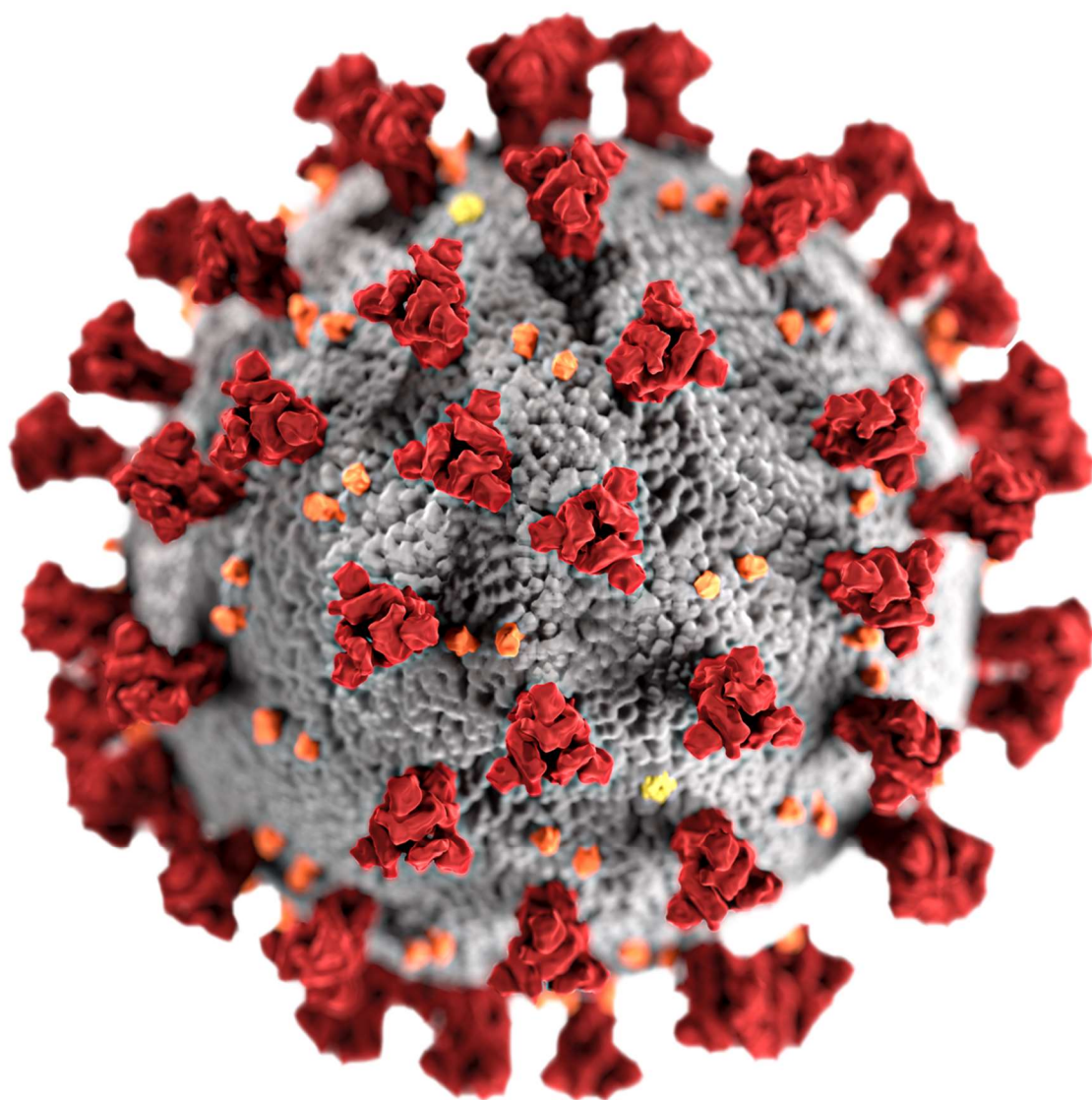


# Corononomics

Scenarios for the UK economy in 2020-21



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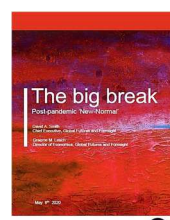
This report analyses the short-term impact of Covid-19 on the UK economy in 2020-21.

A second report in the series will examine the more enduring long-term economic impact of Covid-19 over the coming decade.

**macronomics** has also produced 2 other Covid-19 reports in conjunction with **Global Futures & Foresight**:



**April 2020**



**May 2020**

## Summary

- Entire sectors are being crushed. CEOs lament that previously sound companies are struggling for their very survival. Even with a second half bounce-back, the Bank of England and the Office for Budget Responsibility think the UK could contract at the fastest rate in 300 years in 2020. The economic numbers are, quite literally, off the charts. But what happens next?
- The scale of economic uncertainty at present is perhaps greater than at any time in our economic history. In response this report presents a comprehensive set of 5 epidemiological and economic scenarios, in order to help readers understand the economic consequences of the Covid-19 threat to lives and livelihoods.
- In the second half of the year the economy could bounce back and regain all the lost output in the first half. Alternatively, if there is a second wave to the pandemic - over the Autumn-Winter period - the economy could implode and not regain its pre-pandemic output level until 2025-30. Amazingly, all these scenarios are a possibility - from the roaring twenties to a 1930s style depression.
- The 5 economic scenarios are: **Super V** (miraculous recovery), **V** (full recovery), **U** (hospitalisation), **W** (intensive care) and **L** (near death experience).
- The range of possibilities is that wide, because the epidemiological uncertainty is so great. The 5 economic scenarios are based on epidemiological outcomes ranging from a very quick lifting of the lockdown and social distancing over the Summer, through to a second or third wave to the pandemic over the Autumn-Winter of 2020-21.
- The great hope for the **Super V** and **V** scenarios is very large numbers of unrecorded asymptomatic cases and therefore much higher levels of herd immunity.
- If the **Super V**, **V** or **U** scenarios don't occur, the negative economic consequences of the crisis could be dangerously non-linear, increasing over time. The longer and deeper the crisis, the lower the probability of a quick bounce-back when it's over.
- It is difficult to be at all clear, as yet, as to which scenario will come to pass. Our very hesitant judgement is that the **U** or **V** scenarios are the most likely.

- The immediate impact of Covid-19 will be weaker inflation or even deflation, but thereafter there is huge uncertainty as to whether or not it will lead to sustained zero inflation/deflation or in fact result in the 'resurrection of inflation' via monetisation and 'helicopter money'.
- Accelerating money supply growth at present - particularly in the US, but also in the UK and Eurozone - suggests that an acceleration in inflation is possible in 2021.
- In sharp contrast to the aftermath from the great financial crisis, both commercial banks (over 2008-09 onwards they were being encouraged to re-build capital) and central banks are now being encouraged to expand their balance sheets, thereby accelerating monetary growth.
- After the great financial crisis HM Government introduced a policy of fiscal austerity. Whilst it is possible that strategy could be repeated after the pandemic is over, it seems unlikely. The political mood music seems very different, despite the current surge in public debt from an already very high base. Politicians seem to lack the willpower, although this might be simply that they expect the crisis to be over very quickly, with a bounce back in the economy, and higher debt to be then easily financed at record low interest rates.
- Financial markets remain unperturbed by the issuance of debt. The UK government borrowed at a negative interest rate for the first time ever in May.

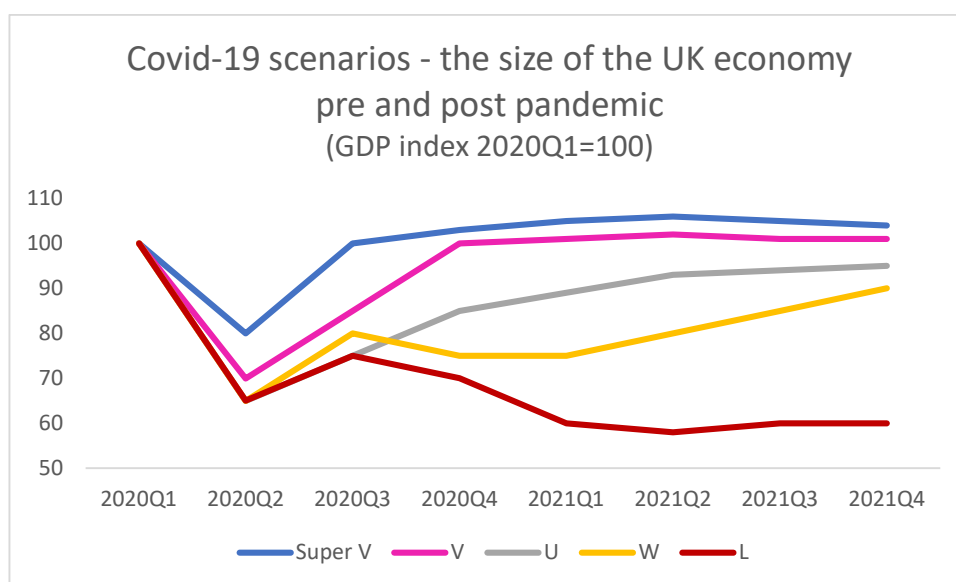
**The Covid19 scenarios in this paper reflect the enormous fluctuations in economic activity seen over recent months. The scale of the changes are sufficient to completely swamp any Brexit effects in the scenarios from leaving the EU at the end of 2020 (or if the transition is extended). This seems an astonishing statement, given the Brexit domination of economics and politics over recent years, but such are the extraordinary times in which we live. This means that Brexit is not a significant swing factor in any of the scenarios.**

# 1. Introduction

The scale of economic uncertainty at present is perhaps greater than at any time in our economic history. In response this report presents a comprehensive set of epidemiological and economic scenarios, in order to help readers understand the economic consequences of the Covid-19 threat to lives and livelihoods. Economic scenarios are back in vogue. There's a need to understand the epidemiology and the associated economic consequences, across a whole range of possible outcomes. This UK report sets out 5 economic scenarios (**Super V**, **V**, **U**, **W** and **L**) around different epidemiological outcomes, ranging from a fast lifting of containment measures, to a second and third wave to the pandemic over the Autumn-Winter of 2020-21.

As the scenarios show (Chart 1.1), in the second half of the year the economy could bounce back and regain all the lost output in the first half. Alternatively, if there is a second wave to the pandemic - over the Autumn-Winter period - the economy could implode and not regain its pre-pandemic output level until 2025-30. The range of possibilities is that wide because the epidemiological uncertainty is so great.

**Chart 1.1**



The scale of the crisis almost defies belief. The Bank of England (BoE) has produced<sup>1</sup> a 'plausible illustrative scenario' which sees the UK economy contract 30 percent in 2020Q2 versus the end

<sup>1</sup> <https://www.bankofengland.co.uk/-/media/boe/files/monetary-policy-report/2020/may/monetary-policy-report-may-2020>

of 2019. The Office for Budget Responsibility (OBR) has produced<sup>2</sup> its own 'baseline reference scenario' which foresees the UK economy contracting by 35 percent (quarter-on-quarter) in 2020Q2. Even with a second half bounce back, the OBR thinks the UK economy could contract 13 percent (year-on-year) in 2020, whilst the Bank of England puts the contraction at 14%. This is the worst fall in GDP in 300 years. In 1709 the economy collapsed due to the 'Great Frost', in 2020 it has been hit by another natural disaster.

The world and UK economies have been hit by massive supply and demand shocks from the lockdown and social distancing measures, as workers were prevented from working, and consumers from consuming. The numbers are, quite literally, off the charts:

- In the US total non-farm payroll employment fell by 20.5 million in April and the unemployment rate rose to 14.7 percent. This was the highest rate and the largest monthly jump ever. The Bureau of Labor Statistics also stated that methodological issues meant that the overall unemployment rate was probably 5 percentage points higher at 19.7 percent.
- In the UK, since the lockdown, around 2 million people have made new claims for Universal Credit and it is estimated that 7.5 million jobs in 800,000 companies have been furloughed. Combine unemployment and furloughed workers and you get an underlying - albeit temporary - unemployed rate of around 28 percent!
- In April, West Texas Intermediate crude oil prices went negative for the first time in history<sup>3</sup>.
- The April BoE Monthly Decision Maker Panel survey<sup>4</sup>, of CFOs in small, medium and large UK businesses, found on average that firms expected their sales turnover would be 44% lower, employment 18 percent lower and investment 50 percent lower than would otherwise have been.
- SMMT figures<sup>5</sup> show new car registrations down 97 percent in April.
- The third wave of the Business Impact of the Coronavirus Survey from the ONS<sup>6</sup> found that 1 in 4 firms have closed temporarily or paused trading. 24 percent of those businesses still operating had experienced a 50 percent plus reduction in turnover.
- The UK Debt Management Office auctioned gilts at -0.024 percent in May – the first time in history it has borrowed money at negative interest rates.

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<sup>2</sup> [https://cdn.obr.uk/Coronavirus\\_reference\\_scenario\\_commentary.pdf](https://cdn.obr.uk/Coronavirus_reference_scenario_commentary.pdf)

<sup>3</sup> The negative price was a quirk, but that shouldn't detract from the enormity of the oil supply glut at present. Gasoline stocks in the US are at their highest ever levels.

<sup>4</sup> <https://www.bankofengland.co.uk/decision-maker-panel/2020/april-2020>

<sup>5</sup> <https://www.smmmt.co.uk/vehicle-data/car-registrations/>

<sup>6</sup> <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronavirus/theukconomyandsocietyfasterindicators/latest>

## 2. Epidemiological considerations

One American epidemiologist<sup>7</sup> commented on the coronavirus SARS-CoV-2 that: *“The virus is a combination of The Alien, The Day the Earth Stood Still, The Andromeda Strain and Apocalypse Now”*. With such a threat to lives and livelihoods, it is essential to set out the broad parameters of different epidemiological outcomes in order to then understand the economic consequences. The economic scenarios in this report are driven by these different epidemiological outcomes.

The pandemic will only be over ultimately when herd immunity is obtained, and sufficient numbers of people are immune so that the disease can't spread. Birmingham University Professor of Microbiology and Infection, Willem van Schaik, summarises the problem: *“Herd immunity can only be reached by widespread vaccination (but there is currently no vaccine against coronavirus), or by individuals falling ill and recovering, thereby developing natural immunity against the virus”*.<sup>8</sup>

With this in mind, different epidemiological scenarios are developed – later in the report - on this basis of the reproductive number, herd immunity, mass vaccination and whether or not there is more than one pandemic wave. These factors help determine the length and nature of the lockdown and social distancing measures, which then bear directly on the economic scenarios. This chapter sets out the thinking underpinning the epidemiological scenarios. But there remains huge uncertainty around a new virus such as SARS-CoV-2 and its epidemiology<sup>9</sup>, which means that we can only create epidemiological scenarios not certainties.

Newspaper reports on the Prime Minister's first Cabinet meeting following his dice with death and Covid-19, stated that he quoted the Roman orator Cicero: *“The Health of the people should be the supreme law”*. But this is easier said than done. Exiting a pandemic can be a lot harder than entering one. In announcing the first stage to the lifting of the lockdown, the Prime Minister also observed that having reached the summit, coming down the mountain is often more dangerous. That's an observation with empirical support. One study<sup>10</sup> of Everest states: *“As difficult as it is to scale Mount Everest, coming back down from the world's tallest peak is far more deadly ... [of*

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<sup>7</sup> Reported in *The Sunday Times*, 10<sup>th</sup> May 2020.

<sup>8</sup> <https://www.sciencemediacentre.org/expert-comments-about-herd-immunity/>

<sup>9</sup> As yet we don't have definitive serological tests which can tell us how much of the population has been infected. We don't know how immunity to the coronavirus works, whether everyone produces antibodies and if the antibody response is linked to the severity of the illness. Furthermore we don't know whether antibodies actually convey immunity and how long it lasts. Source: Science Media Centre: <https://www.sciencemediacentre.org/does-covid-19-need-a-different-kind-of-journalism/>

<sup>10</sup> <https://blogs.scientificamerican.com/news-blog/death-on-mount-everest-the-perils-o-2008-12-10/>

*those who died] 56 percent succumbed on their descent*". To understand why the descent from the pandemic is so dangerous we have to go back to the future.

Before its change in tack in early March, the Government was adopting a mitigation strategy against SARS-CoV-2, aiming to protect the elderly and those with multiple comorbidities who were vulnerable, whilst at the same time allowing the virus to spread in order to build herd immunity in the population. The Government famously reversed policy from mitigation to suppression, having been given estimates from an epidemiological team<sup>11</sup> at Imperial College, that there could be up to 500,000 deaths with the former approach.

A mitigation strategy came with an unacceptable human cost, but it would have had dire economic consequences as well. Up to 500,000 deaths would have terrified people and could potentially have brought even more chaos, with economic and social activity brought to a complete halt. In other words, the dire 2020Q2 GDP contractions in the illustrative scenario from the Bank of England (-30%) or the baseline reference scenario from the Office for Budget Responsibility (-35%) could have been dramatically exceeded<sup>12</sup>. An economic catastrophe of even greater scale, and the death of 0.5 million people, was obviously deemed unconscionable. But then what to do? A pandemic is only truly over, when it's over, when herd immunity is achieved.

So the Government's strategy is all about buying time until a vaccine becomes available or herd immunity is attained naturally. This is the 'flattening the curve' in order to prevent the NHS becoming overwhelmed by new cases, and strains on intensive care facilities in particular. In order to flatten the curve the suppression strategy made containment measures absolutely essential in order to reduce transmission. But there's a snag. Social distancing and the lockdown are a double-edged sword. They achieve the vital task of slowing the spread of the disease, but this leaves the majority of the population with little chance of gaining herd immunity.

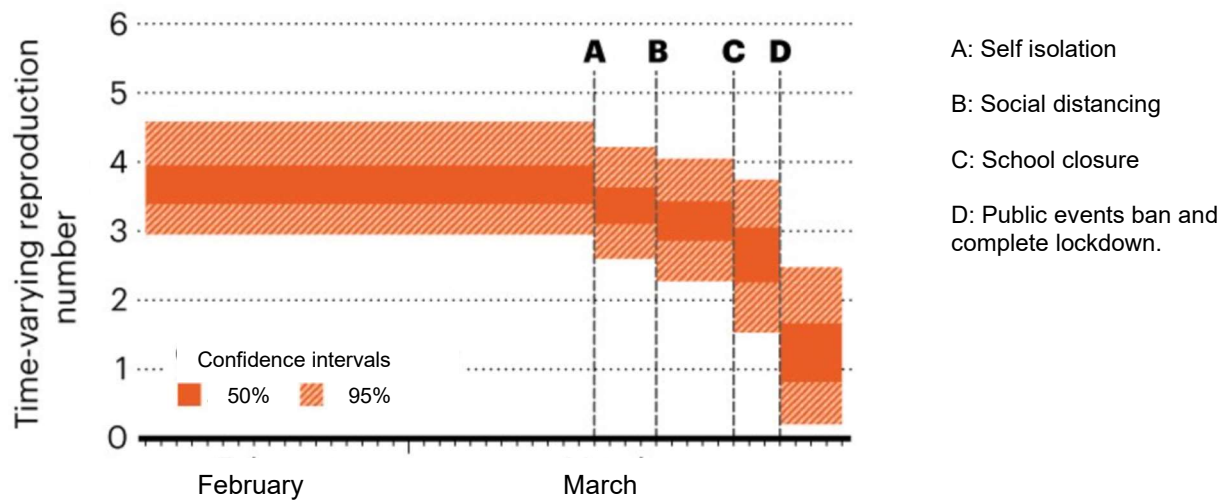
In the absence of herd immunity it is absolutely essential that the reproductive number be kept below 1. The Prime Minister has said that: *"Driving down the R is the country's collective endeavour"*. Figure 2.1 shows Imperial College estimates of how containment measures reduced the reproduction number for Covid-19.

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<sup>11</sup> <https://www.nature.com/articles/d41586-020-01003-6>

<sup>12</sup> From an economic perspective therefore the debate was more one of what kind of suppression could minimise the collateral economic damage – the nature of the lockdown, social distancing, contact, track and tracing etc – and the lessons from overseas where countries had adopted different approaches, such as in South Korea, Sweden etc.

**Figure 2.1 Lockdowns keep infections at bay**



Source: Nature and Imperial College.

There are in fact two  $R$  numbers: the basic reproduction number  $R_0$  and the effective or time varying reproduction number  $R_e$ .

### The basic reproduction number $R_0$

$R_0$  is the average number of people that an infected person goes on to infect. Epidemiologists define  $R_0$  as the expected number of secondary cases produced by a single infection, in a completely susceptible population<sup>13</sup>. At the outset of a new disease such as Covid-19 the entire population could be susceptible to it. If we take an  $R_0$  number of 2 as an illustration (and assume the interval time period is a week) then starting with one person, after 1 week there are 2 new infections, 2 weeks 4 new infections, 3 weeks 8 new infections, 4 weeks 16 new infections etc. If that rate of exponential growth was to continue for just under 33 weeks the entire global population would be infected! Below we'll explain why that rate of exponential growth isn't maintained, but for now the key point is that with a basic reproduction number of 2, after  $n$  weeks there would be  $2^n$  new infections. If  $R_0$  is above 1 the number of new infections rises exponentially.

What happens when  $R_0$  is less than 1? Let's assume that  $R_0$  is 0.6. Obviously a person can't infect 0.6 of another person but remember that this is an average number so that say 10 individuals could infect 6 others. As before, if we start with 1 infected person then after 1 week there are 0.6 new infections, 2 weeks 0.36 ( $0.6 \times 0.6$ ) new infections, 3 weeks 0.22 ( $0.36 \times 0.6$ ) new infections

<sup>13</sup> <https://web.stanford.edu/~jhj1/teachingdocs/Jones-on-R0.pdf>

etc. The rule here is that after  $n$  weeks there are  $(0.6)^n$  new infections. The number of new cases becomes smaller and smaller as  $n$  increases over time.

The basic reproduction number  $R_0$  indicates the maximum epidemic potential of a pathogen if the entire population is susceptible to it. This is determined by how infectious the disease is as a result of factors such as how long an infected person is infectious, contact rates and the mode of transmission<sup>14</sup>.

$R_0$  is therefore a function of:<sup>15</sup>

- **Transmissibility ( $t$ )** - the probability of infection given contact between a susceptible and infected individual.
- **The average rate of contact ( $c$ )** - between susceptible and infected individuals.
- **The duration of infectiousness ( $d$ )** – how long an infected person is infectious.

$$R_0 = t \times c \times d \qquad R_0 = (\text{infection/contact}) \times (\text{contact/time}) \times (\text{time/contact})$$

Quite simply, if a disease is highly infectious, and there is a lot of contact between susceptible and infected individuals, and infected individuals remain infectious for a long time, the  $R_0$  number is going to be a lot higher than if the disease is far less infectious, contact rates are low and those infected aren't infectious for very long.

### The effective reproduction number $R_e$

Over time the population susceptible to the disease will decline, and so the exponential growth will be constrained by the number of deaths and recoveries, or the arrival of a vaccine. What the suppression strategy and containment measures aim to do is to reduce the size of the susceptible population, without incurring the mortality and morbidity that would have occurred in the absence of containment measures.

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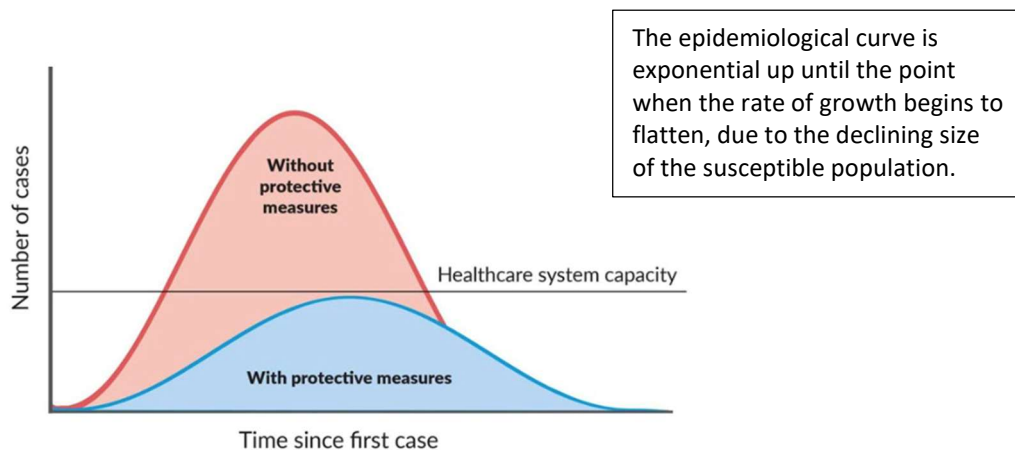
<sup>14</sup> With airborne viruses having a higher  $R_0$ .

<sup>15</sup> *The basic reproduction number in a nutshell*, James Holland Jones, Department of Anthropological Sciences, Stanford University. <https://web.stanford.edu/~jhj1/teachingdocs/Jones-on-R0.pdf>

This means that the important R number is the effective reproduction number  $R_e$ . The notation here is  $R_e = sR_0$  where  $s$  represents the proportion of the population susceptible to the disease. If only half the population is susceptible to the disease then  $R_e = 0.5R_0$ . If the  $R_e$  number is above 1 Covid-19 will spread with exponential growth.

Herd immunity is attained when sufficient numbers of people are immune and so the disease can't spread. This leads to the question as to how many people need to be immune in order for a population to acquire herd immunity? As we have seen the key to killing the spread of a disease is getting the effective  $R_e$  number below 1, or in notation:  $sR_0 < 1$ . This can be re-arranged to show:  $s < 1/R_0$  i.e. the proportion of the susceptible people in the population has to be under  $1/R_0$ . So how many people need to be immune to achieve this? This is straightforward because if the proportion of susceptible people is  $s$  then those not susceptible is  $1-s$ . So if  $s < 1/R_0$  then:  $1 - s > 1 - 1/R_0$ . This states that in order to achieve herd immunity we need to get at least  $1 - 1/R_0$  of the population immune. In other words herd immunity is calculated as at least 1 minus the reciprocal of the reproduction number (see: Table 2.1). Box 2.1 shows a formal mathematical explanation.

**Figure 2.2 The epidemiological curve**



Plugging in different values for  $R_0$  yields the results shown in Table 2.1. For example, if  $R_0$  is 2, we need to get  $1 - 1/2 = 0.5$  of the population immune i.e. 1 minus 0.5 = 0.5, or 50%. If it is 2.5 then  $1 - 1/2.5 = 0.6$  of the population need to become immune i.e. 1 minus 0.4 = 0.6, or 60%.

The more relevant number for thinking about the lifting of containment measures is the effective reproduction number  $R_e$  which allows for the changing size of the susceptible population. The number of course isn't fixed, it will vary over time and geographically. The strategy during the lifting of the lockdown and social distancing measures is to keep the number below 1:

- If  $R_e < 1$  each existing infection causes less than one new infection, in which case the disease will eventually die out (at 0.9 this would still take years, at 0.5 probably less than 18 months).
- If  $R_e = 1$  each existing infection causes 1 new infection, in which case there won't be an outbreak.
- If  $R_e > 1$  each existing infection causes more than one new infection, and the re-introduction of containment measures will be required.

Table 2.1 <b>Levels of herd immunity and the associated <math>R_0</math> number</b>	
$R_0$ - the number of susceptible people infected by a single infected person	Level of herd immunity required to stop a disease spreading at different values of $R_0$
1.25	20%
1.5	33%
2	50%
2.5	60%
3	67%
3.5	71%
4	75%
Note: Herd immunity is calculated as 1 minus the reciprocal of the reproduction number $R_0$ .	

Table 2.1 highlights the challenge of lifting the lockdown and social distancing measures if herd immunity has not been attained. Without a vaccine you need a lot of immune people to end an outbreak. If the effective reproduction number is above 1 Covid-19 will spread if there is an insufficient level of herd immunity. With an  $R_0$  number of 1.5 the disease will spread unless a third of the population has acquired herd immunity. And the pre-lockdown number (see: Figure 2.1) was much higher due to the infectiousness of the disease. If you don't know what the level of herd immunity is (which we don't as yet), or know that it is very low, the suppression strategy demands that you try to keep the  $R_e$  number below 1. If you have low herd immunity you need to have that low  $R_e$  number otherwise the disease will grow exponentially again.

If the  $R_e$  number is to be kept below 1 it's going to be very difficult to get back to normal until herd immunity is attained, either naturally or through a vaccine. Flattening the curve has flattened the

economy, but lifting the lockdown will still be driven by the reproduction number and NHS capacity. Epidemiological factors continue to outweigh economic considerations in the minds of policymakers<sup>16</sup>.

A review of epidemiological modelling, by Oxford Economics<sup>17</sup>, stated that, *“these epidemiological models suggest that for lockdowns to be successful in avoiding a collapse of health care systems they need to be imposed for unsustainably long periods”*. OE’s own modelling suggested a period of 6-9 months with 50 percent adherence. OE estimate adherence<sup>18</sup> to date has been around 15-30 percent on their measure. The lower the adherence to lockdown, the larger the susceptible population, and as a result a second peak or pandemic wave remains very possible.

For some time we’re likely to be working in the *“empty chair economy”* with staggered office opening hours and half-full trains. This is simply because it’s going to be very difficult to maintain control of the coronavirus without some form of social distancing. And even then a highly effective contact, tracing and isolation system needs to be put into operation.

So in lifting the lockdown and social distancing the Government is likely to proceed very cautiously with what has been described as a *“whack-a-mole policy”*: hitting down hard on any flare ups with the potential re-imposition of stringent lockdown and social distancing where required. This has also been described as *“adaptive tightening”* with containment measures responding to hot spots around the country. Government policy will remain focussed on the measures being strict enough to avoid overwhelming hospitals and ICUs, and long enough to avoid a second wave of contagion.

The fact that many emerging economies are behind the curve with regard to the pandemic, and may (by no means always e.g. technology led tracking and tracing in Vietnam) have less effective health systems and containment measures, means that the threat from overseas will continue for some time. This is likely to result in an extended period of travel restrictions and quarantine

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<sup>16</sup> This is not to suggest that the lockdown strategy is without challenge in the scientific community and elsewhere. It has been strongly challenged, but rightly or wrongly, it is at the heart of the Government’s policy and the strategy being pursued. Doubts have been expressed for 2 reasons: Firstly, because of differing strategies pursued in other countries, such as Germany, Sweden, South Korea etc., which are deemed to have been more successful. Secondly, Professor Neil Ferguson’s track record has been questioned. The science writer and author Matt Ridley has written that: *“In 2001 the Imperial team’s modelling led to the culling of 6 million livestock and was criticised by epidemiological experts as severely flawed. In various years in the early 2000s Ferguson predicted up to 136,000 deaths from mad cow disease, 200 million from bird flu and 65,000 from swine flu. The final death toll in each case was in the hundreds”*. Ridley also makes some worrying observations concerning the unstable results a University of Edinburgh team found when operating the said Imperial model. Further criticism is levelled at Ferguson for the fact that his modelling did not allow for large variations within groups of people with regard to their susceptibility to infection and their social connections. According to Ridley, introducing such heterogeneity, with modest social distancing, means that the threshold to achieve herd immunity is much lower than the 50 – 60 percent implied by the Ferguson model. Source: *Was lockdown based on crude guesswork?* The Sunday Telegraph, 10<sup>th</sup> May 2020.

<sup>17</sup> Research Briefing - *Lessons from coronavirus epidemiological models*, Oxford Economics, 5<sup>th</sup> May 2020.

<sup>18</sup> Using Google mobility data.

measures, damaging tourism and trade – yet more bad news for the airline, travel and tourism and aviation sectors.

There are potential future problems closer to home as well. Former Governor of the Bank of England, Lord Mervyn King, has warned of the threat of “*rebellion risk*” from people fed up with the controls and likely to start breaking the rules.

At the time of writing, New Zealand has reportedly driven new cases down to zero for the first time, but this doesn’t mean that the virus has disappeared. Reports also suggest that only 2 percent of New Zealanders are carrying Covid-19 anti-bodies. In other words there could be close to zero herd immunity. Containment measures don’t kill the virus, they merely buy you time. Social distancing and lockdown measures slow the spread of the disease but don’t completely eradicate it, so when the containment measures are lifted, social interaction will raise the transmission rate again. Governments need the wisdom of Solomon at times such as these.

### **A game changer?**

What would be a game changer is the emergence of powerful evidence of higher levels of herd immunity in the UK, and the possibility that large segments of the population have already been infected by Covid-19, but were asymptomatic and therefore unaware. There have been a spate of studies<sup>19</sup> trying to estimate levels of herd immunity around the world. At the time of writing the Government is about to approve a new anti-body test which could potentially yield such information, but the evidence to date suggests herd immunity levels remain very low, around 5% in Italy and Spain<sup>20</sup>. Those studies showing higher levels of herd immunity have tended to be challenged. Perhaps the best way to summarise these results is to state that whilst they show evidence of many asymptomatic cases, the numbers are simply not high enough yet to be in any way confident there is a sufficiently high level of herd immunity.

But one attention grabbing study<sup>21</sup> does provide grounds for optimism. Estimating the spread of Covid-19 using the SIR (Susceptible, Infected, Removed) model it finds that: “... *those who have been infected but are asymptomatic may be 200 times as numerous as those who develop*

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<sup>19</sup> <https://www.stuff.co.nz/national/health/coronavirus/121289444/coronavirus-is-asymptomatic-covid19-really-that-widespread>

<sup>20</sup> The Sunday Times, *Britain is using R to plot a scientific course out of the pandemic*, 17<sup>th</sup> May 2020.

<sup>21</sup> *Assessing the spread of the novel coronavirus in the absence of mass testing*, Oscar Dimdore-Miles and David Miles CEPR Covid Economics, Issue 16, 11<sup>th</sup> May 2020.  
<https://cepr.org/sites/default/files/news/CovidEconomics16.pdf>

*symptoms ... based on the numbers who have tested positive with symptoms it would seem likely that a high proportion of the UK population (60% or so by end April 2020) had already been infected and that a substantial proportion then had some sort of immunity. This would be very good news. It would mean that the rate of new infections would be likely to die down even if there was some rise in  $\beta$  as severe lockdown conditions were to be eased".* If this proves to be correct the **Super V** and **V** shaped economic recovery scenarios - developed later in this paper - become far more plausible.

Even with evidence of herd immunity however, it wouldn't provide a guarantee against a second wave. If x% of the population have anti-bodies it doesn't prove x% are immune. Herd immunity is only reliable if it is enduring. If it doesn't last it reduces the proportion of the population which is immune and increases the proportion which is susceptible. Mild, asymptomatic infections may not confer much immunity. There is also the possibility of the mutation of the virus, which means that immunity to a certain strain would not necessarily confer immunity to a new/different strain.

In a US context former US FDA Commissioner, Dr Mark McClellan, has pointed out that knowledge of anti-body testing - serological tests – is not as advanced as we would like<sup>22</sup>. There are uncertainties with this new coronavirus regarding, *"what antibody responses mean in terms of providing immunity to the virus ... what levels of anti-body response can provide the confidence that someone won't contract or transmit the disease and for how long ... antibodies to the Covid-19 coronaviruses are in some ways similar to the antibodies to other coronaviruses. So some tests have cross-reactivity and may suggest that someone is immune when they're really not. There may also be problems with false negatives"*.

McClellan argues that: *"The data so far suggests that the vast majority of Americans are not immune to Covid-19. And that means that antibody tests, even when we do get them right, won't be a primary solution when we reopen"*. The partial re-assurance for politicians is the experience of those economies further down the road (in terms of their death and case load curves) who have successfully eased.

## **The epidemiological scenarios**

The potential range of epidemiological scenarios is shown in Table 2.2. Table 2.2 attempts to link epidemiology with economics based on the analysis above. The **Super V** (miraculous recovery) and **V** (full recovery) scenarios are shown to be possible only if there is a very fast, or fast lifting

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<sup>22</sup> In contrast to serological antibody testing, PCR tests detect the presence of the coronavirus in the body.

of the lockdown. This requires that herd immunity be attained far sooner than in the other scenarios because without it the containment measures would have to stay in place.

Easing in the absence of the required level of herd immunity, is fraught with risk. Climbers generally die coming back down from the peak because of a lack of oxygen which causes blood vessels in their brains to leak fluid into the surrounding tissue, causing a fatal swelling called cerebral edema<sup>23</sup>. The risk with coming down from the lockdown, is that a lack of herd immunity causes the virus to leak into the surrounding population, causing a fatal swelling of Covid-19. Estimates<sup>24</sup> of the Covid-19 infection fatality rate are around 0.5 to 1.0 percent of cases.

Thankfully the counter argument is equally powerful as well. If serological tests are found to show much higher than expected levels of herd immunity (due to asymptomatic cases), and there is some confidence that the immunity could be enduring (very early days admittedly to know for sure), or a vaccine becomes available, then the descent down the mountain will be a far more relaxed affair.

Table 2.2 Epidemiological factors in pandemic economic scenarios					
Epi factors	Super cycle	V cycle	U cycle	W cycle	L cycle
Lifting/lockdown speed	Very fast lift	Fast lift	Slow lift	Some re-introduction	Massive re-introduction
Uptick, second or third wave	None	None	Slight uptick, no new wave	Small second wave	Massive second wave
Reproduction number $R_0$	Stays <1	Stays <1	Around 1	Moves above 1	Moves well above 1
Herd immunity level	Reached in Autumn 2020	Reached by end of 2020	Reached in 2021	Reached in 2022	Reached in 2023+
Mass vaccination by	End 2020	Early 2021	Late 2021	Not until 2022	Not until 2023
Economic prognosis	Miraculous recovery	Full recovery	Hospitalised economy	In intensive care	Economy nearly dies

<sup>23</sup> <https://blogs.scientificamerican.com/news-blog/death-on-mount-everest-the-perils-o-2008-12-10/>

<sup>24</sup> <https://www.sciencealert.com/why-herd-immunity-will-not-save-us-from-the-covid-19-pandemic>

## Box 2.1

### The basic SIR Epidemic model – Susceptible (S), Infected (I), Removed (R).

For a population N the susceptible population is  $s=S/N$ , the infected population is  $i=I/N$ , and the removed population is  $r=R/N$ . The basic three equation SIR model is then:

**Equation 1**      $ds/dt = -\beta si$

This shows how the susceptible population declines over time, hence the negative sign.  $\beta$  is known as the effective contact rate. The effective contact rate is the  $t$  and  $c$  in the equation  $R_0 = t \times c \times d$  above. The  $d$  or duration of infection term in that equation is the inverse of the removed rate because the quicker the removal the shorter the duration of the disease.

**Equation 2**      $di/dt = \beta si - \nu i$

This shows how the number of infected individuals over time is determined by new infections ( $\beta si$  in equation 1 with a positive sign) less those removed due to death and recovery.  $\nu$  is the removed rate.

**Equation 3**      $dr/dt = \nu i$

This shows the change in removals due to death and recovery.

An epidemic occurs if the number of infected individuals increases i.e.  $di/dt > 0$

Therefore from equation 2 where:  $\beta si - \nu i > 0$  and re-arranging obtains:  $\beta si/\nu > i$

At the start of a new virus nearly everyone is susceptible to it and so substituting  $s = 1$  and re-arranging we arrive at the inequality:

$$\beta/\nu = R_0 > 1$$

This is the  $\beta$  at the heart of the suppression strategy to reduce the effective contact rate, although the basic SIR model is a gross simplification of the modelling informing governments.

(Source: *The Basic Reproduction Number in a Nutshell*, James Holland Jones, Stanford University);

<https://web.stanford.edu/~jhj1/teachingdocs/Jones-on-R0.pdf>

### 3. The economic impact of a pandemic

What started as a supply-side shock very quickly became a demand-side shock of epic proportion as well. The bottom line is that workers were prevented from working, and consumers from consuming, and this initial effect was then intensified by the knock-on effects on consumer and business confidence, and the behavioural changes this induced. Covid-19 impacted the economy through the multifarious channels described below and in Figure 3.1:

- **Supply chain disruption** - As a result of which businesses have to scale back production or re-orientate supply chains through alternative suppliers, which takes time, even if it is possible in the short-term.
- **Labour supply reduction** - Workers forced to stay at home due to lockdowns, illness, social distancing, caring for elderly relatives and/or children. For some occupations, hours-worked and productivity can be maintained with home working. For others it results in reduced hours and/or less productive working. Of course, in some cases the lockdown and social distancing will have stimulated new and more productive ways of working which will have an enduring effect.
- **Uncertainty and confidence** - Uncertainty and confidence factors amplify existing effects in many ways e.g. precautionary behaviour by households and firms, reduced confidence results in higher savings, deferred consumption of discretionary items and less investment. But there could be more intangible investment to facilitate new ways of working, consuming and learning.
- **Partial or full sector lockdowns** – The worst hit sectors being travel, hospitality, leisure, sport, entertainment and retailing, with some exceptions such as grocery and pharmacies.
- **Economic policy reactions** – Massive monetary and fiscal policy interventions. In the UK fiscal guarantees have exceeded £300 billion. The OBR estimates that the direct tax and spending effects of Government decisions is around £123 billion<sup>25</sup>. However this excludes the effects of automatic stabilisers<sup>26</sup> on the economy.

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<sup>25</sup> As of 14<sup>th</sup> May. <https://obr.uk/coronavirus-analysis/>

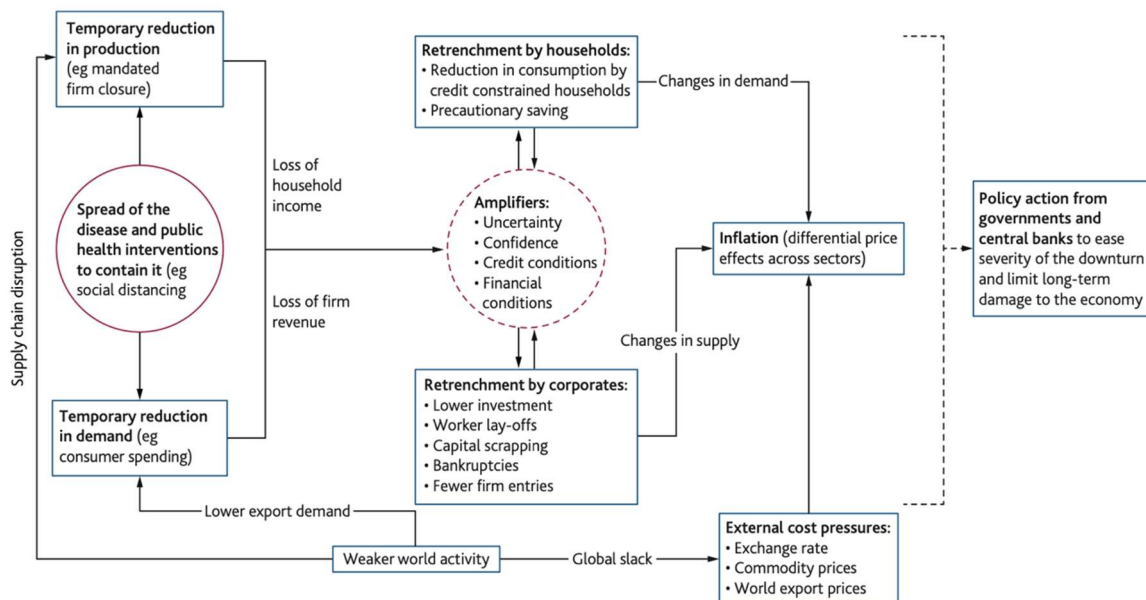
<sup>26</sup> Such as increased public spending on unemployment and welfare benefits and reduced revenues from taxation in a much weaker economy.

When these effects are factored in the OBR estimates<sup>27</sup> public sector net borrowing in 2020-21 will rise above £300 billion, even with the V shaped bounce back in the second half of the year, assumed in their baseline reference scenario. The BoE has extended quantitative easing by £200 billion.

Figure 3.1 shows how the economy is hit by both supply-side and demand-side shocks. The supply-side reduction in production and the demand-side reduction in consumption, results in a loss of income for households and firms. These effects are amplified by collapsing confidence, rising uncertainty and a worsening financial situation for both households and corporates. Both households and firms engage in retrenchment behaviour as a result. Corporates reduce payroll and investment in order to preserve cash. Households decrease discretionary spending and increase precautionary saving, fearful of being made unemployed or furloughed with reduced income. Global factors also intervene through supply-chains and the consequences of the crisis for exchange rates and commodity prices.

**Figure 3.1**

### How Covid-19 impacts the economy



Source: Monetary Policy Report, Bank of England, May 2020.

This process is very fluid with dynamic effects. The initial sharp reduction in production and demand produces a domino effect throughout the economy, further reducing revenue and

<sup>27</sup> <https://obr.uk/coronavirus-analysis/>

incomes. Some of the foregone discretionary spending will be permanent. As the lockdown eases, people won't double up on haircuts. They won't go out to eat twice as much post lockdown, if social distancing rules are still in place. There could also be 'scarring' to the economy from the permanent loss of output from companies sent into insolvency.

The scale of these effects induced the fiscal and monetary policy reaction of HM Government in the form of lower interest rates, extended QE, fiscal subsidies, direct payments and loan guarantees. The baseline reference scenario above excludes probable further fiscal activism in the form of time limited VAT or Stamp Duty rate reductions, that might be introduced to boost activity as the containment measures are eased - in a bid to get back to normal in the economy as soon as possible.

The risk of a second wave of unemployment, if the Government relief programmes are lifted too soon, led to the extension of the furlough scheme by 4 months to October 2020. Employees will continue to receive 80% of their monthly wages up to £2,500. But the Chancellor has announced that from August employers will have to start sharing the scheme, presumably through a higher contribution. As yet the precise detail of what 'sharing' means is not forthcoming. Without the extension there were fears that employers would trigger 45-day redundancy consultations. What we don't know is to what extent employers will see the extension as an implementable phased return to normality, or an irrelevance because their business is going under regardless. The extension buys more time. Further temporary aid to households has come from so-called 'mortgage holidays'<sup>28</sup> which have been given to around 2 million mortgage holders for a three-month period<sup>29</sup>.

The longer the crisis lasts the bigger the economic problem becomes as wider negative effects take hold – there's amplification. More businesses fail and more people become unemployed. The economic consequences of the crisis are non-linear, increasing over time.

The starting point for the crisis wasn't a good one. The significant potential difference between the economic impact of this pandemic, with those previously, has been highlighted by the Bank for International Settlements (BIS)<sup>30</sup> which has stated that: *"the context of high globalisation and high leverage in parts of the corporate and household sectors makes these short-term amplification mechanisms more potent than in past epidemics"*.

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<sup>28</sup> The term holidays is misleading because in most cases it doesn't involve a 3-month extension to the life of the mortgage, but simply an increase in monthly payments after the 3-month period, stretched out over the duration of the loan.

<sup>29</sup> Estimate from Capital Economics.

<sup>30</sup> <https://www.bis.org/publ/bisbull07.htm>

One of the key issues is the scale of debt going into the crisis. A recent CEPR report<sup>31</sup> commented: *“Sovereign spreads in the euro area, for Italy in particular, are already widening, indicating that there could be more trouble ahead for the credibility and solvency of sovereign borrowers ... the coronavirus crisis arrives against a backdrop of private sector indebtedness. Corporate and household balance sheets in Europe are extended - neither firms nor households deleveraged substantially since the financial crisis and the European sovereign debt crisis. On the contrary, low monetary policy rates and low credit spreads lured them into complacency about debt levels. Corporate leverage is at an all-time high. A large fraction of corporate debt is now rated BBB, the lowest investment grade rating, while corporate debt rated below investment grade is at an all-time high. For example, almost half of all US corporate bonds maturing in the next five years are below investment grade.*

*Current policies will inevitably leave parts of the corporate sector with even larger debt burdens. These will delay a recovery - distressed firms tend to implement labour reductions, sell assets, reduce investments and employment, and shrink their business, and they become reluctant to raise new capital. Additionally, banks and other lenders stuck with underperforming loans may restrain lending. If one firm is affected, its customers, suppliers and employees are affected in turn. All of this can turn a temporary economic shock into a long-term balance-sheet driven dislocation. One policy lesson of the big financial crises in the developed world, starting with Japan in the early 1990s, is that the effects of simmering corporate debt overhang are multiple and nefarious”.*

Some reassurance regarding the systemic financial threat is provided by the BoE's May *Interim Financial Stability Report*<sup>32</sup> which states that bank capital positions are three times stronger than before the global financial crisis (CET1 capital ratio of 16% versus 4.5%) and the BoE also reports that they pass a desktop stress test of the illustrative scenario employed in the May Monetary Policy Report, due to the fact that: *“Banks entered into this period of stress with an aggregate common equity tier 1 (CET1) capital ratio more than three times higher than before the global financial crisis, and holding approximately £1 trillion of assets”.* Another consideration is the scale of government loan guarantees, which means that if the proverbial really was to hit the fan, it could be the government, just as much as the banks, which was on the hook.

The main concern with the stress test is its use of the illustrative scenario, which assumes a second half bounce-back in the economy. This may prove correct (discussed in scenarios

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<sup>31</sup> <https://voxeu.org/article/corporate-debt-burdens-threaten-economic-recovery-after-covid-19>

<sup>32</sup> <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2020/may-2020.pdf>

chapters below), but if it doesn't and/or there is a second or third wave to the pandemic, it is unlikely we would escape financial contagion of some form.

As will be shown, in the W and L shaped scenarios - and the U to some degree - the longer and deeper downturn, and slower recovery, means that 'hysteresis' long-lasting economic effects will come into play in the labour market, with formerly employed workers gradually becoming more detached, losing skills and confidence, with the risk of becoming long-term unemployed. In the Super V and V shaped cyclical bounce backs there is either a miraculous recovery by the end of the third quarter or a full recovery by the end of the fourth. Either way hysteresis effects would be minimal under these scenarios.

### **Previous pandemics and modelling**

Covid-19 and Influenza (the flu) are both infectious respiratory diseases, and have similar symptoms, but they are caused by different viruses. Consequently, drawing epidemiological and economic inferences from the Spanish Flu (1918-19), Asian Flu (1957-58), or Hong Kong Flu (1968-69) pandemics are not without difficulty.

The sheer scale of the Spanish Flu pandemic makes it relevant to understanding Covid-19 now, but it's a frustrating comparison, as we're hampered by poor data and a dearth of studies on this period. Even big pandemics have received minimal attention from economists. This author looked back at his old university economic history course notes on the post-World War 1 and early 1920s period and found no references at all to Spanish Flu. It's not altogether clear whether or not this was the fault of the teacher or the student.

The conventional wisdom is that the US economy contracted sharply over the 1919-20 period. However, revised estimates of historical GDP over this period in the US suggest the downturn was far less, and therefore compatible with a V shaped recovery<sup>33</sup>. One literature review of the impact of the Spanish Flu on the US economy found little effect<sup>34</sup>.

In the UK the economy boomed over the 1918-20 period. Comparisons are however confounded by the difficulty in separating out the effects of Spanish Flu from demobilisation at the end of World War 1. Unlike the US, the UK had an immediate post-war boom, but then experienced a GDP downturn in the early 1920s which was worse than in the depression of the 1930s. The US in contrast began the 'Roaring Twenties' GDP growth acceleration from 1922 onwards.

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<sup>33</sup> <https://voxeu.org/article/1918-influenza-did-not-kill-us-economy>

<sup>34</sup> [https://www.stlouisfed.org/~media/files/pdfs/community-development/research-reports/pandemic\\_flu\\_report.pdf](https://www.stlouisfed.org/~media/files/pdfs/community-development/research-reports/pandemic_flu_report.pdf)

The Asian and Hong Kong flu outbreaks were of a much smaller magnitude than the Spanish Flu or Covid-19 in terms of their economic impact. A cursory glance at the historic quarterly UK GDP series, for the period of the Asian and Hong Kong Flu pandemics shows mere blips with a complete bounce back in the next quarter. Again, however, there is some uncertainty as to the actual economic impact of a pandemic, because of the contrasting performance of the UK and US economies. At the time of the Asian Flu, whilst the UK economy was enjoying Harold Macmillan's "you've never had it so good" over the 1957-58 period, the US experienced 'Eisenhower's Recession' with a sharp decline lasting 8 months. Whilst the downturn in the US was much greater than in the UK, the economy soon recovered.

Table 3.1 describes 3 different categories of studies:

- Economic studies of previous pandemics.
- Economic model simulations of pandemics with/without containment measures.
- Covid-19 scenarios from official bodies such as the BoE, OBR, OECD and IMF.

Table 3.1 <b>The economic impact of previous and simulated pandemics</b>		
<b>Pandemic/epidemic</b>	<b>Study</b>	<b>Economic impact</b>
Spanish Flu (1918-19)	Barro et al (2020)	Average GDP per capita loss of 6%.
SARS (2003-04)	Correia et al (2020)	GDP growth 1 – 2 percentage points lower in mainland China.
Ebola (2014-16)	Lee and McKibbin (2004)	GDP growth 2 – 3 percentage points lower in countries hit.
Modelling of the global impact of a Spanish Flu scale pandemic.	WHO (2019)	5% of GDP.
Modelling based on mild/severe pandemics in the US. Severe kills 2 million people with attack rate of 30%, mortality rate of 2.5%. Mild attack rate of 25% and mortality rate of 1.1%.	Congressional Budget Office (2005)	GDP output loss of 1% (mild) to 5% (severe).

European pandemic impact using similar assumptions to CBO (2005) study.	Jonung and Roeger (2006)	2% to 4% of GDP output loss.
Modelling of hypothetical Asian Flu with 76,000 UK deaths. No containment measures.	McKibbin and Sidorenko (2006)	-2.4% impact on annual UK GDP.
Modelling of hypothetical Spanish Flu with 380,000 UK deaths. No containment measures.	McKibbin and Sidorenko (2006)	-5.8% impact on annual UK GDP.
Baseline scenario with 41,900 deaths. No containment measures.	Keogh-Brown et al (2009)	-0.2% impact on annual UK GDP.
Baseline scenario with school closure and voluntary absenteeism. Schools closed for 3 months and one third of workers absent from work for a month.	Keogh-Brown et al (2009)	-2.2% impact on annual UK GDP.
Severe scenario with 305,100 deaths, school closure and voluntary absenteeism. Schools closed for 3 months and one third of workers absent from work for a month.	Keogh-Brown et al (2009)	-4.5% impact on annual UK GDP.
High-mortality, low infectiousness, 52,243 deaths. Some school closures and voluntary absenteeism.	Verikios et al (2016)	-0.4% impact on annual UK GDP.
Low-mortality, high infectiousness. 50,747 deaths. Some school closures and voluntary absenteeism.	Verikios et al (2016)	-2.0% impact on annual UK GDP.
Extensive social distancing for 6 weeks.	Barrot et al (2020)	-5.6% impact on annual French GDP
Extensive social distancing for the entire duration of the pandemic.	Eichenbaum et al (2020)	-22% impact on annual consumption.

One year of social distancing	Del Rio-Chanona et al (2020)	-22% impact on annual US GDP.
Simulation of the estimated decline in GDP as a result of strict containment measures over three months.	OECD (2020)	2 percentage points decline in annual GDP growth for each month, with annual growth up to 6 percentage points lower.
Scenario simulations. Baseline, containment 50 percent longer and second wave in 2021.	IMF (2020)	Baseline global GDP decline of -3% in 2020. Longer duration with further 3% GDP reduction in 2020. Second wave reduces global GDP -7% relative to baseline in 2021.
Baseline reference scenario.	OBR (2020)	-12.8% GDP decline in 2020. 2020Q2 GDP decline -35% (quarter-on-quarter).
Illustrative scenario	Bank of England (2020)	-14% GDP decline in 2020. 2020Q2 GDP decline of 30% from end 2019.

What we can derive from the studies in Table 3.1 is that:

- (1) The economic consequences will differ in each pandemic, we can only draw tentative comparisons with previous pandemics.
- (2) Previous studies tend to assume far higher death rates but still produce far lower output losses relatively speaking from pandemics, compared to Covid-19.
- (3) The modelling of pandemics generally predicts that they will only have temporary effects, with GDP growth accelerating sharply in the quarters after the outbreak
- (4) Model simulations show increasingly negative impacts as more lockdown and social distancing are incorporated.
- (5) The most recent estimates of the economic impact of Covid-19 are of an order of magnitude greater than most previous estimates.
- (6) This time is different in other ways as well, in terms of the initial conditions going into the crisis - the size of public and private debt - and the scale of monetary and fiscal policy response.

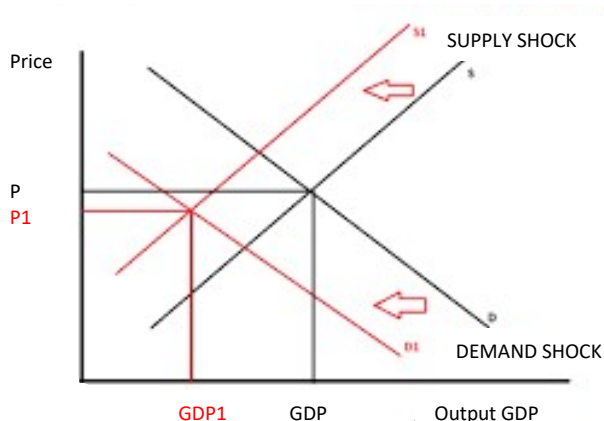
## 4. Deflation, inflation or stagflation?

Before we develop the individual scenarios it's important to address one crucial question regarding the economic consequences of Covid-19. Will it lead to deflation, inflation or even stagflation? As will be shown, this could become one of the most contentious topics in the entire debate on the economic consequences of Covid-19. Moreover, the issue is complicated by there being relatively little evidence on the impact of previous pandemics on inflation<sup>35</sup>.

Traditional modelling of pandemics sees them as largely a negative supply-shock and therefore inflationary i.e. supply falls more than demand. But the opposite could also be the case i.e. demand falls more than supply, with spare capacity triggering deflationary forces. The Monetary Policy Committee's illustrative scenario assumes that notwithstanding the supply-side contraction, the demand-side implosion has been greater still, with additional spare capacity, higher unemployment and inflationary pressure expected to remain weak in the near term.

To explore the inflation-deflation issue we need to begin with the standard textbook aggregate demand (AD) and supply (AS) framework shown in Figure 4.1. These aggregate curves capture the combined disaggregated heterogeneous sectors, across all of the economy, which are being impacted to a greater or lesser extent by Covid-19.

**Figure 4.1 The short-term impact of Covid-19 on aggregate supply and demand**



<sup>35</sup> P.54, *Monetary Policy Report*, Monetary Policy Committee, Bank of England, May 2020.  
<https://www.bankofengland.co.uk/-/media/boe/files/monetary-policy-report/2020/may/monetary-policy-report-may-2020>

Figure 4.1 essentially shows the Bank of England illustrative scenario with a substantial initial supply-side shock, followed by an even greater demand-side shock, with the result that the price level is lower<sup>36</sup>.

The Covid-19 economic crisis started with a supply-shock (workers were stopped from working, supply-chain effects) which moved the upward sloping supply curve left. But there is also a demand-shock (consumers stopped from consuming, precautionary saving, reduced business investment) to the system which moves the downward sloping demand curve left as well. The end result will undoubtedly be lower output, but the inflation impact will be determined by how these 2 shocks operate in relation to each other. Part of the uncertainty around the question of deflation versus inflation relates to the indeterminacy in Figure 4.1, and how the aggregate supply and demand shocks will interact with each other over the course of the lifting of containment measures.

So will supply fall more than demand (creating inflationary pressure) or demand fall more than supply (creating deflationary pressure)? Will the economic legacy of Covid-19 be a transition from the death to the resurrection of inflation? Or will it see the arrival of deflation?

The conclusion of this chapter is that contrary to the conventional wisdom, the longer and deeper the pandemic and economic downturn, the greater the inflationary threat will become. This is because of the scale of public and private sector debt that will be incurred and the political temptation to monetise budget deficits. However, regardless of the ultimate outcome, the short-term consequence of the crisis is likely to be a move downwards and reduction in inflation.

The UK inflation rate fell to its lowest level in 4 years in April, to 0.8 percent (year-on-year). This was almost half the March rate of 1.5 percent (year-on-year). In the short-term at least it appears that the inflationary 'shortage' consequences of the supply-shock are being offset by falls in other non-food commodity prices such as oil<sup>37</sup>.

When the crisis struck, market expectations of inflation collapsed across the globe. For example, break-evens (the difference between nominal and real yields), collapsed in the US, as the coronavirus spread from China to Europe and North America. Yields have since increased but still signal an expectation that the crisis will lead to lower inflation.

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<sup>36</sup> During the SARS crisis inflation in China was under 1 percent (year-on-year) for most of 2003. More recently it rose to 5.4 percent (year-on-year) in January 2020, before falling back to 3.3 percent (year-on-year) in April. So mixed messages.

<sup>37</sup> However, it must be stressed that over the period of the crisis and lockdown it is probably not possible to gauge accurately what the actual representative rate of inflation is, because the traditional 'basket' of goods and services used to calculate the index, simply won't represent actual consumer behaviour.

This view is reinforced by the collapse in oil prices. At the time of writing Brent Crude prices were around \$18.50 per barrel – a 75 percent price fall over the past year. The scale of this price fall could help drive headline inflation rates downwards towards zero over the coming months. The script would seem to have been written for an unfolding deflation across the world's leading economies.

The script also has powerful support from the standard New Keynesian model (NK) beloved of central banks across the globe. In the NK approach nominal interest rates are adjusted in response to changes in output and inflation. More precisely, in response to changes in the output gap. The output gap is the difference between actual output and potential output.

Potential output is the productive capacity of an economy. With regard to inflation, what matters is the deviation of actual inflation from its target measure (such as the 2 percent target for the Bank of England MPC in the UK) and expectations of this over a 2-year horizon. The seismic collapse in actual output in the wake of the Covid-19 containment measures, suggests a dramatic widening in the size of the output gap<sup>38</sup>.

The crisis has resulted in a spike in precautionary saving (notwithstanding distress borrowing) and a retrenchment in investment – all suggesting an excess of saving over investment and that the 'natural' rate of interest has fallen significantly. The savings spike has three potential sources:

- (1) De-consumption due to the lockdown and the forced closing of shops which prevent previous expenditure patterns from being maintained. It is unlikely that an increase in on-line retailing will have entirely offset this de-consumption effect.
- (2) An increase in precautionary saving due to consumer's fears over unemployment etc.
- (3) Negative wealth effects from stock market falls. At the time of writing the FTSE100 index was down 21 percent on its level at the beginning of 2020. At its lowest point, just before the lockdown, the FTSE100 was down 33 percent from its January 1<sup>st</sup> level. For the approaching retirement cognoscente, conscious of the size of their pension pots, falls of this magnitude could trigger alarm bells and a desire to increase saving.

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<sup>38</sup> Although this is more nuanced than at first appears, because potential output right now has collapsed as well due to the forced lockdown. The assumption of course is that this is only a temporary fall in potential output and that the supply shock can be eased with the lifting of the lockdown and social distancing.

Combine all these effects, with the NK model, the collapse in oil and other commodity prices, and a depressed labour market from the surge in unemployment<sup>39</sup> - limiting the scope for any wage-price spiral - and the inflation outlook appears benign and likely to fall towards zero or even turn negative with deflation. If the story ended here, it would finish with The Economist magazine, which recently stated that: *"Inflation is a fairy-tale beast ... few serious people expect to see one"*.<sup>40</sup>

### **The resurrection of inflation?**

Despite these short-term trends, 2020 inflation could become a very misleading indicator of the outlook in 2021. We'll now unpack the resurrection of inflation thesis.

Covid-19 is often compared to a war with an invisible enemy. It has been asserted that the pandemic will mark a defining moment, namely a transition to much greater inflation than experienced over recent decades: *"The coronavirus pandemic ... will mark the dividing line between the deflationary forces of the last 30 years ... and the resurgent inflation of the next two decades"*.<sup>41</sup>

One of the arguments here is that a rise in labour power will induce faster inflation. The idea is that deaths from Covid-19 will reduce the supply of labour, and the shortage will increase employee relative to employer power in wage negotiations. This seems unlikely given that the death rate from Covid-19 is much lower than for example, the Spanish Flu. Case fatality rates are

between 0.5 and 1.0 percent for Covid-19 but were > 2.5 percent for Spanish Flu. Moreover, the highest proportion of deaths under Spanish Flu was among those of young prime worker age, whereas with Covid-19 it is the elderly<sup>42</sup>. So this source of rising inflation is almost certainly ruled out.

A second angle to the war (or natural disaster) argument is the idea that they are simply inflationary in the aftermath full stop. This also is doubtful. In the case of the Napoleonic War, World War 1 and World War 2, UK inflation was lower in the 5 years after the war ended, as compared with the 5 years before the conflicts<sup>43</sup>.

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<sup>39</sup> Of course this might be challenged on the basis of the 'Death of the Phillips Curve' debate over recent years, when any inverse short-term relationship between the unemployment rate and rates of wage increase disappeared. The long-term Phillips Curve is a vertical line where the rate of inflation has no link with unemployment.

<sup>40</sup> <https://www.economist.com/finance-and-economics/2020/04/18/covid-19-could-lead-to-the-return-of-inflation-eventually>

<sup>41</sup> Goodhart, C and M Pradhan (2020), "Future imperfect after coronavirus", VoxEU.org, 27 March 2020.

<sup>42</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3734171/>

<sup>43</sup> <https://voxeu.org/article/will-inflation-make-comeback-after-crisis-ends>

The obvious and immediate economic similarity of Covid-19 with a war is the explosion in public debt, with the Government expected to run a deficit (PSNB) of 15+ percent of GDP in 2020-21 - the highest share since World War 2. For **U**, **W** or **L** scenarios public debt could rise to more than 100 percent of GDP in 2020-21. After the Napoleonic War public debt increased to 164 percent of GDP, after World War 1 it reached 137 percent of GDP and after World War 2 it peaked at 259 percent of GDP. So the pressure to use inflation to erode public debt is less than after these conflicts. However, this could change if worst case economic scenarios (**W** or **L** scenarios explained below) were to come to pass and public debt increased even more.

David Smith, Economics Editor of the Sunday Times points out that<sup>44</sup>: *“In the 30 years after WW2 the economy expanded by more than 1,200% in cash terms. The cash value of government debt in contrast grew by only 137%, so it fell sharply relative to GDP”*. The longer the pandemic goes on the greater the temptation will be to try and increase inflation as a deliberate aim of policy. This is the war analogy with the most bite.

### **The scale of the monetary policy response**

The decelerating inflation or deflationary story explained above excludes the effects of the economic policy stimulus. There has been a massive monetary policy response to the Covid-19 crisis, and this has profound implications for inflation. In sharp contrast to the immediate aftermath of the great financial crisis, when banks were encouraged to re-build capital (thus weakening money supply growth) the situation now has been reversed with all manner of government guarantees to encourage banks to lend more. This is the crucial difference between the situation

now and after the great financial crisis; together with the speed and scale of the central bank response. The Governor of the Bank of England has stated that the best thing banks can do for both the economy, and themselves, is to extend lines of credit because the alternative might be rapid growth in their non-performing loan book which could undermine bank solvency and the economy. The Bank of England is confident that banks have sufficient capital buffers to withstand the consequences of its illustrative scenario<sup>45</sup>.

After the great financial crisis commercial banks were under regulatory pressure to increase their capital reserves and this provided a weakening effect on growth in the money supply. Back then, central bank QE prevented an implosion in the money supply, it didn't create an explosion in it. That's why initial fears of hyperinflation following the introduction of QE were so misplaced. Over

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<sup>44</sup> *Wartime lessons on deficits, debt and the size of the state*, David Smith, The Sunday Times, 10<sup>th</sup> May 2020.

<sup>45</sup> <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2020/may-2020.pdf>

the past decade, despite massive QE, broad money supply growth across the world's leading economies has been anaemic and very unlikely – up until now – to create rising inflationary pressure. That situation is now changing, with significant implications for the money supply, because of the behaviour of both commercial and central banks.

There has been a huge extension in quantitative easing. The Federal Reserve's balance sheet has increased by \$2 trillion since the start of the crisis, the ECB is expanding QE by around €800 billion and the Bank of England has embarked on a £200 billion expansion. Now both central and commercial banks are contributing to the growth of the money supply.

**Chart 4.1 US Broad Money Supply Growth**

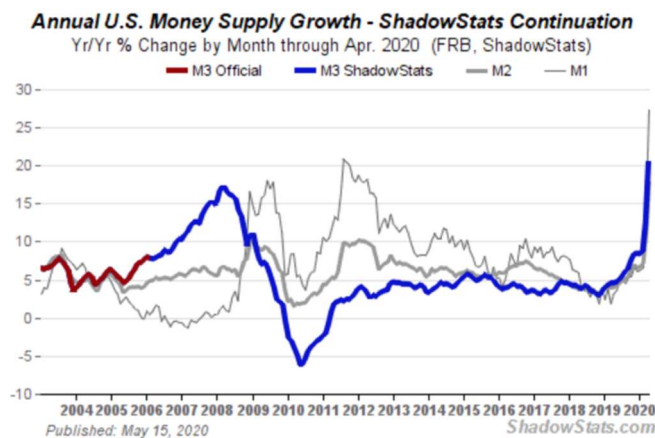


Chart 4.1 shows the rapid acceleration in monetary growth in the US in 2020. A rapid expansion such as this means that too much money is chasing too few goods and suggests rising inflation will be the consequence towards the end of 2020 and into 2021. The fastest previous peak in the rate of growth of the US broad money supply occurred just after World War 1, when it reached 18-19 percent (year-on-year). That rate of growth is now being matched, and almost certainly will be exceeded, with M3 broad money rising at the fastest rate in US peacetime history.

Whilst the acceleration in the UK has not been as fast as that in the US, there has still been a notable pick-up in the growth of the broad money supply (defined as the Bank of England M4<sub>x</sub> measure) to just under 7.5 percent (year-on-year) in the latest figures. UK broad money supply growth is probably heading towards 10 percent (year-on-year) just as US broad money growth hits 20 percent (year-on-year).

Even in the euro-zone broad money M3 growth has reached 7.5 percent (year-on-year) in the latest figures and is heading higher - notwithstanding the recent German court challenge to the legality of quantitative easing.

The inflation threat from rising money supply growth might be dampened initially by a fall in the velocity<sup>46</sup> of money (crudely, the number of times money changes hands) as a result of the lockdown and social distancing measures. Sustained uncertainty might also contribute to a reduction in the velocity of money, thereby dampening the effect of faster monetary growth. But the acceleration has been so fast, particularly in the US, that it's difficult to believe there won't be inflationary consequences.

**Chart 4.2 UK Broad Money Supply Growth – M4<sub>x</sub> measure**



Source: Bank of England

### The scale of the fiscal policy response

There has been a huge fiscal response to Covid-19 and in many of the world's leading economies the stimulus has been significantly greater than after the financial crisis in 2009, despite the fact that the starting point for the ratio of public debt to GDP is much higher now than then. The notable exception is China where the direct fiscal stimulus was around 8 percent of GDP after the financial crisis and is less than a third of that now (Table 4.1).

There is a twofold explanation of the willingness of governments to embark on an aggressive fiscal response: (1) The assumption that it would be temporary and would unwind quickly. (2) Historic lows in interest rates which mean the debt is more easily financed - with financial markets unruffled by the explosion in debt. US 10-year bond yields are at 0.7 percent at the time of writing. UK 10-

<sup>46</sup> The key identity here is  $MV=PT$  where  $M$  is money supply,  $V$  is the velocity of money and  $PT$  is prices times transactions, essentially nominal GDP.

year gilt yields are at 0.24 percent. The 2-year gilt yield was negative at -0.03 percent at the time of writing.

Table 4.1 shows a comparison of the fiscal response to Covid-19 across the world's largest economies<sup>47</sup>. The fiscal situation is also very fluid, for example, with the extension of the furlough scheme to October in the UK, which isn't accounted for in the table. The fiscal response in Table 4.1 only captures direct Covid-19 related measures. On top of this will be the automatic stabilisers of higher public spending and lower taxation receipts which will mean that total public sector net borrowing in 2020-21 is likely to reach at least £325 billion according to **macronomics** estimates.

<b>Table 4.1</b> <b>IMF Fiscal Tracker - Breakdown of the fiscal response to Covid-19</b>			
<b>Country</b>	<b>Above the line (% GDP)</b>	<b>Below the line (% GDP)</b>	<b>Guarantees (% GDP)</b>
<b>Japan</b>	10.0	10.1	-
<b>Germany</b>	4.4	6.2	23.4
<b>Italy</b>	1.2	-	32.4
<b>Spain</b>	1.2	0.9	8.9
<b>UK</b>	3.1	15.7	-
<b>US</b>	6.9	2.0	2.2
<b>Australia</b>	10.6	0.8	1.1
<b>Canada</b>	5.2	0.2	3.1
<b>France</b>	0.7	-	13.9
<b>China</b>	2.5	-	-

The latest April IMF Fiscal Tracker covers the period up until 8<sup>th</sup> April and so the next iteration is likely to show a larger still fiscal response. Table 4.1 shows the IMF Fiscal Tracker estimates of the division of the fiscal stimulus into 3 components: (1) The above the line measures from additional public spending and foregone tax revenues. (2) Below the line measures from loans and deferrals, including tax and social security contributions to be paid at a future date. (3) Government guarantees and other contingent liabilities to help the private sector. In some

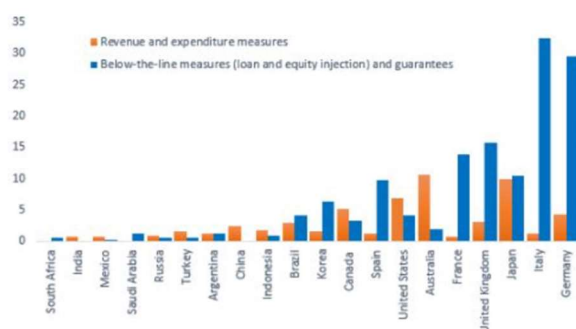
<sup>47</sup> The difference in the UK figure (3.1% of GDP PSNB, versus 5.9% figure from the OBR) is explained by the fact that the OBR assumes the UK will contract by 12.8 percent (year-on-year) in 2020, whereas the IMF thinks the contraction will be 'only' 6.5 percent (year-on-year).

countries IMF estimates were not available for the fiscal cost of government guarantees and contingent liabilities at the time of writing.

What Table 4.1 and Chart 4.3 show is that there is considerable variation in national fiscal responses to Covid-19 and that government guarantees often form the largest element – something which could have grave fiscal consequences in worst case scenarios. Promises politicians thought would never be kept, might have to be.

**Chart 4.3 G20 Fiscal stimulus**

(Announced fiscal measures in G20 economies, % of GDP)



Sources: National authorities; and IMF staff estimates as of April 8, 2020.

Note: G20 = Group of twenty. G20 aggregates are calculated using PPP-adjusted GDP weights

## Helicopter money

The scale of the expansion in quantitative easing is not the only significant monetary policy shift since the onset of the Covid-19 crisis. Central banks such as the Bank of England and the Fed have indicated the possibility of monetisation i.e. a willingness to engage in even more extraordinary monetary policy and so-called ‘helicopter money’<sup>48</sup>. Commenting on the potential for helicopter money, CEPR President Weder di Mauro was quoted in the Financial Times<sup>49</sup> saying: *“Things are moving very fast and minds are too”*. Former Chairman of the Federal Reserve Ben Bernanke has argued<sup>50</sup> that: *“under certain extreme circumstances monetary financing of fiscal deficit spending may be the best available alternative”*.

The original name helicopter money was coined by Milton Friedman in 1969, when he wrote a parable of the idea that central banks could print money and distribute it directly to individuals –

<sup>48</sup> It might be argued that in some sense ‘helicopter money’ has already been in existence for a decade because QE involves a central bank making direct payments to the private sector, and that in undertaking that QE and it isn’t then reversed, there is a permanent increase in the money supply.

<sup>49</sup> P9. The Financial Times: Big Read on the Global Economy, Weekend edition 21<sup>st</sup>/22<sup>nd</sup> March 2020.

<sup>50</sup> P9. The Financial Times: Big Read on the Global Economy, Weekend edition 21<sup>st</sup>/22<sup>nd</sup> March 2020.

thrown out of a helicopter. The idea has subsequently evolved into a slightly more formal approach, with it generally used to encompass the 'permanent' monetisation of budget deficits<sup>51</sup>. In the current context of large fiscal largesse monetisation is highly relevant to the two key questions around the stimulus:

- How should the stimulus be financed?
- How should the money then be distributed?

Monetisation is the issue of whether the Bank of England should pay for HM Government's fiscal stimulus directly, effectively printing money (in the direct market), or should borrow it in the usual way (through the secondary market). Monetisation would occur if the Bank of England bought gilts directly from the Government, in contrast to the operation of QE to date, where the purchases have been made in the secondary market from banks and pension funds etc. At present the Bank of England operates entirely in the secondary market when it undertakes quantitative easing.

The Great Financial Crisis led to extraordinary monetary policy in the form of massive 'secondary' quantitative easing. Could the Great Infection lead to even more extraordinary monetary policy with even greater 'primary' quantitative easing?

Thus far there is no sign whatsoever of the need for direct financing because gilt sales have been 'covered' i.e. the demand to purchase gilts has exceeded the amount offered for sale in the primary market. As Sky News Economics Editor Ed Conway pointed out in one broadcast, the reason the gilt auctions are covered is because there is, "*a monster [the Bank of England]*" waiting in the secondary market to buy them.

But the worse the economic scenario (the **W** and **L** scenarios), in the case of a second or third wave to the pandemic, and the greater the issuance of public debt, the greater the pressure might be for the BoE to buy directly from HM Treasury if gilt auctions became 'uncovered'. The alternative would be a sharp spike in gilt rates.

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<sup>51</sup> However, ideas closer to the original parable have not gone away. In the wake of the Great Financial Crisis it was suggested by prominent economic commentators such as Martin Wolf at The Financial Times, that central banks make direct payments to individuals in order to stem the threat of deflation.

In worst case scenarios inflation could become an object of policy i.e. the authorities aim to increase inflation in order to erode the real value of public and private debt. This would be a very different form of inflation targeting as compared to the present!

We are left with two differing views regarding inflation determination beyond the immediate short-term reduction in inflation and slide towards deflation:

- The weaker the economic scenario, the greater the output gap, and hence weaker inflation/deflation.
- The weaker the economic scenario, the greater the increase in public debt, and the greater the political incentive to monetise the deficit (albeit prevented as yet by legislation on central bank independence and inflation targets). The worse the economic scenario the greater the pressure could become.

To summarise, we apply the above inflation factors to the individual scenarios:

- In all 5 scenarios the initial 2020 impact of the crisis is likely to be decelerating inflation and/or deflation.
- At present money supply growth is accelerating in 2020 which possibly makes inflation more likely than deflation in 2021.
- The **Super V** or **V** scenarios exhibit a second half recovery which combines with a pro-cyclical monetary and fiscal policy stimulus to increase inflation in late 2020/early 2021. This requires a moderate tightening in monetary policy in early 2021 to bring inflation back towards target.
- The **U** scenario is the central scenario for deflation and the possibility of negative interest rates.
- The **W** and **L** scenarios see more deflation in the short-term and more inflation in the long-term because of monetisation.
- In sharp contrast to the great financial crisis, both commercial banks (over 2008-09 onwards they were being encouraged to re-build capital) and central banks are being encouraged to expand their balance sheets, thereby accelerating monetary growth.

- However, under the **W** and **L** scenarios there could be a retrenchment by commercial banks but the introduction of 'helicopter money' by central banks.
- The huge differences between scenarios mean that interest rates could rise (**Super V** or **V** scenarios) slightly, remain at zero or go negative (**U** scenario), or spike due to significantly higher inflation and public debt in the **W** and **L** scenarios - unless central banks resorted to direct financing.
- After the great financial crisis HM Government introduced a policy of fiscal austerity. Whilst it is possible that strategy could be repeated after the pandemic is over, it seems unlikely. The political mood music seems very different, despite the current surge in public debt from an already very high base. Politicians seem to lack the willpower, although this might be simply that they expect the crisis to be over very quickly, with a bounce back in the economy, and higher debt to then be easily financed at record low interest rates.
- Under **W** and **L** it seems very likely that central banks around the world would monetise public debt on a vast scale, given that in these scenarios commercial banks could have failed stress tests and there could be systemic financial instability. In such circumstances commercial banks would probably be re-building capital and shrinking the money supply themselves, encouraging central banks to double-down on monetisation.

### **The return of stagflation or super stagflation?**

It is not just inflation that threatens to increase in late 2020 and into 2021. Stagflation – simultaneous high unemployment and inflation – is set to make a comeback. Unemployment increases significantly in all but the Super V or V scenarios. This means that the 'Misery Index' will be back in vogue also. The claimant count of unemployed rose 856,000 in April to 2.1 million – the biggest monthly increase since records began in 1971. But it is also estimated that the number of furloughed workers is around 7.5 million<sup>52</sup>.

Combine unemployment and furloughed workers and you get an underlying - albeit temporary - unemployed rate of around 28 percent! It's not the same, but it gives an indication of the enormity of the crisis and how many people need to get back to work. This means that within 2 months the UK has gone from having the lowest level of the misery index in half a century to almost the highest. In the mid-1970s the Misery Index peaked at almost 30 percent, but back then the problem was more inflation than unemployment.

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<sup>52</sup>Statement by the Chancellor of the Exchequer.

Table 4.2 The Misery Index (by the end of 2021)			
Economic scenario	Unemployment rate	Inflation rate (CPI)	Misery Index
<b>Super V - Miraculous recovery</b>	4.5	3.0	7.5
<b>V - Full recovery</b>	5.0	2.5	7.5
<b>U - Hospitalised</b>	8.5	0.5	9.0
<b>W - Intensive care</b>	10.0	6.0	16.0
<b>L - Near death experience</b>	20.0	10.0	30.0

Even with furloughed employees, the conventional rate of unemployment is likely to double from 4 percent in March to 8 percent within a few months. However, under the alternative **W** and **L** economic scenarios it is likely to increase much more from current levels. Although under the **Super V** and **V** scenarios the increase will be less marked and the reversal much quicker. Scenarios for the Misery Index are shown in Table 4.2. Under the **W** scenario we see the emergence of stagflation. Under the **L** scenario there is what could be described as Super Stagflation.

The Misery Index under the **L** economic scenario would see a return to the awful economic days at the end of the 1970s when we last saw simultaneous double-digit unemployment and inflation. An unemployment rate of 20 percent would be slightly more than the 17 percent rate seen in the wake of the Spanish Flu and the UK economic downturn in the early 1920s. And it would be slightly less than the 22 percent rate reached during the Great depression in the 1930s.

## 5. The 5 scenarios

5 economic scenarios are derived on the basis of the different potential epidemiological outcomes shown in Table 2.2<sup>53</sup>. These range from a very swift bounce-back in the economy in the second half of 2020, through to what can only be described as an economic Armageddon scenario with output not regaining its pre-pandemic level until 2030.

The fact that such a scenario can be considered speaks volumes as to the depth of the economic crisis we face. It should be remembered however that this is only 1 of 5 illustrative economic scenarios. Attaching probabilities to the most likely scenarios is very difficult because it is totally dependent on epidemiological outcomes. Table 5.1 suggests the **U** or **V** scenario might have the edge, but this is highly speculative due to the fact that we simply don't know the answers yet to fundamental questions around the attainment of herd immunity. As a result, we also don't know the answers to questions about the lifting of the lockdown and social distancing measures, and the likelihood of a second or third wave to the pandemic.

Table 5.1 Post Covid-19 Economic Scenarios					
Scenario	Economic prognosis	Speed of lift/lockdown	2020Q2 GDP loss (qtr-on-qtr)	Date regain 2020Q2 lost output	Probability
<b>Super V</b>	Miraculous recovery	Very fast lift	-20	2020Q3	10%
<b>V</b>	Full recovery	Fast lift	-30	2020Q4	25%
<b>U</b>	Hospitalised	Slow lift	-35	2023	40%
<b>W</b>	Intensive care	Slow lock	-35	2025	15%
<b>L</b>	Near death experience	Fast lock	-35	2030	10%

**The economic scenario numbers are illustrative orders of magnitude. The numbers should not be seen as forecasts.**

<sup>53</sup> The economic scenarios incorporate the lifting of the lockdown in the following way. If the full lockdown imposed a reduction of 30% of GDP, and half the measures are assumed to be lifted in 2020Q3 and the rest in 2020Q4, then 15% is added back to the level of GDP in each quarter. Alternatively if the lifting extends over 3 quarters then 10% of GDP is added back to the level in each quarter etc. These are crude assumptions for illustrative purposes.

The 5 scenarios are intended to be illustrative of the key factors which will lead to alternative outcomes. This could be described as narrative forecasting, with the story underlying each scenario being as important as the numbers. From an economic perspective the critical epidemiological influences are:

- The speed and scale of the lifting (or re-imposition) of containment measures.
- Whether or not there is a second or third wave to the pandemic.

There is the added concern as well, that even if there isn't a second wave to the pandemic, there could still be a second wave that hits the economy, as companies run out of money and make a huge number of furloughed workers redundant. The furlough programme is estimated to cost between £63 billion to October. Other reliefs can't last indefinitely either, most notably the mortgage holidays provided by banks and building societies.

The economic scenarios described are:

- **Super V economic cycle (The miraculous recovery scenario)** - Based on a superfast lifting of the lockdown and social distancing. This results in a miraculous economic recovery with pre-pandemic output regained by the end of the third quarter 2020
- **V economic cycle (The full recovery scenario)** - This scenario assumes a fast lifting of the lockdown and social distancing, with half the economic losses removed in 2020Q3 and the remainder in 2020Q4. This results in a full economic recovery by the end of the year.
- **U economic cycle (The hospitalised scenario)** - Based on a slow lifting of the lockdown and social distancing, with the economy continuing to be hospitalised and pre-pandemic output levels not regained until 2023.
- **W economic cycle (The intensive care scenario)** - This scenario sees the emergence of a second wave of infections, with a moderate tightening in lockdown and social distancing. However, this is enough to keep the economy in intensive care over the 2020-21 period. The double-dip in output means that pre-pandemic output levels aren't regained until 2025.
- **L economic cycle (The near-death scenario)** - This scenario sees the emergence of a massive second and possibly third wave of infections over the 2020-21 period. Mutation of the virus and very low levels of herd immunity result in draconian lockdown and social

distancing rules, the economic consequences of which are catastrophic. The economy nearly dies and takes until 2030 to recover pre-pandemic output levels. It's that bad. This is an outlier scenario to illustrate the worst possible case.

The 2020Q2 reduction in GDP is not the same across all 5 scenarios. In the Super V scenario there is a 20% (quarter-on-quarter) reduction because of a lift in the lockdown from late May onwards. In the **V** scenario there is a 30% (quarter-on-quarter) reduction with no lifting of containment measures until the end of June.

Gauging the correct figure is not easy. The Office for Budget Responsibility (OBR) adopted a largely mechanical approach in suggesting a 35% (quarter-on-quarter) contraction as its baseline reference scenario for HM Treasury. They estimated how much output in each sector was lost due to the lockdown and social distancing, and applied that to the weight of each sector in GDP. But this is no easy task. It is also confounded by huge uncertainty regarding the behavioural changes individuals and businesses may undertake because of anxiety and fear regarding their lives and livelihoods. The behavioural multipliers are almost certainly large and increasing over time.

A review of independent economic forecaster estimates of the likely 2020Q2 fall in UK GDP produced a range from -10% (quarter-on-quarter) to -25% (quarter-on-quarter). The assumption of a 35% reduction is used in the **U**, **W** and **L** scenarios. The quarterly GDP profile for each scenario over the 2020-21 period is shown in Table 5.2.

Table 5.2 Illustrative scenarios for UK GDP Growth (quarter-on-quarter % change)								
Scenario	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4
<b>Super V</b>	Base	-20	25	3	2	1	-1	1
<b>V</b>	Base	-30	21	18	1	1	-1	0
<b>U</b>	Base	-35	15	13	5	1	2	1
<b>W</b>	Base	-35	23	-6	-7	14	6	6
<b>L</b>	Base	-35	15	-7	-14	0	-8	9

The clear message from Table 5.2 is that the next 6 months are likely to be tumultuous. Under the **Super V** and **V** scenarios the economy comes roaring back in the second half of the year. Under the **U** scenario the economy comes back, but at a slower pace due to the maintenance of some

containment measures in response to occasional upticks in Covid-19 cases and deaths. The scary scenarios are W and L where moderate or massive second pandemic waves hit the economy.

Table 5.3 Illustrative scenarios for UK GDP Growth (year-on-year % change)			
Scenario	2019	2020	2021
<b>Super V – Miraculous recovery</b>	1.4	-4	10
<b>V - Full recovery</b>	1.4	-11	14
<b>U - Hospitalised</b>	1.4	-18	14
<b>W - Intensive care</b>	1.4	-19	3
<b>L - Near death experience</b>	1.4	-22	-23

Feeding these alternative assumptions through the various economic scenarios highlights the vast differential in GDP performance in 2020 and 2021 as a result <sup>54</sup>. Table 5.3 shows the 2020 GDP change ranges from -4 percent in the **Super V** scenario to a frightening -22 percent in the **L** scenario<sup>55</sup>.

Table 5.4 shows the end 2020Q4 level of output as compared to the pre-pandemic level in 2020Q1. The range of estimates is enormous, from +3% to -30%. The economic uncertainty is that high. Similarly, in Table 5.5, comparing pre-pandemic output with that in 2021Q4 shows a range from +4% to -40%.

The flat and slightly falling quarter-on-quarter GDP path in 2021 in the **Super V** and **V** scenarios (see: Table 5.2) reflects the strength of the recovery and rising inflationary pressures, which are offset through tighter monetary policy (and perhaps a faster reversal in fiscal policy). The issue of whether or not the Covid-19 economic crisis will lead to inflation, deflation and/or stagflation is discussed below.

With regard to a vaccine and anti-viral drugs the **Super V** and **V** scenarios see pharmaceutical interventions arriving after the economic recovery has been completed and so they have little

<sup>54</sup> A point to note with regard to the tables and charts is that because of the violent movements in quarterly GDP in 2020 (shown in Table 3), then in the Super V and V scenarios the economic recovery is complete by year end and the quarterly movements thereafter are relatively moderate, but the year-on-year effect means that annual growth shows through in a higher figure for 2021 than 2020.

<sup>55</sup> These are illustrative scenarios and don't incorporate the ONS 2020Q1 GDP figure which wasn't available at the time of compilation.

impact<sup>56</sup>. By implication adequate levels of herd immunity have already been achieved. If they arrive before then they will just make the **Super V** or **V** scenarios more likely. Under the **U** scenario mass deployment of a vaccine doesn't arrive until the Summer of 2021. For the **W** and **L** cycles the assumption is that it is not until very late in 2021 at the earliest. Or perhaps not even then if there is a third wave to the pandemic and/or a mutation of the coronavirus.

Table 5.4 The GDP differential (end 2020Q4 versus 2020Q1)	
<b>Super V - Miraculous recovery</b>	+3%
<b>V - Full recovery</b>	Zero
<b>U - Hospitalised</b>	-15%
<b>W - Intensive care</b>	-25%
<b>L - Near death experience</b>	-30%

Table 5.5 The GDP differential (end 2021Q4 versus 2020Q1)	
<b>Super V - Miraculous recovery</b>	+4%
<b>V - Full recovery</b>	+1%
<b>U - Hospitalised</b>	-5%
<b>W - Intensive care</b>	-10%
<b>L - Near death experience</b>	-40%

Table 5.6 The time when the pre-pandemic GDP level is regained	
<b>Super V - Miraculous recovery</b>	2020Q3
<b>V - Full recovery</b>	2020Q4
<b>U - Hospitalised</b>	2023
<b>W - Intensive care</b>	2025
<b>L - Near death experience</b>	2030

<sup>56</sup> Faster Cures/Milken Institute are tracking around 120 potential treatments worldwide.

According to press reports, scientists believe that the virus has mutated into two strains: the older 'S-type' appears to be milder and less infectious, whereas the 'L-type' mutation, which emerged later, spreads more quickly and is now responsible for around 70 percent of cases.

Table 5.6 captures the stark economic message from the scenarios analysis which is that whilst in two of the scenarios (**Super V** and **V**) the economy recovers all the lost output in the first half of the year, in the second half, the potential for far worse outcomes remains considerable. In the **U**-shaped cycle lost output is not regained until 2023. In the **W** cycle lost output is not regained until the middle of the decade around 2025 and in the **L** cycle the economic contraction is so great lost output is not regained until the end of the decade around 2030.

We now examine each individual scenario in more detail in order to highlight the key characteristics and features the associated economic cycle is likely to display. It must be emphasised that the final **L**-shaped cycle scenario is an outlier for illustrative purposes.

## 6. Super V economic scenario

**Miraculous recovery:** The economy regains its pre-pandemic GDP level by the end of 2020Q3.

Chart 6.1

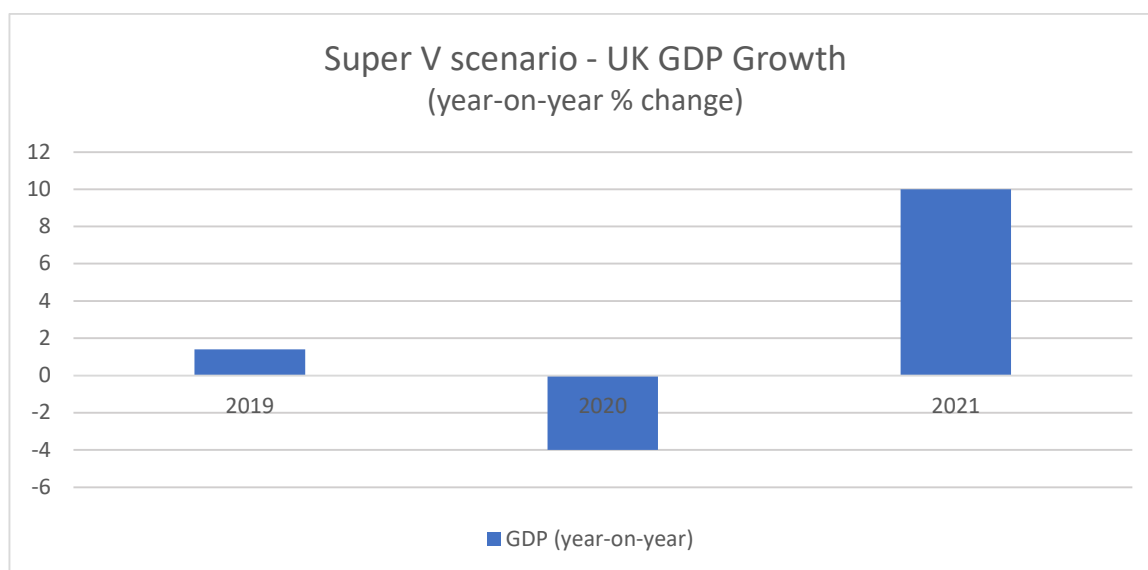
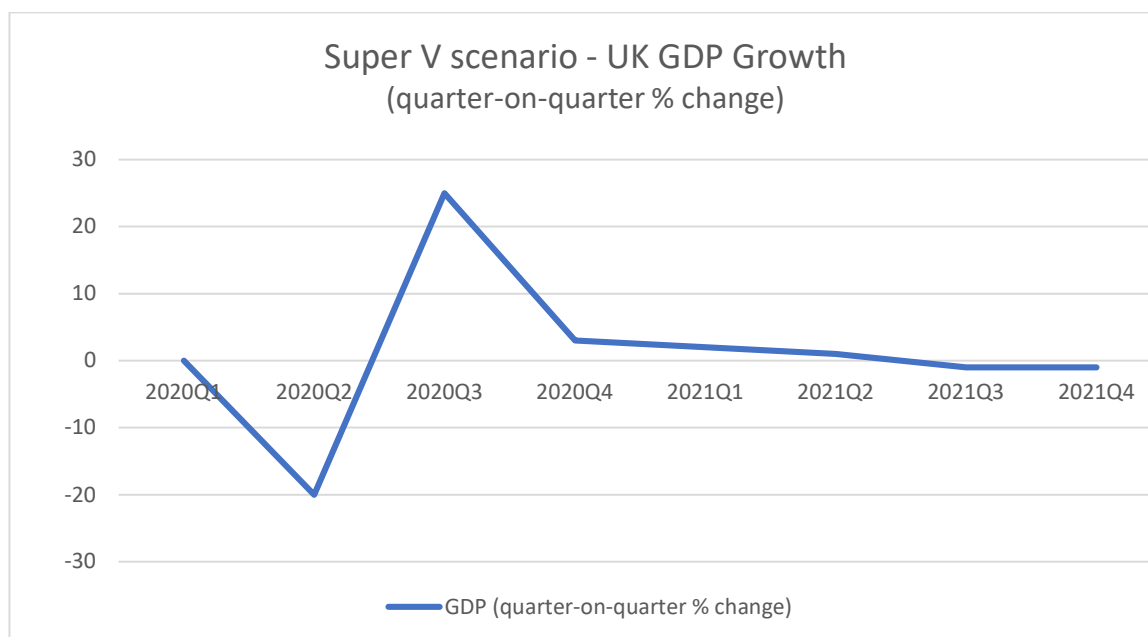


Chart 6.2



<b>Table 6.1</b>
<b>Characteristics of a Super V scenario</b>
Very fast lifting of lockdown and social distancing starts in May.
Successful lifting in other countries boosts consumer and business confidence.
There is a repeat of the Asian and Hong Kong Flu GDP bounce backs in the subsequent quarter.
Pent-up demand with little precautionary behaviour leads to a strong consumer bounce-back.
Say's Law – There is a symmetrical positive supply-shock from easing the lockdown/distancing.
There are strong pro-cyclical monetary and fiscal policy effects.
The recovery starts from a 20% fall in 2020Q2 GDP.

The Super V economic scenario is based on a rapid lifting of the economic lockdown and social distancing beginning in late May, as the authorities draw confidence from other economies such as China and Italy, who are further along the epidemiological curve. Declining cases and deaths leads the authorities into a phased lifting of restrictions with most lifted by mid-August 2020. This is the superfast lift scenario with strong knock-on economic effects. What goes down goes back up - this is the idea of Say's Law, very loosely paraphrased as supply creates its own demand, and that if a negative supply shock started the crisis, a positive one can end it, if the intervening period has been relatively short without permanent damage to the economy.

Consumer and business confidence builds as mass testing produces evidence that herd immunity could be reached before the Autumn/Winter. Consumers return to the High Street in droves, eager to spend their repressed consumption. The stock market surges as a result as well. Significantly also, the projected 2020Q2 fall in output is reduced as a result of the containment measures beginning to be lifted in 2020Q2. Unemployment falls quickly under this scenario with most furloughed workers returning to work by the end of 2020. In the **Super V** scenario the number of furloughed employees declines at the same rate as the economy (their existing employer or a new one) re-absorbs them into employment. In other words people pass from furlough into employment not unemployment.

The strong economic pick-up is encouraged by pro-cyclical fiscal and monetary policy with the economic benefits of the relief measures not being felt economically until shops and businesses could re-open. The lag in payments from HMRC to individuals and businesses means that

restrictions begin to ease just as the money comes through the letterbox. In other words, fiscal policy begins to take effect in an upturn not a downturn, encouraging the economy to overshoot upwards. The strong policy stimulus – both fiscal and monetary – with an acceleration in money supply growth, leads to higher inflation and higher interest rates in 2021 to slow the economy.

Wider and more enduring economic effects may emerge at this time as well, with the emergence of new business models based around alternative ways of working, retailing and learning which emerged during the crisis. There may also be a greater agility and openness to new ideas around AI, 5G and IoT business models. We could see a positive sense of post-pandemic new normal emerge, along the lines of what was seen in the US in the *'Roaring Twenties'* (1920s) - the sense of progress through technology which emerged after the Spanish Flu of 1918-19.

The Super V recovery scenario would be a repeat of the quick rebounds in the UK economy seen after the Asian Flu (1958-59) and Hong Kong Flu (1969-70). It would also be akin to those seen in China and Hong Kong post SARS in 2003-04.

## 7. V economic scenario

**Full recovery:** The economy regains its pre-pandemic GDP level by the end of 2020Q4.

Chart 7.1

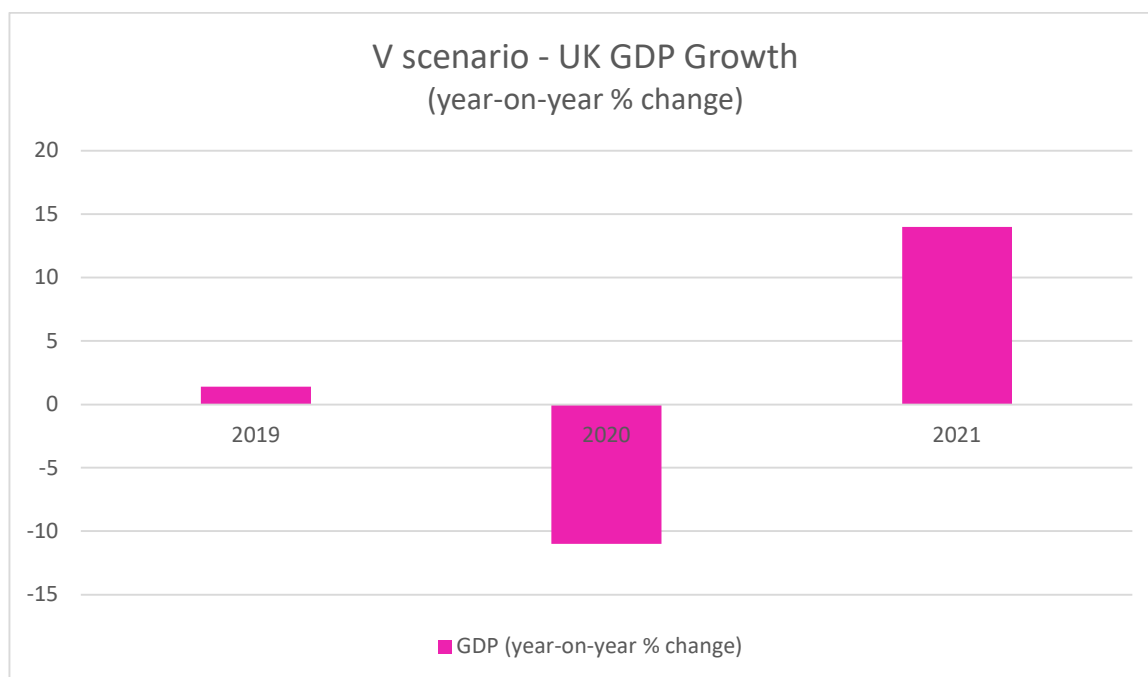
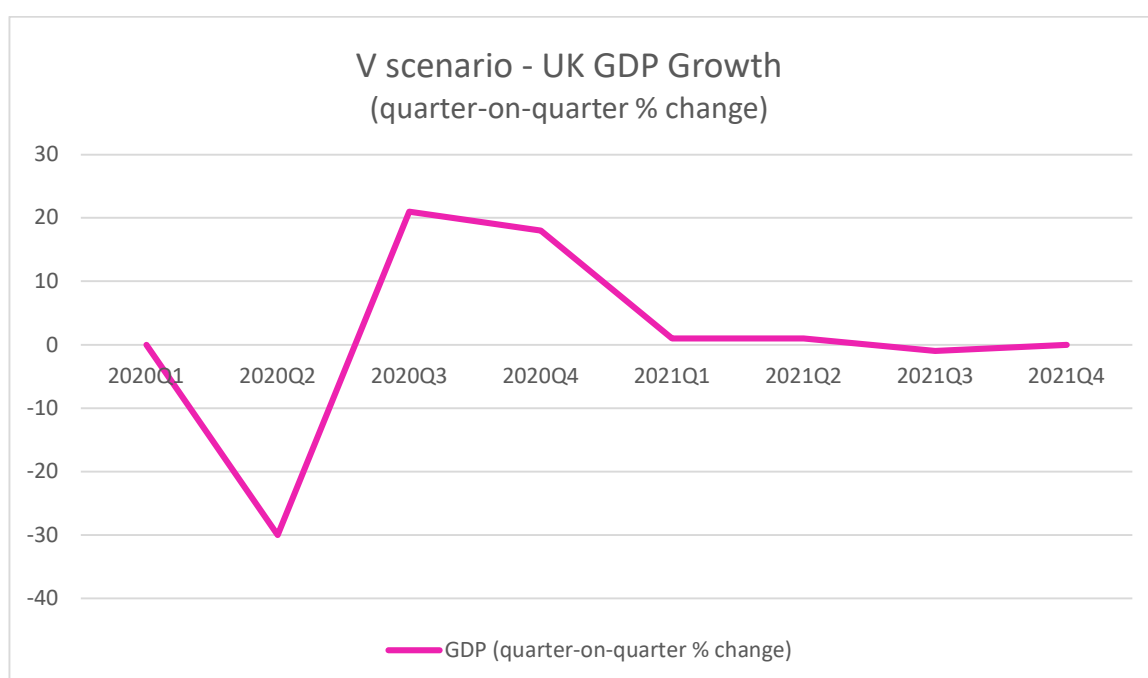


Chart 7.2



<b>Table 7.1</b>
<b>Characteristics of a V scenario</b>
A fast lift of the lockdown and social distancing starts at the end of June.
There are strong confidence effects but less than in the Super V scenario.
There are strong pent-up demand effects but less than in the Super V scenario.
The Say's Law effect is apparent but less than under the Super V scenario.
There are pro-cyclical effects but less than in the Super V scenario.
The recovery starts from a 30% fall in 2020Q2 GDP.

The **V** economic scenario is similar but not the same as the OBR reference scenario produced for HM Treasury as a baseline view. The quarterly rate of output growth is slightly slower in 2020 than under the **Super V** scenario.

In the **Super V** scenario the economy contracts by 20% (quarter-on-quarter) in 2020Q2 but then grows by 25% (quarter-on-quarter) in 2020Q3 and a further 3% (quarter-on-quarter) in 2020Q4, thus regaining pre-pandemic level of output by the end of 2020Q3. In the **V** scenario the economy contracts 30% (quarter-on-quarter) in 2020Q2 but then grows by 21% (quarter-on-quarter) in 2020Q3 and a further 18% (quarter-on-quarter) in 2020Q4, thus regaining pre-pandemic level of output by year-end.

There is nothing particularly different between the 2 scenarios, except that the **Super V** scenario grows from a higher base due to the economy having contracted by 20 not 30 percent in 2020Q2. As with the **Super V** scenario, the **V** scenario is supported by historical experience seen in the previous Asian and Hong Kong Flu and SARS episodes.

Comparing the **V** with the **Super V** scenario there are the same effects: consumer bounce, improved consumer and business confidence, stock market recovery, investment pick-up, pro-cyclical policy effects, falling unemployment and very little loss of permanent output. These effects are slightly more muted, that's all. This also means that the upward overshoot seen in the **Super V** scenario is less marked in the **V** scenario and the increase in inflation as well. This still requires a policy response in 2021 but the tightening is less as a result also.

## 8. U economic scenario

**Hospitalised economy:** The economy doesn't regain its pre-pandemic GDP level until 2023.

Chart 8.1

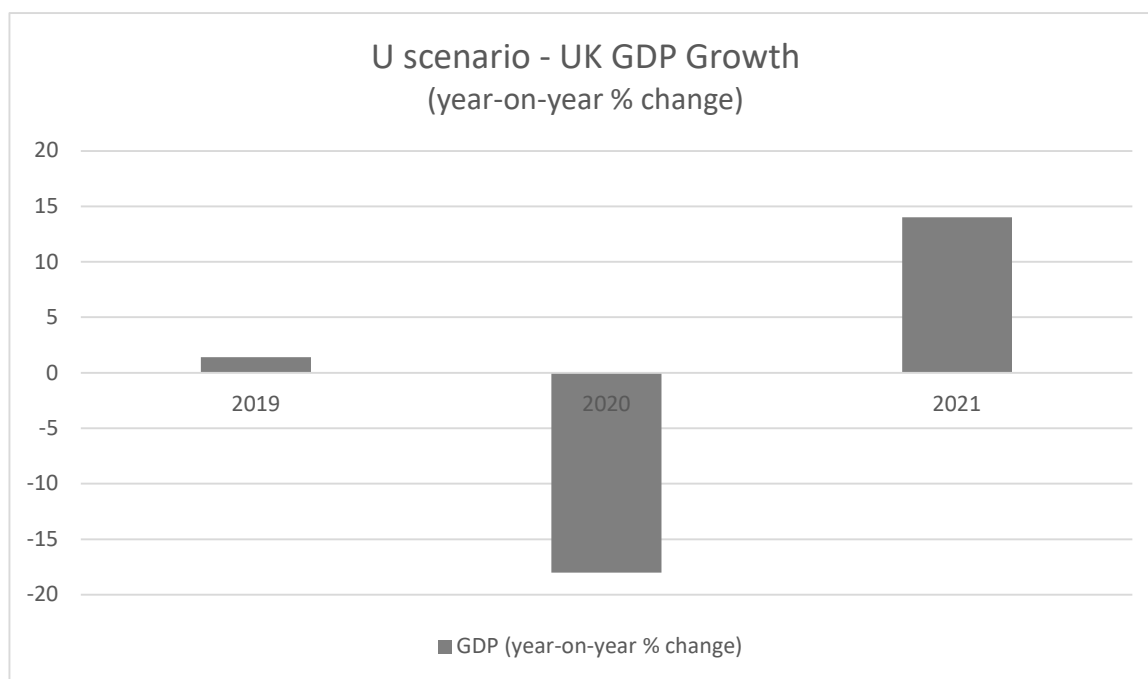
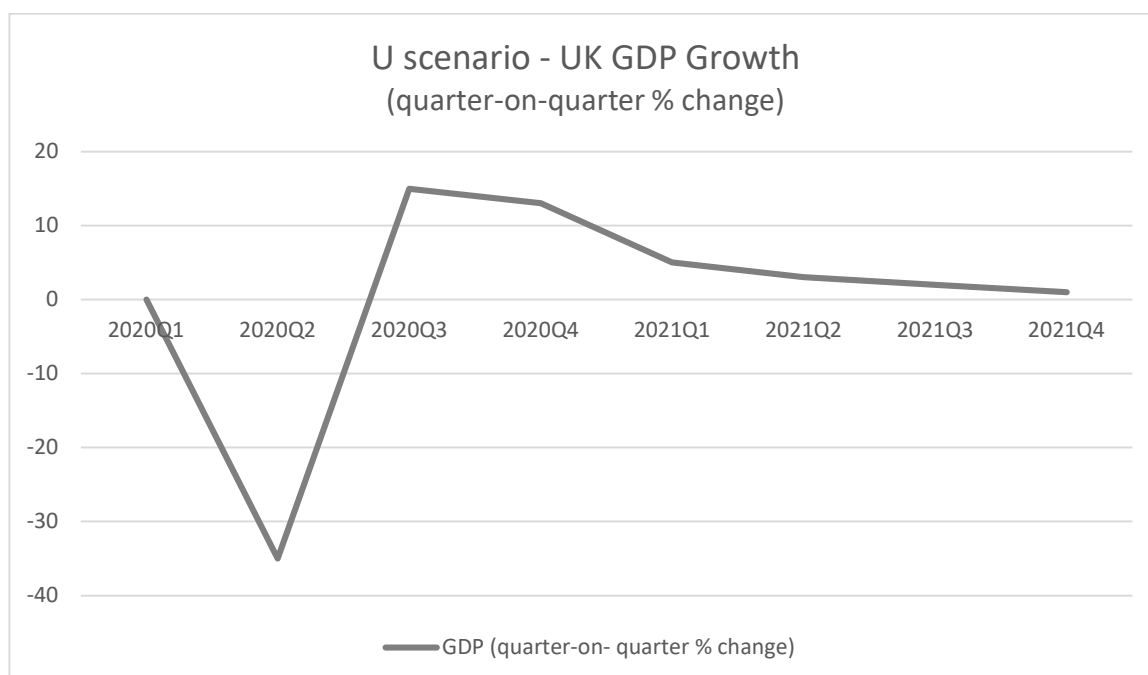


Chart 8.2



<b>Table 8.1</b>
<b>Characteristics of a U scenario</b>
There is a much slower lifting of the lockdown – half the effect seen in the Super V & V scenarios.
There are sporadic Covid-19 upticks in cases but there is no second wave.
Social distancing is a constant reminder of the economic threat and erodes confidence.
Precautionary behaviour by consumers and businesses remains high.
This is the scenario most closely associated with zero inflation/deflation.
Recovery starts more slowly after a 35% fall in 2020Q2 GDP.

The **U** economic scenario is based on a slow lifting of the lockdown with around half the bounce back seen in the **Super V** and **V** scenarios in 2020Q3 and 2020Q4. Subsequently, whilst there is no second wave of infections in the **U** scenario, there are sporadic upticks in cases and deaths which result in the authorities keeping some aspects of social distancing (e.g. for the over 70s and those with vulnerable conditions, or on a geographical basis tied to hot spots) until after the Autumn/Winter of 2020-21.

The retention of these controls provides a constant reminder to households and firms that an invisible threat to their lives and their livelihoods remains. The natural consequence of this is a significant increase in precautionary savings by individuals and companies, a caution reinforced by the higher levels of unemployment this scenario entails. Under the **U** scenario precautionary behaviour intensifies in order to build-up savings levels for a rainy day.

The American economic commentator, Irwin Stelzer, writing in the Sunday Times stated: “*Covid-19 has revealed that many Americans live on the edge of penury*”. He wasn’t making the point about those on low incomes alone, his argument was that large numbers on higher incomes are maxed out on credit cards, debt and monthly outgoings as well, and have little capacity to absorb a sharp fall in income, and will therefore have to retrench.

Firms are also likely to be wary of making investment decisions given the greater uncertainty which will arise every time an uptick in cases or deaths occurs. As a result, the **U** economic scenario foresees the economy not regaining pre-pandemic levels of output until 2023, partly due to the permanent losses of output which occur due to the depth and duration of the downturn.

One of the greatest dangers with the **U** scenario is that it could deteriorate into something worse, if a second wave of redundancies is triggered, regardless of any second wave in the coronavirus. This could occur with the withdrawal of relief programmes too early. In the words of a Sunday Times article: *“There could be a brutal comedown for firms numbed by furlough heroine”*.

The weaker economic recovery following the sharp downturn naturally lead to higher levels of unemployment. UK unemployment has already risen to 2.1 million. If all the furloughed workers were made redundant – obviously unrealistic - that would add an astonishing 7.5 million to the jobless total. Even a significant share of that number would be utterly politically impossible and so the furlough programme could continue beyond October - in a scaled down form - linked to the lifting of the lockdown. This will further increase public sector net borrowing (PSNB).

The initial economic effect of the pandemic was a supply-side shock as the Government sought to prevent workers from working, and consumers from consuming, in order to keep infected and uninfected people as far apart as possible. This resulted in a collapse in output way below its potential rate of growth – in economic speak, a very wide output gap has opened up. In this situation of rising precautionary saving and reduced investment (saving exceeding investment in the economy), zero inflation or deflationary pressures are likely to win out.

The **U** scenario assumes that the public debt burden doesn't rise enough to trigger extensive monetisation and faster monetary growth. It also assumes that monetary growth in the UK remains well below that in the US. Moreover, the velocity of money (crudely, the number of times it changes hands) will have fallen as well with the lockdown and social distancing, and this will take some of the edge off inflation also.

## 9. W economic scenario

**Intensive care:** The economy doesn't regain its pre-pandemic GDP level until 2025.

Chart 9.1

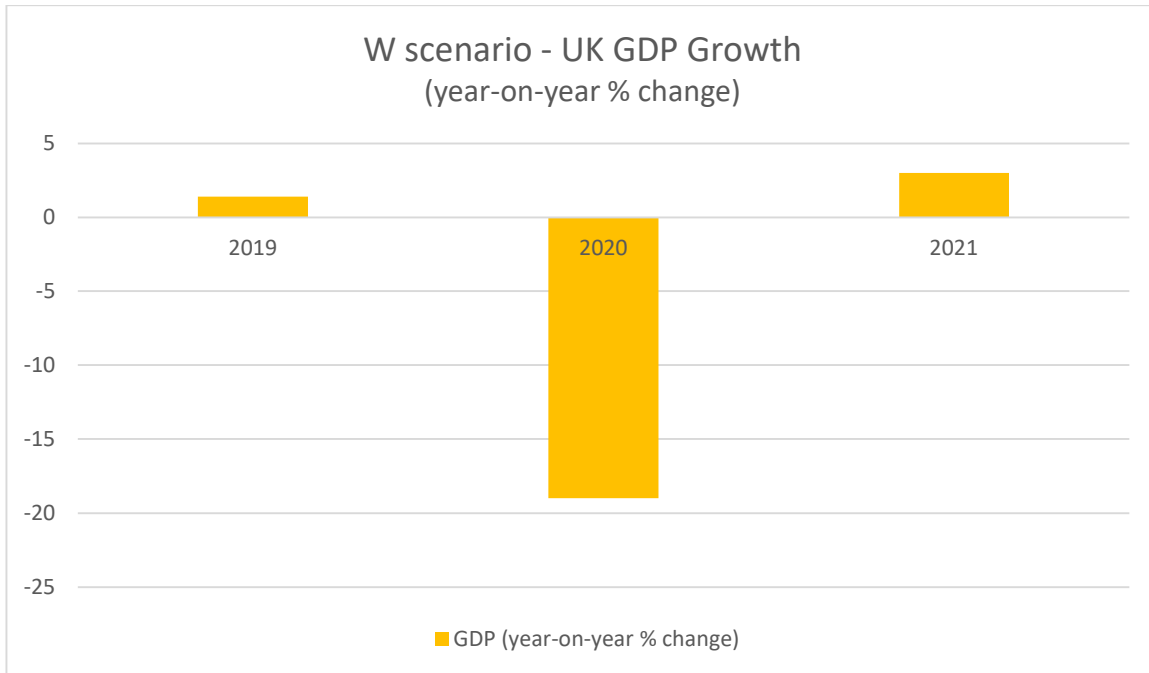
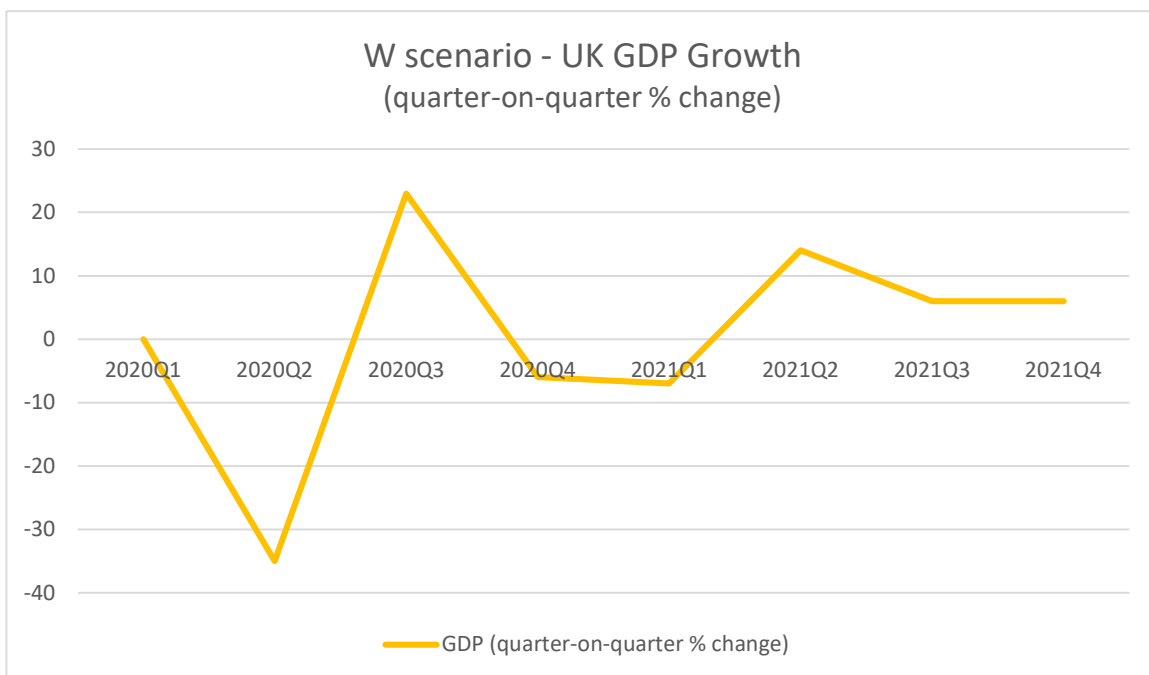


Chart 9.2



<b>Table 9.1</b>
<b>Characteristics of a W scenario</b>
A moderate second pandemic wave hits in the Autumn-Winter of 2020-21.
There is a re-introduction of some lockdown and stricter social distancing measures.
There is a further wave of insolvencies and redundancies.
Consumers and businesses engage in much greater precautionary saving.
The second wave triggers a further explosion in public debt.
Double digit unemployment and inflation arrive due to monetisation - Stagflation.
The economy is only at 75% of its pre-pandemic size by the end of 2020Q4.

The **W** economic scenario is the second worst economic scenario in the set of 5. It's worse because it incorporates the possibility of a small second wave of infections in the Autumn-Winter of 2020-21. This leads the authorities to tighten social distancing rules and certain aspects of the lockdown. It is not a full-retreat to the containment policies enforced over the March-May period, but it is sufficient to have a very negative effect on consumer and business confidence.

The **W** shaped cycle incorporates a 23% (quarter-on-quarter) recovery in output in 2020Q3. Things appear to be fine, but then the second wave hits in the Autumn and the economy contracts by -6% (quarter-on-quarter) in 2020Q4 and by -7% (quarter-on-quarter) in 2021Q1. This second wave is relatively small and is brought under control, but it is sufficient to trigger a further wave of insolvencies and unemployment.

This scenario is dangerous because it results in GDP in 2021Q1 still being at only 75% of its pre-pandemic level in 2020Q1. This suggests enormous permanent losses in output across the economy. Precautionary saving is much higher and investment much lower, as the nascent recovery is completely snuffed out.

The scale of the explosion in public debt is enormous because in this scenario: (1) Automatic stabilisers - such as unemployment and other benefits - are much higher. (2) Tax revenues are much lower. (3) Discretionary expenditures - such as reliefs for business - are much higher. (4) Government guarantees to the banks begin to be called in on a large scale.

In contrast to the **U** economic scenario, the **W** scenario foresees the arrival of stagflation with higher inflation and unemployment. The stagflation is encouraged by monetisation of the budget deficit and consequent money supply growth.

In this scenario more inflation becomes an actual policy target as a means of eroding the real value of debt in the public and private sector. The rise in inflation triggers a response in the bond markets with spikes in yields, unleashing massive monetisation in response to drive them back down. This hiatus would further weaken confidence in the economy and the prospects for recovery, with the result that the economy doesn't regain its pre-pandemic level of output until 2025.

One of the dangers in the **W** scenario is that if the weakness intensifies in a supply-demand doom loop the shape of the cycle could end-up being less **W** and more VL shape. In such circumstances the even more frightening prospect of the **L** scenario comes into play. There are domino effects from **U** to **W** to **L**.

## 10. L economic scenario

**Near death experience:** The economy doesn't regain its pre-pandemic GDP level until 2030.

Chart 10.1

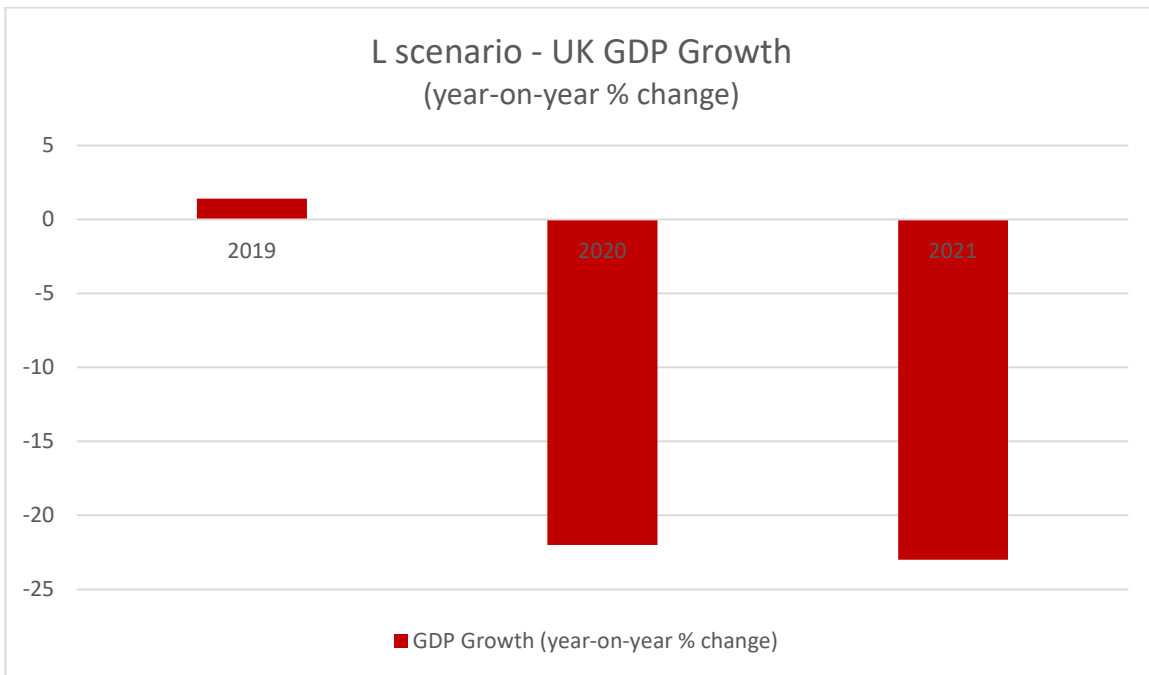
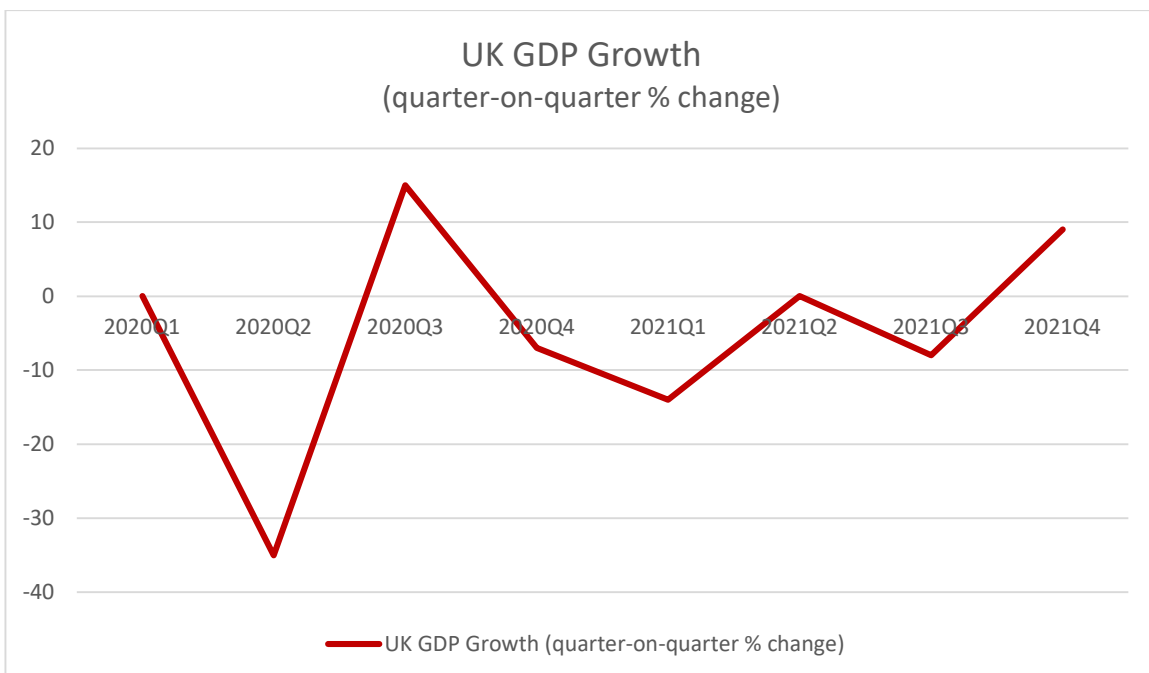


Chart 10.2



<b>Table 10.1</b>
<b>Characteristics of an L scenario</b>
A big second pandemic in the Autumn-Winter of 2020-21 results in draconian containment.
Very high double-digit depression levels of unemployment and Super Stagflation.
Public deficits and debt rises to World War 1 and 2 levels as a percentage of GDP.
The explosion in debt results in massive monetisation and helicopter money.
The economy is only at 60% of its pre-pandemic size by the end of 2021Q4.

It must be emphasised that the final L-shaped cycle scenario is an outlier for illustrative purposes.

The L economic scenario is without doubt the most shocking economic outlook I've ever considered in 30 years of economic forecasting. Everything but the kitchen sink is in there (listed below), not because it would all happen (though it could), but simply because everything in there is possible if there were to be a major second and possibly third wave of infection, if herd immunity levels are very low going into the Autumn/Winter and/or the virus mutates. It's a scenario where the  $R_0$  number moves well above 1 and a massive lockdown is then enforced, even more stringent than before. Draconian containment measures are then kept in place throughout the Autumn/Winter of 2020-21.

The economic consequences of a second (and third wave) are simply horrific. Having grown 15% (quarter-on-quarter) in 2020Q3, the economy declines -7% (quarter-on-quarter) in 2020Q4 and a further -14% (quarter-on-quarter) in 2021Q1. The chart shows a further -8% (quarter-on-quarter) contraction in 2021Q3 due to a third wave, but this is less important (in terms of whether it happens or not) because the damage will already have been done.

Under the L scenario, by the end of 2021Q1 the UK economy would be at 60% of its pre-pandemic level of output. In other words the economy will be down 40% (year-on-year). Feed these assumptions through and it means that the UK economy would contract 22% (year-on-year) in 2020 and 23% (year-on-year) in 2021. Such an economic scenario would unleash economic, social and political dislocation on a par with a devastating war – it is the Armageddon scenario.

This is 'one **L** of a recovery' for all the wrong reasons. Here are just a few of the potential outcomes from it:

- Depression levels of unemployment at 20%+.
- Transition from deflation to inflation.
- Massive public deficits above 20% of GDP, with an explosion in public debt.
- Monetisation of budget deficits.
- A surge in inflation because of monetisation.
- Financial contagion.
- Supply-demand doom loops.
- Sovereign-bank doom loops.
- Protectionism and beggar thy neighbour policies.
- Return of the euro crisis.
- North-South tensions in the EU and pressures towards disintegration.
- An epidemic of zombie companies.
- A glacial return to normal with pre-pandemic output not regained until 2030.

## Author - Graeme Leach



Graeme Leach is one of Britain's leading economists and divides his time between economic consulting, speaking and writing as CEO of his own company **macronomics**, and futures consulting as director of economics at Global Futures and Foresight (GFF).

Graeme is a former chief economist and director of Policy at the Institute of Directors (IoD), where he was also a member of the Board. Graeme represented the IoD in economic discussions with the Chancellor and 10 Downing Street.

He is a visiting professor of economic policy and a senior fellow of the Legatum Institute in London. He is also a member of the IEA Shadow Monetary Policy Committee (SMPC).

Over recent decades Graeme has made 100s of speeches on the future economic outlook, and and economic policy, in more than 25 countries across the globe.

He has undertaken 100s of live television and radio interviews on BBC News, Sky News, Radio 4's Today Programme and others. Over the past 5 years he wrote a weekly column for the City AM newspaper and numerous articles for the Daily Telegraph.

He started his career at The Henley Centre for Forecasting, where he was chief UK economist and chief international economist. He has also worked as economic adviser to the Scottish Provident Investment Group.

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