

# COVID-19 Economic Update

From Eric Lascelles' #MacroMemo, April 27–May 1, 2020

## COVID-19 effects to linger

- Overview
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### Overview

The past week brought a mix of good and bad developments on the COVID-19 file.

#### Negatives include:

- Given that even China has not managed to completely halt the spread of COVID-19, it is increasingly hard to fathom that a full return to economic normality will be possible without the achievement of i) herd immunity, ii) a vaccine or iii) a significantly enhanced safety protocol. But the first would impart an unacceptably high loss of life, the second is arguably still 12 to 18 months away and the third is not yet technically possible. As such, we may be stuck with a limited economic recovery.

- Consequently, we have further downgraded our 2020 growth outlook in response to this prospective sluggish recovery. The changes further reflect a deeper peak-to-trough GDP decline, and more sophisticated assumptions about the economy's underlying potential growth rate.

- It is a further frustration that Canada's daily infection rate has failed to decline as readily as in most other developed countries, with the result that we are forced to revise the country's peak infection date from April 3 to April 21.

#### However, these are at least partially offset by a raft of positives:

- We are now one week closer to the end of the quarantine (whenever that might be!).
- Health care systems are reportedly becoming less burdened by COVID-19, which is good news in its own right given the implication that there are fewer seriously ill people. It furthermore means there is increasingly spare capacity to handle any future surge.
- The number of new daily global deaths has declined significantly. While this is theoretically a lagging indicator and has its warts, it may now be more reliable than tracking the number of new infections.
- The European COVID-19 data has improved substantially.

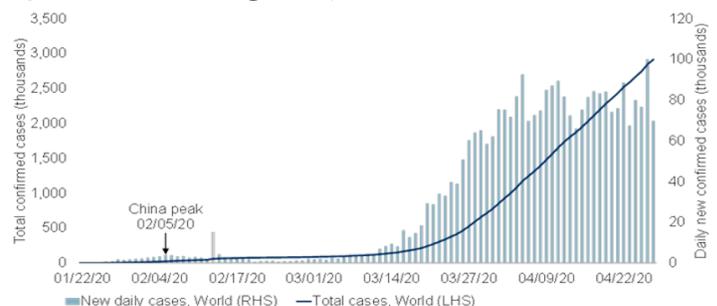
- A variety of countries and regions are beginning to restart their economies. At a minimum, this is a short-term positive for the economy (though it could backfire if regions re-open too forcefully).

- If anything, we are now feeling more nervous that our forecasts are too pessimistic than that they are too optimistic. This is a novel sentiment! That said, the main reason for our concern is that the consensus is substantially less negative than our figures. The actual evidence squares up fairly well with our forecast.

### Virus spread

There have now been nearly 3 million COVID-19 infections around the world. The latest day recorded just under 70,000 new cases, but this may be an unfairly cheery assessment as the prior day experienced a record 100,000 infections. The vagaries of testing and record-keeping continue to make for a frustratingly bumpy series. Up until two days ago we had been inclined to describe the global trend as being in slight decline, but that is now more debatable (see first chart).

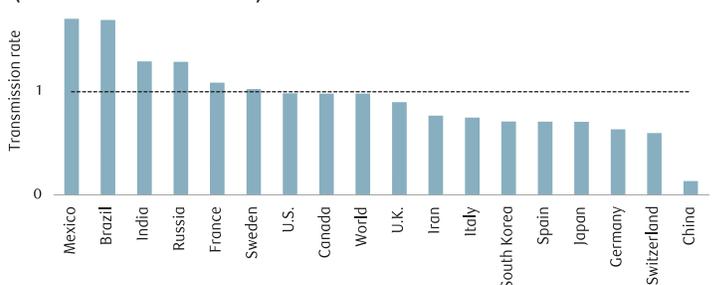
#### Spread of COVID-19 globally



Note: As of 04/27/2020. Spike on 02/13/2020 due to methodology change. Source: ECDC, Macrobond, RBC GAM

Furthermore, the global COVID-19 transmission rate remains just below the critical one threshold (see chart).

#### Transmission rate above one suggests continued growth (based on new cases)



Note: As of 04/28/2020. Transmission rate calculated as 7-day % change of underlying 5-day moving average of new daily cases. Source: ECDC, Macrobond, RBC GAM

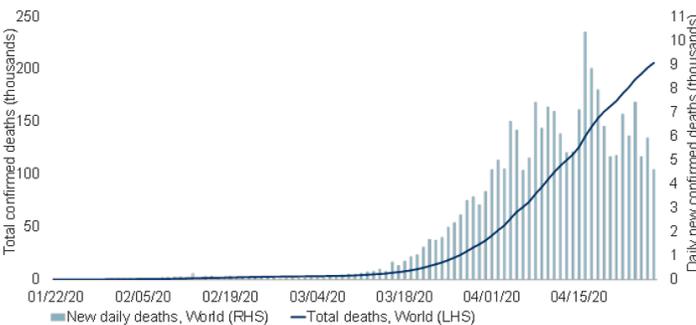
There is substantial uncertainty associated with the true number of new infections. This is due mainly to insufficient testing and the undercounting of asymptomatic cases.

The fact that testing rates are improving is by itself wonderful news, but actively distorts the evaluation of COVID-19's ebb and flow since a rising fraction of true new cases are presumably being captured with each passing day. Thus, the official numbers could show a rising caseload when in reality there may have been more prior cases that were simply never identified.

The matter of asymptomatic cases remains a controversial one. Mounting evidence from Iceland, Italy, Germany and California argues these represent a large fraction of the total cases. The latest and most eye-catching study examines the U.S. prison system and reaches the provocative conclusion that fully 96% of all cases were asymptomatic! This is far from the final word, and more research is surely needed.

Due to all of this messiness, we find ourselves increasingly focused on mortality rates rather than infection rates. These are also imperfect as there are suspicions that some COVID-19 related deaths are being classified as other illnesses. Alternately, the abnormally high non-COVID-19 fatality rate could simply reflect the delay of unrelated medical procedures, a reluctance to visit the emergency room, less exercise or more stress. Despite these warts, the mortality trend appears to be cleaner than the infection rate and makes the happy argument that COVID-19 is now several weeks past its peak and has improved substantially (see next chart).

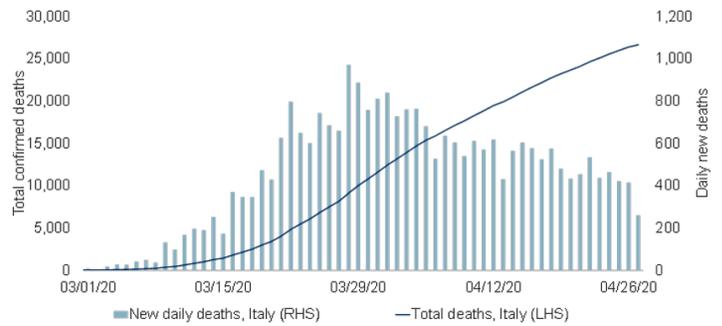
**COVID-19 deaths**



Note: As of 04/27/2020. Spike on 02/13/2020 due to methodology change. Source: ECDC, Macrobond, RBC GAM

Europe has recorded particularly impressive improvements. The daily deaths in Italy (see next chart), France, Germany and Switzerland are all substantially lower.

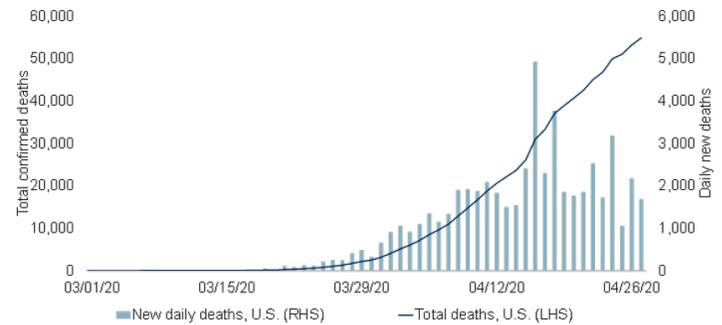
**COVID-19 deaths in Italy**



Note: As of 04/27/2020. Source: ECDC, Macrobond, RBC GAM

The U.K. has gone roughly sideways from an infection rate perspective and has recently managed a decline in fatalities. The U.S. daily infection rate has declined slightly, with the daily mortality rate declining even more substantially (see next chart).

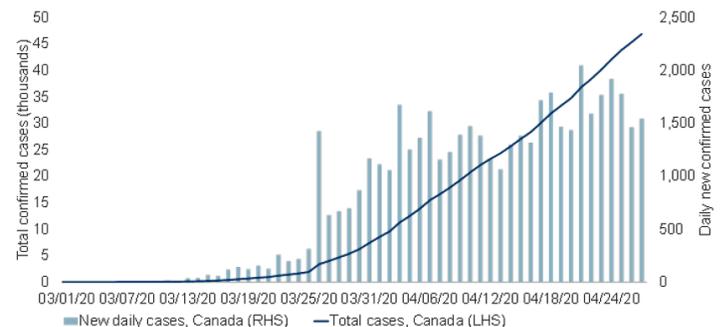
**COVID-19 deaths in the U.S.**



Note: As of 04/27/2020. Source: ECDC, Macrobond, RBC GAM

Canada has been an unexpected source of frustration, as our initial interpretation that the country had enjoyed among the fastest quarantine-to-peak transitions was ultimately proven premature. Whereas we had previously pegged Canada's daily peak infections as April 3, it now appears to have been April 21 (see chart). Canada's mortality rate also appears to have peaked unusually late.

**Spread of COVID-19 in Canada**



Note: As of 04/27/2020. Source: ECDC, Macrobond, RBC GAM

It is strange that Canada's peak occurred later than the U.S. since the quality of Canada's quarantine has been higher, on average. One speculative explanation for Canada's

poor performance is that some research finds a tentative connection between the climate and the rate of spread of COVID-19. The peak potency of the virus appears to align with temperatures just above freezing. Much of Canada idled in precisely this temperature range throughout April, whereas the U.S. and Europe mostly enjoyed warmer weather. While the situation is not perfectly analogous, it is notable that Russia has suffered a particularly bad performance over the past month as well.

**Virus in context**

One point of curiosity is that while COVID-19 is both notably infectious and potentially fatal, it is not especially unique in either regard. There are many, many diseases that are more fatal, including the likes of SARS, MERS, the Ebola virus and the Spanish Flu. Furthermore, there are quite a number of more infectious diseases. Indeed, there are even a large number of pathogens that are both more fatal and more infectious. These include smallpox, yellow fever, measles, cholera, dengue fever and tuberculosis.

How, then, is it that COVID-19 has created such an enormous problem for the world when it is hardly the “baddest” virus around? There are five reasons:

1. In many cases, the aforementioned diseases did actually kill large numbers of people. To cite a particularly prominent example, smallpox is estimated to have killed up to 300 million people in the 20th century alone, until it was eradicated in 1977.
2. Vaccines and effective treatments have now been found for most of these diseases, making them manageable. In contrast, COVID-19 lacks such treatment.
3. Societal norms have apparently changed over the last several decades, such that governments and voters are apparently no longer willing to tolerate the indiscriminate deaths associated with pandemics. The economic consequences of this virus are consequentially much greater than for an equivalent virus in the past.
4. Most diseases are not seriously contagious until after symptoms develop, making it relatively straight forward to identify ill people and isolate them. It isn’t usually necessary to quarantine the other 99% of the population. COVID-19 appears to be an exception.
5. Furthermore, most serious diseases have symptoms that are markedly different than common infections like the cold or flu. In contrast, COVID-19 resembles these less serious diseases for many and is even asymptomatic for others. It is thus hard to weed out.

**Economic developments**

We continue to review a wide range of real-time economic indicators. These make varying claims, but there are broadly two main conclusions. First, the economic decline has been

extremely steep. But, second, the decline is mostly done. Output has now settled at a depressed level, but is no longer actively deteriorating. In some cases, it is even slightly ameliorating. Highlights include:

- New York City emergency room traffic is down.
- Air travel is up slightly relative to a week ago.
- U.S. movie theatre sales are still extremely low, but rebounding slightly.
- U.S. newspaper sentiment is becoming slightly less negative.
- U.S. raw steel production may be down by a third, but has staged a slight rebound in the latest week.
- Mortgage applications and loads per truck have stabilized at low levels.

**Labour market:**

U.S. weekly jobless claims have fallen to 4.4 million initial claims in the latest week (see chart). This is still extraordinarily high, but represents a further improvement from the 5.2 million figure the week before and 6 million-plus in prior weeks. There are now more than 26 million new claims since the onset of COVID-19 quarantining. Should all of this show up in the unemployment rate, it is consistent with an unemployment rate of roughly 20%, with further increases presumably to come in future weeks.

**U.S. jobless claims skyrocket as cities and states go into lockdown**



Note: As of the week ending 04/18/2020. Shaded area represents recession. Source: DOL, Haver Analytics, RBC GAM

In Canada, there have now been 6.7 million applicants for the country’s primary worker assistance program, representing a shocking one-third of the country’s labour force. The analysis is imperfect since some people are eligible for the program while still working limited hours, but it could well translate into an unemployment rate of 20%, 30% or even higher.

**Consumer spending:**

A simple thought experiment is useful. It involves three sets of assumptions:

1. Assume that 15% of U.S. workers have lost their jobs and that this group reduces their spending by 40% (a large

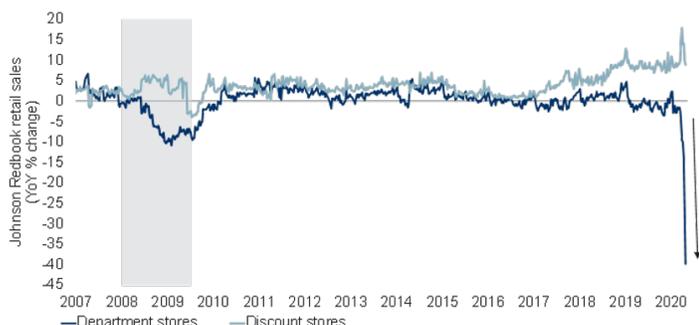
fraction of consumer spending is non-discretionary and so it is hard to cut by much more than this on short notice).

2. A further 30% of Americans have suffered some loss of income and cut their spending by 25%.
3. The remaining 55% of Americans enjoy an unaltered labour income, but risk aversion and store closings prompt them to spend 10% less.

Combined, these assumptions are consistent with a 19% decline in consumer spending. This is a useful figure to keep in mind, though it is hardly the final word on the subject. On the one hand, we fear it may be excessively pessimistic to the extent this simple analysis has largely ignored retirees with fixed incomes. It also neglects the fact that the sectors suffering the steepest job losses tend to pay among the lowest wages (so less of an impact on spending).

On the other hand, a variety of credit card and debit card data sources argue for an even steeper decline. Weekly data on U.S. department and chain store sales show a 40% year-over-year decline though discount stores report a substantial 9% increase in sales (see next chart).

### U.S. retail sales plunged after lockdown



Note: As of the week of 04/18/2020. Shaded area represents recession. Source: Redbook Research, Haver Analytics, RBC GAM

### Updated forecasts

After three weeks of stability, we have again revised our growth forecasts downward. Whereas the U.S. 2020 GDP forecast was previously -7.7%, it has now migrated down to -10.6% (see table).

### COVID-19 scenarios: 2020 U.S. real GDP forecast

Annual average % change		Duration		
		Short	Medium	Long
Depth	Shallow -10% trough	-3.1	-3.9	-6.5
	Medium -22.5% trough	-8.8	-10.6	-16.5
	Deep -40% trough	-16.9	-20.1	-30.5

Note: As at 04/24/2020. Assumes rapid decline into trough versus much lengthier recovery period. Source: RBC GAM

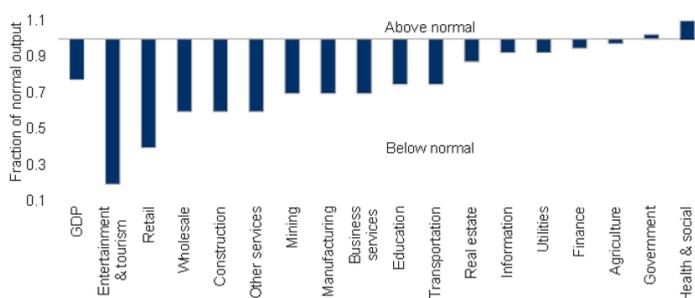
This represents a substantially below-consensus number. For reference, the Bloomberg consensus for U.S. 2020 GDP is merely -3.5%. However, note that the range of underlying estimates is massive, spanning -10.8% to +1.7%.

The downward revision in our forecast is rooted in four new assumptions:

### 1) Deeper peak-to-trough decline

First, we revisited our sector-based peak-to-trough output assumptions, arriving at a more accurate (though still highly speculative!) medium depth scenario estimate (see chart).

### Medium scenario: U.S. output levels during and post COVID-19 outbreak



Note: As of 04/24/2020. Bars show the peak-to-trough deviation from normal output for each U.S. sector in 2020 and 2021 in a medium-depth and medium-duration scenario. Pre-COVID output level = 1. Source: Haver Analytics, RBC GAM

Major sector-based refinements include revising down the extent of the estimated government sector boost since the bulk of stimulus programs will not be counted as additional government output but instead merely as financial transfers to the household sector; notable downward revisions were also made to manufacturing, utilities and entertainment & tourism. Conversely, we now assume the real estate sector is more resilient than before given the large fraction of the sector that is rooted in rent and imputed rent payments rather than simply real-estate transactions.

The new sector assumptions argue for a 22.5% peak-to-trough decline in U.S. output, worse than the prior -20% assumption. The alternate shallow and deep scenarios remain unchanged at -10% and -40%.

Providing perspective on this 22.5% peak-to-trough decline, we note that the OECD is working with a -20% to -25% assumption for the developed world. The French statistical institute and the U.K. government assumes a 35% decline for their respective nations, and the Bank of Canada assumes a -22.5% midpoint for Canada. A new Fed survey gauging the effect of COVID-19 on business sales points to a whopping 41% decline. Thus, while our number is undeniably huge and worse than the private-sector consensus, it is arguably in line with a variety of other official estimates.

### 2) More gradual recovery

Second -- and as we had hinted over the past several weeks -- our thinking has increasingly pivoted toward a slower economic recovery once quarantine measures begin to be lifted (see graphic).

## Sluggish economic rebound

Three reasons the economic recovery should be gradual:	
1	<b>Incremental re-opening</b> <ul style="list-style-type: none"> <li>Government plans incremental restart</li> <li>Limited by disease transmission</li> <li>Cannot fully re-open until one of the following:                             <ul style="list-style-type: none"> <li>Mass testing &amp; tracing</li> <li>Effective therapeutic</li> <li>Vaccine</li> <li>Herd immunity</li> </ul> </li> </ul>
2	<b>Limited demand</b> <ul style="list-style-type: none"> <li>Diminished income</li> <li>Diminished wealth</li> <li>Limited pent-up demand (virus hit services)</li> <li>Generalized risk aversion</li> <li>Specific aversion to social activities</li> </ul>
3	<b>Limited supply</b> <ul style="list-style-type: none"> <li>Supply chain issues</li> <li>Re-hiring workers could be challenging given generous government benefits</li> </ul>

As of April 2020. Source: RBC GAM

As discussed in more detail in a later section, this normalization of social distancing rules is likely to be incremental and ultimately incomplete until substantial technical leaps are made either in terms of tracking and tracing the virus or in the development of a vaccine.

Simultaneously, we suspect economic demand will recover only fitfully even as government regulations lighten given the damage done to income and wealth in the interim, generalized risk aversion after a traumatic event, specific aversion to social activities and limited pent-up demand. There should be less pent-up demand than usual after this recession because the service sector has been disproportionately hit by social distancing rules and people simply won't need to get two haircuts once the quarantine is done – one will suffice. We note that restaurant demand fell substantially before government restrictions were imposed, suggesting that demand for such services is unlikely to fully rebound when those rules are lifted.

Finally, economic supply may also struggle to smoothly revive. While this should be the least serious of the three drags, some supply chain complications are inevitable and generous government support could make it harder to lure laid off workers back to their old jobs.

Specifically, although we now allow for a partial resumption of activity in May (rather than the prior June), our medium duration scenario now assumes that only half of the output gap is closed by September 2020 (versus 60% previously), and that the economy doesn't reclaim its prior peak level of output until February 2022 as opposed to September 2021. Finally, the economy does not return to its full potential until the very end of 2022.

For all of this pessimism, it is useful to note that this still represents an extremely rapid rebound by the standards of other recessions. For instance, this trajectory has the economy reclaiming its prior high in just under two years, whereas it took 3.5 years after the global financial crisis. Similarly, the economy returns to its potential in fewer than three years, whereas this took 9 years after the global financial crisis. We think these differences make sense given the artificial nature of the COVID-19 decline.

## 3) Potential growth rate

Third, we have enhanced our forecast by recognizing that the underlying rate of potential economic growth invariably slows during recessions as innovation diminishes. Because our forecasts are built as a fraction of the economy's full potential, a slower rate of potential growth maps onto a slower rate of actual growth. Depending on the country, we assume a 0.5% to 1.0% deceleration in productivity growth relative to normal in 2020 and a lesser hit in 2021.

## 4) Updated stimulus estimates

Finally, our updated forecast incorporates the latest stimulus announcements. Policy support is proving challenging to size for two reasons. First, no amount of stimulus can help an economy that is effectively closed, making the timing of the economic boost subject to more debate than usual. Second, refundable loans and loan guarantees are harder to map onto GDP than more conventional transfers and tax cuts.

## International implications

All four of these new considerations were also mapped onto our international growth forecasts, resulting in a further moderate downgrade to the 2020 growth outlook for those countries as well (see table).

### Global growth forecast 2020: Medium-depth/medium-length scenario

U.S.	-10.6
Canada	-12.7
Eurozone	-15.0
Germany	-12.4
France	-15.7
Italy	-18.1
Spain	-17.9
U.K.	-15.3
Japan	-10.3
China	-0.1
Developed	-12.4
Emerging	-0.8
Global	-6.3

As at 04/25/2020. Source: RBC GAM

## Data ahead

The U.S. Federal Reserve renders its next decision this week. It is likely to keep its policy position mostly unchanged. It has already delivered extremely bold measures with little regard for its fixed schedule of meetings. Furthermore, with financial markets demonstrating improving sentiment in recent weeks, it is not the ideal time to deploy the remaining ammunition. The Fed may well eventually transition to a formal yield-curve control mechanism in which it sets explicit ceilings for bond yields, but that seems unlikely to happen this week at a time when the bond market is behaving well.

Personal income and spending numbers for March will soon be released in the U.S. These will be very interesting given that they should capture the beginning of the COVID-19

quarantine. We suspect the market consensus for a 1.5% decline in income and a 5.0% projected drop in spending are likely too optimistic.

U.S. first-quarter GDP will similarly be released this week. We look for a notably worse outcome than the consensus forecast for a 3.8% annualized GDP decline. It would not be a stretch for a figure twice that bad or worse, in our view.

### **Herd immunity**

Let us turn to a popular subject these days: how to get the economy and life back to normal. We see three different options: herd immunity, a vaccine or advanced technical measures.

Let us start with the pursuit of herd immunity. The initial allure of getting to a point where the virus can no longer spread freely because a sufficient number of people have already been infected is that it doesn't require any heroic discoveries or special technologies, and it would allow the economy to fully return to normal once achieved. Indeed, this is how a great many past pandemics were ultimately quelled, including the Spanish Flu.

However, before we leap aboard the herd immunity train, let us recognize it requires a significant fraction of the world's population to be infected, and many to die as a result of this.

The question is just how damaging this might be. Unfortunately, the characteristics of COVID-19 make it a fairly unattractive candidate for this approach. Because the transmission rate is quite high, you would need something like 70% of the world's population to contract the disease. For context, the Spanish Flu achieved herd immunity at around 30% of the world's population.

Furthermore, assuming a 0.75% fatality rate, 1.8 million Americans and 200,000 Canadians would die. This is not an attractive thought.

With these numbers in hand, we then wondered just how unprecedented having this many infectious deaths would be in the historical context. After all, there were more infectious deaths in the past. How far back would one have to go to regard this number as the "normal" casualties for a year? We had hoped the answer might merely be something like 1970 or 1960, but alas the answer is 1910. Even if herd immunity were achieved over two years, you would have to go back to the 1930s to find an equivalent year with that many infectious deaths. This is barely within the bounds of anyone's living experience.

For herd immunity to work, one also needs to assume that lasting immunity can be obtained. This is not an unreasonable assumption, but it is far from assured as discussed a little later. As a result, while herd immunity could well prove the solution to COVID-19 if all else fails, it certainly won't be the first choice.

### **Vaccine/therapeutic**

A far more attractive proposition is the development of a vaccine or powerful therapeutic that would stop COVID-19 in its tracks and allow an immediate return to normal life without widespread suffering.

However, there is a timing problem. Notwithstanding one group of Oxford researchers who propose a novel solution by the fall -- and who are not given much of a chance of succeeding by the experts -- a 12 to 18-month horizon is commonly cited for the development of an effective vaccine.

And note that this represents an optimistic scenario. Historically, no vaccine has ever taken less than four years to get to market. For that matter, no variety of coronavirus has ever had a vaccine successfully developed for it. It will also take a not inconsiderable amount of time to produce billions of copies of any vaccine for the world.

Granted, many therapeutics are also under development. These are other drugs that might help limit the symptoms of COVID-19 or make it harder to transmit, but don't strictly confer antibodies. These can be developed more quickly, in theory, with many promising candidates already identified. But some of the most talked about early candidates -- hydroxychloroquine and remdesivir -- have been hyped to an extent that may prove difficult to justify. Again, more testing is needed.

But the main message is that a silver bullet -- a vaccine that instantly eradicates COVID-19 -- is unlikely for 2020. Thus, other options need to be pursued in the meantime.

### **Advanced technical measures**

A key idea while waiting for a vaccine is to use advanced technical measures to prevent the spread of COVID-19 while allowing the economy to fully (or nearly fully) re-open.

This would require some combination of widespread testing for the disease, extensive tracing of infections, antibody tests to determine immunity, possibly immunity passports, universal mask-wearing in public, and so on. South Korea provides an example of a country that has managed to minimize economic damage while controlling the virus using many of these techniques.

This may yet prove possible, but there are several technical issues:

- Testing would ideally be significantly more extensive than currently. Whereas the best countries have tested 28 per 1,000 people, one science-based proposal envisions 8% of the population having to be tested per day (80 per 1,000 -- every day, not just on time since the start of March). Thus, testing needs to ramp up by another 10 to 100 times to become sufficiently comprehensive to permit a return to normal life.

- Tracing has worked in places like China (with enormous human resources) and South Korea (with a limited outbreak), but would be logistically very difficult in countries such as the U.S. with nearly a million cases. Computer software has been developed in Singapore and Australia to calculate proximity via cell phone location, and another major effort is underway via a Google-Apple partnership. It is not clear whether these will work, or if instead more traditional and laborious techniques will prove necessary.

- Some antibody tests already exist and others are being developed, but their precision varies widely, with some reportedly as low as 20%. This is clearly not good enough. It is also apparently possible that someone with antibodies might still be infectious. For that matter, having the disease is no guarantee of immunity since a subset of those that recover don't appear to possess any antibodies. The World Health Organization further warns against immunity passports since it is unclear how long immunity will last.

A mix of technical solutions are nevertheless probably the best option for fully restarting the economy if 2020 is the goal, but significantly better testing and tracing are required, at a minimum. As yet, it is unclear whether China has fully pulled off its economic revival, or whether it is instead stuck in the category that follows.

### Gradual restart instead

Instead, what is most probable as we wait on the three aforementioned resolutions – herd immunity, a vaccine or advanced technical measures – is that the economic restart can be only partial.

The following table lays out some of the key criteria for initiating the exit strategy, and provides an approximate sequence for reviving economic output.

#### Exit strategy and sequence

<p><b>Exit criteria:</b></p> <ul style="list-style-type: none"> <li>• Reduced new virus count</li> <li>• Spare medical capacity</li> <li>• Enhanced testing &amp; tracing</li> <li>• Enhanced protective measures (masks, altered workspaces, transit, store procedures)</li> </ul>
<p><b>Restart sequence:</b></p> <ul style="list-style-type: none"> <li>• Young, healthy and immune workers can restart before old and sick</li> <li>• Jobs that can be done from home</li> <li>• Jobs with low interpersonal contact</li> <li>• Sectors that are essential to allowing a broader restart of the economy</li> <li>• Sectors with a high economic importance</li> <li>• Schools/daycares to let parents work outside the home</li> <li>• Social activities come later (restaurants, theatre, recreational sports)</li> <li>• Mass gatherings must wait for herd immunity or vaccine</li> </ul>
<p><b>Criticism:</b></p> <ul style="list-style-type: none"> <li>• Economy is extremely complex – most sectors provide important inputs to other sectors</li> </ul>

As of April 2020. Source: RBC GAM

In our view, it is unlikely that mass gatherings and some of the other more advanced steps will be possible until one of the three aforementioned breakthroughs is achieved. Furthermore, some social distancing will continue to be required, including:

- potentially reducing the density of offices
- reducing physical meetings
- staggering breaks and start/finish times
- limiting the usage of mass transit, and so on.

To the extent that upwards of 85% of fatalities have originated from places like nursing homes, it is very likely that the old and infirm will have to remain particularly protected.

Meanwhile, one issue with a partial restart is that policymakers may be underestimating the complexity of the economy. What constitutes an essential industry is highly unclear. To use a simple thought experiment, everyone agrees that hospitals are essential. By extension, doesn't that mean that everything hospitals use is essential? That would include not just medicine and medical equipment, but paper, pens, computers, furnishings, the legal, accounting and financial support provides to the health care sector, and so on. And to produce those items, yet more sectors are needed. In the end, other than a few truly discretionary consumer-facing sectors such as restaurants, tourism and entertainment, it is hard to think of a part of the economy that isn't directly and unavoidably required for the officially designated essential sectors to function for any sustained period of time.

### Start your engines

In practice, quite a number of countries and regions are now beginning to restart their economies. We may soon have useful real-time data.

European countries continue to take incremental steps, with Italy planning to begin easing its own measures on May 4.

U.S. states like Georgia and Colorado have been particularly eager to restart, and are beginning the process.

Three Canadian provinces – Saskatchewan, New Brunswick and Prince Edward Island – are similarly inching forward. Quebec, the most adversely affected of Canada's provinces, now plans to restart its schools on May 11.

### Mind-bending oil market

As last week's #MacroMemo went to press, something truly unprecedented was happening in the oil market. While oil prices have been incredibly depressed for weeks, the price of West Texas oil briefly fell into negative territory on April 20. Technically, oil producers (or, more specifically, the holders of certain futures contracts) had to pay to get rid of their oil.

Why didn't people arbitrage this away by buying more oil while it was free? Because demand is incredibly depressed and inelastic in the short run, supply is too high and inelastic in the short run, inventories are

bloated such that there is almost nowhere to put it, and the raw product needs to go through refiners before it can actually be consumed.

The price of oil is no longer negative – that was an extreme moment brought on in significant part by expiring futures contracts – but it remains very low, at just \$12 per barrel. We expect the oil market to remain very challenging over the next few years.

Demand has fallen by roughly 30% in response to COVID-19, but OPEC cuts only managed to reduce supply by around 10%. As a result of this, oil inventories are now within a few weeks of reaching maximum capacity. After that, there literally won't be anywhere to put the extra oil.

Some of the supply-demand mismatch can be resolved organically as new drilling is halted and existing wells naturally decline over time. But that process isn't nearly fast enough to resolve the supply-demand mismatch in a matter of weeks.

In turn, significant further oil supply will have to be shut-in, a painful process. The decision-making process isn't quite as straight-forward as determining which producers have the highest cost of oil. Key determinants include the operating cost of oil extraction (not the all-in cost), the amount each producer is leveraged, and the cost of halting production. This last variable is quite important, as it is far from free

to stop extracting oil, and in some cases – such as with Canada's oil sands – stopping can even diminish the future supply once a well is restarted.

All of this helps to explain the reluctance for oil production to stop even as prices flirt with negative numbers. Nevertheless, a further 20% decline in the oil supply is needed in short order and so oil prices are likely to remain exceedingly low.

### Long-term COVID-19 musings

Since the onset of COVID-19, we have mused about a variety of possible long-term side effects of COVID-19. Here they are compiled into a single list (see graphic).

#### Exit strategy and sequence

General	Economy and markets
Much will prove only transitory (Spanish flu, 9/11)	More skittish about future viral outbreaks
Populism – Unclear more vs less?	More public debt / default risk
Low density > high density	More private debt / default risk
Human life valued more highly than in past	Ultra-low interest rates to persist
More focus on low probability/high impact risks	Hazier distinction between monetary & fiscal policy
Geopolitics get trickier, EU challenged?	Permanent expansion of government? Maybe, but not convinced
Environment – less focus but better trajectory?	Anti-globalization – less immigration / more onshoring
	Accelerating automation
	Loss of human capital from school & business closure (small)
	Innovation – helped by new patterns of demand / hurt by remote work?
	Online > Brick and mortar
	Big business > small business
	Less anti-trust pressure, fewer data privacy limitations
	Lower long-term return on investment? Would require high death rate

As of April 2020. Source: RBC GAM

– With contributions from Vivien Lee and Graeme Saunders



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