

Comparing Two Financial Crises

Insights the Global Financial Crisis (GFC) Offers Us Today

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Overview

We compare the current COVID-19 crisis with the early stages of the global financial crisis (GFC) to identify investment strategies that could be helpful in the coming weeks. There are two main observations:

- > Following the onset of the GFC, stocks underwent a reversal: stocks that did poorly in October and November 2008 did well in December 2008 and January 2009, and vice versa. Betting on a reversal in the coming weeks may also make sense, but would likely entail a high level of risk.
- > The factor strategies of Minimum Variance, Multifactor, Quality, and Value did well after the onset of the GFC. They may do well now, too.

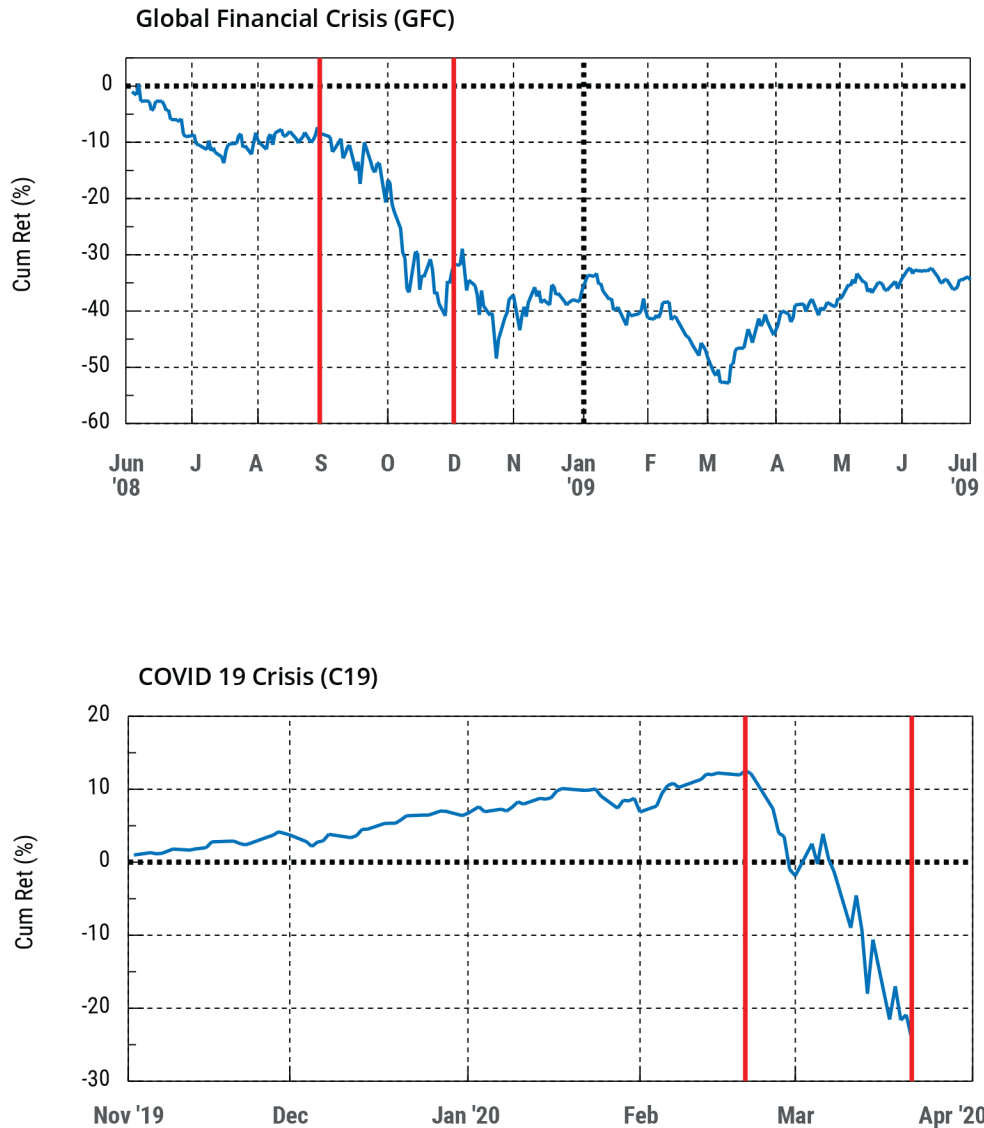
Introduction

As we struggle through the second major financial crisis in less than 12 years, this paper examines the similarities of the two crises, in an effort to identify sensible investment strategies for the next few weeks.

Fig. 1 shows the cumulative return of the STOXX USA 900 over two time horizons: The global financial crisis (GFC) from June 2008 to July 2009, and the COVID-19 crisis (C19), from November 2019 to April 2020. Red lines demarcate the time window used herein as the “start” of each crisis: GFC = 8/29/08 to 10/31/08; C19 = 2/19/20 to 3/20/20. Both crises exhibit large drops in market value over the course of 2-3 weeks. During the GFC, the STOXX USA 900 lost about 30% (40% if you start from the beginning of June), while the C19 crisis has resulted in a loss of about 30% as of 3/20/2020. After November 2008, the market remained roughly flat for eight months, bottoming out in early March 2009.

Fig. 1. Cumulative return of the STOXX USA 900 over two time horizons.

- > The GFC from June 2008 to July 2009 (top)
- > The C19 crisis from November 2019 to April 2020 (bottom).
- > Red lines demarcate the time window used as the “start” herein: GFC = 8/29/08 to 10/31/08; C19 = 2/19/20 to 3/20/20.



Source: Qontigo.

So, do similar market drops mean what follows next will be similar as well? No one knows (yet), but this paper attempts to compare what we do know about the two crises so far so that we can at least know what similarities to potentially expect.

In performing this analysis, we partition the crises into two time periods, a starting time period and a follow-up period. These are defined in Table 1 below.

Table 1. The starting and follow-up time windows used here for each crisis.

Name	Time Window
Start of GFC	8/29/2008 to 10/31/2008
GFC 5M Follow Up	10/31/2008 to 3/31/2008
Start of C19	2/19/2020 to 3/20/2020
C19 Follow Up	3/30/2020 to TBD

The five-month GFC follow up ends very close to the bottom of the market, which was then followed by a junk rally. A future article will examine trends that worked well during that time period.

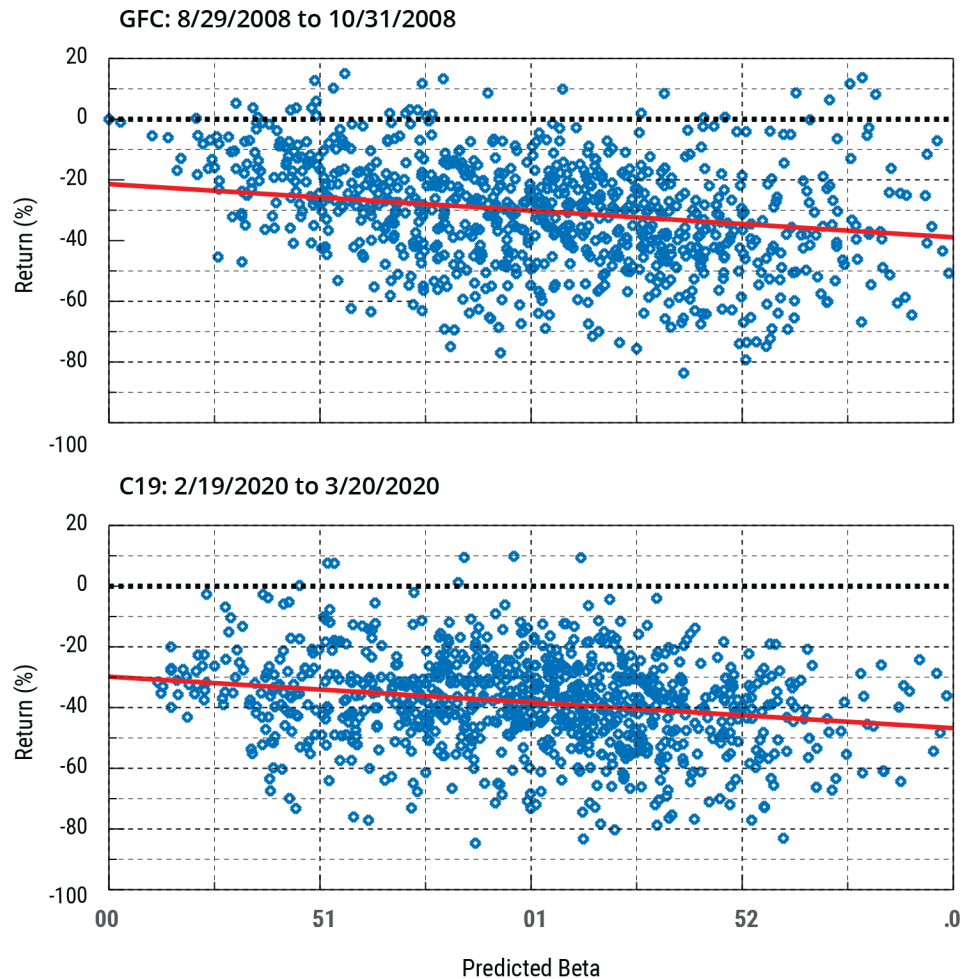
Identifying Winning and Losing Stocks

To identify out- and under-performing assets, we regress each asset's predicted beta (as of the starting date of the crisis) against the realized return over the initial market drop (indicated by the red bars in Fig. 1)¹. The predicted beta is calculated using the Axioma Medium Horizon, Fundamental Factor US Equity Risk Model (AXUS4-MH) and the STOXX USA 900 benchmark as of either 8/29/2008 or 2/19/2020.

Fig. 2 shows the data and the linear regression for the GFC (top) and the C19 (bottom). While both regressions show negative slopes (larger losses for names with higher beta), it is a shallow slope. In other words, stocks with lower beta performed somewhat better, but even low beta stocks had awful returns.

¹ In the regression, we equal-weight all names in the benchmark. Other weighting schemes produced similar results.

Fig. 2. Predicted beta versus realized return for the GFC (top) and C19 (bottom). The linear regression fit is shown by the red line. Source: Qontigo.



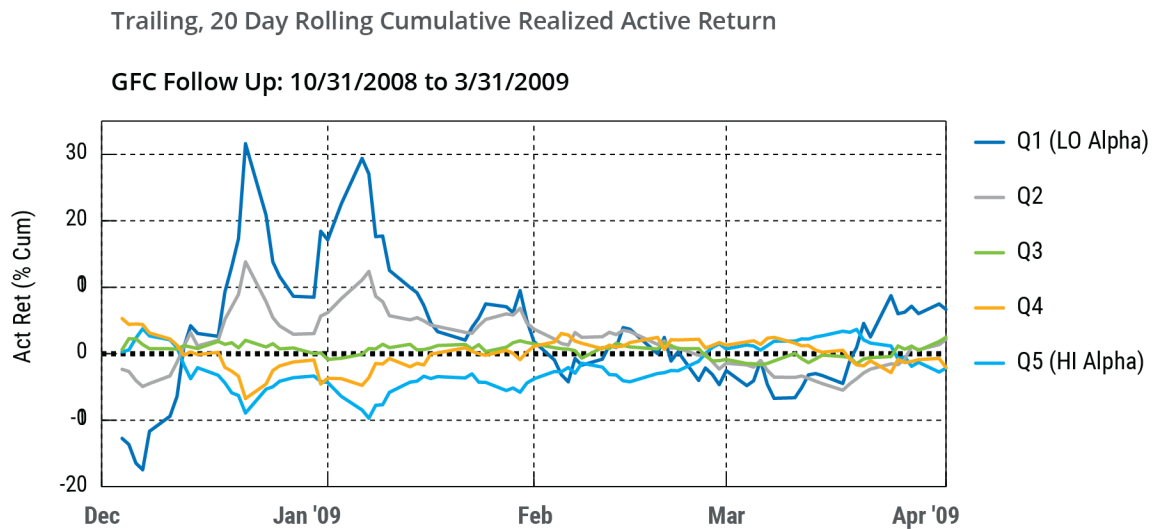
Here we assume that the residual of the regression is an alpha signal. The blue data points above the red line have positive residuals/alphas, while those below the red line have negative residuals/alphas. This alpha captures the performance of each name that deviates from the beta prediction over the start of the crisis.

Appendix A lists the names with largest and smallest 30 alphas during the starts of the GFC and the C19. The names and industries are what one would expect. For the GFC, Banks and Airlines did well, while Insurance and Oil & Gas did poorly. For the C19, Health Care and Consumer Staples did well, while Hotels, Restaurants, and Oil & Gas did poorly.

Next, we test our alpha signal over the five months following the GFC (e.g. from 10/31/2008 to 3/31/2009). We perform a backtest with cap-weighted quintiles based on the alpha signal, and compute the 20-day, rolling active return, which is shown in Fig. 3.

Fig. 3. The trailing, 20-day, rolling cumulative active return for the cap-weighted, alpha quintiles in the five months after the start of the GFC.

Q1 = quintile with the smallest alphas; **Q5** = quintile with the largest alphas.



Source: Qontigo.

The rolling active returns show that the Q1 and Q2 (low alpha) quintiles experienced substantial out-performance in December and January, rebounding from their disastrous performance during the start of the GFC. Also, the Q4 and Q5 quintiles under-performed during the same time period. Hence, all four quintiles exhibit a reversal of their performance during the start of the GFC.

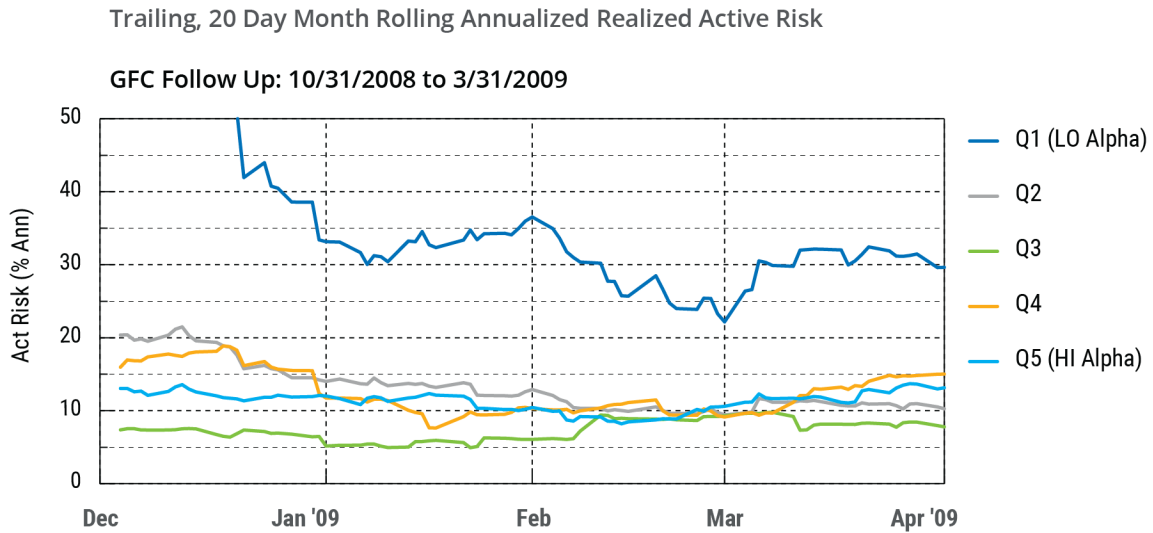
This data suggests that the same reversal could occur during the C19. That is, **hotel, restaurant, and airlines** stocks, which have been battered during the start of the C19, may rebound, and the rebound may be substantial. Conversely, the **biotech, and food & household-product** companies that have outperformed the market recently may lag in the months ahead.

A reversal such as that would not be surprising, but one should be cautious. Some of the names that rebounded during the GFC, such as AIG, the worst performer during the start of the GFC, did so in part because of government support. Others, such as Lehman, did not receive any. Although the federal government is working on legislation to help industries hurt by the C19, it remains unclear how extensive that will be.

This uncertainty surrounding the fate of the Q1 names is reflected in the tracking error of the Q1 portfolios, which is shown in Fig. 4. While quintiles Q2 to Q5 exhibit similar tracking errors, the Q1 quintile has tracking errors more than two times higher.

Fig. 4. The trailing, 20-day, rolling active risk (tracking error) for the cap-weighted, alpha quintiles in the five months after the start of the GFC.

Q1 = quintile with the smallest alphas; **Q5** = quintile with the largest alphas.



Source: Qontigo.

For those who anticipate a rebound, betting on the Q1 names may prove to be the best strategy, but it may require a high tolerance for risk. For those who believe a rebound is likely but have less tolerance for risk, a bet on Q2, the second worst quintile, may be more palatable.

Identifying Winning and Losing Factors

Next, we examine winning and losing investment factors, such as momentum and value.

Before doing so, however, a few comments about sector and industry returns are in order, since one of the most obvious aspects of both the GFC and the C19 has been a clear separation of the market into winning and losing sectors and industries. Appendix B gives the sector and industry performance statistics for the starts of the GFC and the C19.

Anyone who has followed the news lately will recognize the winning and losing sectors. The three best-performing sectors are the same in each crisis, although in a different order, while only Industrials is in the bottom three for both crises.

Three Best Performing Sectors

GFC	Consumer Staples, Health Care, & Telecommunication Services ²
C19	Telecommunication Services, Consumer Staples, & Health Care

Three Worst Performing Sectors

GFC	Industrials, Real Estate, & Materials
C19	Industrials, Financials, & Energy

None of this is surprising, but it highlights an important point: any portfolio that is industry- or sector-neutral will almost certainly diversify away a substantial fraction of any over- or under-performance. In other words, a sector- or industry-neutral portfolio will most likely have returns more similar to the underlying benchmark than the industry and sector returns shown in Appendix B. Of course, this is precisely the rationale for maintaining that neutrality in the first place.

As a result, one cannot expect to recover a large fraction of the recent losses using factor investing, simply because most factors are designed to be industry neutral. In fact, the factor returns associated with style factors in a factor risk model can be thought of as the returns of perfectly industry-neutral portfolios.

Nevertheless, one can identify winning and losing factors. Here, we use the STOXX Minimum Variance and STOXX Factor Indices to identify eight potential investment factors: Multifactor, Momentum, Quality, (Low) Size, Value, Low Risk, Minimum Variance, and Minimum Variance Unconstrained. We run backtests over the three time windows for which we have data, and show those results in Table 2. In those tables, outperforming factors are highlighted in green.

² There are only a handful of names in the Telecommunication Services Sector, so performance may be dominated by one or two names.

Table 2. Performance statistics of factor indices. Outperforming factors are highlighted in green.

- > **2A.** Performance statistics of factor indices over the start of C19.
- > **2B.** Performance statistics of factor indices over the start of the GFC.
- > **2C.** Performance statistics of factor indices over the 5-month follow-up of the GFC.

Source: Qontigo. Index data prior to launch is simulated.

Start of C19 2/19/2020 to 3/20/2020	Realized Return (Cum)	Realized Risk (% Ann)	Sharpe Ratio	Realized Active Return (Cum)	Realized Active Risk (% Ann)	Information Ratio
STOXX USA 900	-32.6%	81.7%	-1.21			
STOXX USA 900 Ax Multifactor	-32.2%	78.7%	-1.26	0.4%	9.4%	0.01
STOXX USA 900 Ax Momentum	-33.3%	83.2%	-1.19	-0.7%	8.7%	-0.01
STOXX USA 900 Ax Quality	-31.5%	77.6%	-1.27	1.2%	7.5%	0.03
STOXX USA 900 Ax Size	-36.3%	80.6%	-1.23	-3.6%	9.7%	-0.05
STOXX USA 900 Ax Value	-42.2%	92.8%	-1.08	-9.5%	15.6%	-0.06
STOXX USA 900 Ax Low Risk	-31.1%	75.5%	-1.31	1.5%	13.6%	0.02
STOXX USA 900 Minimum Variance	-26.3%	72.2%	-1.34	6.3%	22.6%	0.09
STOXX USA 900 Minimum Variance Unconstrained	-29.5%	73.1%	-1.34	3.2%	24.1%	0.03
Start of GFC 8/29/2008 to 10/31/2009	Realized Return (Cum)	Realized Risk (% Ann)	Sharpe Ratio	Realized Active Return (Cum)	Realized Active Risk (% Ann)	Information Ratio
STOXX USA 900	-25.5%	68.8%	-1.19			
STOXX USA 900 Ax Multifactor	-28.0%	63.3%	-1.34	-2.5%	11.4%	-0.29
STOXX USA 900 Ax Momentum	-26.8%	67.6%	-1.23	-1.3%	9.7%	-0.19
STOXX USA 900 Ax Quality	-27.6%	70.6%	-1.19	-2.1%	10.4%	-0.27
STOXX USA 900 Ax Size	-28.5%	65.9%	-1.30	-3.0%	11.9%	-0.33
STOXX USA 900 Ax Value	-29.5%	77.7%	-1.11	-3.9%	16.4%	-0.30
STOXX USA 900 Ax Low Risk	-18.6%	57.8%	-1.20	6.9%	15.2%	0.81
STOXX USA 900 Minimum Variance	-19.4%	53.7%	-1.32	6.1%	20.3%	0.52
STOXX USA 900 Minimum Variance Unconstrained	-14.5%	45.6%	-1.30	11.0%	29.8%	0.75
GFC Follow 5M Follow Up 10/31/2008 to 3/31/2009	Realized Return (Cum)	Realized Risk (% Ann)	Sharpe Ratio	Realized Active Return (Cum)	Realized Active Risk (% Ann)	Information Ratio
STOXX USA 900	-17.0%	53.8%	-0.69			
STOXX USA 900 Ax Multifactor	-14.8%	49.3%	-0.66	2.3%	9.1%	0.48
STOXX USA 900 Ax Momentum	-18.8%	47.3%	-0.85	-1.7%	9.8%	-0.33
STOXX USA 900 Ax Quality	-11.6%	50.2%	-0.52	5.5%	9.2%	1.17
STOXX USA 900 Ax Size	-17.8%	52.5%	-0.73	-0.8%	8.8%	-0.16
STOXX USA 900 Ax Value	-15.9%	53.7%	-0.65	1.1%	7.8%	0.27
STOXX USA 900 Ax Low Risk	-17.6%	44.5%	-0.86	-0.6%	11.9%	-0.09
STOXX USA 900 Minimum Variance	-11.1%	37.7%	-0.67	5.9%	20.2%	0.58
STOXX USA 900 Minimum Variance Unconstrained	-13.6%	29.0%	-1.04	3.5%	31.1%	0.22

- > First, the data confirms that, in general, the factor active returns are smaller than the industry and sector active returns, as expected due to their industry-neutral character.
- > Second, only three factors were winners in the starts of both crises: Low Risk, Minimum Variance, and Minimum Variance Unconstrained. However, at the start of the GFC, these factors had Information Ratios of between 0.52 and 0.81, while at the start of the C19, the Information Ratios were essentially zero.
- > Finally, looking at the GFC five-month follow up, there were five winning factors: Quality (IR = 1.17), Multifactor (IR = 0.48), Value (IR = 0.27), Minimum Variance (IR = 0.58) and Minimum Variance Unconstrained (IR = 0.22). It may be that one or more of these factors may outperform in the weeks ahead, too. Note, however, that the tracking error for both Minimum Variance factors is substantially higher than those of the other factors, as is expected for portfolios that minimize total risk. For those with limited tracking error mandates, the other factors (Multifactor, Quality, Value) may be more attractive.

Summary

We have performed two different analyses in order to identify investment strategies that may do well in the weeks ahead.

First, we created a simple alpha model to characterize the winners and losers during the start of two crises, the GFC and the C19. In the months following the start of the GFC, stocks experienced a reversal, with losers during the start of the GFC outperforming and winners during the start of the GFC underperforming. This suggests a similar reversal may occur in the weeks ahead for the winners and losers of the C19. While this would not be surprising, we note that the reversal of the initial losers of the GFC experienced a great deal of uncertainty (as measured by active risk). Betting on today's losers may be a good bet, but it requires a high tolerance for risk. For those with less risk appetite, a bet on the modest losers (Q2), may be more tolerable.

Second, we examined factor investments. Since these kinds of investments are normally industry neutral, their out/underperformance is smaller than those of pure sector or industry bets. Several factors outperformed during the start of the GFC, but during the start of the C19, the realized Information Ratios were all quite small. During the follow up to the GFC, Quality, Multifactor, Value and Minimum Variance were the outperforming factors.

Appendix A: Largest and Smallest Alphas

Table A1. The names with the largest (top) and smallest (bottom) alphas over the start of the GFC.

Table A1 gives the 30 names with the largest and smallest alphas for the start of the GFC, while Table A2 gives the best and worst names for the start of the C19.

Largest 30 Alphas — Start of GFC							
	Ticker	Description	Sector	Industry	Alpha	Beta	Realized Return
1	DAL	DELTA AIR LINES	Industrials	Airlines	77.3%	2.38	35.06%
2	RF	REGIONS FINANCIAL CORP NEW	Financials	Banks	68.0%	2.96	20.71%
3	WL	WILMINGTON TRUST CORP	Financials	Banks	62.2%	1.86	24.52%
4	BBT	BB&T CORP	Financials	Banks	61.7%	2.18	21.25%
5	MI	MARSHALL & ILSLEY CORP NEW	Financials	Banks	59.2%	2.37	17.08%
6	TCB	TCF FINL CORP	Financials	Banks	54.9%	2.19	14.34%
7	SNV	SYNOVUS FINL CORP	Financials	Banks	52.9%	2.12	12.91%
8	WFC	WELLS FARGO & CO NEW	Financials	Banks	52.2%	2.10	12.49%
9	MTB	M & T BK CORP	Financials	Banks	50.7%	1.78	13.68%
10	FNB	FNB CORP PA	Financials	Banks	48.4%	1.76	11.68%
11	JPM	JP MORGAN CHASE & CO	Financials	Diversified Financial Services	48.1%	2.14	7.99%
12	CYN	CITY NATL CORP	Financials	Banks	45.4%	1.82	8.16%
13	ONB	OLD NATL BANCORP IND	Financials	Banks	44.3%	1.63	8.66%
14	KEY	KEYCORP	Financials	Banks	44.1%	2.38	1.83%
15	AMR	AMR CORP	Industrials	Airlines	43.3%	2.63	-1.16%
16	BXS	BANCORPSOUTH INC	Financials	Banks	42.7%	1.71	6.35%
17	CMA	COMERICA INC	Financials	Banks	42.4%	2.37	0.28%
18	SVR	SYNIVERSE HLDG	Telecommunication Services	Wireless Telecommunication Services	41.6%	0.79	13.32%
19	FDO	FAMILY DLR STORES INC	Consumer Discretionary	Multiline Retail	41.4%	1.32	8.48%
20	PNY	PIEDMONT NAT GAS INC	Utilities	Gas Utilities	41.3%	0.56	15.04%
21	DV	DEVRY INC DEL	Consumer Discretionary	Diversified Consumer Services	40.7%	1.07	9.91%
22	WRB	BERKLEY W R CORP	Financials	Insurance	39.7%	0.74	11.79%
23	FLO	FLOWERS INDUSTRIES INC	Consumer Staples	Food Products	38.4%	0.49	12.77%
24	CB	CHUBB CORP	Financials	Insurance	37.9%	0.90	8.62%
25	STI	SUNTRUST BKS INC	Financials	Banks	37.0%	2.26	-4.18%
26	RAH	RALCORP HLDGS INC NEW	Consumer Staples	Food Products	36.3%	0.53	10.23%
27	GHL	GREENHILL	Financials	Capital Markets	35.7%	1.66	-0.20%
28	NAL	NEWALLIANCE BANCSH	Financials	Thriffs & Mortgage Finance	34.8%	1.46	0.66%
29	CHH	CHOICE HOTELS	Consumer Discretionary	Hotels Restaurants & Leisure	34.4%	1.26	1.99%
30	ICE	INTERCON EXCHANGE	Financials	Diversified Financial Services	34.3%	1.80	-2.81%

Smallest 30 Alphas — Start of GFC							
	Ticker	Description	Sector	Industry	Alpha	Beta	Realized Return
1	HL	HECLA MNG CO	Materials	Metals & Mining	-34.0%	1.04	-64.53%
2	HMA	HEALTH MGMT ASSOC INC NEW	Health Care	Health Care Providers & Services	-35.0%	0.85	-63.86%
3	KEG	KEY ENERGY SVCS INC	Energy	Energy Equipment & Services	-35.2%	0.74	-63.10%
4	SHS	SAUER-DANFOSS	Industrials	Machinery	-35.5%	1.33	-68.51%
5	CVH	COVENTRY HEALTH	Health Care	Health Care Providers & Services	-35.9%	0.57	-62.34%
6	XCO	EXCO RESOURCES	Energy	Oil Gas & Consumable Fuels	-36.0%	0.90	-65.29%
7	SPW	SPX CORP	Industrials	Machinery	-36.1%	1.14	-67.44%
8	CAR	AVIS BUDGET GROUP	Industrials	Road & Rail	-36.3%	2.37	-78.48%
9	HLX	HELIX ENERGY SOLNS	Energy	Energy Equipment & Services	-36.4%	0.90	-65.68%
10	CEG	CONSTELLATION ENERGY GROUP I	Utilities	Indpt Power & Renew Elec Prod'rs	-36.6%	0.62	-63.44%
11	X	UNITED STATES STL CORP NEW	Materials	Metals & Mining	-37.2%	1.57	-72.29%
12	ROC	ROCKWOOD HOLDINGS	Materials	Chemicals	-37.4%	0.98	-67.37%
13	SFI	ISTAR FINANCIAL	Financials	Mortg Real Estate Invest Tsts (REITs)	-38.4%	2.43	-81.04%
14	CTV	COMMSCOPE	Information Technology	Communications Equipment	-38.4%	1.16	-69.96%
15	PPO	POLYPORE INTL	Industrials	Electrical Equipment	-38.5%	1.03	-68.90%
16	CLF	CLEVELAND CLIFFS INC	Materials	Metals & Mining	-38.5%	1.53	-73.34%
17	AKS	AK STL HLDG CORP	Materials	Metals & Mining	-38.9%	1.51	-73.54%
18	TTI	TETRA TECHNOLOGIES INC DEL	Energy	Energy Equipment & Services	-39.1%	0.92	-68.56%
19	OZM	OCH-ZIFF CAPT MGT-A	Financials	Capital Markets	-39.5%	1.49	-73.95%
20	BC	BRUNSWICK CORP	Consumer Discretionary	Leisure Products	-39.8%	1.56	-74.84%
21	CVI	CVR ENERGY	Energy	Oil Gas & Consumable Fuels	-40.1%	1.15	-71.52%
22	RRI	RELIANT ENERGY	Utilities	Indpt Power & Renew Elec Prod'rs	-40.8%	0.79	-69.17%
23	SD	SANDRIDGE ENERGY	Energy	Oil Gas & Consumable Fuels	-40.9%	0.82	-69.43%
24	PCX	PATRIOT COAL	Energy	Oil Gas & Consumable Fuels	-41.6%	1.21	-73.60%
25	ES	ENERGYSOLUTIONS	Industrials	Commercial Services & Supplies	-43.3%	1.25	-75.58%
26	CNO	CONSECO	Financials	Insurance	-44.7%	1.51	-79.26%
27	VQ	VENOCO	Energy	Oil Gas & Consumable Fuels	-46.4%	0.81	-74.91%
28	PL	PROTECTIVE LIFE CORP	Financials	Insurance	-47.5%	0.93	-76.99%
29	HIG	HARTFORD FINL SVCS GROUP INC	Financials	Insurance	-50.3%	1.36	-83.64%
30	AIG	AMERICAN INTL GROUP INC	Financials	Insurance	-50.9%	2.14	-91.03%

Table A2. The names with the largest (top) and smallest (bottom) alphas over the start of the C19.

Largest 30 Alphas — Start of C19							
	Ticker	Description	Sector	Industry	Alpha	Beta	Realized Return
1	MRNA	MODERNA INC	Health Care	Biotechnology	89.6%	1.27	49.05%
2	TDOC	TELADOC HEALTH INC	Health Care	Health Care Technology	65.3%	1.73	20.77%
3	REGN	REGENERON PHARMACEUTICALS	Health Care	Biotechnology	48.7%	1.12	9.39%
4	GILD	GILEAD SCIENCES INC	Health Care	Biotechnology	47.8%	0.96	9.85%
5	ERIE	ERIE INDTY CO	Financials	Insurance	46.4%	0.84	9.49%
6	KR	KROGER CO	Consumer Staples	Food & Staples Retailing	41.9%	0.53	7.55%
7	CLX	CLOROX CO DEL	Consumer Staples	Household Products	41.8%	0.52	7.62%
8	DPZ	DOMINOS PIZZA INC	Consumer Discretionary	Hotels Restaurants & Leisure	38.0%	0.83	1.21%
9	DBX	DROPBOX INC	Information Technology	Software	36.8%	1.30	-3.98%
10	COG	CABOT OIL & GAS CORP	Energy	Oil Gas & Consumable Fuels	35.5%	1.19	-4.36%
11	GIS	GENERAL MLS INC	Consumer Staples	Food Products	33.9%	0.45	0.24%
12	CTXS	CITRIX SYS INC	Information Technology	Software	33.8%	0.72	-2.10%
13	LOGM	LOGMEIN INC	Information Technology	Software	33.0%	1.14	-6.39%
14	TIF	TIFFANY & CO NEW	Consumer Discretionary	Specialty Retail	31.6%	0.94	-6.13%
15	WMT	WALMART INC	Consumer Staples	Food & Staples Retailing	30.2%	0.36	-2.71%
16	CY	CYPRESS SEMICONDUCTOR CORP	Information Technology	Semicon & Semicon Equip	29.6%	0.63	-5.51%
17	WBC	WABCO HLDGS INC	Industrials	Machinery	29.2%	0.38	-3.81%
18	FLO	FLOWERS FOODS INC	Consumer Staples	Food Products	29.1%	0.23	-2.65%
19	UPS	UNITED PARCEL SERVICE INC	Industrials	Air Freight & Logistics	28.5%	1.21	-11.56%
20	MKTX	MARKETAXESS HLDGS INC	Financials	Capital Markets	28.5%	0.92	-9.09%
21	YUMC	YUM CHINA HLDGS INC	Consumer Discretionary	Hotels Restaurants & Leisure	28.3%	1.16	-11.36%
22	CPB	CAMPBELL SOUP CO	Consumer Staples	Food Products	28.2%	0.43	-5.21%
23	NFLX	NETFLIX INC	Consumer Discretionary	Internet & Direct Marketing Retail	27.7%	1.39	-13.82%
24	DOCU	DOCUSIGN INC	Information Technology	Software	27.7%	1.27	-12.89%
25	SJM	SMUCKER J M CO	Consumer Staples	Food Products	27.4%	0.41	-5.86%
26	PKG	PACKAGING CORP AMER	Materials	Containers & Packaging	26.6%	1.08	-12.31%
27	CHRW	C H ROBINSON WORLDWIDE INC	Industrials	Air Freight & Logistics	26.6%	1.08	-12.36%
28	DLR	DIGITAL RLTY TR INC	Real Estate	Equity Real Estate Invest Trts (REITs)	26.6%	0.52	-7.67%
29	TTWO	TAKE-TWO INTERACTIVE SOFTWARE	Information Technology	Software	26.3%	0.97	-11.79%
30	WBA	WALGREENS BOOTS ALLIANCE INC	Consumer Staples	Food & Staples Retailing	26.2%	0.86	-10.85%

Smallest 30 Alphas — Start of C19							
	Ticker	Description	Sector	Industry	Alpha	Beta	Realized Return
1	TOL	TOLL BROTHERS INC	Consumer Discretionary	Household Durables	-29.9%	0.81	-66.59%
2	DVN	DEVON ENERGY CORP NEW	Energy	Oil Gas & Consumable Fuels	-30.0%	1.55	-72.91%
3	HHC	HOWARD HUGHES CORP	Real Estate	Real Estate Management & Development	-30.1%	1.00	-68.37%
4	VTR	VENTAS INC	Real Estate	Equity Real Estate Invest Trts (REITs)	-30.4%	0.38	-63.45%
5	SIX	SIX FLAGS ENTMT CORP NEW	Consumer Discretionary	Hotels Restaurants & Leisure	-30.9%	0.93	-68.64%
6	CCL	CARNIVAL CORP	Consumer Discretionary	Hotels Restaurants & Leisure	-31.2%	1.29	-71.99%
7	DRI	DARDEN RESTAURANTS INC	Consumer Discretionary	Hotels Restaurants & Leisure	-31.7%	0.73	-67.68%
8	MGM	MGM RESORTS INTERNATIONAL	Consumer Discretionary	Hotels Restaurants & Leisure	-31.9%	1.14	-71.37%
9	PK	PARK HOTELS RESORTS INC	Real Estate	Equity Real Estate Invest Trts (REITs)	-32.6%	0.99	-70.78%
10	ADS	ALLIANCE DATA SYSTEMS CORP	Information Technology	IT Services	-33.3%	1.15	-72.82%
11	BA	BOEING CO	Industrials	Aerospace & Defense	-33.5%	1.01	-71.92%
12	SPR	SPIRIT AEROSYSTEMS HLDGS INC	Industrials	Aerospace & Defense	-33.8%	0.92	-71.36%
13	MUR	MURPHY OIL CORP	Energy	Oil Gas & Consumable Fuels	-34.3%	1.33	-75.36%
14	USFD	US FOODS HLDG CORP	Consumer Staples	Food & Staples Retailing	-34.4%	0.38	-67.41%
15	HAL	HALLIBURTON CO	Energy	Energy Equipment & Services	-34.4%	1.52	-77.08%
16	AAN	AARONS INC	Consumer Discretionary	Specialty Retail	-35.0%	1.00	-73.23%
17	OXY	OCCIDENTAL PETE CORP	Energy	Oil Gas & Consumable Fuels	-35.1%	1.12	-74.42%
18	WPX	WPX ENERGY INC	Energy	Oil Gas & Consumable Fuels	-35.2%	1.39	-76.75%
19	FANG	DIAMONDBACK ENERGY INC	Energy	Oil Gas & Consumable Fuels	-35.4%	1.33	-76.41%
20	PFGC	PERFORMANCE FOOD GROUP CO	Consumer Staples	Food & Staples Retailing	-36.5%	0.43	-69.91%
21	OKE	ONEOK INC NEW	Energy	Oil Gas & Consumable Fuels	-37.2%	0.72	-73.07%
22	NBL	NOBLE ENERGY INC	Energy	Oil Gas & Consumable Fuels	-37.9%	1.30	-78.70%
23	RCL	ROYAL CARIBBEAN CRUISES LTD	Consumer Discretionary	Hotels Restaurants & Leisure	-38.6%	1.16	-78.30%
24	EPR	EPR PROPERTIES	Real Estate	Equity Real Estate Invest Trts (REITs)	-39.7%	0.44	-73.22%
25	APA	APACHE CORP	Energy	Oil Gas & Consumable Fuels	-39.7%	1.60	-83.03%
26	TRGP	TARGA RES CORP	Energy	Oil Gas & Consumable Fuels	-40.3%	1.20	-80.24%
27	RHP	RYMAN HOSPITALITY PPTYS INC	Real Estate	Equity Real Estate Invest Trts (REITs)	-41.3%	0.58	-76.00%
28	SVC	SERVICE PROPERTIES TRUST	Real Estate	Equity Real Estate Invest Trts (REITs)	-42.1%	0.61	-77.10%
29	NCLH	NORWEGIAN CRUISE LINE HLDG L	Consumer Discretionary	Hotels Restaurants & Leisure	-43.9%	1.12	-83.24%
30	SABR	SABRE CORP	Information Technology	IT Services	-47.5%	0.87	-84.65%

Some readers may be surprised to see several Bank stocks listed as the best performers during the start of the GFC, as the newspapers were filled with stories of “banks” in distress. Although some of the names in the GICS Bank industry did poorly, the more “famous” banks were classified in different GICS Industries:

- > Goldman Sachs Group, Industry = Capital Markets, Realized Return = -43.41%
- > Citigroup Inc., Industry = Diversified Financial Services, Realized Return = -27.24%
- > American Express Co., Industry = Consumer Finance, Realized Return = -30.34%

The banks listed as top performers during the GFC did not have the same kind of financial exposure to bad debt that the more famous banks did.

Appendix B: Sector and Industry Performance

One of the most important aspects of both the GFC and the C19 has been a clear separation of the market into winning and losing sectors and industries. Table B1 shows various performance statistics of the 11 GICS Sectors during the start of both crises, with the sectors sorted by their returns from highest to lowest.

Table B1. Performance statistics of the GICS Sectors during the start of two crises: the C19 (top) and the GFC (bottom).

Start of C19: 2/19/2020 to 3/20/2020	Realized Return (Cum)	Realized Risk (% Ann)	Ave Names Held	Ave Predicted Beta	Percent Up Days (Act Ret)
STOXX USA 900 (Benchmark)	-32.65%	81.7%	900.0	1.00	
Telecommunication Services	-19.98%	67.1%	6.6	0.65	77%
Consumer Staples	-22.36%	73.8%	44.0	0.62	73%
Health Care	-24.35%	68.9%	102.0	0.88	77%
Information Technology	-30.80%	90.5%	164.4	1.16	55%
Utilities	-32.18%	89.2%	43.0	0.55	59%
Consumer Discretionary	-33.34%	75.5%	131.0	1.04	55%
Materials	-33.76%	81.1%	45.0	1.08	45%
Real Estate	-37.21%	94.5%	75.0	0.74	50%
Industrials	-39.25%	80.3%	123.0	1.10	45%
Financials	-40.45%	100.6%	134.0	1.07	36%
Energy	-53.23%	114.2%	32.0	1.29	23%

Start of GFC: 8/29/2008 to 10/31/2008	Realized Return (Cum)	Realized Risk (% Ann)	Ave Names Held	Ave Predicted Beta	Percent Up Days (Act Ret)
STOXX USA 900 (Benchmark)	-25.52%	68.8%	896.5	1.00	
Consumer Staples	-12.31%	49.7%	53.0	0.46	61%
Health Care	-19.54%	53.8%	64.6	0.54	57%
Telecommunication Services	-20.11%	72.5%	12.0	0.89	50%
Utilities	-23.18%	69.7%	73.0	0.68	55%
Financials	-24.36%	100.4%	113.7	1.64	48%
Consumer Discretionary	-27.75%	64.8%	131.0	1.09	43%
Energy	-28.34%	105.5%	95.4	1.08	50%
Information Technology	-29.69%	61.2%	66.5	0.95	41%
Industrials	-29.82%	61.3%	145.0	1.06	45%
Real Estate	-30.16%	100.9%	69.4	1.25	43%
Materials	-40.80%	90.6%	71.9	1.24	41%

Table B2. The 25 best (top) and worst (bottom) performing industries over the start of the GFC.

Table B2 gives the 25 best- and worst-performing industries over the start of the GFC, while Table B3 gives the 25 best- and worst-performing industries over the start of C19 crisis.

25 Best Performing Industries Start of GFC		Realized Return (Cum)	Realized Risk (% Ann)	Ave Names Held	Ave Predicted Beta	Percent Up Days (Act Ret)
1	Banks	6.71%	97.34%	22.1	1.74	57%
2	Airlines	-2.96%	84.12%	3.5	1.28	48%
3	Water Utilities	-5.36%	62.90%	1.5	0.73	57%
4	Distributors	-6.38%	53.58%	1.0	0.59	55%
5	Household Products	-7.85%	49.86%	6.0	0.27	66%
6	Food Products	-10.58%	44.76%	20.5	0.57	55%
7	Food & Staples Retailing	-11.05%	53.80%	10.5	0.62	66%
8	Thriffs & Mortgage Finance	-11.52%	96.69%	4.5	1.56	52%
9	Pharmaceuticals	-13.36%	51.16%	11.0	0.51	55%
10	Tobacco	-14.37%	63.93%	5.5	0.35	52%
11	Diversified Financial Services	-14.61%	129.40%	8.5	2.07	50%
12	Diversified Telecommunication Services	-15.47%	71.12%	5.0	0.85	52%
13	Beverages	-17.03%	55.30%	6.5	0.41	52%
14	Multi-Utilities	-18.36%	64.06%	22.9	0.61	57%
15	Air Freight & Logistics	-18.60%	57.19%	2.0	0.98	52%
16	Mortgage Real Estate Investment Trusts (REITs)	-19.30%	135.85%	3.9	1.59	48%
17	Diversified Consumer Services	-19.58%	59.92%	8.0	0.87	48%
18	Textiles Apparel & Luxury Goods	-19.81%	72.85%	12.0	1.04	55%
19	Electric Utilities	-20.12%	68.12%	25.0	0.65	55%
20	Gas Utilities	-20.64%	85.89%	15.6	0.76	45%
21	Commercial Services & Supplies	-21.69%	55.30%	17.1	0.81	48%
22	Health Care Equipment & Supplies	-22.07%	51.16%	20.5	0.50	52%
23	Technology Hardware Storage & Peripherals	-23.18%	57.22%	10.0	0.79	52%
24	Road & Rail	-23.82%	69.54%	9.5	1.10	48%
25	Specialty Retail	-24.05%	64.47%	31.5	1.12	50%

25 Worst Performing Industries Start of GFC		Realized Return (Cum)	Realized Risk (% Ann)	Ave Names Held	Ave Predicted Beta	Percent Up Days (Act Ret)
44	Media	-30.52%	72.63%	20.5	0.92	39%
45	Construction Materials	-31.17%	77.46%	4.0	1.45	45%
46	Containers & Packaging	-31.49%	59.66%	12.0	1.09	43%
47	IT Services	-32.24%	68.27%	19.5	1.10	45%
48	Semiconductors & Semiconductor Equipment	-32.94%	66.09%	9.0	1.02	45%
49	Personal Products	-33.44%	60.75%	4.0	0.53	52%
50	Electrical Equipment	-33.80%	76.26%	15.5	1.12	41%
51	Transportation Infrastructure	-34.26%	63.26%	0.5	0.62	55%
52	Chemicals	-34.58%	86.89%	34.0	1.15	43%
53	Leisure Products	-34.91%	60.11%	4.0	1.03	52%
54	Life Sciences Tools & Services	-36.06%	64.82%	6.0	0.56	57%
55	Capital Markets	-36.93%	111.24%	25.6	1.70	45%
56	Real Estate Management & Development	-37.54%	101.88%	4.0	1.27	52%
57	Electronic Equipment Instruments & Components	-37.59%	63.64%	13.0	0.93	32%
58	Paper & Forest Products	-38.22%	79.51%	5.0	1.27	52%
59	Insurance	-38.96%	92.53%	43.5	1.16	48%
60	Building Products	-40.05%	57.67%	7.0	1.14	48%
61	Automobiles	-41.50%	88.19%	3.0	1.64	39%
62	Communications Equipment	-41.75%	79.79%	7.0	1.11	36%
63	Machinery	-42.14%	71.59%	38.5	1.18	39%
64	Construction & Engineering	-46.76%	110.71%	9.0	1.51	39%
65	Auto Components	-47.96%	72.68%	7.0	1.23	32%
66	Indpt Power & Renew Elec Prod'rs	-49.14%	111.45%	8.0	1.01	39%
67	Energy Equipment & Services	-49.21%	117.53%	34.0	1.11	43%
68	Metals & Mining	-54.37%	122.14%	16.9	1.48	34%

Table B3. The 25 best (top) and worst (bottom) performing industries over the start of the C19.

25 Best Performing Industries Start of C19		Realized Return (Cum)	Realized Risk (% Ann)	Ave Names Held	Ave Predicted Beta	Percent Up Days (Act Ret)
1	Food & Staples Retailing	-12.22%	74.40%	8.0	0.60	68%
2	Biotechnology	-15.57%	66.26%	21.0	0.89	73%
3	Health Care Technology	-15.88%	58.18%	3.0	0.93	59%
4	Household Products	-16.78%	79.50%	5.0	0.60	68%
5	Internet & Direct Marketing Retail	-18.37%	65.74%	10.0	1.09	68%
6	Pharmaceuticals	-19.06%	63.16%	11.0	0.68	77%
7	Diversified Telecommunication Services	-19.64%	66.61%	4.6	0.64	77%
8	Air Freight & Logistics	-21.14%	75.59%	5.0	1.20	55%
9	Multiline Retail	-21.49%	77.45%	6.0	0.78	68%
10	Food Products	-22.35%	67.86%	18.0	0.61	77%
11	Life Sciences Tools & Services	-23.24%	66.17%	13.0	1.10	59%
12	Communications Equipment	-23.72%	83.95%	7.0	1.12	50%
13	Wireless Telecommunication Services	-25.03%	91.21%	2.0	0.82	50%
14	Software	-27.19%	93.49%	55.0	1.06	64%
15	Tobacco	-27.21%	83.08%	2.0	0.58	59%
16	Diversified Financial Services	-27.53%	84.11%	4.0	0.88	64%
17	Gas Utilities	-29.22%	91.97%	7.0	0.66	64%
18	Containers & Packaging	-29.32%	78.93%	11.0	1.02	50%

19	Water Utilities	-29.76%	105.13%	2.0	0.50	64%
20	Tech Hardware Storage & Peripherals	-30.03%	94.70%	8.0	1.32	45%
21	Health Care Equipment & Supplies	-30.05%	66.62%	32.0	0.90	50%
22	Multi-Utilities	-30.39%	90.74%	12.0	0.55	64%
23	Metals & Mining	-30.44%	74.87%	7.0	0.92	50%
24	Internet Software & Services	-30.87%	78.59%	7.0	1.06	50%
25	Personal Products	-31.76%	85.25%	3.0	0.99	55%

25 Worst Performing Industries Start of C19		Realized Return (Cum)	Realized Risk (% Ann)	Ave Names Held	Ave Predicted Beta	Percent Up Days (Act Ret)
1	Electrical Equipment	-37.53%	98.50%	9.0	1.20	36%
2	Building Products	-37.63%	74.22%	9.5	1.00	50%
3	Textiles Apparel & Luxury Goods	-38.00%	78.25%	12.0	1.14	36%
4	Road & Rail	-38.26%	91.78%	10.0	1.19	50%
5	Construction Materials	-39.95%	105.62%	3.0	0.92	32%
6	Construction & Engineering	-40.36%	83.60%	4.0	1.14	36%
7	Specialty Retail	-40.57%	96.99%	19.0	0.94	59%
8	Indpt Power & Renew Elec Prod'rs	-40.90%	113.35%	2.3	0.82	41%
9	Insurance	-41.31%	89.10%	41.0	0.93	27%
10	Distributors	-42.01%	83.65%	3.0	1.00	50%
11	Hotels Restaurants & Leisure	-42.82%	90.42%	28.0	1.09	36%
12	Banks	-43.38%	113.92%	42.0	1.18	27%
13	Auto Components	-44.46%	113.89%	5.0	1.27	41%
14	Aerospace & Defense	-47.01%	86.03%	19.0	1.03	32%
15	Household Durables	-49.08%	88.95%	11.0	1.00	27%
16	Real Estate Management & Development	-49.48%	99.88%	3.0	1.14	27%
17	Marine	-50.96%	125.49%	1.0	1.21	36%
18	Automobiles	-51.00%	110.57%	4.0	1.47	32%
19	Leisure Products	-51.09%	96.22%	4.0	1.26	27%
20	Consumer Finance	-52.18%	119.39%	8.0	1.14	27%
21	Oil Gas & Consumable Fuels	-52.41%	111.93%	27.0	1.26	23%
22	Mortgage Real Estate Investment Trusts (REITs)	-53.19%	103.76%	5.0	0.85	36%
23	Airlines	-59.50%	116.20%	6.0	1.35	36%
24	Energy Equipment & Services	-61.74%	147.78%	5.0	1.69	27%
25	Transportation Infrastructure	-65.32%	204.97%	1.0	1.09	41%

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