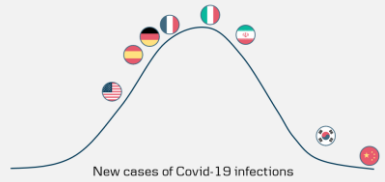
25 March 2020

# Research COVID-19

## Closer to the peak of bad news

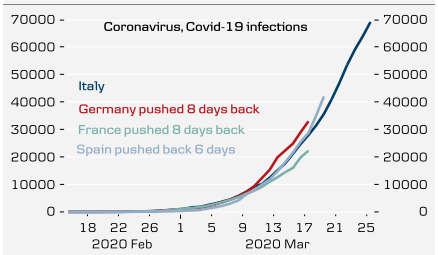
- **On the following pages, we look at when we can expect to see a peak in the *new cases* of COVID-19 across Europe and the US and as such the peak in the bad news regarding COVID-19. There is a lot of uncertainty about these projections and we are not virologists, but based on the experience in China, South Korea and indications from Italy, we aim to make a qualified guess.**
- **Based on the experience of these countries we look for the following.**
  - Italy. A peak in new cases is becoming clearer this week and we look for a peak in active cases around mid-April (active cases are the number of people currently infected, hence the difference between total accumulated infections and how many have recovered or died).
  - Germany and France. We look for new infections to peak late this week or early next week and active cases top out during the second half of April.
  - US. We think a peak in new cases could be reached by the end of next week and active cases peak in the last week of April.
- **We already see signs that Italy has topped out when it comes to the number of new cases. Both infections and deaths show a clear decline in growth rates.**
- **As the peak becomes evident in more countries, we may approach the peak in 'bad news' regarding COVID-19, although the total numbers will still rise for some time.**
- **We look for lockdowns to be gradually lifted during the second half of April and early May in both the US and Europe.**

Countries in the 'virus cycle'




*Source: Danske Bank*

Italy the epicentre, rest of Europe lags by about a week




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

Tentative dates for peaks in new cases and estimates for US and Europe

| | Date of lockdown/restrictions | Date of peak in new cases | # of days to peak from 200 cases | Date of peak in active cases | Days from peak in new cases to peak in active cases |
|---|---|---|---|---|---|
| China, Hubei | 21 Jan | 4 Feb | 14 | 17 Feb | 10 |
| China, Guangdong | 21 Jan | 1 Feb | 9 | 13 Feb | 12 |
| South Korea | 22 Feb | 2 Mar | 8 | 12 Mar | 10 |
| Italy | 9 Mar | **22 Mar (est)** | 13 | 11 Apr est | 20 |
| France | 17 Mar | **27 Mar (est)** | 11 | 16 Apr est | 20 |
| Germany | 20 Mar est | **1 Apr (est)** | 12 | 21 Apr est | 20 |
| US | 19 Mar est | **5 Apr (est)** | 20 | 25 Apr est | 20 |

*Note: The dates are based on own estimates and a margin of error on each side should be added. The date of lockdown/restrictions for some countries is based on an estimate of when measures became strict.*

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

*If you wish to receive our daily update on the development of COVID-19, please send a mail to alvo@danskebank.dk.*

*You can find some examples here.*

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## It looks like a peak of new cases in Italy

**The measures on social distancing implemented worldwide are unprecedented** and as such, there is no data on which to base an estimate of how fast the contagion will slow down. The contagion rate, the so-called R0, which measures how many people an infected person will pass the disease on to, is estimated to be 2.5 without social distancing. However, if it drops below 1, the virus will die out – at least in the short term.

While measures to contain the virus have been slower and enforced less vigorously in Europe than in Asia, **the experience from China and South Korea provides a glimmer of hope that we are at a peak in Italy and soon will be in the rest of Europe**. In these countries, it took from 8 days (South Korea) to 14 days (Hubei, China) from when tough measures were taken until the peak in new cases was reached. In the Chinese province of Guangdong it took 9 (see Appendix for charts for these areas).

In Italy, the outbreak was clear in late February but it took ten days before a full lockdown was put in place on 9 March. Judging from the latest data, it would seem we reached a peak on 22 March, 13 days after the lockdown of the whole country. It may seem early, but it should be born in mind that a lockdown of Lombardy had already taken place before the full lockdown. Restrictions were scaled up gradually.

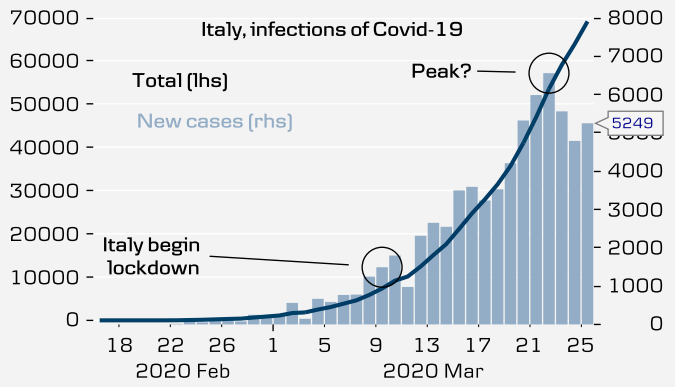
**Lock downs in selected countries/regions**

| | |
|---|---|
| 9 Mar | Italy |
| 14 Mar | Spain |
| 17 Mar | France |
| 19 Mar | California |
| 20 Mar | Bavaria |
| 22 Mar | New York |
| 24 Mar | UK |

*Note: The degree of lockdown varies but overall covers a 'stay home' order and non-essential shops closed.*

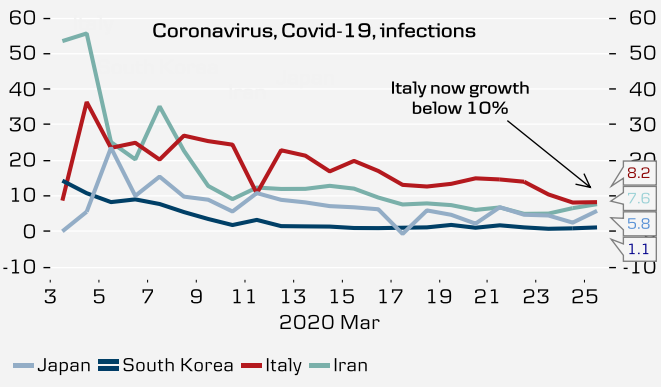
*Source: CNN, Politico*

**Italy: Number of new infections may have peaked on 22 March**



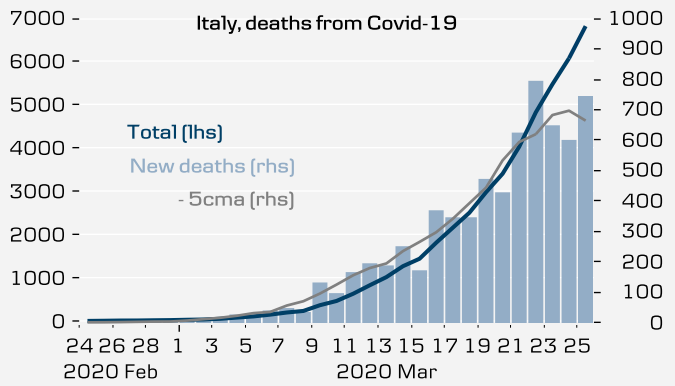

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**It would be consistent with the declining growth rate seen in other countries**



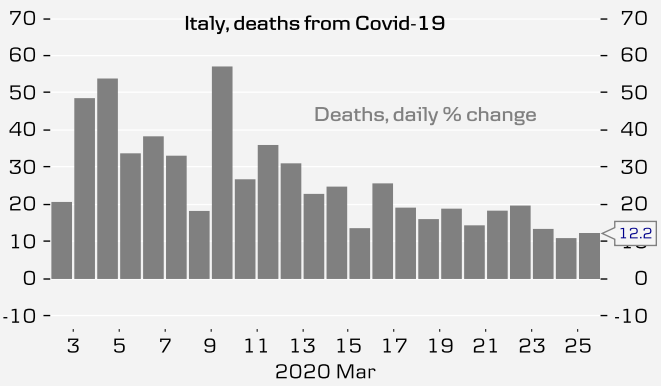

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**The number of new deaths per day has also levelled off in recent days (cma is centred moving average)**




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**The growth in deaths is now around 10%**




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

Can we trust the numbers for Italy? We know there is uncertainty about the number of infections, but there are a few reasons that make us believe the development is for real:

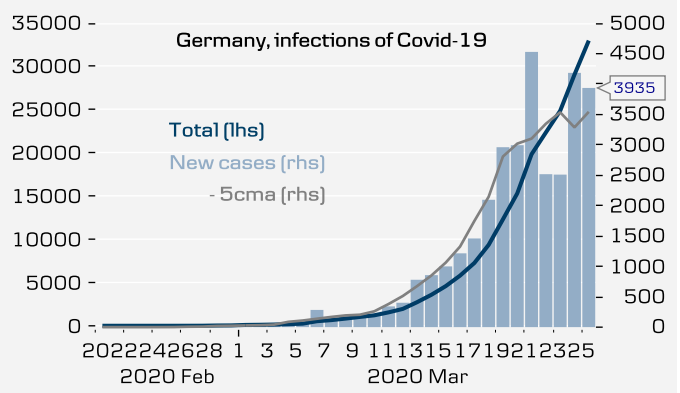
1. **The growth in the number of deaths has also slowed** and there should be much less uncertainty about this as it does not depend on the degree of testing.
2. **We *should* expect contagion to slow down at this point given the measures taken** in Italy. Apart from the lockdown, improved hygiene and fear rising in the population all contribute to social distancing and thus weaker contagion.

In reality, the contagion slows immediately when measures are taken, but it doesn't show up in the data until around a week later. This is because the person registered as infected today probably got the virus at least a week ago, due to an incubation period estimated at around five days and the time it takes to be sick enough to get a test and be registered.

## The rest of Europe lags Italy by around a week

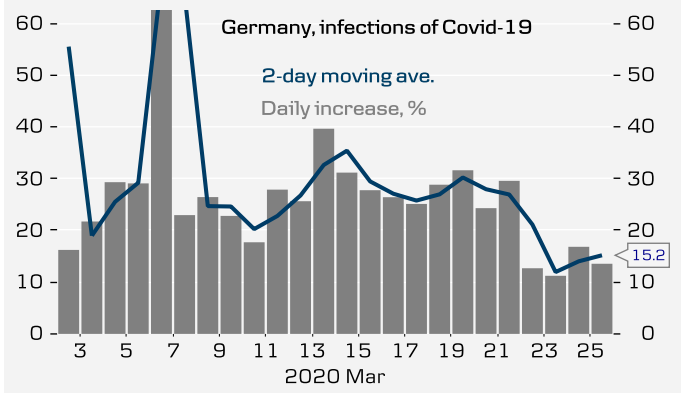
As the top chart on the front page shows, the virus spread from Italy to the rest of Europe with about a week's lag. People returning from skiing holidays brought the virus with them home and from there it started to spread. However, restrictions have been put in place at

**Germany: We also see signs of improvement here...**



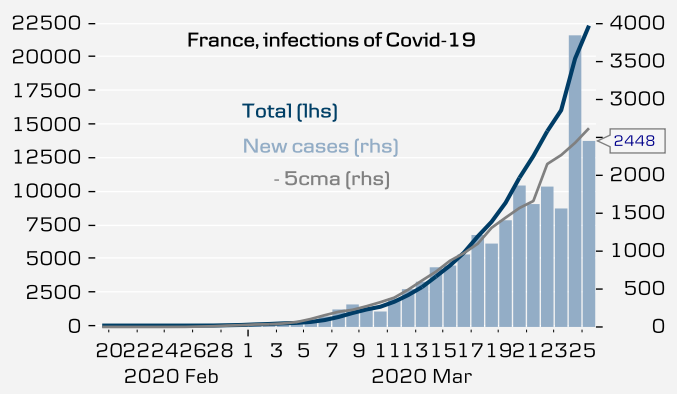

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**... as growth rate is now below 20%**



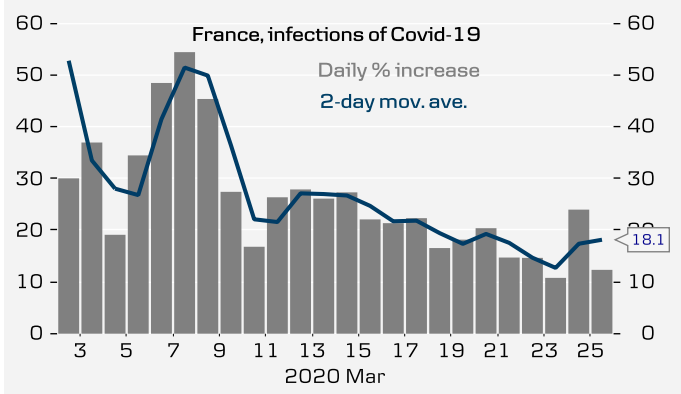

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**France: The rise in new cases seems to be slowing down...**




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**... and growth rate is trending lower now**




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

about the same pace as in Italy. We therefore expect to see a peak in Germany, France and Spain with a lag of around a week, hence by the end of the month or in early April. France has taken stronger measures than Germany, with a full and strongly enforced lockdown on 17 March, so we put the peak for France a bit earlier (27 March) than Germany (1 April). However, the data for the past couple of days suggest that Germany is seeing more slowdown so we should look out for a peak here also, already later this week. The dates should not be taken too literally, but as an indication of when to look for things to improve. Before we reach the peak, we expect further increases in new cases, but the daily percent change is expected to decline further from here (see table below).

**Overview of development in contagion rate measured by % changed**

Infections, daily % increase, 2 day average

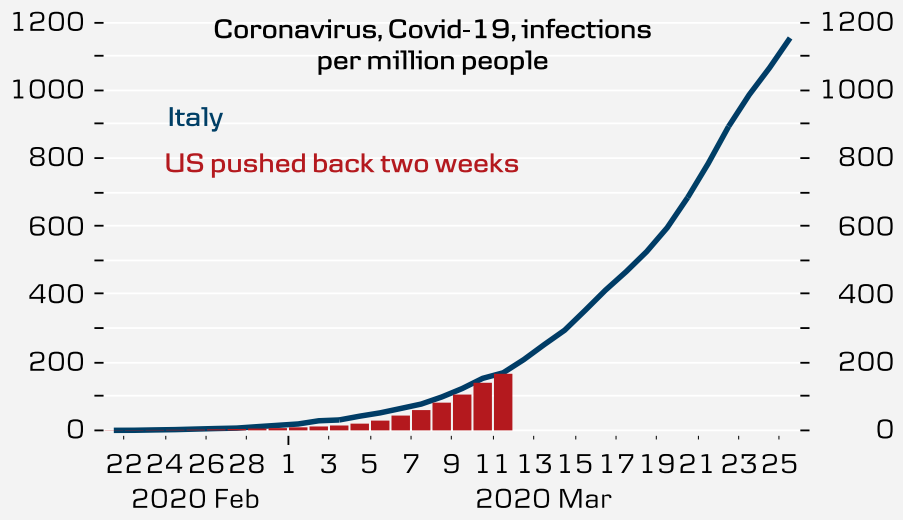
| | 14-mar | 15-mar | 16-mar | 17-mar | 18-mar | 19-mar | 20-mar | 21-mar | 22-mar | 23-mar | 24-mar |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Iran | 12 | 12 | 11 | 9 | 8 | 8 | 7 | 6 | 6 | 5 | 6 |
| Italy | 19 | 9 | 18 | 26 | 15 | 13 | 14 | 15 | 14 | 12 | 9 |
| France | 27 | 25 | 22 | 21 | 19 | 17 | 19 | 18 | 15 | 13 | 17 |
| Spain | 36 | 43 | 38 | 25 | 22 | 22 | 24 | 21 | 19 | 16 | 17 |
| Germany | 35 | 29 | 27 | 26 | 27 | 30 | 28 | 27 | 21 | 12 | 14 |
| UK | 25 | 41 | 42 | 16 | 19 | 31 | 30 | 23 | 24 | 20 | 15 |
| US | 25 | 19 | 21 | 28 | 29 | 29 | 37 | 31 | 27 | 31 | 29 |

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

## A peak in the US to follow late next week

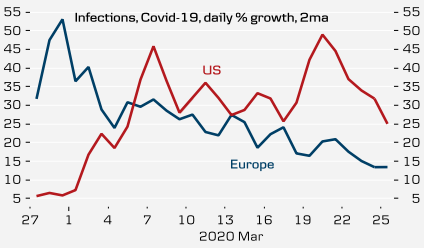
**While the rest of Europe has lagged Italy by about a week, the US is another week behind.** So we should not expect to see improvement here until late next week. In the meantime, we will likely see some pretty bad numbers coming out of the US. However, if we do indeed see an improvement in Europe over the coming week, it will be fair to infer that the US will be next, as the US has taken some of the same measures and will likely take more over the coming week as numbers grow bigger. The US has also scaled up testing significantly, which is important in getting the virus under control. Financial markets may thus increasingly see through the bad numbers that are only there temporarily until the US is next to get 'to the other side'.

**The US is lagging Italy by about two weeks**




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**The growth in infections has come down in Europe, US lags a bit**




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

## The economy to open up gradually in late April

**With improvement in the virus numbers, governments around the world will be keen to get their economies started again**. Apart from the development of new infections, the decision will also be driven by the number of active cases, as these determine the pressure on hospitals. In order to get active infections to decline, the number of new infections needs to get lower than the sum of people recovering and those that die. In China and South Korea, this happened around 10-12 days after the peak in new cases (see charts below).

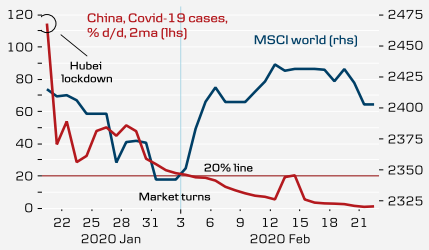
We have assumed it will take a bit longer in Europe and the US, as the decline in new cases may not be as rapid as in China and South Korea due to the less aggressive measures and smaller amount of testing taking place in Europe and the US. **It implies that we should be looking at a gradual opening of the economies towards the end of April.**

## The return to normal will be gradual

**The measures to contain the virus will likely not be removed in one go as this could risk a new flare-up in the virus**. The areas most sensitive to economic activity should be opened first, such as manufacturing production and certain parts of the service sector. However, recommendations to work from home will probably stay in place for some time after and schools and universities could also be closed into May. When the contagion has come down to a very low level, a full removal of restrictions may be removed, but still with recommendations to keep distance and focus on hygiene. Possible warmer spring weather will help, but we do not know that for sure yet.

**Our growth forecasts are based on the above assumptions and if it plays out, we should see a U-shaped recovery take place with activity gradually coming back over the summer and into the second half of the year**, with much support from stimulus in fiscal and monetary policy. Consumers will also benefit from a lower oil price and lower rates.

In February equity markets turned when the growth rate was falling...

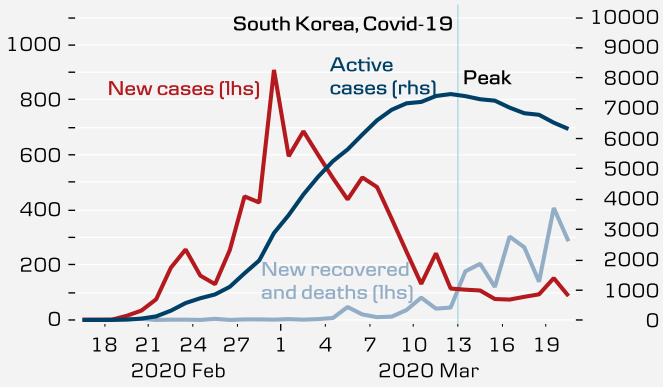



*Source: Macrobond Financial, Danske Bank*

... but before the number of new cases had actually peaked

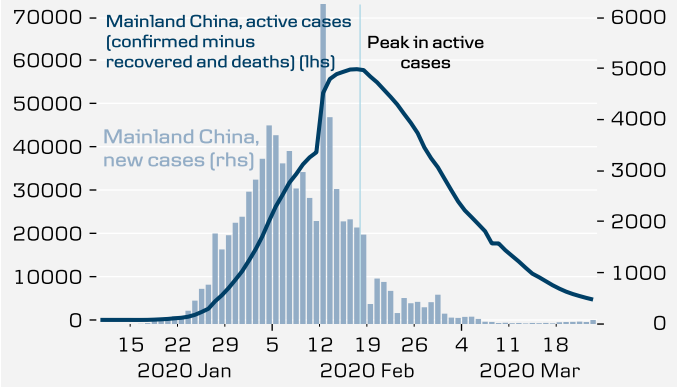

*Source: Macrobond Financial, Danske Bank*

Active cases peak 10 days after new cases in South Korea




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

In China it also happened 10 days later




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

**We should also see a recovery in risk sentiment as markets now fear a prolonged recession**, maybe priced with a 50% probability. During the Chinese outbreak in February, markets turned when it was clear that contagion was slowing and even before we had seen the peak in the number of new cases.

**The risk is clearly that we are too optimistic and it takes longer to contain the virus in Europe and the US**. And/or that we see a major outbreak in South America and India over the coming month. These risks bear close watching. But for now, we see a good chance that we could be close to the peak in the bad news on the COVID-19 – or at least the market's perception of it.

**There is also the risk that the virus could come back in a second wave**. We will address this in another piece. For now, though, we believe markets will focus on the first wave and if we see improvement here, the risk premiums in risk markets should come down.

### Can we use the data?

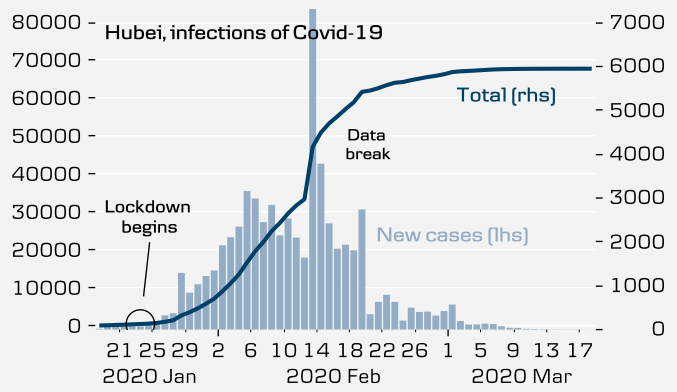
**There is clearly a lot of uncertainty about the numbers**. The difference in testing criteria means it can be hard to compare the data across countries. The total registered infections will also not represent the true number of infections as there will be a shadow number of undetected cases and this can differ from country to country.

**However, we do not believe that it renders the numbers completely without use**. As long as the testing criteria are reasonably unchanged *within* a country, it should be acceptable to look at the development in the number of *new* cases (unfortunately testing criteria are sometimes changed too). It also seems that the development in the numbers is consistent with what one would expect and hence are somewhat useful. For example, we *should* expect contagion to slow down when people change behaviour and restrictions on movement are imposed. The so-called reproduction rate (also called R0) is the average number of people an infected person will transfer the disease to. It is estimated by scientists to be around 2.5 for COVID-19. If R0 is reduced, contagion will slow down and the growth rate of the number of infected will decrease. A decline in R0 below 1 will make the virus die out.

**We can also use data on deaths to cross-check the numbers on infections**. The number of deaths lags the number of infections as it on average takes around two weeks before death sets in for a small percentage of the patients with COVID-19. But if we see a lower rate of increase in deaths, it gives an indication that a slowdown in infections has also taken place.

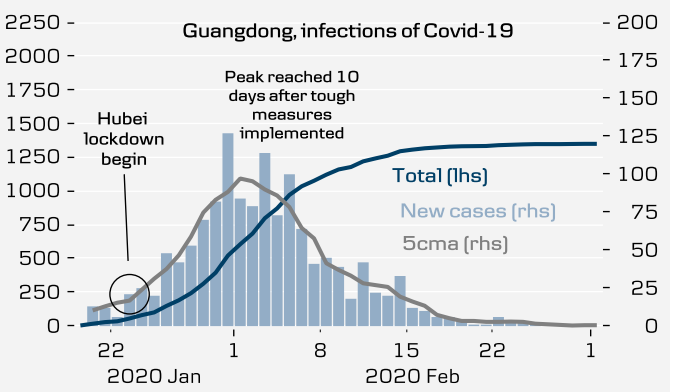
## Appendix. Charts on countries earlier in the 'virus cycle'

### After one month of lockdown Hubei had seen significant slowing in contagion



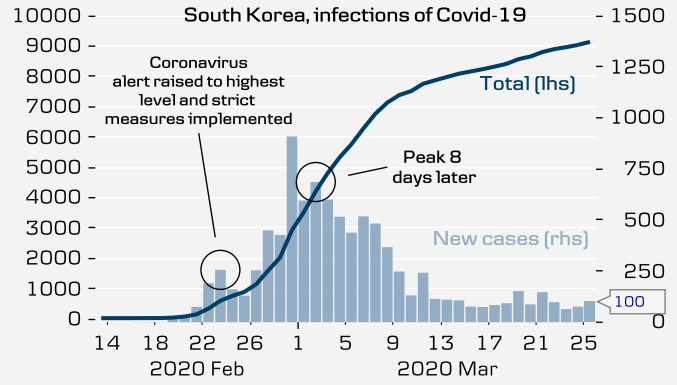

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

### In the Guangdong province (113m population) the peak was reached after 10 days



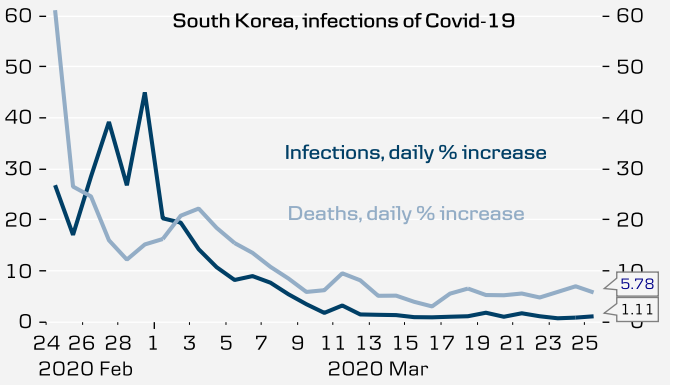

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

### South Korea: It took 8-9 days from 'red alert' until peak in new cases was visible



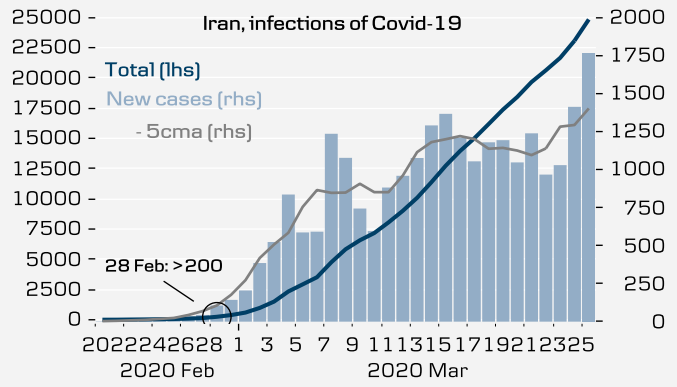

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

### The declining growth in deaths helps to verify the slowdown in infection growth



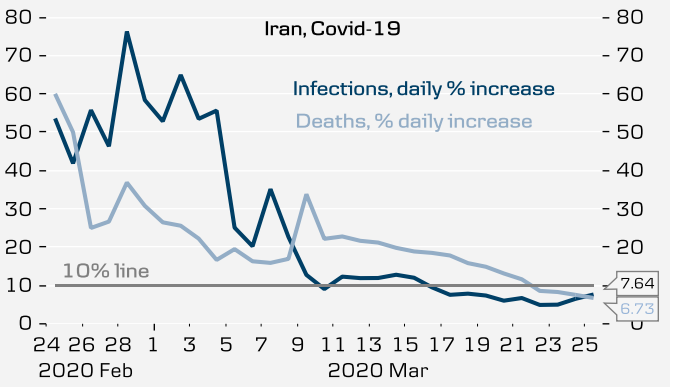

*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

### Iran: Renewed spike in new cases. Lockdown has not been imposed so less strict measures than in Europe and US




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

### The slowdown in new deaths gives validity to declining growth in infection numbers




*Source: ECDC, Worldometer, John Hopkins University, Danske Bank*

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