Diagnosing factor performance during epidemics

March 2020

Research Signals

In the final week of February 2020, US stocks recorded their worst weekly loss, at that time, since the financial crisis on fears surrounding the coronavirus, significantly **impacting** factor performance. Further developments in subsequent weeks saw market volatility **spilling over** into early March, followed by the **official end** to the near 11-year bull market run while markets whipsawed on every piece of news. In prior epidemics the economic impact has tended to be temporary, although the initial global economic impact of COVID-19 has been harsher and more widespread. In this report, we attempt to add some sense of order to the chaos, with a review of factor performance during epidemics which have occurred since the turn of the century.

- In prior epidemics, 60-Month Beta, Natural Logarithm of Market Capitalization and, for the most part, Book-to-Market and Altman Z Score saw large magnitude factor performance early on and remained directionally the same over the longer term
- While each epidemic resided in its own unique market environment, underperformance was generally associated with 3-M Revision in FY2 EPS Forecasts and, to a lesser extent, with Industry-adjusted 12-month Relative Price Strength
- Across our style models, value strategies tended to outpace the growth and momentum strategies over the short term at the onset of prior epidemics

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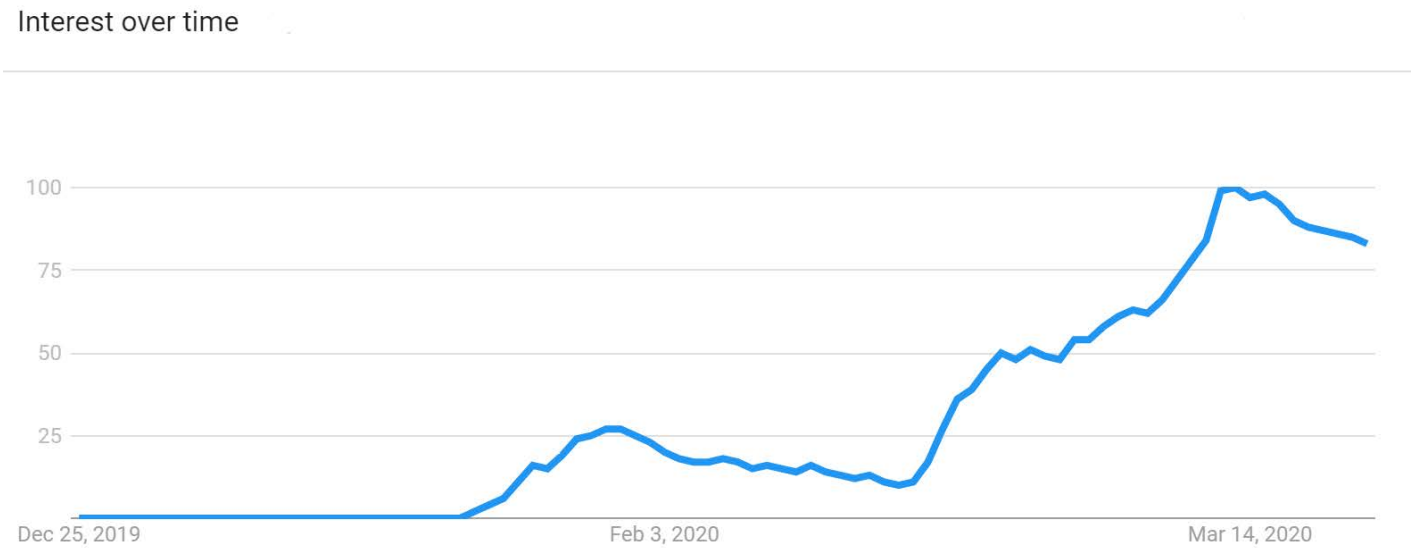
Introduction

The World Health Organization (WHO) was first alerted on 31 December 2019 to pneumonia cases in Wuhan, China caused by an unknown virus, later named the coronavirus disease 2019 (COVID-19) virus. Since that time, cases have continued to rise in over 100 countries and the outbreak has officially been named a pandemic, according to the WHO. Equity markets, in turn, entered bear market territory in early March, ending the longest bull run in history on volatility levels eventually **surpassing** the financial crisis, as fears surrounding the coronavirus, from both a health and economic basis, escalated. To be sure, as of 22 March, interest in searches for the term "coronavirus" (Figure 1) leveled off from early February through the third week of the month, before increasing exponentially in lockstep with market volatility and reaching its apex in interest on 13 March, according to Google Trends.

Figure 1



Source: Google

While the extent and length of the pandemic and the ultimate impact on markets are unknown, we perform an event study during prior epidemics to shed light on historical trends in market and factor performance. Table 1 lists the epidemics that we studied over the past 20 years in addition to the subsequent 1-, 3-, 6- and 12-month market cumulative returns from the month end date, proxied by the iShares Russell 1000 ETF (IWB), sourced from the IHS Markit ETF Analytics database. Interestingly, market returns were positive during each event over longer holding periods, with negative returns posted only for MERS (-1.38%) and Zika (-0.04%) at the 1-month time horizon. This contrasts starkly with the year-to-date (as of 20 March 2020) return of -29.05% as a result of COVID-19.

Table 1

Epidemics and market cumulative returns (%)

Epidemic	Month end	1-month	3-month	6-month	12-month
SARS	April 2003	5.68	8.79	15.82	21.76
Avian flu	June 2006	0.22	4.56	11.28	18.26
Dengue fever	September 2006	3.37	6.43	7.24	14.83
Swine flu	April 2009	5.51	13.16	18.80	37.37
Cholera	November 2010	6.14	12.43	14.36	5.29
MERS	May 2013	-1.38	0.53	11.14	18.56
Ebola	March 2014	0.46	5.08	4.85	10.62
Zika	January 2016	-0.04	6.94	12.55	18.29
COVID-19	December 2019	0.10	-29.05*	NA	NA

Source: IHS Markit

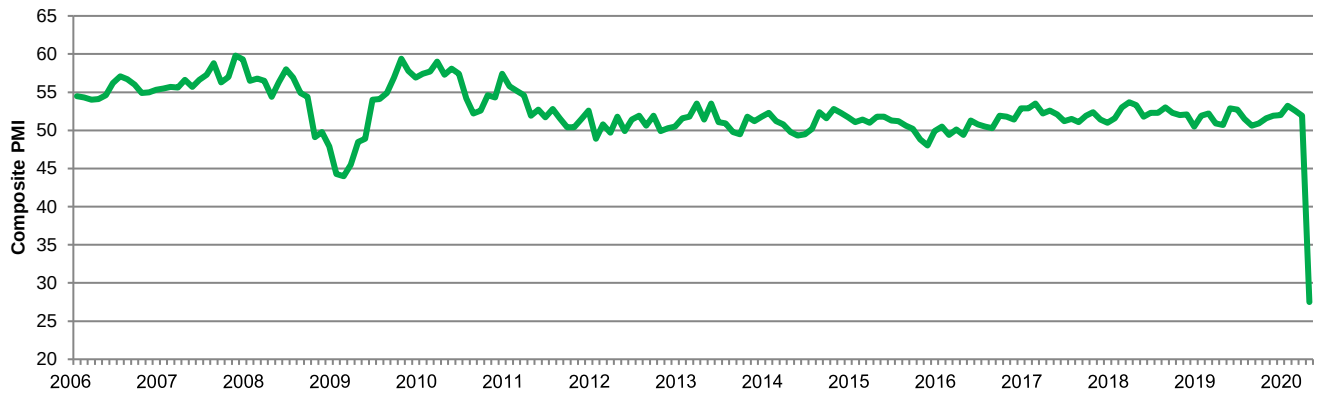
*Through 20 March 2020

We remark, however, that each epidemic occurred in its own unique market environment, differentiating it from the COVID-19 outbreak, especially with respect to the current market rout. For example, the swine flu, a novel H1N1 influenza virus that emerged in 2009, was the only recent outbreak that reached the level of a pandemic; however, we note that it overlapped with the significant turnaround from the financial crisis in 2009 which was very influential on market results. Other epidemics were more centralized outside the US, such as the avian flu and Dengue fever in 2006 and the Haiti cholera outbreak in 2010.

As another example, at the time of SARS, mainland China was the world's sixth-largest economy, accounting for only 4.2% of global GDP. Now, mainland China is the world's second-largest economy, accounting for 16.3% of global GDP. Furthermore, mainland China is more vulnerable today than it was in 2003, with productivity and overall economic growth already slowing amid the effects of the mainland China-US trade conflict. The China Composite PMI (Figure 2) provides a clear depiction of the uniqueness of the current environment. The unprecedented drop over the history of the series, from 51.9 in January to 27.5 in February, was especially driven by the impact of company closures and travel restrictions on the services sector (February PMI: 26.5).

Figure 2

China seasonally-adjusted Composite PMI



Source: IHS Markit

Factor performance during prior epidemics

With this understanding, we begin our study with a performance review covering a representative group of factors spanning major style groups from our 400+ factor library. Our analysis is based on 1-month decile spreads along with 3-, 6- and 12-month cumulative monthly decile spreads across our US Large Cap universe, which consists of approximately 1,000 of the largest cap names. The decile spread is computed as the difference in the equal-weighted monthly return at the top (decile 1) and bottom (decile 10) tails.

First, from a factor perspective, we focus our results on several factors of interest covering value, momentum, size, risk and short sentiment signals, namely Book-to-Market, TTM EBITDA-to-Enterprise Value, 3-M Revision in FY2 EPS Forecasts, Industry-adjusted 12-Month Relative Price Strength, Natural Logarithm of Market Capitalization, 60-Month Beta, Altman Z-score and Demand Supply Ratio. Performance results across 1- through 12-month spreads are summarized in Tables 2 through 5.

Based on the caveats cited above, we focus our observations on specific results of interest, rather than a more generalized commentary on aggregated results. For 60-Month Beta, large magnitude spreads in the shorter time horizons remained directionally the same over the longer term, such as the SARS (Avian flu) 1-month spread of -10.49% (8.99%) compared with the 12-month spread of -13.16% (3.40%). The same can be said for Natural Logarithm of Market Capitalization, as demonstrated by the SARS (Zika) 1-month spread of 9.24% (7.10%) which extended out to a 12-month spread of 28.37% (34.14%).

While Book-to-Market and Altman Z Score performance also tended to remain directionally the same, a notable exception occurred during the Ebola epidemic, where 1-month spreads of 3.30% and 6.23% turned negative by the 6-month horizon, at –3.62% and –1.20%, respectively. We also draw attention to the extreme performance behavior during the swine flu epidemic which coincided with the financial crisis recovery period. Here we find more heightened risk taking in low beta, high bankruptcy risk and small caps, as captured by spreads for 60-Month Beta (1-month: -10.49%; 12-month –36.75%), Altman Z Score (1-month: 8.20%; 12-month: 20.29%) and Natural Logarithm of Market Capitalization (1-month: 9.24%; 12-month: 49.22%), respectively.

As a side note, while we are hesitant to put general comments across all epidemics, we do observe underperformance in general to 3-M Revision in FY2 EPS Forecasts and, to a somewhat lesser extent, with Industry-adjusted 12-month Relative Price Strength.

Finally, we have available 1-month and 3-month-to-date results for COVID-19 for comparison. We certainly find glaring contrasts in the extreme behavior of 1-month performance versus prior epidemics. However, at the 3-month horizon, the negative cumulative spreads for value and bankruptcy risk measures are aligned with the MERS epidemic, though again at much sharper magnitudes. Nevertheless, one similarity across events is the continuation of large magnitude spreads from 1-month to 3-month results.

Table 2

US large cap 1-month factor decile spread

Epidemic	Date	Book-to-Market	TTM EBITDA-to-Enterprise Value	Altman Z Score	60-Month Beta	Natural Logarithm of Market Capitalization	3-M Revision in FY2 EPS Forecasts	Industry-adjusted 12-month Relative Price Strength	Demand Supply Ratio
SARS	April 2003	4.15	-4.66	8.20	-10.49	9.24	-1.76	-3.25	NA
Avian flu	June 2006	4.50	1.56	3.72	8.99	-3.19	-1.76	-1.03	NA
Dengue fever	September 2006	-0.55	2.43	0.53	0.26	1.26	1.95	-0.19	-0.85
Swine flu	April 2009	10.95	5.62	9.88	-8.88	8.26	-15.25	-4.62	0.54
Cholera	November 2010	5.24	-3.08	2.96	-5.45	4.60	-4.68	-4.56	-2.07
MERS	May 2013	-0.32	-0.08	0.42	2.90	0.43	1.19	-0.11	0.46
Ebola	March 2014	3.30	5.34	6.23	3.06	-2.30	-0.29	-2.89	0.74
Zika	January 2016	0.72	2.71	0.04	-0.50	7.10	-3.55	-3.90	-5.20
COVID-19	December 2019	-8.14	-10.67	-5.96	9.47	-6.35	8.35	9.16	1.93

Source: IHS Markit

Table 3

US large cap 3-month cumulative factor decile spread

Epidemic	Date	Book-to-Market	TTM EBITDA-to-Enterprise Value	Altman Z Score	60-Month Beta	Natural Logarithm of Market Capitalization	3-M Revision in FY2 EPS Forecasts	Industry-adjusted 12-month Relative Price Strength	Demand Supply Ratio
SARS	April 2003	3.21	-4.42	3.37	-13.74	14.64	-5.05	-3.84	NA
Avian flu	June 2006	5.67	-2.75	1.72	4.00	-1.31	-11.51	-5.62	NA
Dengue fever	September 2006	2.52	2.12	5.70	0.72	2.30	1.64	-0.02	-1.56
Swine flu	April 2009	17.73	-0.15	10.35	-15.63	16.46	-13.08	-9.60	-2.37
Cholera	November 2010	6.69	-1.29	5.39	-7.88	5.24	-3.51	-4.20	-2.94
MERS	May 2013	-2.50	-3.22	-3.44	-0.99	1.36	-0.25	0.61	-2.10
Ebola	March 2014	0.24	1.87	5.07	2.11	-0.75	1.61	-2.64	-0.54
Zika	January 2016	18.66	-12.41	24.36	-11.95	28.66	-26.04	-11.46	-15.69
COVID-19	December 2019*	-25.15	-23.50	-28.12	32.18	-22.06	16.80	17.35	5.62

Source: IHS Markit

*Through 20 March 2020

Table 4

US large cap 6-month cumulative factor decile spread

Epidemic	Date	Book-to-Market	TTM EBITDA-to-Enterprise Value	Altman Z Score	60-Month Beta	Natural Logarithm of Market Capitalization	3-M Revision in FY2 EPS Forecasts	Industry-adjusted 12-month Relative Price Strength	Demand Supply Ratio
SARS	April 2003	6.92	-9.15	2.49	-26.42	21.81	-3.29	-1.98	NA
Avian flu	June 2006	8.33	-0.69	7.52	4.74	0.96	-10.06	-5.64	NA
Dengue fever	September 2006	-0.79	3.06	8.65	1.96	7.69	3.47	-0.58	-3.86
Swine flu	April 2009	28.52	1.89	12.58	-23.81	27.26	-16.21	-13.21	-5.50
Cholera	November 2010	-0.74	-2.61	8.23	-2.93	6.33	-4.43	-0.26	1.08
MERS	May 2013	-3.40	-0.64	-5.83	-10.04	2.70	0.74	5.94	-2.16
Ebola	March 2014	-3.62	-0.81	-1.20	8.26	-5.07	1.93	0.27	3.37
Zika	January 2016	15.83	-13.00	18.49	-6.00	26.25	-25.03	-9.31	-11.28

Source: IHS Markit

Table 5

US large cap 12-month cumulative factor decile spread

Epidemic	Date	Book-to-Market	TTM EBITDA-to-Enterprise Value	Altman Z Score	60-Month Beta	Natural Logarithm of Market Capitalization	3-M Revision in FY2 EPS Forecasts	Industry-adjusted 12-month Relative Price Strength	Demand Supply Ratio
SARS	April 2003	15.48	-3.85	10.83	-13.16	28.37	-15.51	-3.94	NA
Avian flu	June 2006	0.90	3.91	8.12	3.40	5.57	-5.29	-7.40	NA
Dengue fever	September 2006	-18.27	2.07	-1.45	-1.61	-3.04	21.35	1.55	-0.24
Swine flu	April 2009	32.40	-6.81	20.29	-36.75	49.22	-13.73	-11.91	-15.31
Cholera	November 2010	-6.70	4.49	2.74	12.31	-2.32	-1.03	4.76	10.48
MERS	May 2013	-2.79	7.59	4.46	-9.67	4.38	3.77	3.01	1.58
Ebola	March 2014	-14.64	-7.47	-6.27	15.82	-5.58	8.45	8.13	19.61
Zika	January 2016	36.86	-5.55	21.05	-24.11	34.14	-29.47	-17.37	-9.96

Source: IHS Markit

Style model performance during prior epidemics

Turning to style models, we perform a similar analysis of performance across our US models – Deep Value, Earnings Momentum, Price Momentum, Relative Value, Value Momentum and Historical Growth. Results are summarized in Tables 6 through 9.

Over the short term, value strategies tended to outpace the growth and momentum strategies, as demonstrated by 1-month spreads for Value Momentum (Zika: 3.23%), Deep Value (Ebola: 2.44%) and Relative Value (Avian flu: 3.75%). We further remark that Value Momentum tended to be the best performing model over each holding period, though this may be more related to its record as the top performing of our style models over their full history.

For the available COVID-19 results, Historical Growth has been the best performer thus far with 1- and 3-month spreads of 7.09% and 23.84%, respectively. Relative Value (-1.91%) has also seen some recovery at the 3-month time horizon, while Price Momentum (-9.37%) has given up considerable ground.

Lastly, we comment that the style model results differ from that of the univariate factors in that 1-month performance was less likely to carry over to the full year, perhaps given their multi-factor construction. Consistency in the directional performance of the models was more centered on medium term 3- and 6-month time horizons.

Table 6

US large cap 1-month model decile spread

Epidemic	Date	Deep Value	Earnings Momentum	Price Momentum	Relative Value	Value Momentum	Historical Growth
SARS	April 2003	-7.92	-4.42	-5.79	-5.17	-3.02	-4.77
Avian flu	June 2006	1.74	-1.08	-0.65	3.75	2.33	-3.35
Dengue fever	September 2006	0.29	0.17	1.02	-0.28	0.26	0.60
Swine flu	April 2009	-3.71	-8.64	-1.36	-0.52	2.44	-1.51
Cholera	November 2010	-3.36	-1.25	-0.23	-2.11	-3.68	-4.67
MERS	May 2013	1.78	0.84	0.33	1.68	0.13	-0.59
Ebola	March 2014	2.44	0.62	-3.53	1.44	-0.05	-2.66
Zika	January 2016	3.56	-1.30	-1.42	0.34	3.23	0.89
COVID-19	December 2019	-4.24	0.33	3.15	-3.60	-1.26	7.09

Source: IHS Markit

Table 7

US large cap 3-month cumulative model decile spread

Epidemic	Date	Deep Value	Earnings Momentum	Price Momentum	Relative Value	Value Momentum	Historical Growth
SARS	April 2003	-8.42	-3.16	-7.69	-5.97	-1.68	-2.90
Avian flu	June 2006	2.01	-4.84	-6.51	5.52	0.23	-7.31
Dengue fever	September 2006	0.03	-1.41	0.31	-1.32	-0.85	-0.85
Swine flu	April 2009	-7.84	-10.58	-0.47	-4.18	7.35	-9.68
Cholera	November 2010	-6.73	0.20	-2.23	-3.28	-5.80	-4.78
MERS	May 2013	0.04	2.61	-0.45	3.33	2.98	3.69
Ebola	March 2014	-1.19	-1.38	-1.74	-1.70	-2.57	-3.74
Zika	January 2016	-9.82	-10.65	-3.94	-6.71	-3.56	-13.39
COVID-19	December 2019*	-4.11	-0.98	-9.37	-1.91	-6.83	23.84

Source: IHS Markit

*Through 20 March 2020

Table 8

US large cap 6-month cumulative model decile spread

Epidemic	Date	Deep Value	Earnings Momentum	Price Momentum	Relative Value	Value Momentum	Historical Growth
SARS	April 2003	-13.12	-2.44	-3.74	-8.47	-0.24	-0.56
Avian flu	June 2006	2.05	-6.18	-6.21	4.13	-0.62	-8.10
Dengue fever	September 2006	2.45	-0.47	2.12	-2.82	0.57	1.93
Swine flu	April 2009	-9.76	-16.17	-3.08	-9.15	8.71	-15.71
Cholera	November 2010	-7.53	2.06	0.73	-3.75	-4.76	-3.59
MERS	May 2013	4.41	8.98	2.63	8.46	8.11	10.44
Ebola	March 2014	1.69	-1.46	-2.14	2.74	-0.35	1.83
Zika	January 2016	-8.22	-13.13	-0.64	-11.86	-4.76	-17.18

Source: IHS Markit

Table 9

US large cap 12-month cumulative model decile spread

Epidemic	Date	Deep Value	Earnings Momentum	Price Momentum	Relative Value	Value Momentum	Historical Growth
SARS	April 2003	-10.09	-4.67	-5.29	-6.99	5.34	-1.93
Avian flu	June 2006	5.78	-0.43	-8.78	4.94	4.35	2.22
Dengue fever	September 2006	0.15	9.42	-1.44	-2.43	-1.89	15.74
Swine flu	April 2009	-17.39	-20.30	7.70	-17.04	3.33	-27.52
Cholera	November 2010	3.50	8.58	7.51	4.68	9.15	4.09
MERS	May 2013	1.18	8.95	4.94	5.85	10.85	7.84
Ebola	March 2014	12.85	5.18	5.07	7.94	5.06	13.39
Zika	January 2016	-5.91	-10.41	-5.33	-4.98	-0.31	-14.90

Source: IHS Markit

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