Quarantine

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Equity markets started 2020 strongly, before cascading violently in the second half of January. The chief suspect for this decline is most unusual, and is commonly known as the 'coronavirus', a lethal virus first identified in late December 2019 in the Chinese city of Wuhan.

Epidemics are, first and foremost, human tragedies, as they put human lives at stake. However, they are also catalysts of economic risk.

The number of infected people had, by the 21st of January, reached 282. 10 days later, this number had skyrocketed to 9,826, across 33 Chinese provinces and 25 countries.

The number of infected people is still small, especially when compared to the infection rate of seasonal influenza viruses, which affects between a quarter and half a million people in the world every year. Nonetheless, this new virus commands our attention because of two factors: its fatality rate, which is between 20 and 40 times higher than influenza viruses, and its high transmission rate across humans.

On the financial front, our 20 years of quantitative research on the topics of major risks highlights the clustering of two types of shocks in any complex system: exogenous or endogenous. The former of these leads to rapid crisis but quick recoveries. Endogenous shocks, however, are far unhealthier; they take time to develop and to cure.

An epidemic is a third case, mixing exogenous properties−the economic stress provoked by an outside agent−and endogenous properties−the ability of the stressor to cascade inside the economic system. The outcome, therefore, can randomly be either very limited, or quite to the contrary, disastrous.

For the first time in years of quantitative publications, we argue that the usual irrelevant noise of daily fluctuations becomes now immensely informative.

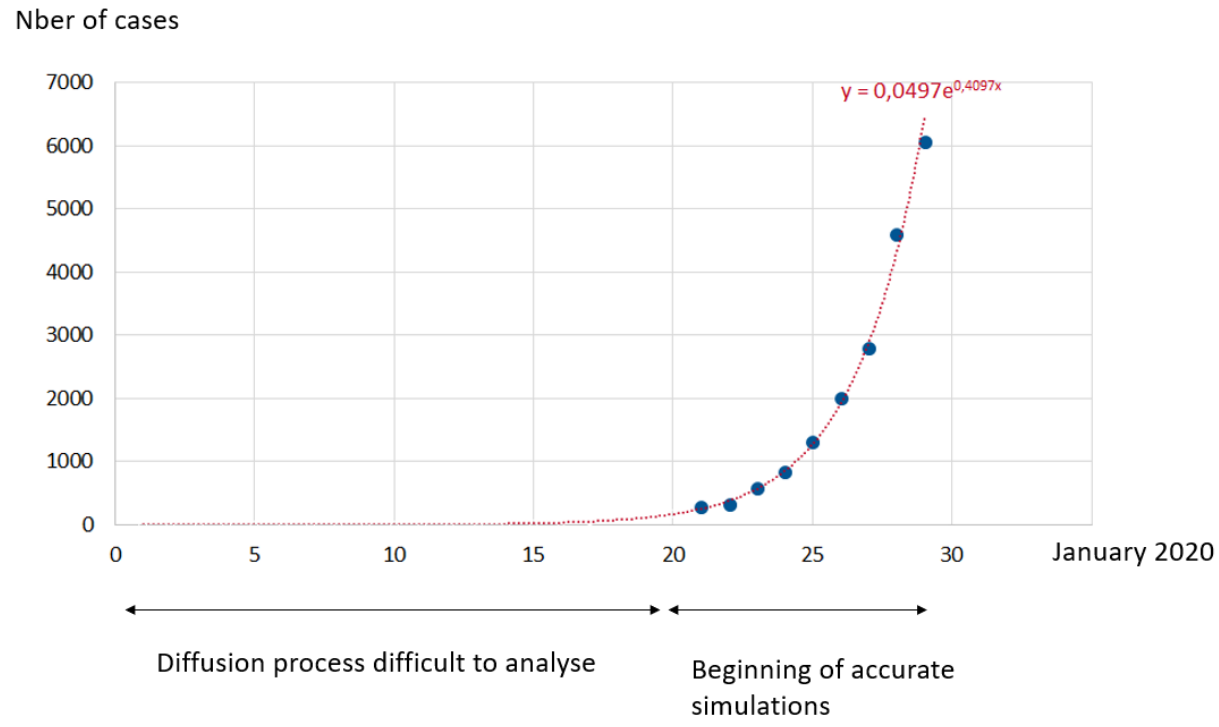
Epidemic Risk at Start

Epidemics are 'cascade' events, like avalanches, which create exponential diffusions of risk. While exponential impacts multiply much faster than linear ones, this is not necessarily clear at start. In this sense, it can be difficult to apprehend the likelihood of catastrophic risk at the beginning of an epidemic.

For instance, in 2009 the French Health Minister purchased 94 million doses of vaccine against H1N1 virus. This 1bn EUR spend turned out to be largely unnecessary, as the virus did not expand massively.

Figure 1 below plots the exponential diffusion of the coronavirus worldwide, as reported by the World Health Organization on a daily basis. Very little statistical information can be retrieved at the very beginning; then the process enters into a visible acceleration phase that can be fitted.

Fig 1. Reported cases of coronavirus infections up to the 29th of January 2020



Source: World Health Organization data, Gavekal Intelligence Software

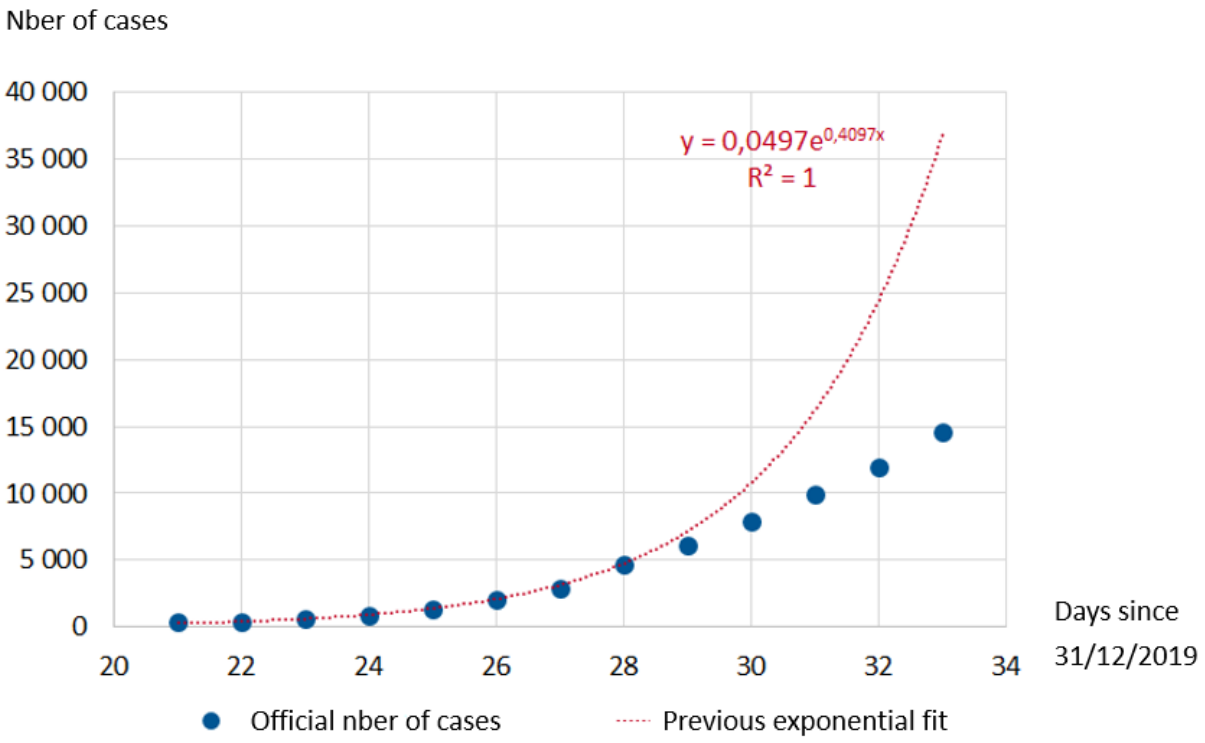
The projections of this exponential fit look extremely alarming. If the diffusion process continues at the same rate, half of humanity will be infected by the end of February! The coronavirus pandemic could mirror the 1918-1919 Spanish flu diffusion, which infected 1 billion people at the time, i.e. 50% of world population.

Such a catastrophic scenario, however, looks extremely improbable largely because the diffusion process has already started to fade.

Don't Bother with Acceleration, Watch the 'Jolt'

Figure 2 below shows that reported cases of coronavirus continued accelerating in the last few days, but at a lower acceleration rate than before.

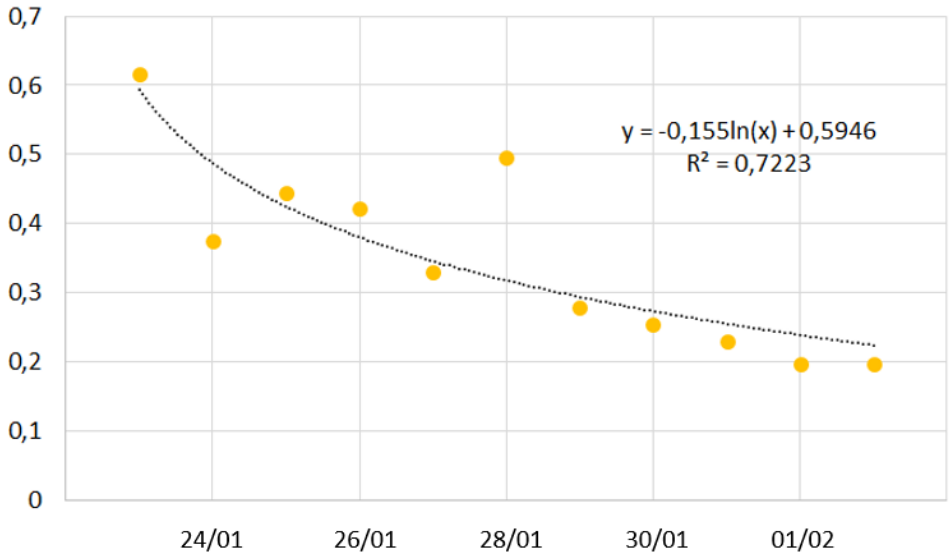
Fig 2. Reported cases of coronavirus infections up to the 2nd of February 2020



Source: World Health Organization data, Gavekal Intelligence Software

The dynamic of an acceleration is measured by its derivative, named the 'Jolt' in mathematics. Figure 3 below shows that the acceleration is fading.

Fig 3. Cases of coronavirus infections up to the 2nd of February 2020- Jolt measure



Source: World Health Organization data, Gavekal Intelligence Software

If the 'Jolt' continues decreasing in line with the fitting function of Figure 3, the pandemic could report up to 300,000 people infected worldwide by the end of February, which is the typical contagion expansion of influenza viruses, then start decreasing.

The fitting model is not sophisticated but provides a top-down view of the catastrophic pandemic risk. Top-down analysis are often much more robust than bottom-up ones for complex processes. It provides also a method to track the evolution daily, thanks to morning reports by the World Health Organization on the following website:

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports

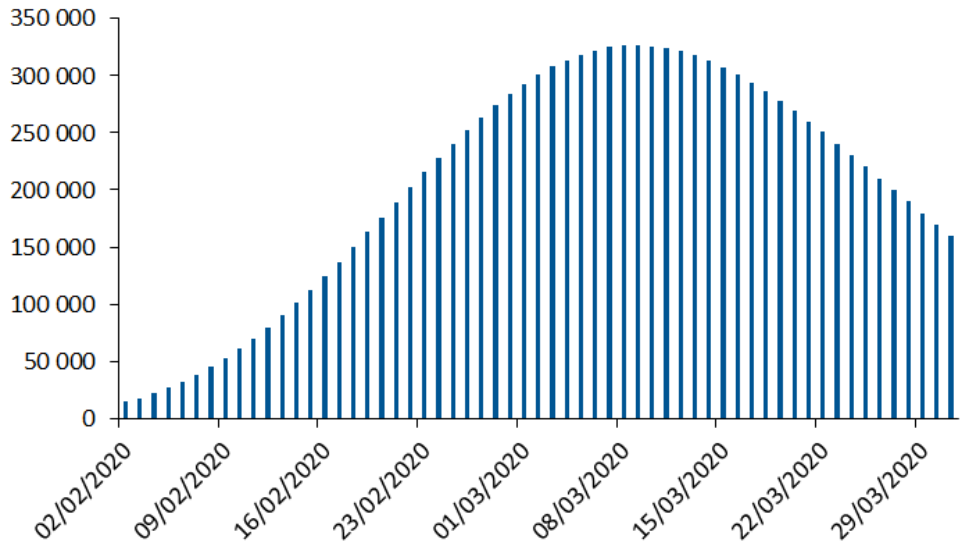
Fig 4. Expected reported cases in the days to come, assuming that the 'Jolt' decreases in line with Figure 3

02/02/2020	14 557
03/02/2020	17 688
04/02/2020	21 809
05/02/2020	26 559
06/02/2020	31 973
07/02/2020	38 082
08/02/2020	44 907
09/02/2020	52 460

Source: Gavekal Intelligence Software

If reported cases increase at a lower rate than simulated above, the coronavirus epidemic shall fade rapidly. If they increase in line with simulations, the number of cases will follow the medium-term dynamic of figure 5 below.

Fig 5. Expected reported cases in the months to come, assuming a 'Jolt' decrease in line with Figure 3



Source: Gavekal Intelligence Software

Conclusion

The latest eleven days of coronavirus data mitigate the catastrophic risk of a global pandemic. Epidemics, however, must be tracked day by day, unlike standard macroeconomic evolutions. In contradiction to all our previous publications on financial risk management over the years, we recommend portfolio managers to temporarily forget about inflation, growth, liquidity, tariffs etc. and to focus daily on estimating catastrophic risks. If the number of world infections outpaces 52,000 by Sunday this week, which we believe is unlikely, our systemic risk estimation will be re-assessed and significantly scaled up.