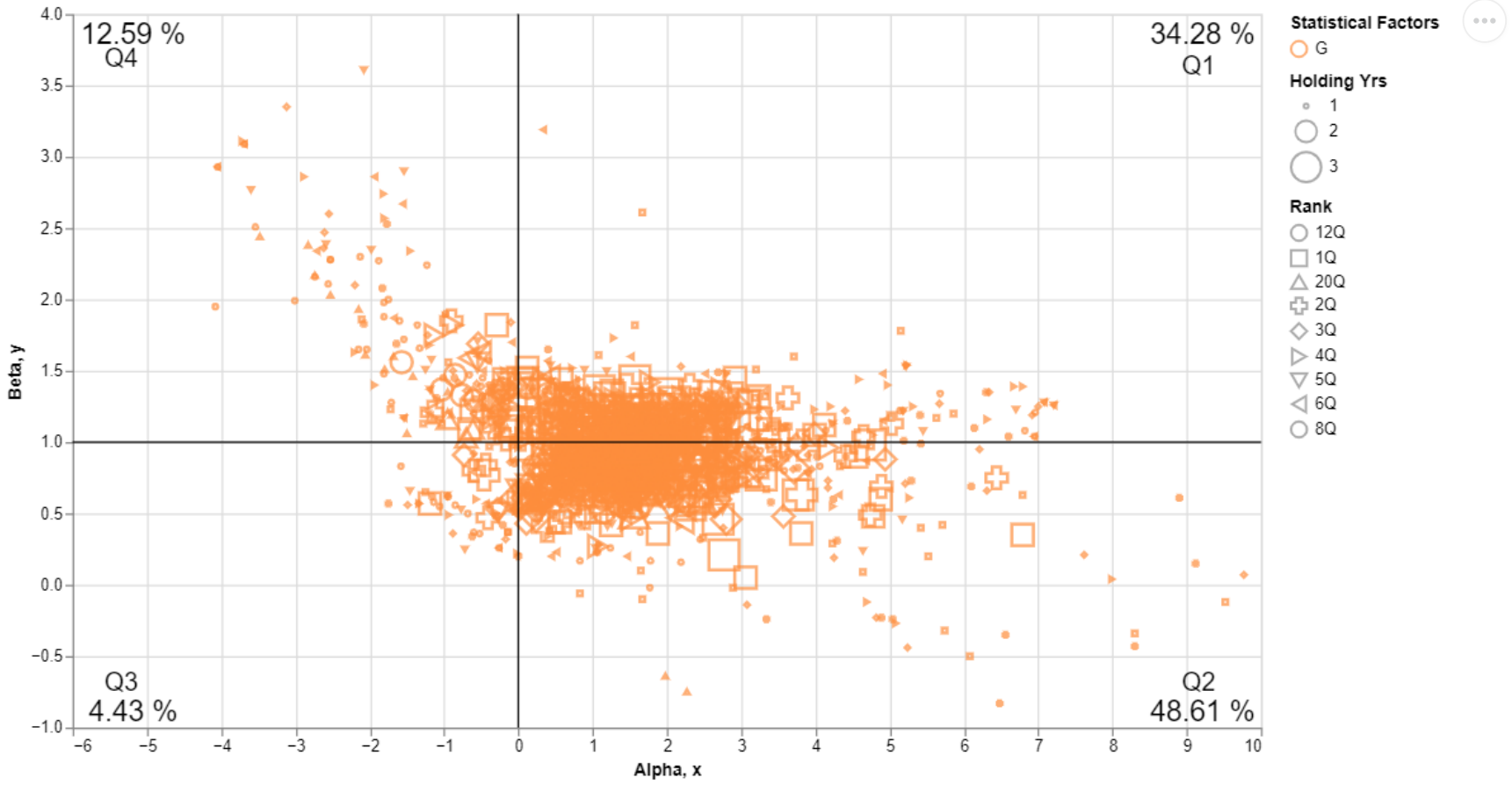
4.4: Alpha vs. Beta

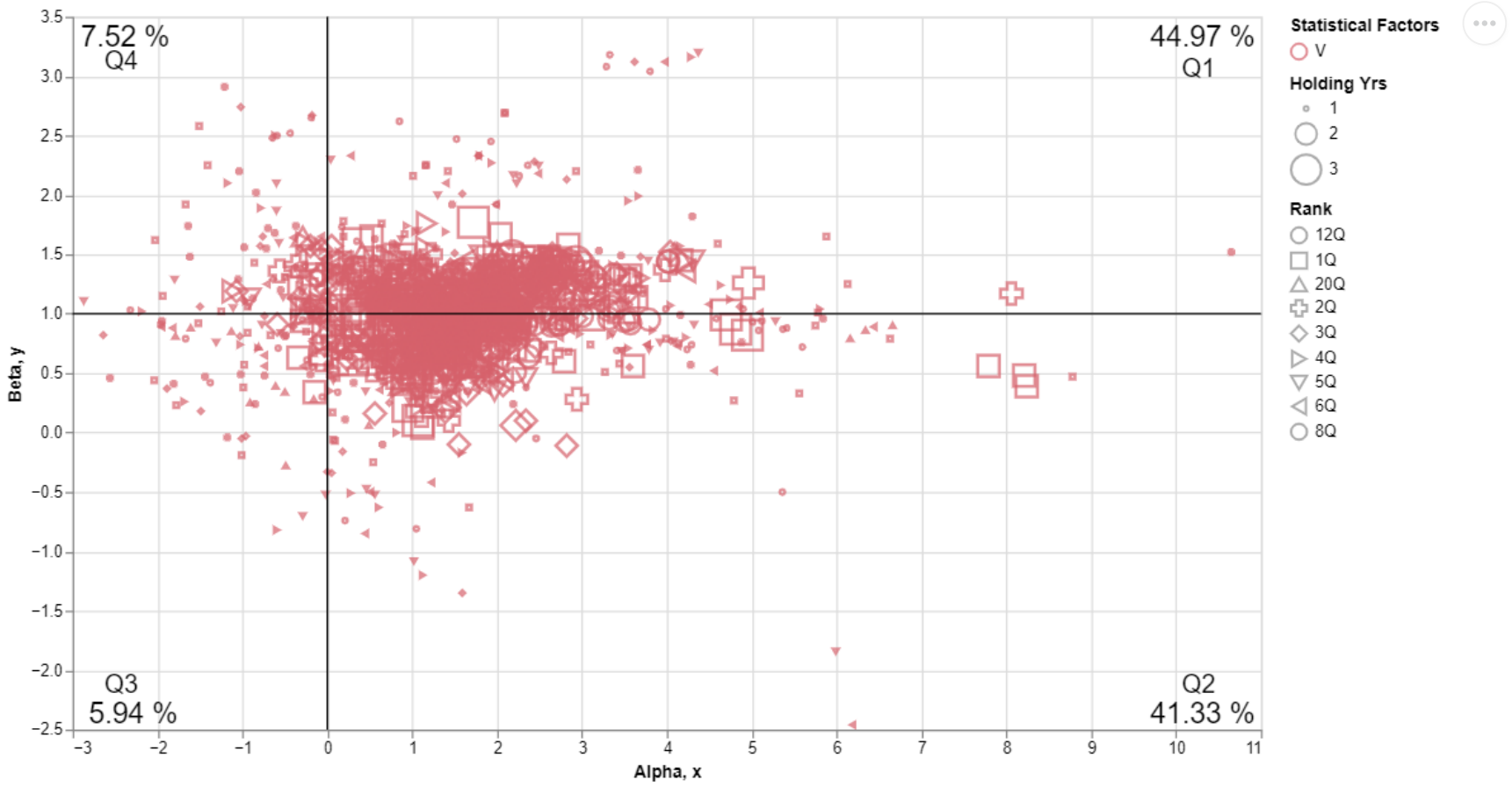
The Cartesian chart of Alpha vs. Beta plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

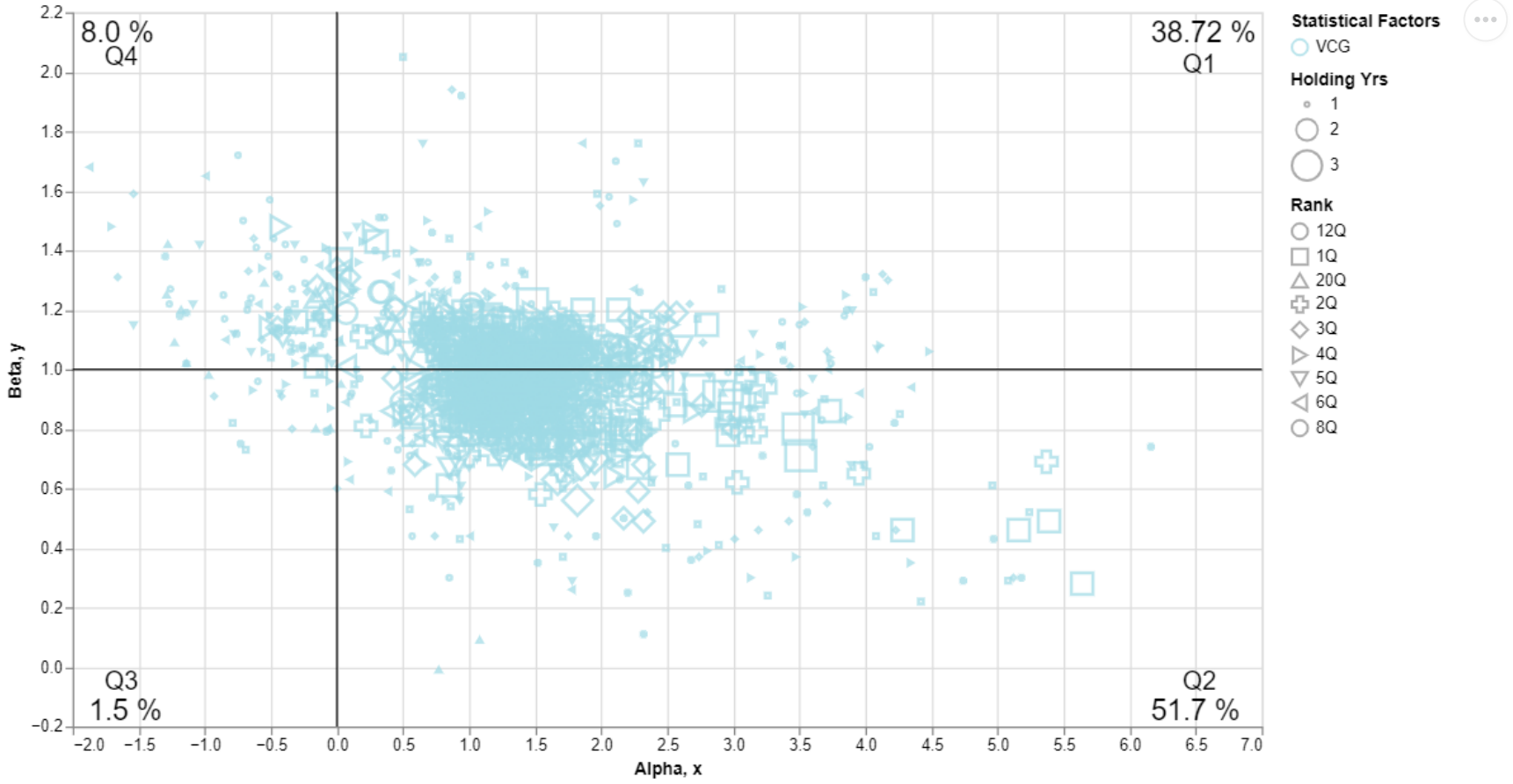
Out[175...

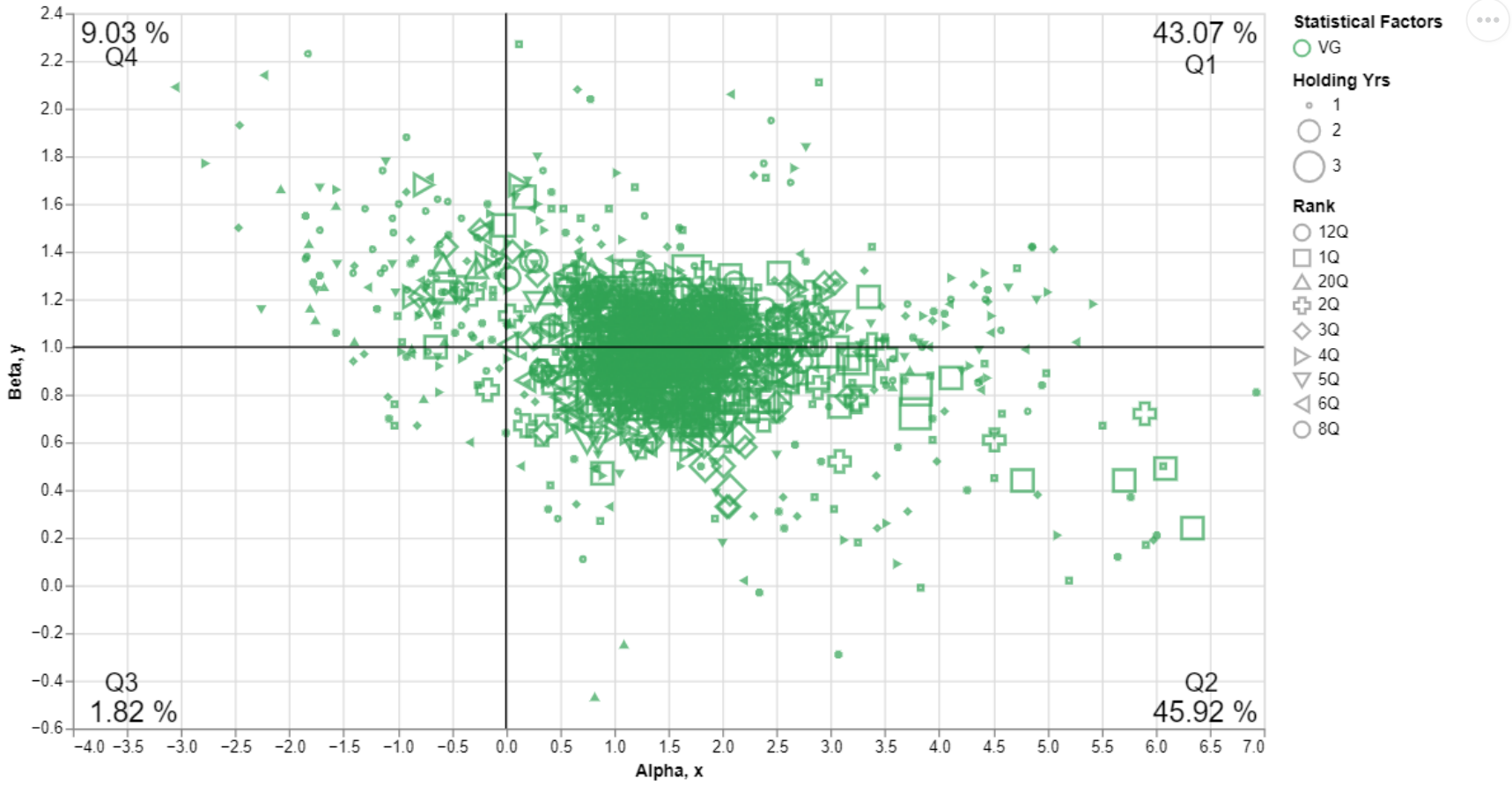





12.59 %
Q4
34.28 %
Q1
Q3
4.43 %
Q2
48.61 %
Beta, y
Alpha, x
Statistical Factors
G
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q


7.52 %
Q4
44.97 %
Q1
Q3
5.94 %
Q2
41.33 %
Beta, y
Alpha, x
Statistical Factors
V
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

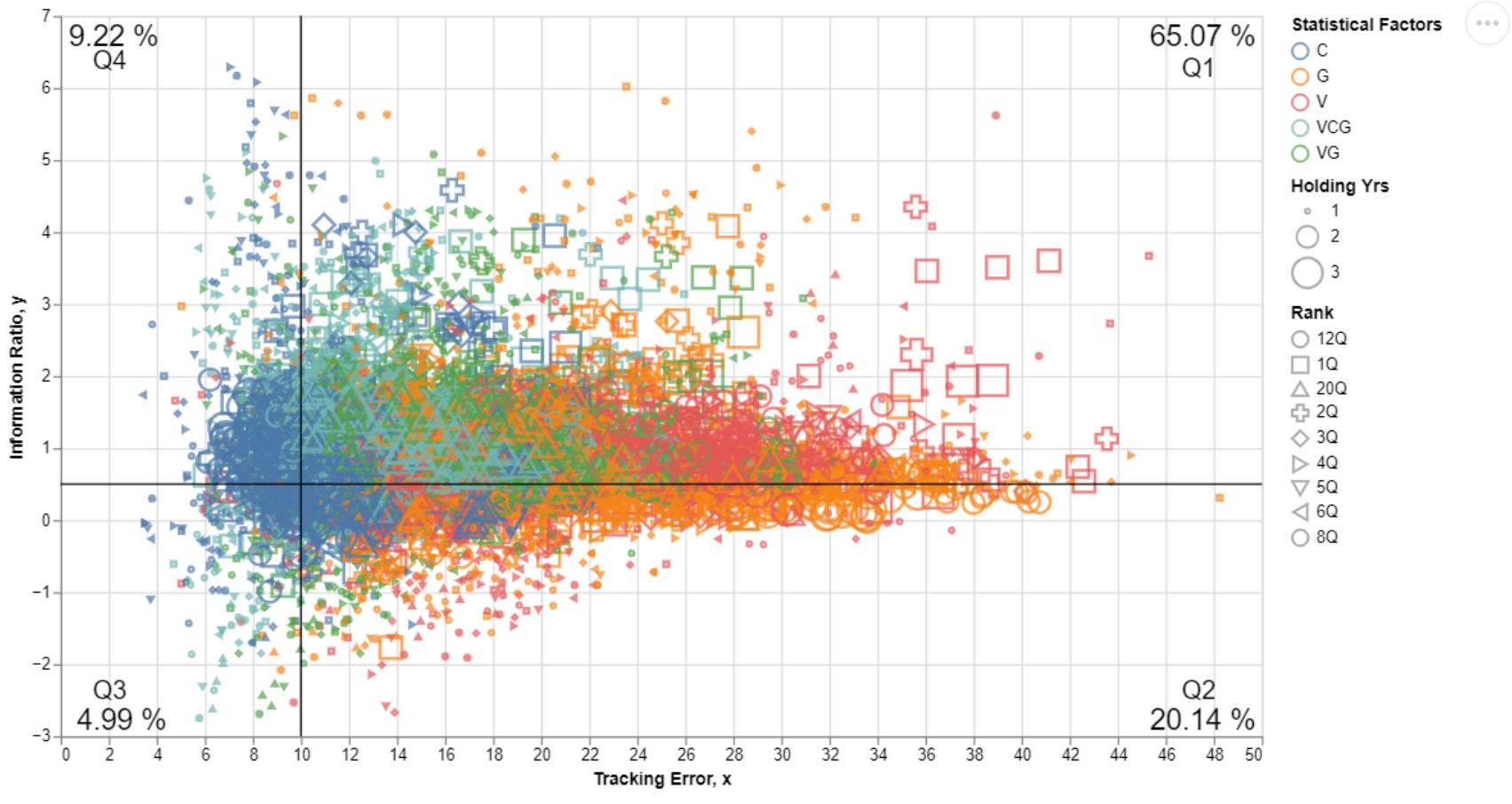

8.0 %
Q4
38.72 %
Q1
Q3
1.5 %
Q2
51.7 %
Beta, y
Alpha, x
Statistical Factors
VCG
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q

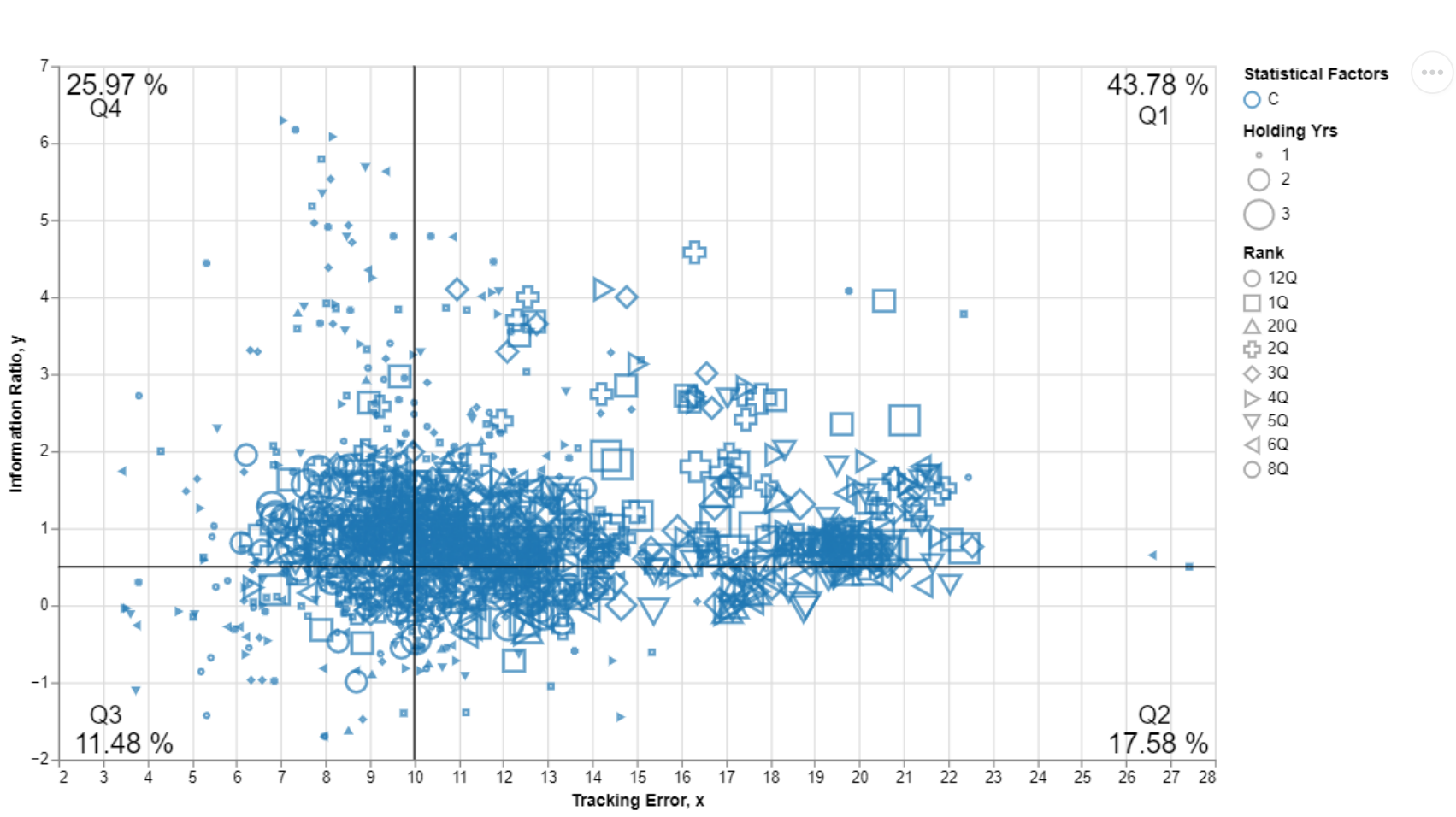


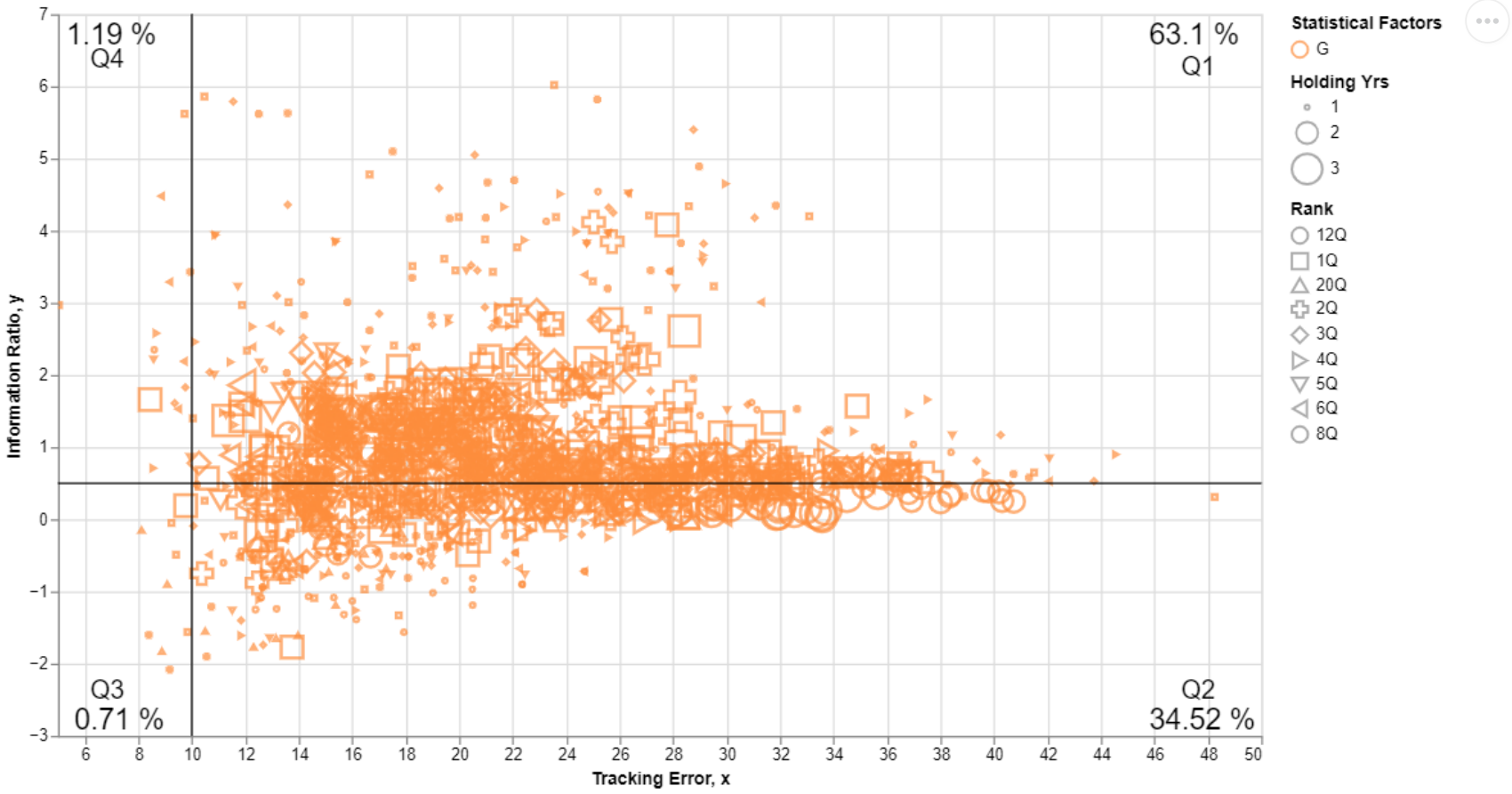
4.5: Tracking Error vs. Information Ratio

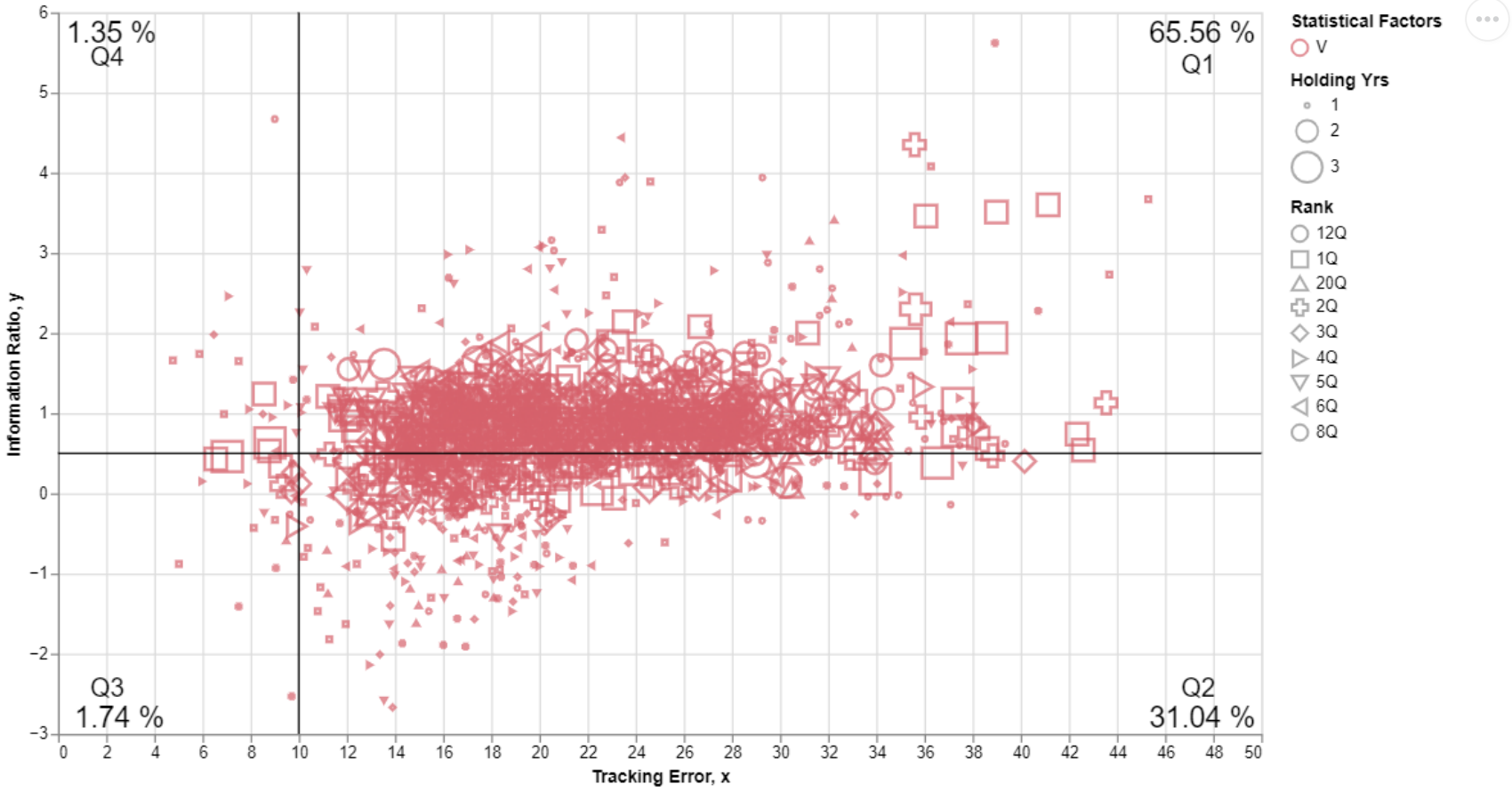
The Cartesian chart of Tracking Error vs. Information Ratio plotted for different statistical factors, for different holding periods and for respective quarterly proxy rankings.

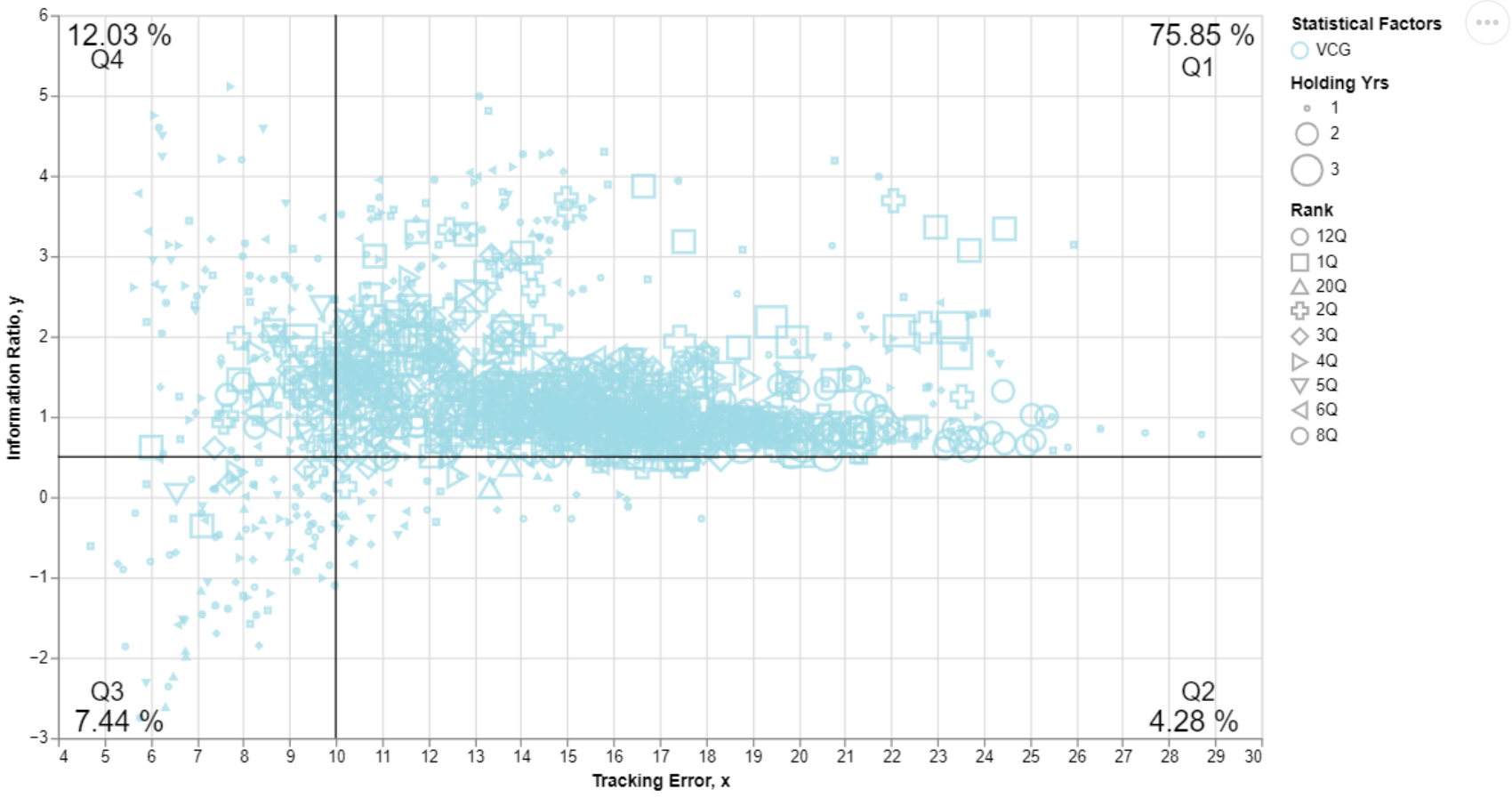
Out[177…

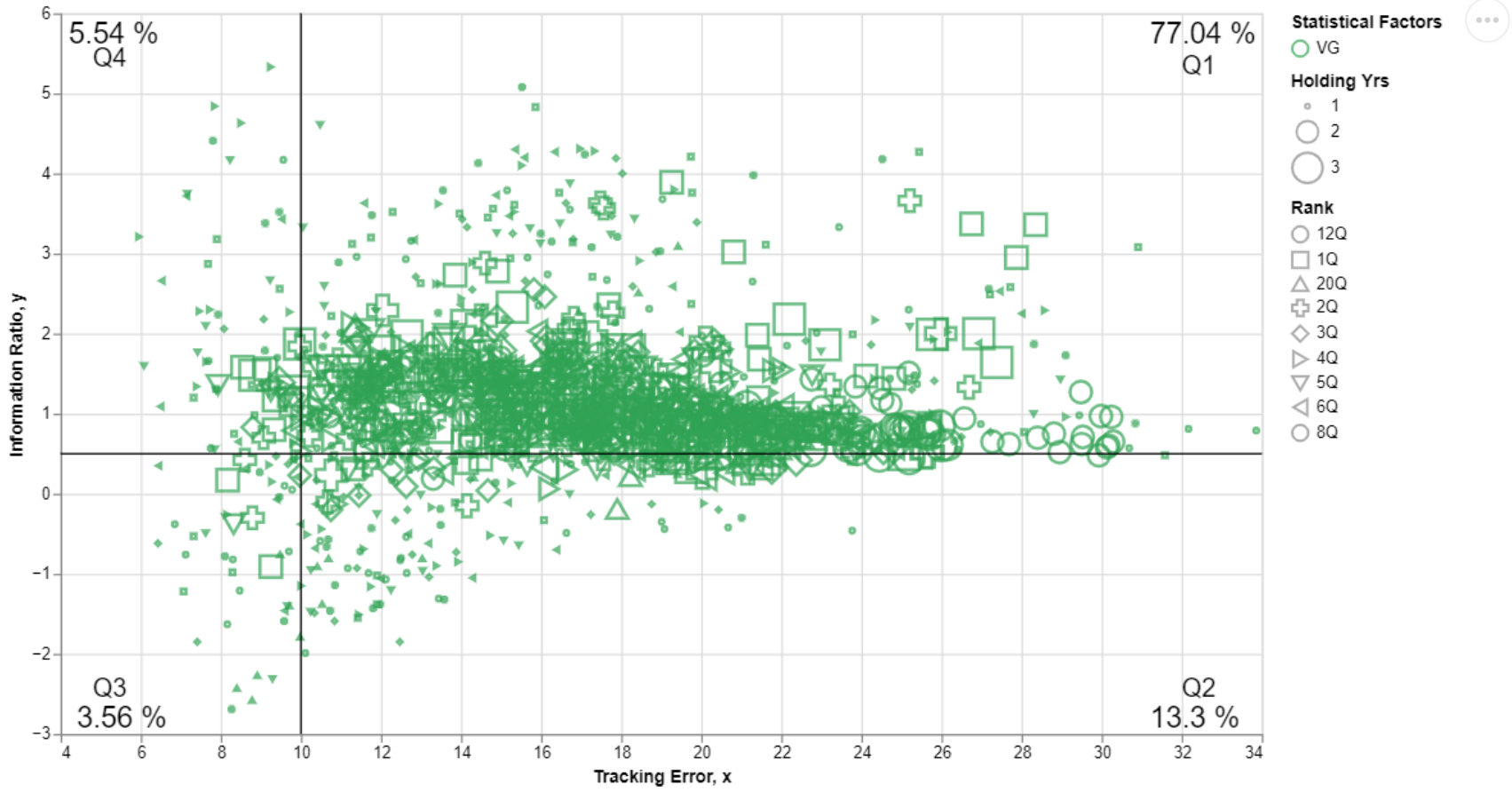





1.19 %
Q4
63.1 %
Q1
Q3
0.71 %
Q2
34.52 %
Information Ratio, y
Tracking Error, x
Statistical Factors
G
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q


1.35 %
Q4
65.56 %
Q1
Q3
1.74 %
Q2
31.04 %
Information Ratio, y
Tracking Error, x
Statistical Factors
V
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q


12.03 %
Q4
75.85 %
Q1
Q3
7.44 %
Q2
4.28 %
Information Ratio, y
Tracking Error, x
Statistical Factors
VCG
Holding Yrs
1
2
3
Rank
12Q
1Q
20Q
2Q
3Q
4Q
5Q
6Q
8Q



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.

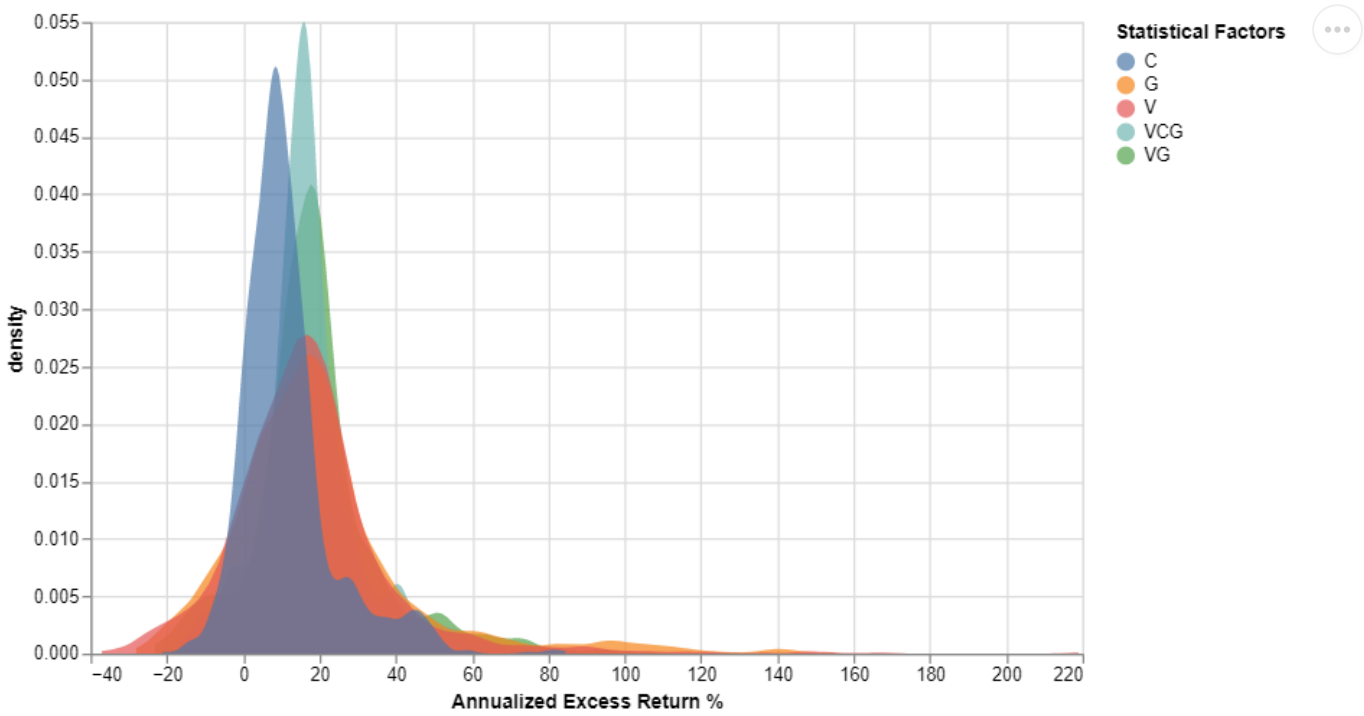
Statistics	Statistical Factors	Q1	Q2	Q3	Q4	Q1+Q2	Q2+Q3	Q3+Q4	Q4+Q1	Q1+Q3	Q2+Q4
Annualized Excess Return % vs. Annualized Excess Volatility %	C	67.3 %	21.85 %	2.85 %	7.76 %	89.15%	24.7%	10.61%	75.06%	70.15%	29.61%
	G	81.55 %	4.35 %	0.63 %	13.46 %	85.9%	4.98%	14.09%	95.01%	82.18%	17.81%
	V	82.58 %	2.38 %	0.4 %	14.65 %	84.96%	2.78%	15.05%	97.23%	82.98%	17.03%
	VCG	91.77 %	1.19 %	0.0 %	7.05 %	92.96%	1.19%	7.05%	98.82%	91.77%	8.24%
	VG	90.18 %	0.71 %	0.08 %	9.03 %	90.89%	0.79%	9.11%	99.21%	90.26%	9.74%
Annualized Excess Return % vs. Information Ratio	C	70.07 %	18.53 %	10.61 %	0.0 %	88.6%	29.14%	10.61%	70.07%	80.68%	18.53%
	G	64.29 %	21.14 %	14.09 %	0.0 %	85.43%	35.23%	14.09%	64.29%	78.38%	21.14%
	V	66.9 %	17.74 %	15.04 %	0.0 %	84.64%	32.78%	15.04%	66.9%	81.94%	17.74%
	VCG	88.04 %	4.67 %	7.05 %	0.0 %	92.71%	11.72%	7.05%	88.04%	95.09%	4.67%
	VG	82.74 %	7.92 %	9.11 %	0.0 %	90.66%	17.03%	9.11%	82.74%	91.85%	7.92%
Annualized Excess Volatility % vs. Information Ratio	C	53.13 %	21.46 %	7.68 %	16.71 %	74.59%	29.14%	24.39%	69.84%	60.81%	38.17%
	G	61.68 %	32.86 %	2.38 %	2.61 %	94.54%	35.24%	4.99%	64.29%	64.06%	35.47%
	V	65.16 %	31.75 %	1.03 %	1.74 %	96.91%	32.78%	2.77%	66.9%	66.19%	33.49%
	VCG	86.86 %	11.72 %	0.0 %	1.19 %	98.58%	11.72%	1.19%	88.05%	86.86%	12.91%
	VG	82.11 %	16.86 %	0.16 %	0.63 %	98.97%	17.02%	0.79%	82.74%	82.27%	17.49%
Alpha vs. Beta	C	14.89 %	73.79 %	6.81 %	2.14 %	88.68%	80.6%	8.95%	17.03%	21.7%	75.93%
	G	32.86 %	48.61 %	4.43 %	12.59 %	81.47%	53.04%	17.02%	45.45%	37.29%	61.2%
	V	44.02 %	41.33 %	5.94 %	7.52 %	85.35%	47.27%	13.46%	51.54%	49.96%	48.85%
	VCG	36.1 %	51.7 %	1.5 %	8.0 %	87.8%	53.2%	9.5%	44.1%	37.6%	59.7%
	VG	41.09 %	45.92 %	1.82 %	9.03 %	87.01%	47.74%	10.85%	50.12%	42.91%	54.95%
Tracking Error vs. Information Ratio	C	43.78 %	17.58 %	11.48 %	25.97 %	61.36%	29.06%	37.45%	69.75%	55.26%	43.55%
	G	63.1 %	34.52 %	0.71 %	1.19 %	97.62%	35.23%	1.9%	64.29%	63.81%	35.71%
	V	65.56 %	31.04 %	1.74 %	1.35 %	96.6%	32.78%	3.09%	66.91%	67.3%	32.39%
	VCG	75.85 %	4.28 %	7.44 %	12.03 %	80.13%	11.72%	19.47%	87.88%	83.29%	16.31%
	VG	77.04 %	13.3 %	3.56 %	5.54 %	90.34%	16.86%	9.1%	82.58%	80.6%	18.84%

5: Statistical Distributions

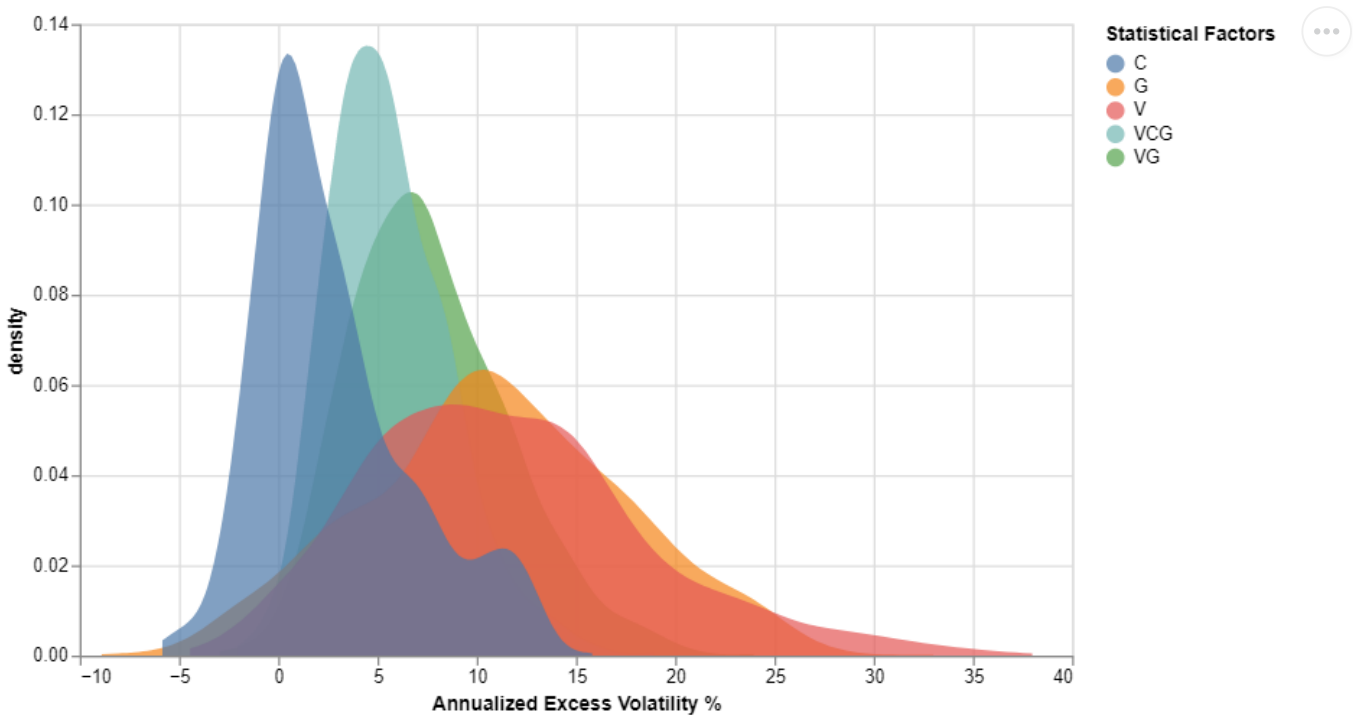
5.1: Area Charts

The area charts below showcase the distribution of Annualized Excess Return, Annualized Excess Volatility and Information Ratio across various statistical factors.

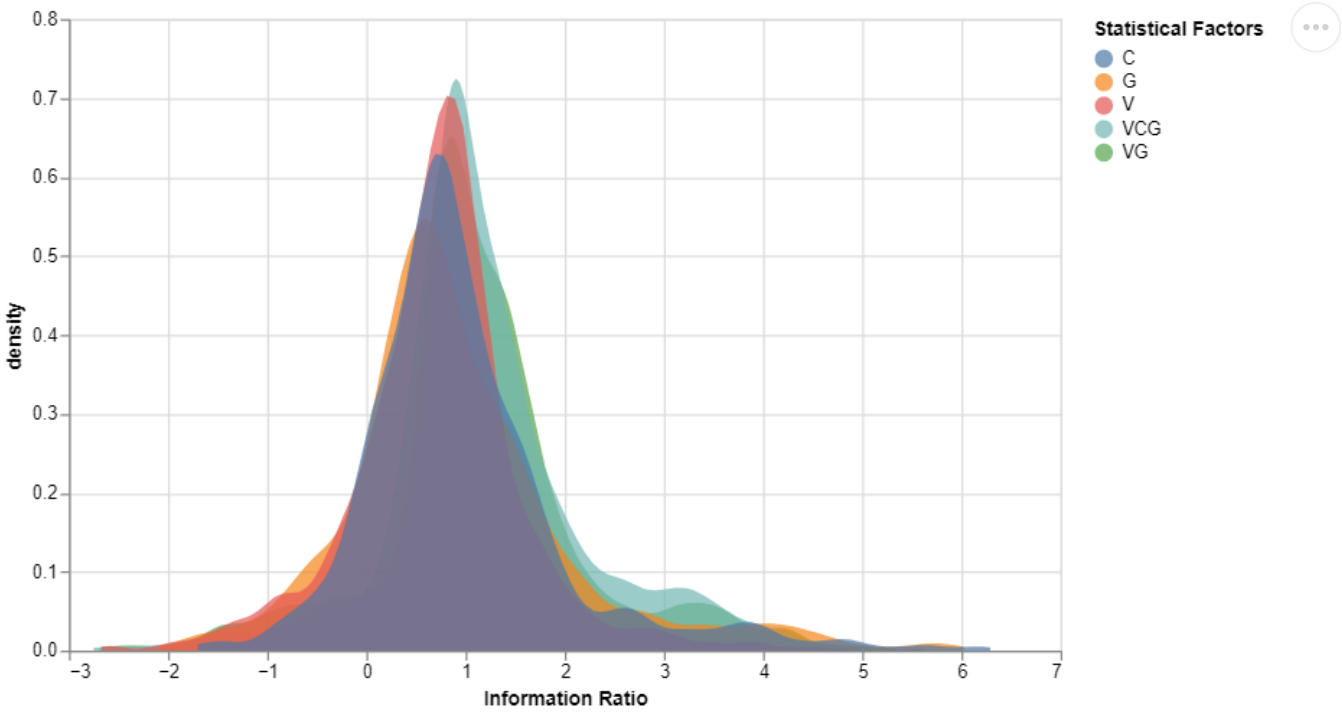
Out[180...



Out[181...



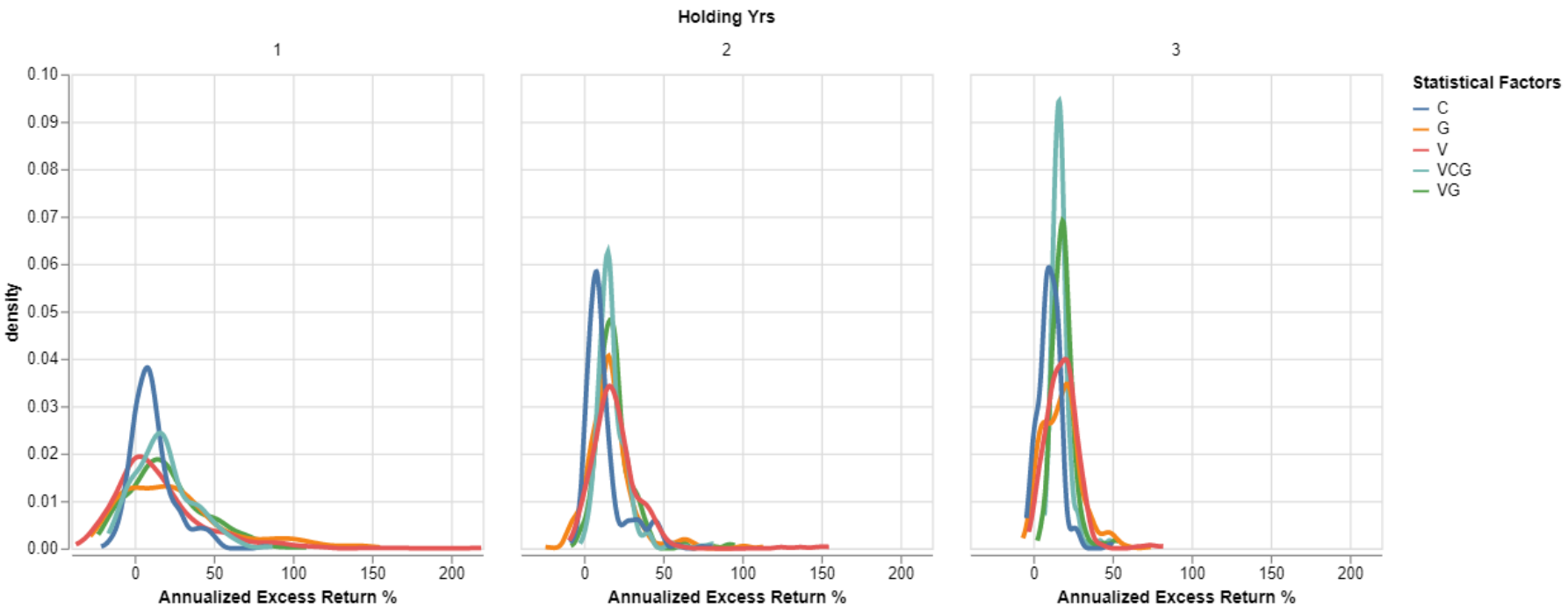
Out[182...



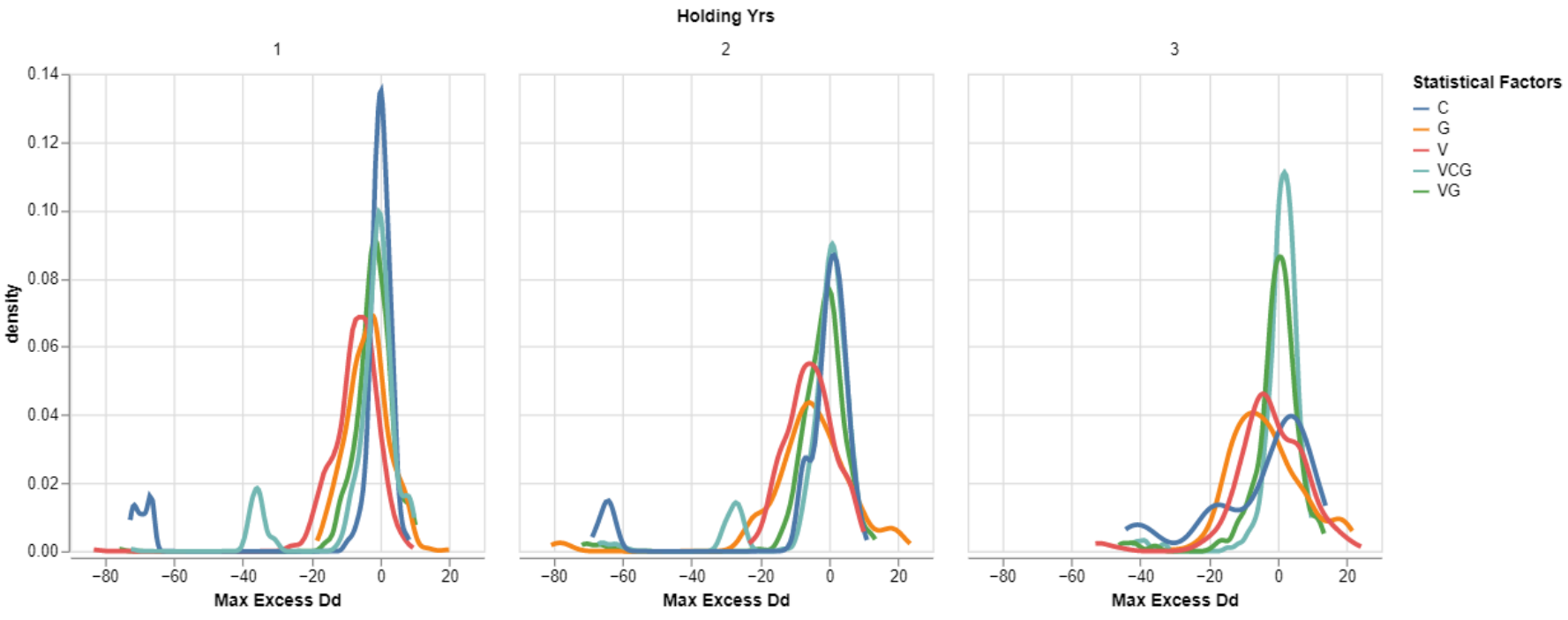
5.2: Line Charts

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.

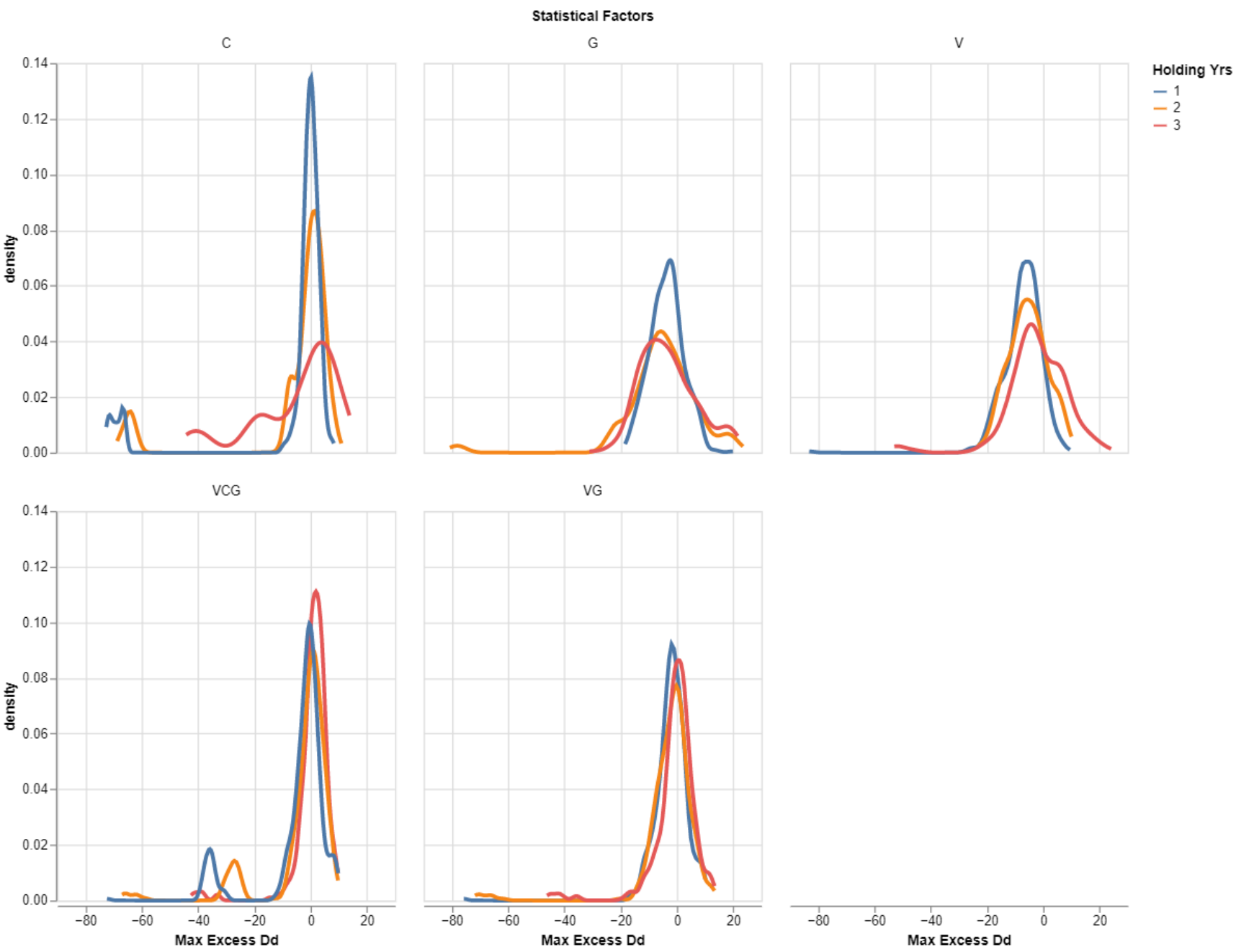
Out[183...



Out[184...



Out[185…



6: Modern Portfolio Theory (MPT) Statistics

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

(**AR** - Annualized Excess Return, **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	10.84	1.85	10.09	1.08	0.91	0.82	-8.47
C	2Y	10.62	3.24	12.24	0.84	0.88	0.89	-15.64
C	3Y	10.22	3.99	13.42	0.79	0.88	0.91	-5.08
G	1Y	19.32	11.05	20.13	0.89	1.23	1.16	-3.68
G	2Y	16.51	10.82	21.69	0.76	1.34	0.96	-5.12
G	3Y	16.95	11.59	23.42	0.78	1.51	0.92	-3.06
V	1Y	16.7	11.79	20.95	0.61	1.33	0.98	-7.21
V	2Y	18.46	13.13	23.14	0.77	1.52	1.04	-6.77
V	3Y	18.04	11.29	21.74	0.81	1.56	1.02	-2.48
VCG	1Y	16.88	5.34	12.72	1.26	1.27	1.03	-4.31
VCG	2Y	17.18	5.82	15.02	1.17	1.38	0.97	-2.84
VCG	3Y	16.94	6.12	15.66	1.13	1.4	0.97	0.66
VG	1Y	19.03	7.57	15.3	1.16	1.39	1.08	-1.85
VG	2Y	17.66	7.28	16.73	1.06	1.43	0.98	-2.18
VG	3Y	18.45	8.12	18.2	1.06	1.54	0.98	-0.56

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