



ALPHASIMPLEX

The Advent of the Pandemic Factor

David E. Kuenzi, CFA^{®1}
Senior Research Scientist and Senior Portfolio Manager

Peter A. Lee, CFA^{®1}
Senior Research Scientist and Portfolio Manager

October 2020

¹ CFA[®] is a registered trademark owned by the CFA Institute.

Introduction

What happens to equities in a pandemic scenario? That was not a question that risk managers or portfolio managers typically asked themselves before February or March of this year. The last pandemic that significantly disrupted global economies was more than 100 years ago and had long faded from market memory when the COVID-19 crisis took hold. Even if there had been a deeper recognition that such an event could occur, would market participants have been able to fully grasp its impact? Probably not. The conclusion would likely have been, “In a pandemic scenario, equities will go down.”

While that is indeed what occurred, the events of February, March, and April 2020 are somewhat more nuanced than that. The dispersion across equity sectors and industries was enormous. Social distancing and lockdowns created winners and losers. This was evident to most of us simply by reading the news. Hotels, restaurants, casinos, airlines—effectively any industry that depends on people being in close proximity to one another—saw their revenues plunge. Conversely, those industries that facilitate social distancing or a mitigation of the impact of COVID-19—including many types of technology, telecommunications, pharmaceutical, and biotechnology companies—saw either an increase in revenues or the strong potential for such an increase.

This describes, in effect, the advent of the Pandemic Factor: losses due to long positions in those companies that would experience extreme difficulty in a pandemic scenario, and short positions in those companies that would benefit.² Had market participants been leery of exposure to this factor prior to the COVID-19 crisis, they might have neutralized or at least limited their exposure to this factor, but this was on the market’s radar. The factor really didn’t exist.

In the remainder of this piece, we use quantitative tools to isolate a “Pandemic Factor.” This allows us to: (i) explain a meaningful portion of the abnormal return dynamics during this period; (ii) observe that the Pandemic Factor is novel (i.e., was not a significant driver of risk prior to 2020); and (iii) anticipate potential consequences of the pandemic shock that may help investors manage risk and construct better portfolios in the wake of the events of 2020.

How to Measure the Pandemic Factor

The next consideration might be to determine the best way to construct such a factor. At first blush, one might think that identifying the best and worst performing sectors would be the best way to go. While this might be easy for the obvious suspects (e.g., hotels, restaurants, and airlines), it can become much more nuanced for other industries—and especially for individual companies. There might be two companies in a traditional industry—one that is

² We note, and show in more detail below, that many other industries are associated with this factor, such as REITs, consumer finance companies, and energy-related firms on the long side, and utilities and retail food-related on the short side.

equipped to easily deliver services without physical contact and one that is not. The market's treatment of these two companies during the COVID-19 crisis would obviously be very different. A bottom-up fundamental approach to constructing a Pandemic Factor would thus be quite difficult and require detailed knowledge of perhaps thousands of companies.

We therefore employ a simpler, quantitative, and robust approach to identifying the Pandemic Factor. This approach starts with the assumption that stocks' returns in the first half of 2020 had three drivers: (1) idiosyncratic considerations unique to each company; (2) well-established common risk factors such as market risk or exposure to firm size, value, or industry characteristics; and (3) the unfolding ramifications of the coronavirus pandemic. Our goal is to identify the daily influence of the coronavirus pandemic on stocks' returns. Using statistical tools, we achieve this in two steps. First, for each stock, we strip away the influence of well-established common risk factors by using their influence in 2019 as a guide to their influence in 2020. Second, we look across all stocks' residual returns (residual after having removed the portion of the returns attributable to those well-established common risk exposures) and find the largest remaining common driver of returns. We conjecture that this is the Pandemic Factor because, like the pandemic itself, it has widespread influence across many stocks and is new in 2020.³

We are now interested in which industries seemed to be most exposed to this Pandemic Factor. Do the industry exposures match our intuitions? For the most part, yes. However, there are indeed some industries, such as REITs, that, at first glance, are not obvious victims of the pandemic environment, but that on further reflection were clearly hurt by social distancing, the closing down of the economy, etc. A sample of these industries is included in Figure 1.

³ A note for the technically minded: the methodology employed here leans heavily on two well-known tools: PCA and multiple linear regression. Additional sanity checks provide further reason to believe that the factor identified through this process is the Pandemic Factor.

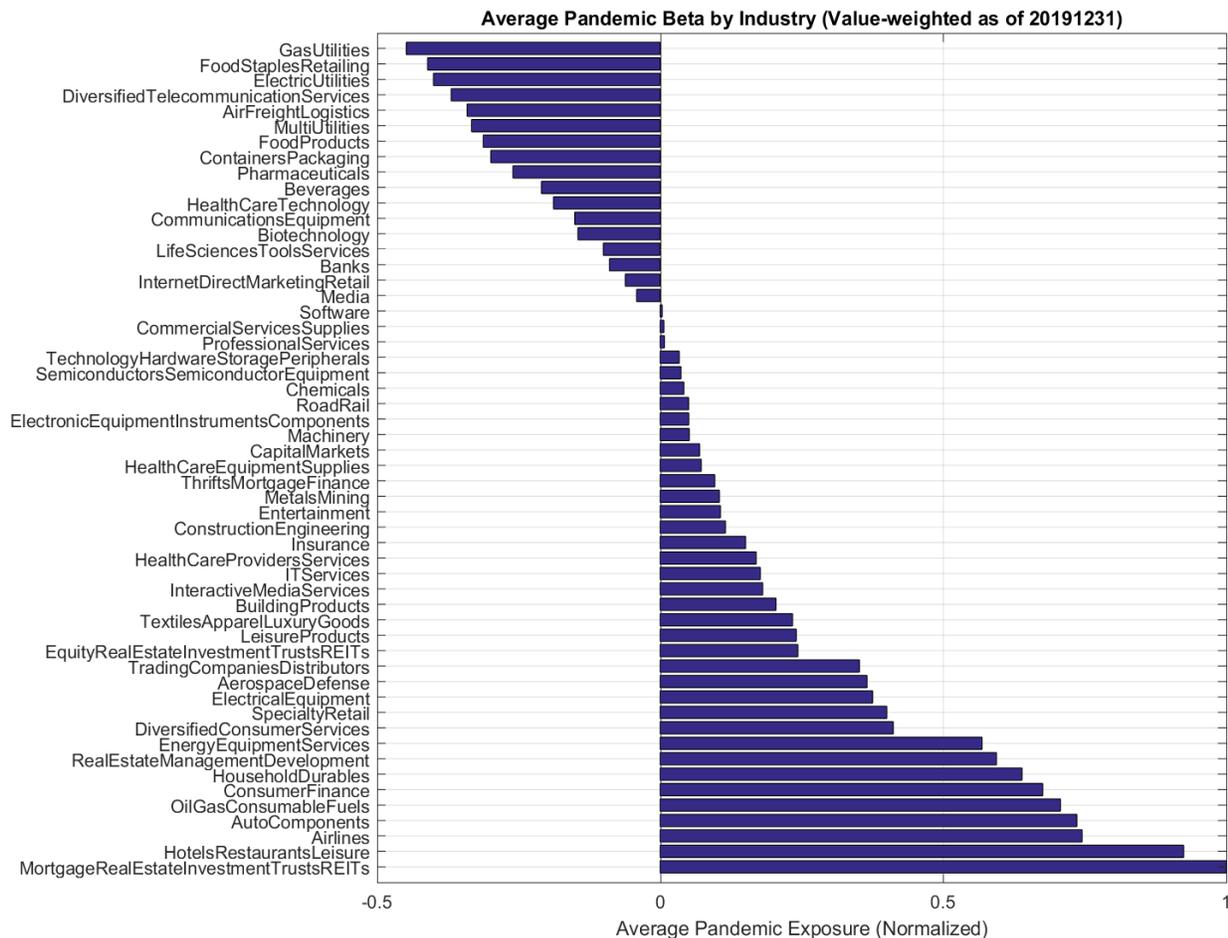


Figure 1: A selection of industries and their returns during the first half of 2020. Past performance is not necessarily indicative of future results.

It certainly makes sense that a variety of food, utility, air freight, biotechnology, pharmaceutical, and telecommunications firms would have negative exposure to the Pandemic Factor, as these are the types of firms whose products, services, and research capabilities have seen steady or increased demand. At the far other end, we see that those types of firms that are most long the Pandemic Factor are not only those in industries like airlines, hotels, restaurants, or leisure (the obvious victims), but also the REITs and finance companies that receive rent or loan payments from many of the suffering industries. Energy also had extraordinary challenges—not only because of the precipitous decrease in demand, but also because a price war among the OPEC+ members ensued.

The Potentially Dangerous Side Effect

One side effect of these market disruptions has been to create extraordinary momentum in the NASDAQ Composite Index, which is heavily weighted to those stocks that have been short

the Pandemic Factor and have therefore in some sense been seen as a safe haven. These stocks were arguably quite expensive coming into the crisis and have now posted outstanding absolute and relative performance. This outperformance is substantial against practically every other equity index, as can be seen in the cumulative return differentials between the NASDAQ and other indices through the end of July 2020:⁴

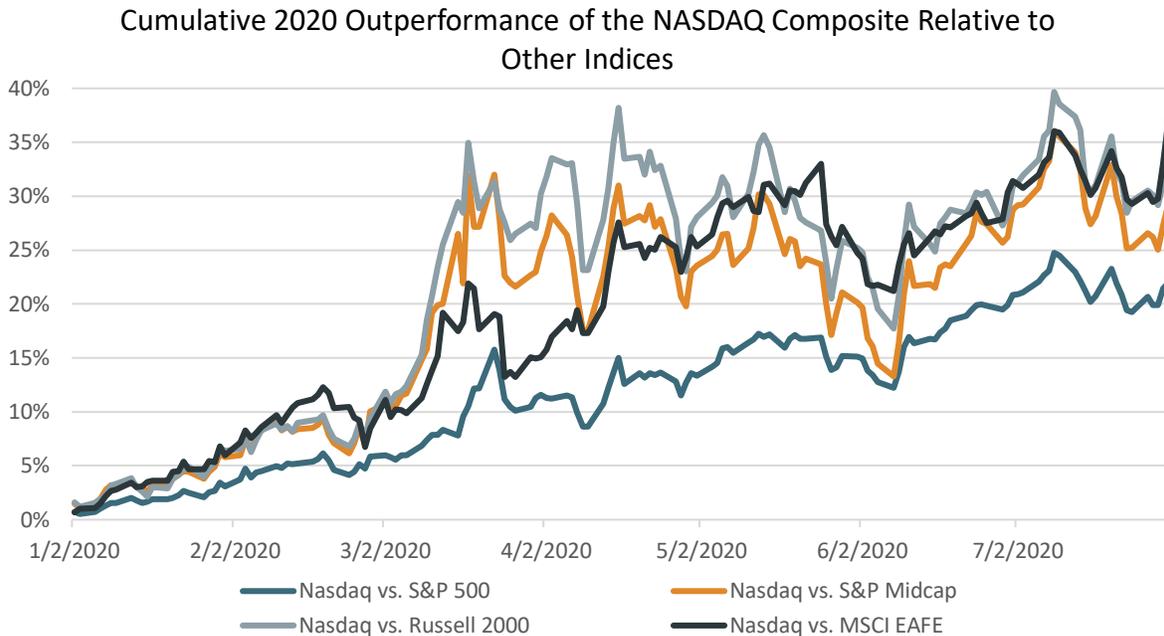


Figure 2: NASDAQ Composite Index performance relative to the S&P 500, Russell 2000, S&P MidCap, and MSCI EAFE from 1/1/2020–7/31/2020. Source: Bloomberg. Past performance is not necessarily indicative of future results.

This extreme outperformance has attracted the attention of both quantitative and discretionary investors. We see concrete evidence of this by considering the two largest long sector exposures of a basic cross-sectional momentum strategy in single-name equities. Healthcare shares make up 37% of the long exposure, while information technology shares make up 22%. Given that market participants often discretionarily follow these momentum signals, we would postulate that many investors have likely loaded up on stocks that were once thought to be very risky, but that, in a pandemic scenario, are now thought by some to be “safe.”

Many of these stocks are high-volatility, high-beta names with rich valuations. The forward price/earnings ratio for the NASDAQ Composite is now 37.7 vs. 27.3 as of December 31,

⁴ We use returns of continuous futures series for the index returns shown here. The source for the futures data is Bloomberg. Each line reflects the cumulative and geometrically compounded daily difference in returns between the NASDAQ futures and each of the other index futures.

2019. This compares to 19.7 as of 12/31/2018. The rapid rise in valuations in 2020 is quite remarkable.

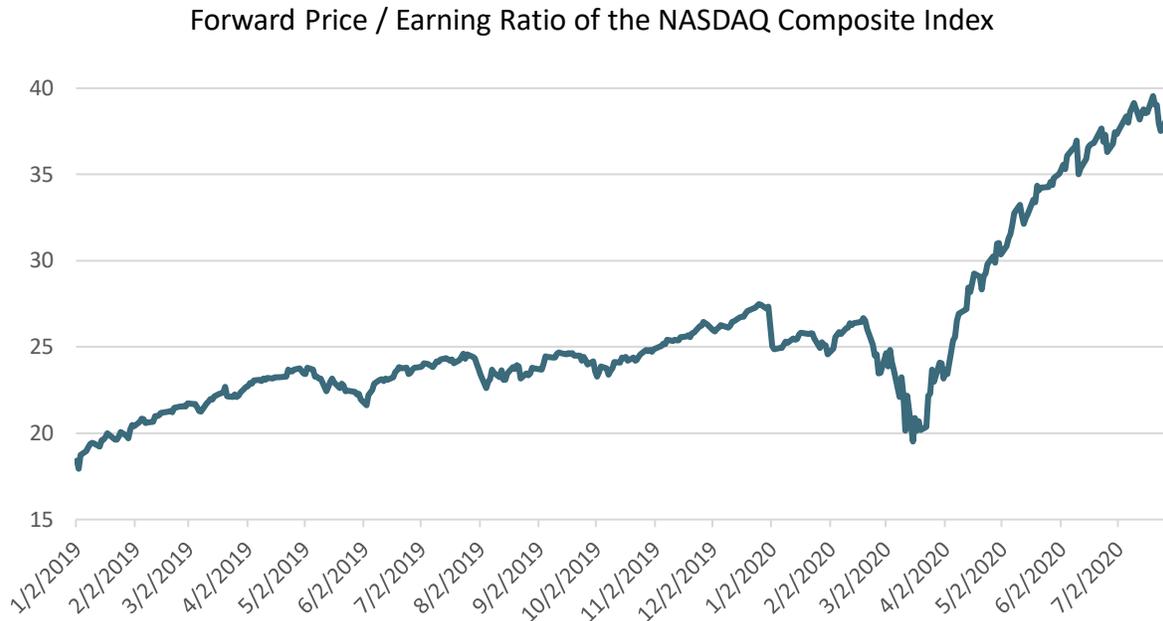


Figure 3: Ratio of Price to Earnings for the NASDAQ Composite Index from 12/31/2018–7/31/2020. Source: Bloomberg. Past performance is not necessarily indicative of future results.

This positioning may expose investors to the potential for a 2000 to 2002-style tech wreck.⁵ In effect, in solving one problem (exposure to the Pandemic Factor), investors have potentially taken on another (exposure to expensive stocks in volatile market sectors—and to a potential tech wreck).

The above analysis has strong implications for portfolio construction and risk management. The important questions seem to be these: Should investors neutralize their exposure to the Pandemic Factor? Is it too late to do so (have the proverbial horses already left the barn)? Is this a factor that should, in general, be hedged moving forward? The latter question must be answered in the context of one's expectation for future disruptive pandemic scenarios. Is the next one likely to be another 100 years out? Or might it come a bit sooner?

Broadly, we believe that investors should indeed be careful to avoid any excessive long or short exposures to the Pandemic Factor; this would include a large imbalanced exposure to either the recent winners in this environment (in an effort to follow the momentum) or the recent losers (in an effort to catch the bounce). In short, diversifying across both, and adding

⁵ Note that, to the extent that investors are long index exposure, they are also likely substantially long these richly-valued sectors; as the market capitalizations of these companies experience a relative increase, their importance in the indices (such as the S&P 500) becomes much greater.

strategies that have the potential to diversify a broader portfolio, may be a useful approach. For investors, prudent portfolio construction is often the best risk management.

APPENDIX

We look for a factor—a common driver of returns—that simultaneously and materially affected many stocks during 2020 but did not materially affect stocks during 2019. Most likely, such a factor would be the Pandemic Factor.

One could reasonably attempt to identify this factor using a range of approaches, some of which are more fundamental, and others more statistical. Here, we employ a statistical approach, a route which has the advantage of requiring few assumptions.

More concretely, we first construct a statistical factor model for each stock designed to explain its behavior during 2019. We do this in two stages: in stage one, we use PCA to identify the six most influential modes of common variation among U.S. stocks' normalized returns during 2019. We quantify each mode of variation as an eigenfactor: the product of an eigenvector and the matrix of stock returns. And then, in stage two, we use multiple linear regression to calculate each stock's normalized returns' exposures to those six factors during 2019.

Next, we look at 2020 returns data and extend forward the six PCA-generated eigenfactors using normalized returns data from 2020 but the eigenvector weightings from 2019. Using the betas estimated from 2019 data, we construct a proxy "y-hat" return time series for each stock during 2020 H1. Subtracting these proxies from the actual normalized returns of each stock during 2020 H1 produces residuals.

To the extent that the main drivers of covariation in 2020 H1 are the same as those in 2019, these residuals should have little in common with each other, but of course 2020 H1 contained the onset of the pandemic, while 2019 did not, so we expect to find a great deal of commonality in stocks' return series' responses to the pandemic. We study the covariance matrix of the stocks' residuals in 2020 H1 and find the principal mode of variation: this should be the pandemic! In fact, the most positive and negative loadings in the principal eigenvector do in fact generally correspond in a sensible way to stocks that have particularly suffered or benefited from the pandemic on a relative basis.

Finally, we calculate the pandemic risk factor's daily returns by using the weightings from the principal eigenvector to creating a long/short portfolio of stocks' residual daily 2020 H1 returns. This pandemic risk factor embodies the most significant systematic risk found in U.S. stocks in 2020 H1 that was not a material issue in 2019.

About the Authors

David E. Kuenzi is a Senior Portfolio Manager and Senior Research Scientist at AlphaSimplex. In this role, Mr. Kuenzi focuses on portfolio management, applied research in hedge fund-related strategies, and overall capability development. He also serves as a co-portfolio manager for the AlphaSimplex Global Alternatives Strategy. Mr. Kuenzi specializes in alternative risk premia, the development of new trading strategies, machine learning, and global markets and macro analysis. Mr. Kuenzi earned a B.A. from Western Michigan University and an M.F.A. from the University of Iowa. In addition, he earned an M.B.A. in Analytical Finance and an M.S. in Financial Mathematics from the University of Chicago. Mr. Kuenzi is a CFA® Charterholder⁶ and an author of multiple articles on investing.

Peter A. Lee is a Senior Research Scientist and Portfolio Manager at AlphaSimplex. In this role, Mr. Lee focuses on portfolio management, applied research in hedge fund-related strategies, and overall capability development. He also serves as a co-portfolio manager for the AlphaSimplex Global Alternatives Strategy. Mr. Lee specializes in systematic single-name equity trading strategies, hedge fund factor replication, and modeling probabilistic dynamic systems using perspectives from probability, information theory, economics, and engineering. Mr. Lee earned an A.B. in Applied Mathematics (Decision and Control focus) with a minor in Economics from Harvard University. He also earned an S.M. in Operations Research from MIT. Mr. Lee is a CFA® Charterholder⁶.

Contact Information

For more information, please contact:

Brent Mathus, Chief Commercial Officer
clientservices@alphasimplex.com
(617) 475-7100

Disclosures

Past performance is not necessarily indicative of future results.

The views and opinions expressed in this paper are solely the authors' and do not necessarily represent the views and opinions of AlphaSimplex Group or any of its affiliates or employees.

The illustrations and examples presented in this document were created by AlphaSimplex based on unaudited internal data and methodologies. Accordingly, while the underlying data were obtained from sources believed to be reliable, AlphaSimplex provides no assurances as to the accuracy or completeness of these illustrations and examples. The views and opinions expressed are as of 9/30/2020 and may change based on market and other conditions. There can be no assurance that developments will transpire as forecasted, and actual results may vary. All investments are subject to risk, including risk of loss.

This document has been prepared for informational purposes only and should not be construed as investment advice. AlphaSimplex is not registered or authorized in all jurisdictions and the strategy described may not be available to all investors in a jurisdiction. Any provision of investment services by AlphaSimplex would only be possible if it was in compliance with all applicable laws and regulations, including, but not limited to, obtaining any required registrations. This material should not be considered a solicitation to buy or an offer to sell any product or service to any person in any jurisdiction where such activity would be unlawful.

Publication: October 2020. Copyright © 2020 by AlphaSimplex Group, LLC. All Rights Reserved.

⁶ CFA® is a registered trademark owned by the CFA Institute.