Jan Krzysztof Solarz
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Holistic management of the COVID-19 pandemic

Pioneering use of the experience
of systemic risk management
for pandemic analysis and scenarios

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Kraków–Legionowo 2021

Edition and correction: Dominika Drygas

Cover and title page design: GRAFOS

Cover illustration: Aleksandr Grechaniuk/123RF

Publisher's reviewer: Prof. Stanisław Flejterski

Translated from Polish: Steven Jones

Publishing house: edu-Libri s.c.

ul. Zalesie 15, 30-384 Kraków

e-mail: edu-libri@edu-libri.pl

DTP: GRAFOS

Printing and binding: OSDW Azymut Sp. z o.o.
Łódź ul. Senatorska 31

ISBN (print) 978-83-66395-15-2

ISBN (PDF) 978-83-66395-16-9

ISBN (epub) 978-83-66395-17-6

ISBN (mobi) 978-83-66395-18-3

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Introduction

A representative from Harvard University's Institute of Global Health in January 2019 wrote: "The risk of infectious disease can no longer be thought of exclusively in terms of rare but devastating events like global influenza pandemic. Moreover, despite considerable progress, the world rearuins ill-prepared to detect and respond to outbreaks and is not prepared to respond to a significant pandemic threat" [*Outbreak*…, 2020, p. 6].

We live in times of uncertainty regarding the sources and consequences of ever newly occurring pathogens. Most researchers believe that it is a question of radical uncertainty, not risk. In a world reeling from COVID 19, it should hardly be necessary to reemphasise that controlling risk means establishing that reference narrative is robust and resilient to unpredicted events [Kay, 2020, p. 5]. Indeed, the risk is measurable whereas uncertainty is more of a cognitive or emotional limitation. The global uncertainty index at the end of April 2020 due to COVID-19 stood at 348 points and was slightly higher than the uncertainty accompanying the US trade war with China (342) in mid-2019 [Strauss-Kahn, 2020].

Most decision-makers are not even aware that they do not know how to objectively resolve a decision-making situation that arises. Sometimes we observe the highest degree of uncertainty, i.e. full awareness that we do not know the nature of the COVID-19 pandemic [Norman, Bar-Yam, Taleb, 2020]. One thing is certain: it causes huge direct and indirect losses of a personal, family, national and global nature. It is estimated that they are comparable to the losses caused by climate change, which amount to 0.7% of the annual global product of mankind [Fan, Jamison, Summers, 2020]. Due to the magnitude of these losses and their unexpected occurrence, we treat this pandemic as a realization of systemic risk. As the peak of the coronavirus outbreaks passes, there is a temptation to recognise that it is a systematic risk, and therefore one that we are condemned to and unable to manage. For centuries, smallpox was considered to be this type of disease. Only the joint effort of the United States and the Soviet Union made it possible to overcome this terrible affliction in the second half of the 20th century. Now the temptation is to view COVID-19 as a systematic risk that each country is attempting to deal with in its own way.

The UN and the EU have initiated, and are cooperating with charitable foundations to develop a joint program to discover a vaccine and to support the weakest and those most vulnerable to the pandemic in refugee camps. However, the polarisation of attitudes towards the pandemic is palpable. Meanwhile, we will better cope with the coronavirus if we consider it multidimensionally, in an attempt to discern and understand the interactions between these dimensions. Only a holistic and systemic approach can free us from bias [Gorynia, 2020b, p. A27].

For me, the coronavirus is a conglomerate of interconnected and pilling up of extremes and adversities, antinomies and extreme poles, which we can nevertheless gather in the form of several interconnected planes or aspects [Gorynia, 2020c, p. 16].

Currently we are eagerly searching for something with which to compare the COVID-19 pandemic. Analogies are a tried and tested cognitive aid. Therefore, we ask whether this is a new incarnation of the Spanish Flu of 1918, or a repeat of the Great Depression of 1929, or perhaps a new form of transformational recession – this time, however, not from an economy of scarcity to an economy of excess, but from the real economy to a virtual economy. Descriptions of COVID-19 thus far, however, resemble the inept description of an elephant by the blind. One says that the elephant is as smooth as its tusks, another one says it is long and flexible like its trunk, and a third one says that it is as thin as its tail. Everyone describes what they have at hand and what they judge with their sense of touch. Yet, for effective action to be taken, a holistic approach to the coronavirus pandemic is essential. This would consist of a medical diagnosis accompanied by a feverish search for therapy, an epidemiological assessment of the population's immunity, social discipline in respecting social distancing, and the wearing of masks. Above this physiological level develop a level of pandemic-driven social solidarity, intergenerational transfers and the ability to ensure the health and financial security of the citizens.

The aim of this study is to apply the legacy of financial sciences in the field of systemic risk management to the management of the COVID-19 pandemic. By adopting this objective, we assume that the pandemic is a holistic embodiment of systemic risk. G20 leaders recognised COVID-19 as a manifestation of systemic risk and entrusted the coordination of their work on co-managing this risk to the Financial Stability Board of the Bank for International Settlements in Basel. As part of this mandate, the Financial Stability Board regularly exchanges information about action taken, determines the financial risk along with its variability in the current situation, and coordinates the confrontation of households and businesses with COVID-19 [*COVID-19 Pandemic* ..., 2020b].

According to the Financial Stability Board, the pandemic represents an unprecedented shock that has pushed the global economy into a recession of unknown depth and duration. In this situation, it is necessary to guarantee loans in circumstances of declining economic growth while also managing the rapidly growing risk. To this end, the Financial Stability Board is carrying out necessary adjustments to plans to introduce new regulations in the financial sector. The criteria for assessing the 'new normality' will be: firstly, the ability to provide credit to assist

the real economy; secondly, uninhibited access to dollar funds as international money; thirdly, maintaining the liquidity of financial markets and the reliable operation of CCPs (platforms that clear transactions via derivative financial instruments).

The undisputed practical importance of the research undertaken requires special care to adjust its cognitive framework to the complexity of the issues raised. The empirical and theoretical material of this book is divided into three chapters reflecting the three dimensions of the pandemic described within. The first dimension is the time and space in which we consider the phenomenon under study. A full financial cycle lasts 12-16 years. A full epidemiological cycle incorporates three virus incubation periods, each lasting two weeks, and an analogous period for the epidemic to fade out. It should be remembered that the method of exiting one systemic crisis determines how the subsequent one ensues. The last SARS epidemic occurred in 2003. In order to help recover from this epidemic, France shared its experience in virology with China and supported the establishment of a top-class (4) laboratory in Wuhan to conduct the most advanced research in this field. Many researchers regard human error at this laboratory as the source of COVID-19. Research is currently underway to verify this hypothesis.

Methodologically sound research should contain logically structured elements. The first one is a description of the phenomenon under study; the second one involves its measurement and scale, while the third is a comparison – in time, space and tradition of scientific thought. Together, they form a fair overview of the achievements of their predecessors. The next stage should be an evaluation of the current state of play. At this stage, it is necessary to evaluate the results obtained. The cognitive power of a study is measured on the scale of clarified variances of the study results and their ability to predict the future course of events. At this stage of the study, the method of forecasting and determining early warning signals is applied.

This general research scheme lies at the heart of the proposed structure for this book. The first part of the book presents the stages of systemic risk management. At first, decision-makers do not want to admit that they are faced with a decision-making situation. The Chinese authorities reportedly hid the news of the virus escaping the lab. The cost of delaying recognition that a systemic risk has emerged is very high. The next step is to measure the risk of a white swan in the form of value at risk or a black swan by using special statistical models. When the large scale of losses is known, an attempt is made to share them with stakeholders. In formal models, the risk diversification or risk trading is taken into account. The practice to date has been to pass on the costs of the systemic risk to resident taxpayers. Currently, these costs are passed with increasing frequency to other participants in value-creation chains and links in critical infrastructure. Thus, increasing systemic risk becomes an accepted method of managing it. In a period of panic driven by fear for one's own life, it is relatively easy to introduce undemocratic changes in the functioning of state and society.

The second chapter poses a practical cognitive question, what benefit is offered by the professional management of a pandemic's systemic risk? In a pandemic, there is a need for personal solidarity. In terms of the political economy, however, the question arises as to what costs of systemic risk realization we are fighting to minimise: social costs and the maximisation of public economic goods, private costs and insurance against unemployment and business continuity, or the costs of guaranteeing the supply of public goods, such as effective vaccines and drugs for the coronavirus?

Our greatest hope is an increase in the supply of coexisting goods, such as logistics, critical infrastructure, as well as reliable mortality and morbidity statistics. The only effective way to control systemic risk is to change the day-to-day financial management habits of a family of three or even four generations.

In the third, empirical chapter, a conceptual model of systemic risk in the financial sector is used to describe the COVID-19 pandemic and measure its systemic risk. It shows how the costs of a pandemic are nationalised and how the profits from the boom in medical procedures are privatised. This is implemented with the use of public and private money in a constant struggle to shift some of the costs onto the remaining participants in the economic turnover. In this sequence of events, each step is important. The pandemic occurs in a context of insufficient health care funding, an ageing population, and excessive competition between financial intermediaries. The shock is the coronavirus mortality rate among seniors. On the other hand, the multipliers are the financial, organisational and emotional consequences of the pandemic, and this concerns the maintenance of confidence in paper money and trust within so-called extended families. The culmination is the emergence of a situation where national strategies to combat COVID-19 are insufficient to ensure the survival of the population.

The conclusion highlights the benefits of a joint, comprehensive consideration of the management of a new type of systemic risk in its medical-epidemiological, economic and financial aspects. In our opinion, the language of systemic risk management facilitates a sufficiently good description of the variable and complex reality of the COVID-19 pandemic.

In the complex and dynamic spacetime of the COVID-19 pandemic, the fight for a guaranteed income that can cover the fixed costs incurred by the forced isolation of citizens comes to the fore. Concurrently, globalisation as a network of economies and societies is in a process of decomposition. Under these conditions, only households are able to create jobs of any real value. Family businesses focused on survival have new development opportunities. The ability to restore global order depends on the quality of everyday financial risk management.

Chapter 1. Comparing the cognitive frames of systemic risk management

1.1. The stages of systemic risk management – comparison over time

The reconstruction of the coronavirus pandemic timeline is currently a subject of dispute for both experts and politicians from different countries. The name 'coronavirus' – derived from the Latin word corona, meaning a crown or a wreath – is related to the fact that the viral sheaths visible in the images of electron microscopes seem to be crowned with a ring of projections resembling a wreath [Pyrć, 2015]. The first coronaviruses diagnosed in humans were described in the 1960s as pathogens HcoV-229E and HCoV-OC43. China refers to reports that a virus corresponding to the SARS-CoV-2 characteristics was first recorded in November 2019 in France. In contrast, Western European countries refer to the report of the World Health Organization (WHO), which on 31 December 2019 wrote about the appearance of a pulmonary infection in the Chinese city of Wuhan.

On 7 January 2020, China officially announced that it had identified a new type of coronavirus in its territory. Four days later, the first person died as a result of contracting SARS-CoV-2. Soon, the first cases of the disease appeared outside China. Therefore, the World Health Organization announced an emergency on 30 January 2020 related to the threat of a coronavirus epidemic. The first death due to the coronavirus in the European Union was recorded on 14 February 2020 in France. In the second half of February, more and more cases were registered in Western Europe and the United States. The epidemic was spreading faster and faster around the world. As a result, on 28 February, the World Health Organization raised the epidemiological risk to the highest possible level. A day later, the first corona-related death was recorded in the United States.

The state of worldwide pandemic was announced on 11 March 2020. Four days later, restrictions were introduced in mass catering establishments, and nine days later in tourism. The pandemic became systemic. Coronavirus cases were expected to peak in mid-April 2020. Only in Iran, Russia and Romania was this expected to

happen a little later. Meanwhile, in May the peak of the pandemic had not yet arrived [Linton, 2020].

Traditional systemic risk management relies on scenario-based assessments and analyses of interference at the hands of decision-makers. This popular approach is based on expert opinion and is relatively easy to implement. On the other hand, modern systemic risk management is based on gigantic databases collected on IT platforms. In this case, the opinions of experts are only a supplement to the overall management of systemic risk since it relies on information from both structured quantitative sources and disordered semantic sources such as social media. In this way, in managing a pandemic's systemic risk, we move seamlessly from an intuitive search for an analogy to the existing situation over to risk assessment based on qualitative expertise supported by econometric models.

Currently, systemic risk management for a pandemic is based on basic risk indicators (such as the number of people who fall ill compared with the number of people who have recovered) and more specific measures (such as the number of people discharged from hospital and the number of those admitted to general hospitals[1]). We must still analyze unstructured data related to emotions. In the longer term, pandemic monitoring will be possible thanks to an integrated, holistic systemic risk management system.

At this critical moment, it makes sense to interpret the systemic risk from the perspective of the financial crisis framework. By combining the latest research on systemic risks, we may arrive at some precautions related to the current events [Bai et al., 2020]. COVID-19 is a human, economic and social crisis [Ebrahim, Buheji, 2020].

Figure 1.1 presents a matrix showing the COVID-19 pandemic as a certain type of manifestation of systemic risk. It is described in two dimensions: the type of model and its scope. Models may refer to an individual or a population, and their scope for humanity and individuals.

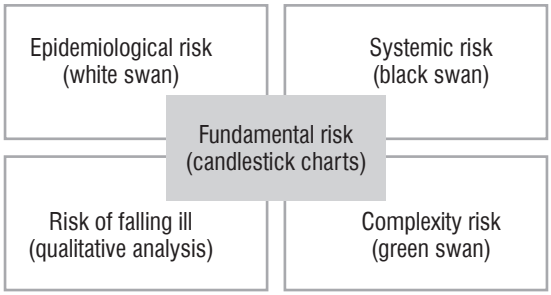

Figure 1.1. The COVID-19 pandemic matrix as systemic risk

Source: own study.

[1] General hospitals are non-pandemic hospitals that have been converted into pandemic hospitals.

Holistic personalised medicine is more powerful than population-based reductionist treatment. The pandemic causes a good many people to develop new lifestyles. What is actually important is who will survive and who will die. A mathematical, epidemic model is insensitive to personal differences and cannot be used to formulate the best treatment for each person. Personal biological properties are particularly relevant to personal resistance to COVID-19 [Wu, Zha 2020].

According to Nassim Nicholas Taleb, the world can be divided into a safe and comfortable Mediocristan and a dangerous and unlikely Extremistan [Taleb, 2019, p. 200]. If the statistical distribution of a process has a 'fat tail', it requires different methods of managing systemic risk than the traditional normal distribution of risk of loss. Pandemics are of systemic importance for financial markets [Schornfeld, 2020, p. 130].

In managing systemic risk, we can distinguish two approaches. One thing is passive and assumes that each market failure or anomaly is individual and unique. In practice, however, they are well described by the statistics of normal distribution and the value at risk method. In the second approach, the context of applying universal risk management methods means that they have to take into account the possibility that highly unlikely events may occur that incur huge losses. These types of events are called black swans. However, swans mutate and can appear in a green version, symbolising catastrophic ecological events, while a blue swan indicates unexpected events generated by digital technologies and artificial intelligence [Mączyńska, 2020].

Luiz Awazu Pereira da Silva claims that when assessing risk on a global scale, there are three types of swans: white, black and green. Table 1.1 provides a synthetic overview of the differences between these approaches.

Table 1.1. Swan typology: similarities and differences

Dimension	White swan	Black swan	Green swan
Probability distribution	Normal	Exogenous, fat ends of the normal distribution	Too complex to predict, but will probably happen
Explanation	Statistical distribution (statisticians)	Risk management (economists)	Scholars who negate the opinions of economists and financiers
Aftermath	Small and moderate	Factual and direct	Human or civilisational
Recommendations	Risk modeling is tried and tested	Risk management requires a change of concept	Coordinated action under circumstances of extreme uncertainty

Source: based on [Silva, 2020, p. 6].

Table 1.2 uses the categorisation of white, black and green swans to describe strategies to combat the COVID-19 pandemic in selected countries.

The authors of the monograph apply their competences in the field of risk management in the financial system in order to organise what is currently known about the COVID-19 pandemic.

They recognise that by nature it is both endogenous as a result of health habits and exogenous in relation to lockdown. Overall, this poses a systemic risk. Holistic systemic risk management organises the sequence of events and action taken in such a way that the exit strategy from one crisis marks the beginning of a new one.

The reviewed work has unquestionable substantive and methodological value. (...) The consequences and challenges related to COVID-19 are among issues of interest and significance analysed in international, and to some extent in Polish, economic and financial literature (scientific, popular science, journalistic works). From this point of view, the reviewed work should be considered as an attempt to synthesise what is most current and relevant in this area. One might risk stating here that the book by Profs Solarz and Waliszewski will be the first Polish publication in 'Coronomics'.

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