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Editorial

Risk and Financial Management of COVID-19 in Business, Economics and Finance

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Abstract: The SARS-CoV-2 coronavirus that causes the COVID-19 disease led to the most significant change in the world order over the past century, destabilizing the global economy and financial stock markets, the world's economy, social development, business, risk, financial management and financial markets, among others. COVID-19 has generated great uncertainty, and dramatically affected tourism, travel, hospitality, supply chains, consumption, production, operations, valuations, security, financial stress and the prices of all products, including fossil fuel and renewable energy sources. This Editorial introduces a Special Issue of the *Journal of Risk and Financial Management (JRFM)* on the "Risk and Financial Management of COVID-19 in Business, Economics and Finance". This Special Issue will attract practical, state-of-the-art applications of mathematics, probability and statistical techniques on the topic, including empirical applications. This paper investigates important issues that have been discussed in tourism, global health security and risk management in business as well as the social and medical sciences.

Keywords: virus and disease; risk and financial management; business; economics and finance; tourism; global health security; social and medical sciences

1. Introduction

The pandemic SARS-CoV-2 coronavirus that causes the COVID-19 disease has seen the most significant change in the world order over the past century, destabilizing the global economy and the financial stock markets. This has had unimagined impacts on the world's economy, social development, business, risk, financial management and financial markets, among others.

COVID-19 has generated great uncertainty, which leads to fear and extreme volatility in financial markets. The COVID-19 disease has affected tourism, travel, hospitality, supply chains, consumption, production, operations, valuations, security, financial stress and the prices of all products, including fossil fuel and renewable energy sources.

A Special Issue of the *Journal of Risk and Financial Management (JRFM)* on the "Risk and Financial Management of COVID-19 in Business, Economics and Finance", edited by the authors, will be devoted to the topic. The Special Issue will also bring together practical, state-of-the-art applications of mathematics, probability and statistical techniques in the risk and financial management of COVID-19 in business, economics and finance, with empirical applications.

The Special Issue will foster and promote state-of-the-art research on any issues related to risk and financial management in the following disciplines:

(1) Business
(2) Economics
(3) Finance

The Guest Editors invite investigators to contribute original research papers on the "Risk and Financial Management of COVID-19 in Business, Economics and Finance". All submissions must contain original unpublished work that is not contemporaneously being considered for publication elsewhere.

One of the primary purposes of this Special Issue was to examine unexplored and unanswered questions in the disciplines of business, economics and finance arising from the important and topical COVID-19 pandemic. Therefore, the next section presents some issues that have been discussed in the areas of tourism, global health security and risk management in business, economics finance and the social and medical sciences.

2. Analysis of COVID-19 in Business, and Social and Medical Sciences

Chang et al. (2020) argued that COVID-19 has changed the world forever and has dramatically affected the international travel, tourism and hospitality industries, which are highly sensitive to significant shocks like COVID-19. It is essential to investigate how these important industries will recover and remain sustainable in a new world order after COVID-19. The authors present a charter for sustainable tourism, travel and hospitality after the COVID-19 pandemic when the number of infections and deaths have been significantly reduced for life to return to a new normal.

Chang and McAleer (2020) examined if an outbreak of the COVID-19 pandemic could and should have been anticipated, given the well documented history of other infectious diseases. In this way, public health and medical contingency plans, as well as decisions in business, economics and finance, might have been prepared in advance. The authors evaluate an important source of health security, the Global Health Security Index, which provides data before the discovery of COVID-19 in December 2019. Using the arithmetic, geometric and harmonic means of six separate categories of global health security, the authors evaluated how countries might have prepared for COVID-19 and responded in an effective and timely manner.

Wang et al. (2020b) considered risk management issues in the context of China's economic and social development, with special reference to Chinese universities, which are widely seen as the backbone of Chinese society. Chinese universities have made significant contributions to emergency risk management with respect to the alumni resource collection, medical rescue and emergency management, mental health maintenance, control of staff mobility and innovation in online education models.

Continuing the theme in Chang and McAleer (2020), McAleer (2020a) evaluated the risk management based on the Global Health Security (GHS) Index. The GHS Index lists 195 countries that were best prepared for a pandemic such as COVID-19, in terms of the number of reported human infections, deaths, countries, major country clusters, timelines and the likelihood of discovering a safe, effective and approved vaccine, or combination of vaccines.

Gössling et al. (2020) provided an assessment of the consequences of the lack of a vaccine and limited medical capacity to treat COVID-19 on tourism and global change. Chiefly as a result of international travel bans affecting international air travel, tourism largely ceased activity in March 2020. The available evidence, although incomplete, suggests that the impact on air travel, cruises and accommodation have been disastrous. Tourism is highly susceptible to official regulations to counteract

pandemics because of restricted mobility (see also Chang et al. 2020). The paper compared the impacts of COVID-19 and other types of global crises and explores how COVID-19 may change the behavior and economies of international communities and the demand for international tourism.

The same authors, though in a different order, essentially discussed the same issues as in the previous paper, though from a different perspective. Hall et al. (2020) provided a comprehensive overview of pandemics, with an emphasis on COVID-19, and their effects on tourism, government regulations and public policy, industry and consumers of tourism. Some measures arising from COVID-19 are interpreted as continuing the expansion in tourism growth projections, although other measures may be interpreted as contributing to sustainability. Caveats are provided regarding the limits to expanding tourism, as well as sustainability, both of which would require a transformed global approach.

There are as many, if not more, unanswered questions (alternatively, "known unknowns") in the medical sciences as there are in business, economics and finance. McAleer (2020b) discusses the diagnostic testing of the SARS-CoV-2 virus and COVID-19 disease from the statistical viewpoint of an optimal number of tests to reach the important and critical diagnosis of a true positive rather than a false negative. As diagnostic testing is essential to "flatten the curve" of the number of confirmed positive cases of COVID-19, the author asks if one test is enough to obtain a correct positive diagnosis?

Numerous papers have been published in leading medical journals regarding the diagnostic testing of COVID-19. In a paper that was published before the known onset of COVID-19, Centor et al. (2019) evaluated alternative methods for estimating the probability of a correct diagnosis. Wu and McGoogan (2020) examined the characteristics of and important lessons from COVID-19. Comment 7 on the paper raises two important queries, namely the likelihood of false positives and false negative diagnoses, and the likelihood of reinfection after purported recovery from the disease.

del Rio and Malani (2020) presented new insights on COVID-19. Comment 4 on the paper raises a number of known unknowns (alternatively, unanswered questions), including: the infection period before symptoms appear; transmission to and from humans; transmission to and from animals; optimal isolation and quarantine periods; the possibility of reinfection after a negative diagnosis; risk factors, including pre-existing illnesses, comorbidities, age, gender, tobacco and alcohol; and seasonal, weather and temperature effects.

Wang et al. (2020a) presented the fast and efficient response to COVID-19 in Taiwan, based on big data analytics, new technology, and proactive testing. The emphasis on risk and disaster management for quarantine during incubation, as well as health care concerns for citizens and residents is reassuring. Comment 6 raises the issue that, although Taiwan's universal health and medical system might be expensive, it seems to be working efficiently in times of crisis when it is needed the most.

Wu et al. (2020) evaluated the risk factors associated with COVID-19 based on a clinical study of patients with compromised immune systems. Unsurprisingly, age was a leading risk factor leading to death. Comment 3 on the paper suggests that it would be informative if the sample were extended to a larger number of patients, according to differences in ages, stages and severity of pneumonia, types and levels of chronic underlying conditions, comorbidities, tobacco and alcohol history, types of coinfections, including influenza, follow-up of recovered patients for reinfection, discharge rates and alternative model specifications. Overall, the list of variables in the conditioning set was more extensive than was incorporated in the invaluable empirical study.

Before COVID-19 was declared a pandemic by the World Health organization (WHO) on 11 February 2020, Paules et al. (2020) warned on 23 January 2020 that COVID-19 was more than just the common cold. The world has changed dramatically since the initial critical analysis. Comment 3 on the paper states that, not long after publication, the prescient caution that was highlighted stands in stark contrast to what has transpired from a public health perspective in many leading countries.

Parodi and Liu (2020) discussed the containment of the mitigation of the virus and the associated disease in the United States, which has shown that they can spread fast and furiously worldwide. Comment 2 on the paper argues that, as containment has failed worldwide, the only option is to

manage the spread and the resulting consequences in a responsible manner. Several Governors have taken the lead at the State level in the USA, while the Federal Government has contributed using their jurisdictional authority, albeit at a much slower pace.

Hopman et al. (2020) examined the management of COVID-19 in low- and middle-income countries. The insightful discussion of the preparedness of low- and middle-income countries (LMICs), especially in Africa, presented helpful lessons that every country should heed. Comment 1 on the paper suggests a number of additional factors that would be worth considering including: relaxing regulatory requirements to aid speedy and efficient manufacturing; the transportation, distribution and storage of medical equipment; messaging about hygiene; and the performance of governments in dealing with COVID-19. Moreover, in countries with well regulated and developed financial markets, the performance of financial stocks is a healthy barometer of the performance of national governments in dealing with COVID-19.

Gostin et al. (2020) dissected presidential powers and the associated response to COVID-19. Comment 2 on the paper gives the well-known quote: "With great power comes great responsibility". Presidential powers include those that are stated and granted explicitly by Article II of the United States Constitution. The excellent and informative paper presents a lucid description of the balance that is required between individual rights and liberty, and public health concerns, in protecting a nation's citizens and residents. The Comment mentions that, among the front liners and first responders are the medical and healthcare workers who are risking their health and lives in upholding their vocation and oath to help the sick and infirm patients with chronic disease and in greatest need are the aged and the socially and economically disadvantaged. In times of crisis, speed is of the essence. Moreover, what is the point in having great presidential power if it is not exercised when the country needs it most?

Merchant and Lurie (2020) analyzed social media and emergency preparedness in response to COVID-19. Social media is designed as a forum for personal opinion rather than as a platform for the accurate and informative dissemination of information that is based on provable facts. Consequently, (mis)information is distributed with great speed, spread, reach and penetration, together with the misunderstanding and (mis)handling of the issues surrounding COVID-19. The generally unyielding views expressed on pro-Trump Fox News, and anti-Trump CNN, among others, add to the general confusion about COVID-19, among others. This is dangerous in situations where the health and safety of every member of society is affected. The Comment ends by referring to the lack of quality control and factual inaccuracies of the self-appointed polymath, President Trump, whose legendary tweets are frequently confused, confusing and provably false.

In an informative and prescriptive paper, Yu et al. (2020) discussed the transmission of COVID-19 in hospital patients with cancer in Wuhan, China. The clinical results suggest that COVID-19 positive patients should be carefully separated from cancer patients currently undergoing chemotherapy or radiotherapy, and that "proper isolation protocols must be in place to mitigate the risk of SARS-CoV-2 infection". Comment 2 on the paper warns that the recommendations might not be feasible for cancer patients undergoing immunosuppressive chemo or radio treatments on a regular basis in hospitals. The Comment raises pertinent conditioning factors, such as the types of cancer of the COVID-19 positive patients, including those other than, or in addition to, non–small cell lung carcinoma (NSCLC); how long the patients had been undergoing such treatments; whether the cancer was primary, secondary, or tertiary; the types of cancer treatments; and the prevalence of seasonal flu.

Bauchner and Easley (2020) hailed the courageous health care heroes of COVID-19 in recognition and appreciation of their incalculable frontline health care contributions. Comment 9 on the paper emphasizes and acknowledges that putting their lives on the line for patients who need their care and attention the most shows just how much the health and medical profession needs these heroes at all times, especially in dealing with the deadly and contagious COVID-19.

In an illuminating and instructive paper, Marini and Gattinoni (2020) evaluated the careful ventilatory workload management of the vasocentric features of COVID-19, the failure of which may lead to multiorgan deterioration and ultimate failure. On the basis of the detailed clinical results, organ

failures do not seem to be linked to advanced age or pre-existing comorbidities. Comment 1 on the paper suggests that, as different comorbidities might have markedly different impacts in assaulting specific organs, additional information on the types of pre-existing comorbidities according to age would be useful in understanding the cause-and-effect relationships. In particular, pre-existing lung comorbidities, such as different stages of cancer and whether it is primary, secondary or tertiary cancer would change the control variables, and hence the conditioning set used to provide the management of COVID-19. Moreover, patient self-induced lung injury might also be considered in light of pre-existing lung comorbidities that could transition to more serious and progressive injuries.

In a detailed and informative paper, Sethuraman et al. (2020) interpreted two commonly used diagnostic tests of COVID-19, the results of which can and do vary over time. Further to the discussion above regarding the likelihood of false negatives and false positive diagnoses, Comment 1 on the paper emphasizes the critical issue in using a variety of diagnostic tests to achieve a correct diagnosis of a true positive finding. In cases where several diagnostic tests are available, with no obvious superiority among them, the use of a variety of tests will lead to a more accurate diagnosis. The availability of time series data from different studies, according to the age of patients, existing comorbidities, types of pre-existing conditions, including the stage of cancer, current treatments and genetic markers would lead to an invaluable unbalanced panel data set for more accurately predicting the probability of detecting infections.

In a thoughtful and invaluable contribution by experts at the U.S. Center for Disease Control and Prevention, Kirkcaldy et al. 2020 analyzed the post-infection immunity of COVID-19, based on limited evidence, leading to many remaining questions. Comment 2 on the paper raises questions that had been asked in previous Comments, including the possibility and frequency of reinfection after a purported recovery from COVID-19, and the transmission to and from animals. Twelve additional unanswered questions regarding COVID-19 transmission and immunity were presented, including among others: the likely long-term effects of COVID-19 on the heart, liver, lungs and other internal organs; the existence of any diagnostic tests of permanent recovery from COVID-19; the possible transmission of the virus from humans to mammals; whether domesticated animals, such as cats and dogs, are tested for COVID-19; if the spread of COVID-19 can be controlled or eradicated; the possibility of mutations of COVID-19; the speed and detection of mutations; whether mutations of the virus likely to be deleterious, neutral, or favourable; the discovery of vaccines for mutations of the virus; and whether the SARS-CoV-2 virus and COVID-19 disease are likely to remain in the population forever, much like the seasonal flu, but without any seasonal warnings.

An invaluable and informative perspective regarding the assessment of deaths from COVID-19 and from seasonal influenza was presented by two experts in Faust and Rio (2020). The authors compared the officially documented weekly counts of COVID-19 deaths with the estimated weekly counts of seasonal influenza deaths, with an emphasis on the serious threat to public health. Comment 3 on the paper acknowledges that the numbers of reported cases and deaths arising from COVID-19 varies daily. As of 18 May 2020, the total number of confirmed cases in the USA was continuing to increase at 1,527,591, with the total number of reported deaths at 90,980 (Worldometer 2020). The comment states that, despite the marked disparity in the numbers of official deaths from COVID-19 and the estimated number from the seasonal flu, political considerations in the USA have led to inappropriate comparisons between the two viral infections. It is well known that seasonal flu patterns have been monitored for over sixty years, since the first safe and effective monovalent flu vaccine was invented in 1938. In stark comparison, the number of confirmed cases and deaths arising from COVID-19 have been monitored for less than four months. A minimum of one year is essential to detect seasonal patterns in any data set, so it is still far too early to infer any seasonal patterns in COVID-19 due to a lack of data availability. If COVID-19 does not disappear "magically" in the foreseeable future, as has been suggested, apparently in all seriousness, by a senior elected public official in the U.S., seasonal patterns will eventually be observed, with higher infection rates highly likely during the colder months. Sadly, the worst is yet to come.

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