The traffic-light route to ending the economic lockdown

5th April, 2020

A discussion paper by Gerard Lyons and Paul Ormerod[1]

Main points

- We support the current lockdown. It is necessary to limit the spread of the virus, to reduce its reproduction rate and to save lives.

- A long lockdown will wipe out large swathes of the economy. There will be a negative impact both financially and mentally on too many people. Already the lockdown has seen a surge in domestic violence. How to end the lockdown is key to helping restart the economy.

- This discussion paper focuses on issues surrounding when and how to end the lockdown.

- We discuss some of the key aspects of epidemiology models relevant to this debate.

- These models have real scientific value and were crucial in making the right decision about imposing the lockdown.

- We use the analytical framework of epidemiological models alongside the key behavioural insights from economics to form the basis for our strategy for exit from lockdown.

- An important lesson from economics is that incentives matter, and thus in ending the lockdown it is important to take into account that future behaviours will be impacted by both what people have learned about the virus and also by the rules the government can impose during the different stages of unlocking.

  Following the success of lockdown, we address the important issues of testing, tracking and treatment.

- We outline how to end the lockdown in a phased and gradual way.

- We suggest that lockdown is followed by three phases, as in a traffic lights, from red to amber to green. Then everyone is clear about the sense of direction. At each stage different economic activities and behaviours are allowed. It will also give hope.

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Introduction and overview

A lockdown is necessary to limit the spread of the virus and save lives, but it is not feasible or practical to prolong it for too long. A long lockdown will wipe out large swathes of the economy. There will be a negative impact both financially and mentally on too many people. Already the lockdown has seen a surge in domestic violence.

It is important to make plans now for when and why the lockdown will end. There are significant trade-offs in these key decisions. Here, we outline how to end the lockdown in a phased and gradual way.

Economists and social scientists have an important role to play in helping answer important questions such as when, why and how to end the lockdown and to bring the economy out of hibernation and back to life.

The mathematical models of epidemiology currently occupy centre-stage in policymaking. To be absolutely clear, these models have real scientific value and have had a positive impact on policy making.

These models have strengths but they also have limitations, and it is the latter that threatens the lockdown being prolonged too far. Assumptions have to be made about the key inputs – the parameters – of any particular model. In physics, for instance, the parameters of physical laws are both fixed and are known with certainty. The same is not true of epidemiological models.

If people revert very quickly to the patterns of behaviour of before the crisis, the epidemiological models are correct. There would be a second wave of infections.

But behaviour will be different, either because of the lessons people have learned during this crisis, or because of the constraints placed upon them by rules and regulations. How many people will shake hands the day after the lockdown is lifted?

We emphasise as strongly as possible that we are using the analytical framework of epidemiological models in our strategy for exit from lockdown. But it is essential to bring into them the key behavioural insight from economics.

Incentives matter. This is one of the most important points in the whole of economics. It is a point that is overlooked if we rely purely on the arguments of epidemiologists to prolong the lockdown.

It is essential that we appreciate the choice we have to make on ending the lockdown is not new. It is a common problem faced all the time in societies, it is just that we don't always acknowledge this.

Some say the lockdown must not end until no-one can infect anyone again and thus ensure no-one dies. To put this in perspective, we could prevent 1,870 deaths and 157,630 injuries over the next year in Great Britain[2] if we were to stop road traffic. Of course, no-one wants these figures to be this high, hence we have all sorts of rules and regulations to improve road safety. Yet, we all accept that we need road traffic, else the economy and way of life would suffer.

We cannot stress too much that it is not our purpose to undermine epidemiological models. The mathematical models of epidemiology have already had one major policy success. They provide the intellectual underpinning for the policy of lockdown which was necessary, and indeed perhaps overdue, when it was implemented. But the results of these models come with huge levels of uncertainty, which both the general public and decision makers in government might not appreciate.

Of course, we have to be sure the reproduction rate of the virus, the R0, is less than one and under control. This is the figure that shows how many people are infected. It is, as we know, complicated further by the nature of this virus, which is why it will be necessary to be rigorous about the rules and the phases by which the lockdown is ended.

Data can be utilised in allowing an easing of the lockdown. If we look at east Asia now, we can learn some of their lessons as we gradually unlock. In a host of economies, data apps are available to allow the authorities to track the virus is not spreading and people to have access to more real-time information about the virus, helping them ensure that risks are kept to a minimum.

[2] 'Reported road casualties in Great Britain: provisional estimates year ending June2019', Department of Transport, Statistical Release, 28 November 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/848485/road-casualties-year-ending-june-2019.pdf

The exit strategy can be done in phases. This will address the worries of epidemiologists. It will avoid what economists call the crowded trade, with the generic example usually cited being of everyone rushing to the exit in a cinema at the same time, although in this virus situation perhaps avoiding rushing to a crowded football match might be the example to use.

We would suggest that lockdown is followed by three phases, as in a traffic lights, from red to amber to green. Then everyone is clear about the sense of direction. We would go, first, from lockdown to red, where we must still stop doing things we might have done before the crisis. Then to amber, as conditions improve, but we still need to be careful. Eventually, back to green, when medical experts can give the all-clear. This process also gives hope. It will reduce the risk that Lord King[3] warned of, where lockdown might cause rebellion. It should ease the pressures on mental health and fears about domestic abuse that have risen during the lockdown.

The first phase would deliberately be called red, to ensure people stopped to think before they did things. More – but not all – types of shops could open and they would have to exercise strict social distancing, as most supermarkets do now. Many might choose not to reopen, for commercial reasons, as demand would be low. Travel should still be discouraged and many international flights banned.

In the amber phase, unlimited private car journeys should be allowed. People may in fact substitute this for public transport. In order to minimise pressure on public transport, and crowds, there would have to be attempts to vary the rush-hour, with different opening and closing times. Wearing masks and disposable gloves could be compulsory when using public transport. Restaurants could reopen but with strict seating demarcations, to uphold social distancing.

It would only be in the green phase that sporting events or mass gatherings could take place, or places of worship reopen. It is in large gatherings that a single person may infect many[4]. Mass transit could return to normal.

[3] Mervyn King made comments related to this during a Policy Exchange Webinar on 1 April, 2020. The speakers were Lords King, Darling and Macpherson and Gerard Lyons, chaired by Juliet Samuel.
[4] This issue has figures prominently during the policy debate, in the UK and elsewhere, regarding the Mitigation and Suppression strategy.

The lockdown is helping overcome the health risk the country faces. However, only by ending the lockdown can we address the economic, social and quality of life challenges.

Context

The UK, like other countries, faces both a health crisis and an economic crisis. Naturally, the health crisis is the bigger problem and it is only when we are passed the worst on health issues that we can become more optimistic about the ability to address the economic challenge ahead. The biggest single problem facing the economy now is a collapse in demand and in income. The danger is that this feeds upon itself. Thus the most effective policy is, as we have outlined previously, to get income and cash to people and to firms. This economic problem will intensify as the lockdown persists, reinforcing the need for further economic policy stimulus. The government needs to provide the cash and the logistics need to be in place to deliver upon this. The potential economic contraction is huge. In this paper we are not focusing on the need to boost income and spending. Here we focus on the need for an exit strategy from the current lockdown.

Double crises

The 2020 Global Health Crisis (GHC) has been talked about frequently in relation to the 2008 Global Financial Crisis (GFC). One important similarity is that in 2008-09 it was only once we were passed the worst of the financial crisis that there could be genuine optimism about what lay ahead on the economic outlook at that time. Of course, many lessons of the financial crisis lingered on for years.

Likewise, now, it is only when we are past the peak of the health crisis that we can be optimistic about the economic outlook. Governments across the world are fighting battles on two fronts: health and the economy. The health crisis takes precedence. The lockdown is necessary to address the health crisis and we have supported it fully. The economic damage from the lockdown is high. Thus, monetary, fiscal, financial and regulatory policy must be aligned to both minimise the economic fall-out and to ensure that the economy is positioned to rebound fully once the health crisis is over. Ending the lockdown is an important part of the necessary process. The question is when to do that?

The epidemiology models

The mathematical models of epidemiology have long been a quiet byway of scientific research.

One of the current authors has had a longstanding interest in them, using their analytical framework to develop a model of crime in the mid-2000s for the then Home Secretary[5] and featuring a range of results based on their approach in an economics book in 1998[6].

But outside their immediate sphere, few have shown much interest in the mathematical models of epidemiology. Now they occupy centre stage in policy making.

It is therefore important to put these models under scrutiny, to understand their strengths and limitations. In particular, their implication that, as the team at Imperial College re-emphasised on 30 March "the virus will be able to spread rapidly should interventions be lifted" (p.12)[7].

To be absolutely clear, these models have real scientific value. They have already had a major positive impact on policy making. But the results obtained from them do not have the same scientific status as, say, the results from physics.

The mere fact that they are set down in mathematical formulations which are incomprehensible to the layperson should not blind us to this fact.

The theoretical models of economics are at a similar level of mathematical difficulty and abstraction, arguably even more so[8]. But even the most ardent economist would not claim that their results have the same status as the laws of physics.

There are of course problems at the frontiers of knowledge where physicists will disagree amongst themselves. But an everyday example will suffice to illustrate our point. Imagine someone holding a pint of beer a fixed distance above the ground. If he or she drops it, how long will it take to hit the ground and what

[5] P. Ormerod (2003). Nonlinear modelling of burglary and violent crime in the UK (monograph with L Smith and C Mounfield), *Occasional Paper no.80*, Home Office
[6] P.Ormerod (1998) *Butterfly Economics*, Faber and Faber
[7] Imperial College COVID-19 Response Team DOI:https://doi.org/10.25561/77731, 30 March 2020, Estimating the number of infections and the impact of non-pharmaceutical interventions on COVID-19 in 11 European countries
[8] Here, as an illustration, is one of the earliest proofs of existence in general equilibrium theory, the core model of economics J.V. Neumann, 1945. A model of general economic equilibrium. *The Review of Economic Studies*, *13*(1), pp.1-9.

will be the exact trajectory of its speed? All physicists will use the same theoretical model to give the answer. Newton's law of gravitation is universal and its key parameter, the gravitational constant, is fixed[9].

The same is not true of the mathematical models of epidemiology – or indeed of economics.

The general approach is shared across different models. The principles were first worked out by two Scottish epidemiologists, Kermack and McKendrick, as long ago as 1927[10]. This abstract model remains the basis of our modern understanding.

They proposed that people at any point in time are in one of three conceptual states. The first defines those who are susceptible to any particular virus. The next category is those who are infected. The final one is "removed". This could mean genuinely recovered or dead, but at any rate, no longer susceptible.

Kermack and McKendrick set up three non-linear differential equations to describe how a virus might spread. The equations describe how movements take place from one state to another.

Their apparent simplicity disguises substantial complexity. From the names of the categories, it is known as the SIR model – susceptible, infected, recovered.

The key part of the system is essentially how many susceptibles any given infected person passes the disease onto before he or she recovers. In turn this depends on how much the susceptibles and infected intermingle, the probability of catching the virus from a single contact, and the length of time someone is infected.

Modern models are more sophisticated, but they rest on these fundamental principles.

Developments in computing power have enabled far more analysis to be carried out much more quickly. They also make them more accessible. Here, for example, is a useful link to an epidemic calculator, http://gabgoh.github.io/COVID/index.html. The visual interface in the calculator is based upon a model of virus spread which is still used at the frontlines of

[9] We are of course aware that Newton's law is only an approximation to the more general laws of relativity, but it remains an excellent approximation in most circumstances.
[10] WO Kermack and AG McKendrick, 'Contributions to the theory of epidemics', Proc. Royal Soc A 115, 700-721 (1927); 133, 55-83 (1932); 141, 94-122 (1933)

research. By clicking on the chart, the various parameters of the model can be given different values and a wide range of scenarios obtained rapidly[11]. The whole point here is that assumptions have to be made about the key inputs – the parameters – of any particular model. In physics, the parameters of physical laws are both fixed and are known with certainty. The same is not true of epidemiological models.

Different groups will each have their own model. This accounts in part for the differences in the projections which we see reported. *But the differences in assumptions which the groups make is far more important than any differences in the technical details of the models*. (Anyone who is interested can see this very easily by playing with the link above).

So, for example, a scientific group in Oxford can argue that tens of millions of people in the UK have already been infected with the corona virus whilst other groups think it may be at most 2 million.

The difference even extends to the various outputs of the same group over time. For example, Professor Neil Ferguson of Imperial College London agreed with the conclusion of the 21 February 2020 meeting[12] of New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG)[13] that Covid19 represented only a moderate risk[14]. Within a matter of days, he argued that there would be at least 250,000 deaths in the UK.

We cannot stress too much that it is not our purpose to ridicule or undermine epidemiological models. But their results come with huge levels of uncertainty, which both the general public and decision makers in government might not appreciate.

[11] This is provided in the excellent piece of 19 March 2020 by Tomas Pueyo https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56. We acknowledge our indebtedness to the article in general.

[12] 'Covid-19 risk was deemed moderate by scientists', Sean O'Neill, The Times, 1 April, 2020. See minutes of the NERVTAG Novel Coronavirus Seventh Meeting: 21 February 2020, Public Health England, Department of Health and Social Care, https://app.box.com/s/3lkcbxepqixkg4mv640dpvvg978ixjtf/file/640968322003

[13] NERVTAG advises the government on the threat posed by new and emerging respiratory viruses https://www.gov.uk/government/groups/new-and-emerging-respiratory-virus-threats-advisory-group

[14] See the 9th Report from the WHO Collaborating Centre for Infectuous Disease Modelling at the MRC Centre for Global Infectuous Disease Analysis, J-IDEA, Imperial College, London https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/

Neither do we intend to enter into a detailed discussion of the difficulties involved in trying to model Covid[15]. Clearly it goes without saying that an understanding of the virus and how it is transmitted is key in any aspect of this debate. Rather, we want to focus on the points, as we stated at the outset, whether a relaxation of lockdown will inevitably see a further major spread of the virus.

The mathematical models of epidemiology have already had one major policy success. They provide the intellectual underpinning for the policy of lockdown which has been applied, in different ways, in many countries.

The initial policy response of the UK government was to take the approach of allowing the population to acquire what was described as herd immunity. In other words, to allow a sufficient number to experience the virus so that it would die away naturally of its own accord. It would become too hard for the virus to find new people to infect.

This approach has attracted much criticism, and rightly so, as it would have implied considerable numbers of deaths, with the health system unable to cope.

It was the most important feature of the epidemiological models which changed the government's mind.

Above, we described three key assumptions needed in any such model:

- how much the susceptibles and infected intermingle
- the probability of catching the virus from a single contact
- the length of time someone is infected

Combining these in a suitable way tells us how many susceptible people **on average** an infected person will infect during the period in which he or she is infected. (We have put the phrase "on average" in bold. We return to discuss it below).

This is the hitherto obscure concept of the "reproduction number", or R0, which has attracted naturally much attention during this pandemic. If it is one, then an infected person will infect one other person. If R0 is above one, a disease will

[15] A very good piece for those interested is here https://fivethirtyeight.com/features/why-its-so-freaking-hard-to-make-a-good-covid-19-model/

spread. Someone who is infected will pass it on to more than one person. If it less than one, it will fade away.

Estimates of the reproduction number for Covid19 vary, but it seems to be somewhere between 2 and 3.5[16]. These estimates were the basis of the gloomy prognosis that without a change in policy, the virus would spread unchecked and lead to hundreds of thousands of deaths.

Once lockdown is imposed, the value of the reproduction number falls sharply, to well below one[17] , perhaps as low as 0.3. A study by the London School of Hygiene and Tropical Medicine puts the UK value at 0.62[18].

Whatever the exact number, we know that lockdown works. It gets the reproduction number below one.

There are sometimes doubts raised about Chinese statistics and exactly when the authorities knew about the disease. But there is no doubt that it is under control in China, where the focus is now on returning the economy to normality, plus ensuring they react quickly to any signs of a second wave of the virus, as seen over the last week with a localised lockdown in one localised area[19]. Attention is also focused upon east Asia, where following the outbreak of the Severe Acute Respiratory Syndrome (SARS) coronavirus in 2002-04 many economies learned lessons and thus appeared to be better prepared to respond when Covid-19 hit. Even so, as we have seen over the last week, the need to contain a second wave of the virus as students, or others, return from Europe has prompted Singapore, seen as a leading example of how to fight a pandemic, to introduce a lockdown.

There is no other effective way to get R0 under control than a lockdown. The earlier the lockdown the quicker the virus is tackled.

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[16] For example, S. Zhao et al. 2020, Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak, https://doi.org/10.1016/j.ijid.2020.01.050

[17] For example, J Zhang et al. 2020, Age profile of susceptibility, mixing, and social distancing shape the dynamics of the novel coronavirus disease 2019 outbreak in China**,** medRxiv preprint doi: https://doi.org/10.1101/2020.03.19.20039107

[18] https://cmmid.github.io/topics/covid19/current-patterns-transmission/comix-impact-of-physical-distance-measures-on-transmission-in-the-UK.html

[19] Over the last week, the focus was both on the rebound in Chinese economic data in March, as seen in the purchasing managers' indices, and also on news of a lockdown in Jin country, in central China.

As soon as lockdown is imposed, there is an immediate impact on the number of true new cases. There will almost certainly be a lag of several days before these become reported cases. But simply looking at reported cases, we can see the effect.

There will be day-to-day fluctuations in recorded numbers for a variety of reasons, some of them arising from the administrative process. Still, In Italy lockdown was imposed on 9 March and the peak of recorded cases was on 21 March. Many countries on the Continent, for comparison, brought in lockdown later, in the middle of the month and almost everywhere the highest level of peak recorded cases appears to have been reached at the end of March[20].

All this has focused attention on when the new reported cases in the UK will peak, and then fall. It is hard to predict with certainty, as reflected in the continuous focus on this among experts and in the media, with latest suggestions being around Easter.

But then what?

Exiting the lockdown

Recall again the three key factors where assumptions are needed in an epidemiological model:

- how much the susceptibles and infected intermingle
- the probability of catching the virus from a single contact
- the length of time someone is infected

Immediately, there is nothing we can do about the third of these, the length of time someone is infected.

If we assume that the other two revert to their pre-lockdown values, then as a matter of pure logic we will see another outbreak of the virus.

But these are not fixed like the parameters in the laws of physics are fixed. They can be altered by human actions.

[20] https://www.worldometers.info/coronavirus/

We can revert to the phrase which we put in bold when we first discussed these key factors: “how many susceptible people **on average** an infected person will infect during the period in which he or she is infected”.

The mathematical models of epidemiology operate at an aggregate level. So they use the average value. It is, as we have seen, a very valuable concept.

But it conceals the fact that there is a very big spread in the number of people infected by individuals who are themselves infected. The average is literally what it says on the tin: we consider a large number of people who are infected, and we take the average across this group of the number of people who are infected by these individuals.

Suppose the reproduction number before lockdown is 3. Some infected people may pass the virus on to just one or two others, or possible even none. A small number of others will infect many more.

This sort of distribution is pervasive in social and economic settings. The distributions of income and wealth, for example. In each case, we can take the average across the population. It is a useful and informative number. But a small number of people have many times more than the average.

So here is an important initial guide to relaxing the lockdown. *Avoid situations in which there is an opportunity for someone to infect many people* – to be, in the jargon, in the “fat tail” of the distribution.

This itself would bring down the pre-lockdown reproduction number. To repeat, this number is not fixed. We can start to move back to a normal situation whilst keeping it under control.

There are a number of different issues, therefore that we need to consider here.

But the most important is that while full support must be provided to the health specialists on a parallel track the economic experts should be planning now, for an exit strategy from the lockdown and for a restarting of the economy. This has to be in addition to the implementation of policy now to minimise the hit to income and to demand, as noted earlier in this paper.

As economists, we are used to the idea that people alter their behaviour as the set of incentives which faces them changes. If the price of a product goes up, we usually buy less of it. But price is by no means the only incentive. The population of the UK is currently living through the most serious health threat

the country has experience for a century. Individuals will certainly alter their behaviour as a result.

It is naïve to imagine that post-lockdown the previous levels of intermingling will reassert themselves. This will only happen over a considerable period of time. Some, especially younger people, may pay little regard, but for many, the lockdown will alter behaviour.

How long will it be, for example, before handshakes – or even kisses on greeting – will once again become the norm? We do not know the answer, but it is plausible to think that it will not be for a long time.

Behaviour changes such as this change the second key factor, namely the probability of catching the virus from a single contact.

This can be reinforced by legislation. For instance, it could be made mandatory to wear disposable gloves and a protective mask whilst using public transport. The latter is not so much for the protection of the individual, rather it is to contain the sneezes or coughs of an infected individual[21]. Legislation, too, could delay the opening of events or of mass gatherings.

The Three T's

The strategy of lockdown has given us an invaluable "T"", namely the wonderful gift of *time*. This itself makes unwinding the lockdown easier. In the first instance, time seems to have enabled the NHS to deal with the virus without being completely overwhelmed, as Northern Italy was. While the fatality rate is high, compared with earlier fears, large numbers have not died through lack of ventilators and serious accidents can still be treated.

So time to prevent the NHS from being overwhelmed, and time for other technical and scientific developments to take place. These are important factors to consider in restarting the economy.

They follow on, naturally, from the mitigation strategy of preventing the spread of the virus.

[21] See, for example, Wölfel, R., Corman, V.M., Guggemos, W. *et al.* Virological assessment of hospitalized patients with COVID-2019. *Nature* (2020). https://doi.org/10.1038/s41586-020-2196-x

These are the “3 Ts”:

- Testing
- Tracking
- Treatment

Testing is necessary. It is applied across many countries. Testing for active disease and anti-body based immunity is a priority, as an accurate measurement of health status is needed and is an important part of forming our responses. Speeding up the scale of testing is a necessity.

Mass testing may be desirable but it does not seem feasible and thus not credible to make it a precondition to ending the lockdown. Over the last week, the government has committed to 100,000 tests per day, by the end of the month. While this is much higher than the present rate of testing, at this rate it would take just under two years to test the whole UK population. No-one is suggesting the last person to be tested should be retained in lockdown for close on two years. Indeed, the speed at which testing will take place will increase, but it highlights the time delay in relying upon testing as one of the main criteria for ending the lockdown.

Testing would allow people who have had the virus or have recovered from it to be identified, but then what?

In our view, it is not feasible or credible to allow the lockdown to end at different dates, for different groups. Human behaviour suggests it would not work, and it would be hard to enforce.

And what about those who are tested and who have not caught or had the virus? What happens to them during the vaccine gap phase? This supports the idea of a phased unlocking.

It feeds into the issue of tracking. This has been vital in east Asia. Tracking is needed, once testing has taken place and while the current vaccine gap phase exists. Significant surveillance technology exists. We are not suggesting this should be used against the British people but perhaps it might be utilised to track what happens to those who have been tested and who do not have the virus yet to minimise future risks.

Then there is treatment. Following the ending of the lockdown there are two aspects to the treatment issue. One is to recognise that there will still be a vaccine gap. An aim to flatten the curve at which people catch the virus and may

thus require intensive care treatment has been a central feature of government policy. It is aimed at reducing pressure on the NHS and demands on the limited number of intensive care units (ICU) beds. During the phased unlocking there will be some who catch the virus, and unfortunately there will likely be some requiring ICU beds. The important lesson is that the system will be better placed to cope, because of the reduced numbers.

The second is to recognise the rapid pace at which progress is being made towards not only quicker and wider access to testing but also towards closing the vaccine gap. Work summarised in a research note by the economist Martin Malone at AlphaBook highlights this. He points out, there are now 41 regulatory authorised diagnostic tests, 23 treatments now in clinical trials across the world, and five vaccines already in human clinical trials.

The exit strategy: red, amber, green

What could be the trigger to end the lockdown? As noted already, we support the current lockdown. It is due to last until Easter Monday. The question then is what happens?

The judgement call to end the lockdown will need to be informed by a range of data. Perhaps an important piece of such data is that recorded cases fall to around half of their peak, confirming a clear downward trend.

Of course, we have to monitor the situation rigorously and check for any sustained upturn in the number of new cases. The government should make it very clear to people that lockdown will be restored unless behaviour changes.

We emphasise as strongly as possible that we are using the analytical framework of epidemiological models in our strategy for exit from lockdown. But it is essential to bring into them the key behavioural insight from economics.

Incentives matter. This is one of the most important points in the whole of economics. It is a point that is overlooked if we rely purely on the arguments of epidemiologists to prolong the lockdown.

The exit strategy can be in phases. This will address the worries of epidemiologists. It will avoid what economists call the crowded trade, such as everyone rushing to the exit in a cinema at the same time.

We would suggest that lockdown is followed by three phases, as in a traffic lights, from red to amber to green. Then everyone is clear about the sense of direction.

We would go, first, from lockdown to red, where we must still stop doing things we might have done before the crisis. Then to amber, as conditions improve, but we still need to be careful. Eventually, back to green, when medical experts can give the all-clear. This process also gives hope. It will reduce the risk that Lord King[22] warned of last week, where lockdown might cause rebellion. It should ease the pressures on mental health and fears about domestic abuse that have risen during the lockdown.

Data can be utilised in allowing an easing of the lockdown. If we look at east Asia now, we can learn some of their lessons as we gradually unlock. In a host of economies, data apps are available to allow people to maximise their information, ensuring risks are kept to a minimum.

The first phase would deliberately be called red, to ensure people stopped to think before they did things. More – but not all – types of shops could open and they would have to exercise strict social distancing, as most supermarkets do now. Many might chose not to reopen, for commercial reasons, as demand would be low. Travel should still be discouraged and many international flights banned.

In the amber phase, unlimited private car journeys should be allowed, although people may be discouraged from seeking out crowded destinations. People may in fact substitute this for public transport. In order to minimise pressure on public transport, and crowds, there would have to be attempts to vary the rush-hour, with different opening and closing times. Ideally, wearing masks and disposable gloves could be compulsory when using public transport. Restaurants could reopen but with strict seating demarcations, to uphold social distancing. Smaller shops could reopen.

It would only be in the green phase that any sporting events or mass gatherings could take place, or places of worship reopen. It is in large gatherings that a single person may infect many. Mass transit could return to normal. The return of international flights should be based on the risks seen in flying to other countries. In this phase, other macro-economic policies such as cutting VAT rates might be employed, aimed at boosting spending.

[22] Mervyn King made comments related to this during the Policy Exchange Webinar on 1 April, 2020

The lockdown is helping overcome the health risk the country faces. However, only by ending the lockdown can we address the economic, social and quality of life challenges.

Longer term lessons

A pandemic was always a risk, but it was one that western countries as well as financial markets had become less concerned about in recent years. Following the outbreak of the Severe Acute Respiratory Syndrome (SARS) coronavirus in north east Asia in 2002-04, the fear of a pandemic featured regularly as one of the top fears mentioned in global surveys of risk. That changed following the 2008-09 financial crisis, after which worries about another financial meltdown dominated. Then, in recent years, concerns about climate change came to the fore in risk assessments. Worries about climate and financial risks are important but epidemiologists and other experts have regularly pointed out the need to guard against a pandemic. It is easy to overlook how many major viruses there have been already this century. While they did not trigger fear in the general public they should have been warning signals for more health systems across the globe to build capacity and be prepared. For instance, in addition to the SARS and 2012 Middle East Respiratory Syndrome (MERS) coronaviruses that had not previously been encountered, there were other familiar threats such as swine and avian flu as well as the ebola outbreak in west Africa in 2014.

The additional challenge for many health systems across the globe is that they are often stretched on an ongoing basis. They can gear up and plan for an annual flu but beyond that it is expensive to build slack into any system for an event that may be unlikely to occur. Of course, hindsight is a great thing and no-one expects anyone, even experts, to be able to predict when a pandemic will strike. All that is understandable, but there is a vital need for more effective early warning systems and to respond to them and also the need to build capacity into health systems to cope, just as capacity to cope with greater shocks had to be built into the financial system after the GFC. There is also the need, as we have outlined here, to ensure that while the health crisis is dealt with quickly to beat the virus, there is also a need to ensure that the economic damage is minimised.

The lockdown was and is necessary to reduce the reproduction rate to below one and to contain the spread of the virus. Ending the lockdown needs to be a phased process – particularly during the period of a vaccine gap – but the economy requires as quick a restart as possible. We have highlighted here the need to use the analysis and thinking of economists and social scientists to provide a clear and credible exit strategy from the lockdown.

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5th April, 2020