Deutsche Bank

Life After COVID
The Gradual Path to Restoring Public Health, Markets & the Economy

April 2020
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Restoring Public Health
“What’s true of all the evils in the world is true of plague as well. It helps men to rise above themselves.”

Albert Camus, French-Algerian philosopher and Nobel Prize-winning author (1913-1960)
Restoring Public Health

**Transmission: Once in a Century**

Suppression: Virus Response Matters Most
Lockdown: Unprecedented
Exit Risk: Resurgence & Return
Co-Existence: Testing & Tracing Infrastructure
Causes of Death in the United States

With a projected 75-100k deaths expected, COVID-19 is not likely to become a top 5 driver of US mortalities in 2020. However, in the absence of strict social distancing measures, it is the uniquely high transmission and hospitalization rates of COVID-19 that pose the greatest threats to public health, the economy and markets.

Source: CDC, World Bank, U.S. Census, Imperial College London, POLITICO staff reports. *Latest data available

2,813,503 total deaths, 2017
Once in a Century Transmission

COVID-19 has now spread to more than 3 million people in over 180 countries and all 50 US states, a rate of infection that has not been seen in more than a century. While it took 3 months for the virus to spread to 500 thousand people globally, it only took 8 days for cases to double to 1 million and another 13 days to reach 2 and 3 million, respectively.

The Importance of Virus Suppression

From the narrow lens of economic analysis, the true impact of COVID-19 comes from its extraordinarily high transmission, the highest in a century, even among young people. In our view, virus suppression and the restoration of public health therefore becomes aligned with favorable economic outcomes. While we need to re-open the economy, and learn to coexist with the virus, it is our view that simply “ring-fencing the elderly” and going “back to work” without “virus suppression” will lead to unfavorable economic outcomes.

1. COVID-19 has the highest transmission rate of any virus in over a century (180 countries in 3 months).

2. Much higher hospitalization and ICU rates than seasonal flu, including for younger adults.

3. Without social distancing, COVID-19 transmission can completely debilitating major healthcare and hospital systems within weeks.

4. Regardless of Government re-open dates, people will sharply limit discretionary activity and spending until they feel “safe” (consumer is 70% of US GDP, and >50% of that spending is discretionary).

5. Viruses are not stagnant, but mutate, and sometimes strengthen, as they adapt to the human condition (i.e., 1918 experience).

6. High transmission in Northern Hemisphere, increases transmission to Southern Hemisphere now entering their winter, which then increases probability of return back to the North in the Fall.

7. “Back to work” during high transmission creates formidable litigation, insurance and employee management challenges for public and private institutions.

8. High percentage of US and global population live in urban-suburban settings.
Most Impacted Countries

The US has just over 6x South Korea’s population, but its peak new daily confirmed case count was more than 40x higher (36,000 vs 850). While the US accounts for 4% of the global population, it accounts for over 25% of global COVID fatalities.

<table>
<thead>
<tr>
<th>Top 20 countries on confirmed cases per 1 million people</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Luxembourg</td>
</tr>
<tr>
<td>2. Spain</td>
</tr>
<tr>
<td>3. Qatar</td>
</tr>
<tr>
<td>4. Belgium</td>
</tr>
<tr>
<td>5. Ireland</td>
</tr>
<tr>
<td>6. Switzerland</td>
</tr>
<tr>
<td>7. Italy</td>
</tr>
<tr>
<td>8. United States</td>
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<tr>
<td>9. Singapore</td>
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<tr>
<td>10. France</td>
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<tr>
<td>11. Portugal</td>
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<tr>
<td>12. United Kingdom</td>
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<tr>
<td>13. Netherlands</td>
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<td>14. Sweden</td>
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<tr>
<td>15. Germany</td>
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<tr>
<td>16. Bahrain</td>
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<tr>
<td>17. Israel</td>
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<tr>
<td>18. Austria</td>
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<tr>
<td>19. Denmark</td>
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<tr>
<td>20. Panama</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top 20 countries on confirmed deaths per 1 million people</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Belgium</td>
</tr>
<tr>
<td>2. Spain</td>
</tr>
<tr>
<td>3. Italy</td>
</tr>
<tr>
<td>4. France</td>
</tr>
<tr>
<td>5. United Kingdom</td>
</tr>
<tr>
<td>6. Netherlands</td>
</tr>
<tr>
<td>7. Sweden</td>
</tr>
<tr>
<td>8. Ireland</td>
</tr>
<tr>
<td>9. Switzerland</td>
</tr>
<tr>
<td>10. United States</td>
</tr>
<tr>
<td>11. Luxembourg</td>
</tr>
<tr>
<td>12. Portugal</td>
</tr>
<tr>
<td>13. Denmark</td>
</tr>
<tr>
<td>14. Germany</td>
</tr>
<tr>
<td>15. Canada</td>
</tr>
<tr>
<td>16. Iran</td>
</tr>
<tr>
<td>17. Austria</td>
</tr>
<tr>
<td>18. Slovenia</td>
</tr>
<tr>
<td>19. Panama</td>
</tr>
<tr>
<td>20. Ecuador</td>
</tr>
</tbody>
</table>

Flattening, then Bending, the Curve

While the US has made much progress on “flattening” the curve, our more relaxed version of social distancing makes the effort of “bending” the curve closer to zero a slower process.

Source: (1-2) Johns Hopkins Coronavirus COVID-19 Global Cases Tracker. Data as of April 28, 2020. Chart shows only first 70 days after first day of over 100 reported cases, end label is data as of April 28, 2020. Axis is on logarithmic scale.
Where the Coronavirus Has Peaked?

**Source:** fivethirtyeight.com, "Coronavirus Cases Are Still Growing In Many U.S. States"

<table>
<thead>
<tr>
<th>States where the estimated percentage of positive COVID-19 tests:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Met or Tied a New High, April 15-22</strong></td>
</tr>
<tr>
<td><strong>Peaked, April 9-15</strong></td>
</tr>
<tr>
<td><strong>Peaked, April 2-8</strong></td>
</tr>
<tr>
<td><strong>Peaked, March 25 - April 1</strong></td>
</tr>
</tbody>
</table>

- **WA**
- **ID**
- **MT**
- **ND**
- **MN**
- **IL**
- **MI**
- **NY**
- **MA**
- **OR**
- **NV**
- **WY**
- **SD**
- **IA**
- **IN**
- **OH**
- **PA**
- **NJ**
- **CT**
- **RI**
- **CA**
- **UT**
- **CO**
- **NE**
- **MO**
- **KY**
- **WV**
- **VA**
- **MD**
- **DE**
- **AZ**
- **NM**
- **KS**
- **AR**
- **TN**
- **NC**
- **SC**
- **DC**
- **OK**
- **LA**
- **MS**
- **AL**
- **GA**
- **TX**
- **FL**
- **HI**
- **AK**
- **VT**
- **NH**
- **WI**
- **ME**
Where the Coronavirus May Not Have Peaked?

While numerous US states are past peak transmission (i.e., NY, CA), rising positive test results suggest that nearly half of all US states (representing over 150 million people) are still at or near peak transmission levels. This has raised concerns about the exit risks associated with the timing and pace of re-opening.

Estimated share of positive tests for 7 day period ending:

<table>
<thead>
<tr>
<th>State</th>
<th>March 25</th>
<th>April 1</th>
<th>April 8</th>
<th>April 15</th>
<th>April 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>5%</td>
<td>7%</td>
<td>10%</td>
<td>10%</td>
<td>13%</td>
</tr>
<tr>
<td>Arkansas</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Colorado</td>
<td>11</td>
<td>20</td>
<td>23</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Connecticut</td>
<td>11</td>
<td>25</td>
<td>35</td>
<td>35</td>
<td>39</td>
</tr>
<tr>
<td>D.C.</td>
<td>7</td>
<td>14</td>
<td>24</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>Delaware</td>
<td>3</td>
<td>7</td>
<td>16</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Illinois</td>
<td>12</td>
<td>21</td>
<td>24</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Iowa</td>
<td>3</td>
<td>8</td>
<td>10</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Kansas</td>
<td>4</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Kentucky</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Maryland</td>
<td>4</td>
<td>11</td>
<td>20</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>7</td>
<td>20</td>
<td>24</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>Minnesota</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Mississippi</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Missouri</td>
<td>3</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Nebraska</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>18</td>
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<tr>
<td>New Jersey</td>
<td>19</td>
<td>46</td>
<td>55</td>
<td>53</td>
<td>54</td>
</tr>
<tr>
<td>New Mexico</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>7</td>
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<tr>
<td>North Carolina</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>North Dakota</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Ohio</td>
<td>4</td>
<td>10</td>
<td>13</td>
<td>13</td>
<td>24</td>
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<tr>
<td>Pennsylvania</td>
<td>5</td>
<td>15</td>
<td>25</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>6</td>
<td>11</td>
<td>11</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Virginia</td>
<td>6</td>
<td>12</td>
<td>17</td>
<td>19</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: fivethirtyeight.com, “Coronavirus Cases Are Still Growing In Many U.S. States”
Restoring Public Health

Transmission: Once in a Century

**Suppression: Virus Response Matters Most**

Lockdown: Unprecedented

Exit Risk: Resurgence & Return

Co-Existence: Testing & Tracing Infrastructure
# Summary Progress of Virus Suppression

After appearing to reach peak confirmed cases in early April (as NY peaked), the US returned higher to new peaks just days ago, with daily confirmed case counts remaining stubbornly high above the 20K level for much of the month.

<table>
<thead>
<tr>
<th>Country</th>
<th>Peak date for daily new confirmed cases</th>
<th># of peak daily new confirmed cases</th>
<th># of current daily new confirmed cases</th>
<th># of days since peak daily new cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asia-Pacific</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>Feb 13</td>
<td>15,100</td>
<td>0</td>
<td>76</td>
</tr>
<tr>
<td>South Korea</td>
<td>Mar 3</td>
<td>851</td>
<td>14</td>
<td>56</td>
</tr>
<tr>
<td>Australia</td>
<td>Mar 28</td>
<td>497</td>
<td>7</td>
<td>31</td>
</tr>
<tr>
<td>Japan</td>
<td>Apr 17</td>
<td>1,200</td>
<td>712</td>
<td>11</td>
</tr>
<tr>
<td>India</td>
<td>Apr 19</td>
<td>1,900</td>
<td>1,600</td>
<td>9</td>
</tr>
<tr>
<td>Singapore</td>
<td>Apr 20</td>
<td>1,400</td>
<td>799</td>
<td>8</td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>Mar 21</td>
<td>6,600</td>
<td>1,700</td>
<td>38</td>
</tr>
<tr>
<td>Spain</td>
<td>Mar 25</td>
<td>9,600</td>
<td>2,800</td>
<td>34</td>
</tr>
<tr>
<td>Austria</td>
<td>Mar 26</td>
<td>1,300</td>
<td>49</td>
<td>33</td>
</tr>
<tr>
<td>Germany</td>
<td>Apr 2</td>
<td>6,900</td>
<td>988</td>
<td>26</td>
</tr>
<tr>
<td>UK</td>
<td>Apr 10</td>
<td>8,700</td>
<td>4,300</td>
<td>18</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Apr 11</td>
<td>1,300</td>
<td>400</td>
<td>17</td>
</tr>
<tr>
<td>France</td>
<td>Apr 12</td>
<td>26,800</td>
<td>3,700</td>
<td>16</td>
</tr>
<tr>
<td>Belgium</td>
<td>Apr 15</td>
<td>2,500</td>
<td>553</td>
<td>13</td>
</tr>
<tr>
<td><strong>NA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>Apr 5</td>
<td>2,800</td>
<td>1,600</td>
<td>23</td>
</tr>
<tr>
<td>US</td>
<td>Apr 24</td>
<td>36,200</td>
<td>22,400</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Johns Hopkins Coronavirus COVID-19 Global Cases Tracker. Data as of April 28, 2020. Day 0 for number of days to peak daily new cases is the first day each country reached 100 cumulative cases.
Progress of Virus Suppression

# of daily new cases

- **China**
  - # of days since peak: 76 days
  - Source: (1-6) Johns Hopkins Coronavirus COVID-19 Global Cases Tracker. Data as of April 28, 2020. Day 0 for number of days to peak daily new cases is the first day each country reached 100 cumulative cases.

- **South Korea**
  - # of days since peak: 56 days

- **Australia**
  - # of days since peak: 31 days

- **Japan**
  - # of days since peak: 11 days

- **India**
  - # of days since peak: 9 days

- **Singapore**
  - # of days since peak: 8 days

Data as of April 28, 2020.
Progress of Virus Suppression

# of daily new cases

**Italy**
- # of days since peak: 38 days

**Spain**
- # of days since peak: 34 days

**Germany**
- # of days since peak: 26 days

**UK**
- # of days since peak: 18 days

**Netherlands**
- # of days since peak: 17 days

**France**
- # of days since peak: 16 days

Source: (1-6) Johns Hopkins Coronavirus COVID-19 Global Cases Tracker. Data as of April 27, 2020. Day 0 for number of days to peak daily new cases is the first day each country reached 100 cumulative cases.
Progress of Virus Suppression

# of daily new cases

Source: (1-2) Johns Hopkins Coronavirus COVID-19 Global Cases Tracker. Data as of April 28, 2020. Day 0 for number of days to peak daily new cases is the first day each country reached 100 cumulative cases.
Restoring Public Health

Transmission: Once in a Century
Suppression: Virus Response Matters Most

**Lockdown: Unprecedented**
Exit Risk: Resurgence & Return
Co-Existence: Testing & Tracing Infrastructure
Global Economy on Lockdown

COVID-19 Government Response Stringency Index

Developed by researchers at the Blavatnik School of Government and Oxford University, the Stringency Index collects publicly available information on indicators of government response to COVID-19. Indicators range from school closures and travel bans to fiscal and monetary response measures. The number and strictness of indicators are recorded and aggregated in the stringency index. The index should not be interpreted as “scoring” the appropriateness or effectiveness of a country’s response.

Source: Financial Times. Coronavirus tracked: the latest figures as the pandemic spreads. All data used for this map provided by the Blavatnik School of Government, University of Oxford. Data as of April 8.
Unprecedented US Containment Measures

Source: Financial Times. Coronavirus tracked: the latest figures as the pandemic spreads. John Hopkins University, CSSE; Worldometers; FT research
*Includes ‘shelter in place’ orders. **Includes Kentucky’s ‘healthy at home’ order.
Restoring Public Health

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Americans Concerned About “Early Exit”

A recent national survey by Pew Research finds that while a majority of Americans favor a gradual phase-in, a growing “loud minority” are pushing for a re-open sooner than later. The risk of virus resurgence and return therefore becomes a prominent one for markets.

% who say…

**Greater concern is that state governments will lift restrictions on public activity…**

| 32% | Not quickly enough | 66% | Too quickly |

**When it comes to the problems the U.S. is facing from the outbreak the…**

| 26% | Worst is behind us | 73% | Worst is still to come… |

Resurgence & Exit Risk

After early success on virus suppression, Japan and Singapore are both battling “2nd waves” of virus resurgence. In Japan, a national state of emergency has since been declared in the world’s 3rd largest economy. And Singapore, a city-state with just 5.7 million people, now has the highest daily case count in Southeast Asia. China is also on-guard for a 2nd wave of new cases, though data transparency remains low.

Daily increase in new cases

Source: (1-2) Johns Hopkins Coronavirus COVID-19 Global Cases Tracker. Data as of April 28, 2020. Day 0 for number of days to peak daily new cases is the first day each country reached 100 cumulative cases.
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Exit Risk: Resurgence & Return

Co-Existence: Testing & Tracing Infrastructure
Scalable Testing Critical to Re-Opening

The United States lags well behind other major countries in arguably the single most important part of the virus response - early, vigilant and broad-based testing. While the reasons are numerous, coordination challenges at multiple levels (federal, state, local, CDC, FDA and HHS), and a failure to prioritize this need sooner, contributed to the current shortfall. This, in turn, will have implications for the phased-in re-opening of the economy.

# of COVID-19 tests performed per million of the population

<table>
<thead>
<tr>
<th>Country</th>
<th>Tests per Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portugal</td>
<td>35,321</td>
</tr>
<tr>
<td>Norway</td>
<td>30,611</td>
</tr>
<tr>
<td>Italy</td>
<td>30,547</td>
</tr>
<tr>
<td>Switzerland</td>
<td>29,637</td>
</tr>
<tr>
<td>Denmark</td>
<td>28,805</td>
</tr>
<tr>
<td>Spain</td>
<td>28,779</td>
</tr>
<tr>
<td>Austria</td>
<td>26,601</td>
</tr>
<tr>
<td>Ireland</td>
<td>25,785</td>
</tr>
<tr>
<td>Germany</td>
<td>24,738</td>
</tr>
<tr>
<td>Singapore</td>
<td>20,815</td>
</tr>
<tr>
<td>Australia</td>
<td>20,811</td>
</tr>
<tr>
<td>Canada</td>
<td>19,629</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>19,426</td>
</tr>
<tr>
<td>US</td>
<td>17,411</td>
</tr>
<tr>
<td>Netherlands</td>
<td>12,240</td>
</tr>
<tr>
<td>South Korea</td>
<td>11,869</td>
</tr>
<tr>
<td>Sweden</td>
<td>11,833</td>
</tr>
<tr>
<td>UK</td>
<td>10,605</td>
</tr>
<tr>
<td>Chile</td>
<td>8,692</td>
</tr>
<tr>
<td>France</td>
<td>7,103</td>
</tr>
</tbody>
</table>

## Types of Testing Needed for Re-Opening

As the economy necessitates that we learn to co-exist with the virus, broad based testing becomes critical to re-opening.

### Both diagnostic and antibody testing will be important

<table>
<thead>
<tr>
<th>Diagnostic Tests</th>
<th>Antibody Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What?</strong></td>
<td></td>
</tr>
<tr>
<td>- Polymerase chain reaction (PCR) test to identify the presence of the diseases' genetic material</td>
<td>- Serologic (blood) test to identify antibody presence</td>
</tr>
<tr>
<td><strong>Why?</strong></td>
<td></td>
</tr>
<tr>
<td>- Identify active cases, even when asymptomatic</td>
<td>- Understand disease presence and post-infection immunity</td>
</tr>
<tr>
<td>- Important for patient treatment and understanding virus spread</td>
<td></td>
</tr>
<tr>
<td><strong>How Many Needed in the US?</strong></td>
<td></td>
</tr>
<tr>
<td>- Estimates vary widely</td>
<td>- Dependent on durability of immunity</td>
</tr>
<tr>
<td>- 750 k per week to 5 million per day for initial re-opening</td>
<td></td>
</tr>
<tr>
<td>- As many as 20 million per day for full economic remobilization</td>
<td></td>
</tr>
<tr>
<td><strong>Current Status</strong></td>
<td></td>
</tr>
<tr>
<td>- 1 million per week</td>
<td>- Many antibody tests currently unreliable</td>
</tr>
<tr>
<td></td>
<td>- Immunity duration &amp; durability not known</td>
</tr>
</tbody>
</table>

### With a fully re-opened economy requiring millions more daily tests than currently available, a “targeted” testing approach, which is scaled over time, becomes necessary

- Hospitalized patients
- Symptomatic healthcare workers
- Nursing home workers
- Other symptomatic “essential” workers
- Residents in “cluster” outbreak areas
- Asymptomatic healthcare workers
- Other asymptomatic “essential” workers
- “Non-essential” working population

Manual Contact Tracing

Manual contact tracing requires public health workers to interview all confirmed COVID cases, track their contacts in the prior weeks and interview those people for symptoms. Key challenges to manual contact tracing include: i) in the US alone, up to 100,000 people would need to be hired and trained to conduct tracing interviews; ii) with 20-40% of cases asymptomatic, manual tracing can be slow and overlook cases; iii) the process is reliant on human memory which can be inconsistent.

Digitized Contact Tracing

Digitized contact tracing could utilize cell phone Bluetooth and GPS data to instantaneously notify individuals who have had contact with a person who tests positive for COVID-19. If used effectively, this would allow individuals to isolate and test to prevent further spread. However, digital tracing networks require high smartphone penetration and population adoption which has been a challenge in numerous jurisdictions. Data privacy is also a concern.

1. Person A comes into contact with person B. Phones exchange identifier beacons.
2. Person A is diagnosed with COVID-19. Test is entered into public health authority app.
3. Person B is notified that they came into contact with someone who was diagnosed.

- The US and many other Western democracies do not currently have the technological infrastructure to support automatic tracing apps
  - Many East Asian countries already have infrastructure in place from prior outbreaks (2015 MERS outbreak in South Korea, 2003 SARS outbreak in Taiwan)

- In order to be effective, adoption must be universal
  - Need a minimum utilization of approximately 70% to be effective
  - Government mandate or voluntary use
  - Enforcement of use and isolation if necessary
  - Alternatives for people without smartphones (older & lower income populations)

- To combat the spread of the virus, sharing data on confirmed and suspected cases is essential, but also raises serious concerns over data privacy
  - Concerns over privacy and civil liberties, particularly in Western democracies
  - Data sovereignty and anonymity

Digital Testing & Immunity Passports

As we begin the new phase of gradually re-opening the economy, testing and tracing become critical to preventing a resurgence in COVID cases and a second wave of economic stoppage. Digital tracing and health QR codes could become commonplace in the “new normal” we return to.

Green
Enables its holder to move unrestricted and travel freely

Yellow
Report immediately. May be asked to stay home for 7 days.

Red
Report immediately. Two-week quarantine required.

Source: New York Times, March 1, 2020
Re-Opening the Economy
“The notion that there’s a control room in the West Wing and that this group will gather around the President and say ‘Go ahead, press the button, sir, we are going to restart’ – that’s not how the US economy works.”

Douglas Holtz-Eakin, Former Head of the US Council of Economic Advisors under President George Bush
Re-Opening the Economy

Phased-In Re-Opening

Hierarchy of Activity Resumption
The Mandated Recession
Crisis from the Bottom
Monetary & Fiscal Bridges
Similar to the monetary and fiscal response, scalability remains an enormous challenge in the virus response. Re-opening the economy will be a gradual process that will require a robust testing and tracing architecture in order to be successful.

#1 Virus Suppression
- Consistent pattern of declining cases
- Consistent pattern of declining hospitalizations
- CDC guidelines specify 14 declining days

#2 Strengthen Healthcare Capacity
- Beds, ventilators and IC units
- PPE for healthcare workers
- Technology enabled coordination and communication

#3 Scalable Testing
- Diagnostic, antibody and fever testing
- Hierarchy of targets (healthcare & essential workers)
- 2-6% of population, daily (over time)

#4 Scalable Contact Tracing
- Manual & digitally based
- Isolation & quarantines
- 40-80% thresholds needed to succeed (over time)
- Apple-Google JV on peer tracing apps

#5 Gradual Re-opening (State-by-State)
- Expand essential workforce (over time)
- Ring-fence elderly & preconditions
- Phased-in activity resumption
- Mask-wearing transition period

#6 Accelerate Production of Treatments
- Streamlined and scalable clinical trials
- Therapeutic treatments (plasma, manufactured antibodies)
- RNA vaccines

Source: Center for American Progress “A National and State Plan to End the Coronavirus Crisis”, The American Enterprise Institute “National Coronavirus Response: A Road Map to Re-opening”, Harvard University, Edmond J. Safra Center for Ethics “Roadmap to Pandemic Resilience”.
World Health Organization Re-Opening Criteria

On April 15th, Tedros Adhanom Ghebreyesus, the World Health Organization’s Director General, outlined six conditions governments should meet before starting to gradually lift COVID-19 restrictions:

1. Disease transmission is under control
2. Health systems have capacity to detect, test, isolate and treat every case and trace every contact
3. Outbreak risks are minimized in vulnerable settings like health facilities and nursing homes
4. Preventive measures are in place in workplaces, schools and other places where it’s essential for people to go
5. Risk of importing new cases can be managed
6. Communities are fully educated, engaged and empowered to live under a new normal

Source: World Health Organization
White House “Re-Opening” Protocols

Although the White House “re-opening” plan requires US states to have 14 straight days of declining confirmed cases, numerous US states have nonetheless prematurely begun to relax selected social distancing measures.

“Gating Criteria” should be met before starting Phase 1 and again before moving to subsequent phases

- **Symptoms:** Downward trajectory over 14 day period
- **Cases:** Downward over 14 day period
- **Hospitals:** Adequate treatment capacity and available testing for at-risk healthcare staff

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>For states &amp; regions that satisfy the gating criteria</td>
<td>With no evidence of rebound and when gating criteria is met for a second time</td>
<td>With no evidence of rebound and when gating criteria is met for a third time</td>
</tr>
<tr>
<td><strong>Individuals:</strong></td>
<td><strong>Individuals:</strong></td>
<td><strong>Individuals:</strong></td>
</tr>
<tr>
<td>- “Ring-fence” vulnerable individuals</td>
<td>- “Ring-fence” vulnerable individuals</td>
<td>- Vulnerable individuals practice social distancing</td>
</tr>
<tr>
<td>- Continue social distancing in public</td>
<td>- Continue social distancing in public</td>
<td>- Low risk individuals minimize time spent in crowded environments</td>
</tr>
<tr>
<td>- Avoid groups of 10 or more</td>
<td>- Non-essential travel can resume</td>
<td></td>
</tr>
<tr>
<td>- Minimize non-essential travel</td>
<td>- Employers:</td>
<td>- Employers:</td>
</tr>
<tr>
<td></td>
<td>- Encourage telework where possible</td>
<td>- Resume unrestricted staffing</td>
</tr>
<tr>
<td></td>
<td>- Return to work in phases where possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Close common areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Minimize non-essential travel</td>
<td></td>
</tr>
<tr>
<td><strong>Specific Types of Businesses:</strong></td>
<td><strong>Specific Types of Businesses:</strong></td>
<td><strong>Specific Types of Businesses:</strong></td>
</tr>
<tr>
<td>- <strong>Schools</strong> remain closed</td>
<td>- <strong>Schools</strong> can re-open</td>
<td>- <strong>Large venues</strong> open with limited physical distancing protocols</td>
</tr>
<tr>
<td>- <strong>Large venues</strong> open with strict physical distancing protocols</td>
<td>- <strong>Large venues</strong> open with moderate physical distancing protocols</td>
<td>- <strong>Gyms</strong> can open if they use sanitation protocols</td>
</tr>
<tr>
<td>- <strong>Gyms</strong> can open if they use physical distancing and sanitation protocols</td>
<td>- <strong>Gyms</strong> can open if they use physical distancing and sanitation protocols</td>
<td>- <strong>Bars</strong> to operate with increased capacity</td>
</tr>
<tr>
<td>- <strong>Bars</strong> remain closed</td>
<td>- <strong>Bars</strong> can open with reduced capacity</td>
<td></td>
</tr>
</tbody>
</table>

Source: Politico. WSJ. The White House “Opening Up America Again”.
Re-Opening Models: State by State Estimates

The University of Washington’s Institute for Health Metrics and Evaluation (IHME) has modeled when states may begin to gradually “re-open”. Estimated re-open dates are based on numerous variables including declining case counts to 1 per 1 million population. The actual re-opening dates may be subject to political considerations and could vary from the model.

<table>
<thead>
<tr>
<th>State</th>
<th>Gov’t Mandated Social Distancing</th>
<th>Projected Gradual Re-Opening Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mass Gathering Restrictions</td>
<td>Schools Closed</td>
</tr>
<tr>
<td>Alabama</td>
<td>Mar 20</td>
<td>Mar 19</td>
</tr>
<tr>
<td>Alaska</td>
<td>Mar 24</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Arizona</td>
<td>Mar 30</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Arkansas</td>
<td>Mar 27</td>
<td>Mar 17</td>
</tr>
<tr>
<td>California</td>
<td>Mar 11</td>
<td>Mar 19</td>
</tr>
<tr>
<td>Colorado</td>
<td>Mar 19</td>
<td>Mar 23</td>
</tr>
<tr>
<td>Connecticut</td>
<td>Mar 12</td>
<td>Mar 17</td>
</tr>
<tr>
<td>Delaware</td>
<td>Mar 16</td>
<td>Mar 16</td>
</tr>
<tr>
<td>D.C.</td>
<td>Mar 13</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Florida</td>
<td>Apr 3</td>
<td>Mar 17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State</th>
<th>Gov’t Mandated Social Distancing</th>
<th>Projected Gradual Re-Opening Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mass Gathering Restrictions</td>
<td>Schools Closed</td>
</tr>
<tr>
<td>Georgia</td>
<td>Mar 24</td>
<td>Mar 18</td>
</tr>
<tr>
<td>Hawaii</td>
<td>Mar 16</td>
<td>Mar 19</td>
</tr>
<tr>
<td>Illinois</td>
<td>Mar 13</td>
<td>Mar 17</td>
</tr>
<tr>
<td>Indiana</td>
<td>Mar 12</td>
<td>Mar 19</td>
</tr>
<tr>
<td>Iowa</td>
<td>Mar 17</td>
<td>Apr 4</td>
</tr>
<tr>
<td>Kansas</td>
<td>Mar 17</td>
<td>Mar 17</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Mar 19</td>
<td>Mar 20</td>
</tr>
<tr>
<td>Louisiana</td>
<td>Mar 13</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Maine</td>
<td>Mar 18</td>
<td>Mar 16</td>
</tr>
</tbody>
</table>

Note: Re-opening date refers to the date when it may be possible to relax social distancing measures with containment strategies (testing, contact tracing, isolation, and limiting gathering sizes). Dates based on when expected infection rates will drop below 1 per 1 million people in a given area and are informed by public health funding. Source: (1) University of Washington, IHME Health Data.
### Re-Opening Models: State by State Estimates

<table>
<thead>
<tr>
<th>State</th>
<th>Gov’t Mandated Social Distancing</th>
<th>Projected Gradual Re-Opening Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mass Gathering Restrictions</td>
<td>Schools Closed</td>
</tr>
<tr>
<td>Maryland</td>
<td>Mar 16</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Massachusettis</td>
<td>Mar 13</td>
<td>Mar 17</td>
</tr>
<tr>
<td>Michigan</td>
<td>Mar 13</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Mar 27</td>
<td>Mar 18</td>
</tr>
<tr>
<td>Mississippi</td>
<td>Mar 24</td>
<td>Mar 19</td>
</tr>
<tr>
<td>Missouri</td>
<td>Mar 23</td>
<td>Mar 23</td>
</tr>
<tr>
<td>Montana</td>
<td>Mar 24</td>
<td>Mar 15</td>
</tr>
<tr>
<td>Nebraska</td>
<td>Mar 16</td>
<td>Apr 2</td>
</tr>
<tr>
<td>Nevada</td>
<td>Mar 19</td>
<td>Mar 16</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>Mar 16</td>
<td>Mar 16</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Mar 16</td>
<td>Mar 18</td>
</tr>
<tr>
<td>New Mexico</td>
<td>Mar 12</td>
<td>Mar 13</td>
</tr>
<tr>
<td>New York</td>
<td>Mar 12</td>
<td>Mar 18</td>
</tr>
<tr>
<td>North Carolina</td>
<td>Mar 14</td>
<td>Mar 14</td>
</tr>
<tr>
<td>North Dakota</td>
<td>N/A</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Ohio</td>
<td>Mar 12</td>
<td>Mar 16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State</th>
<th>Gov’t Mandated Social Distancing</th>
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<tbody>
<tr>
<td></td>
<td>Mass Gathering Restrictions</td>
<td>Schools Closed</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Mar 24</td>
<td>Mar 17</td>
</tr>
<tr>
<td>Oregon</td>
<td>Mar 12</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Apr 1</td>
<td>Mar 17</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>Mar 17</td>
<td>Mar 16</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Mar 18</td>
<td>Mar 16</td>
</tr>
<tr>
<td>South Dakota</td>
<td>Apr 6</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Tennessee</td>
<td>Mar 23</td>
<td>Mar 20</td>
</tr>
<tr>
<td>Texas</td>
<td>Mar 21</td>
<td>Mar 19</td>
</tr>
<tr>
<td>Utah</td>
<td>Mar 17</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Vermont</td>
<td>Mar 13</td>
<td>Mar 18</td>
</tr>
<tr>
<td>Virginia</td>
<td>Mar 15</td>
<td>Mar 16</td>
</tr>
<tr>
<td>Washington</td>
<td>Mar 11</td>
<td>Mar 13</td>
</tr>
<tr>
<td>West Virginia</td>
<td>Mar 24</td>
<td>Mar 14</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Mar 17</td>
<td>Mar 18</td>
</tr>
<tr>
<td>Wyoming</td>
<td>Mar 20</td>
<td>Mar 19</td>
</tr>
</tbody>
</table>

Note: Re-opening date refers to the date when it may be possible to relax social distancing measures with containment strategies (testing, contact tracing, isolation, and limiting gathering sizes). Dates based on when expected infection rates will drop below 1 per 1 million people in a given area and are informed by public health funding. Source: (1) University of Washington. IHME Health Data.
Re-Opening the Economy

Phased-In Re-Opening

Hierarchy of Activity Resumption

The Mandated Recession
Crisis from the Bottom
Monetary & Fiscal Bridges
Comfort Level With Resuming Activity

Despite some US states beginning to lift COVID-19 distancing restrictions, many US consumers don’t expect to feel comfortable returning to social activities for 6 months or more. Ultimately, consumer comfort, rather than government policy, will have the most profound impact on the shape of the US recovery.

<table>
<thead>
<tr>
<th>Activity</th>
<th>In the next two weeks</th>
<th>In the next month</th>
<th>In the next two months</th>
<th>In the next three months</th>
<th>In the next six months</th>
<th>More than six months</th>
<th>Don’t know / No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Going out to eat at a restaurant or cafe</td>
<td>6%</td>
<td>12%</td>
<td>19%</td>
<td>18%</td>
<td>20%</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>Going to a shopping mall</td>
<td>4%</td>
<td>9%</td>
<td>16%</td>
<td>17%</td>
<td>24%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Going on vacation</td>
<td>5%</td>
<td>13%</td>
<td>18%</td>
<td>30%</td>
<td></td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td>Going to the movies</td>
<td>4%</td>
<td>8%</td>
<td>14%</td>
<td>16%</td>
<td>25%</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>Going to a party or social event</td>
<td>4%</td>
<td>9%</td>
<td>14%</td>
<td>18%</td>
<td>23%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Going to a concert</td>
<td>5%</td>
<td>11%</td>
<td>15%</td>
<td>27%</td>
<td></td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Going to a museum</td>
<td>6%</td>
<td>12%</td>
<td>14%</td>
<td>25%</td>
<td></td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Going to a religious gathering or meeting</td>
<td>6%</td>
<td>10%</td>
<td>13%</td>
<td>11%</td>
<td>19%</td>
<td>39%</td>
<td></td>
</tr>
<tr>
<td>Going to an amusement park</td>
<td>5%</td>
<td>10%</td>
<td>14%</td>
<td>27%</td>
<td></td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Going to a theater performance</td>
<td>5%</td>
<td>11%</td>
<td>14%</td>
<td>25%</td>
<td></td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Going to the gym or an exercise class</td>
<td>9%</td>
<td>12%</td>
<td>11%</td>
<td>21%</td>
<td></td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Traveling abroad</td>
<td>5%</td>
<td>10%</td>
<td>11%</td>
<td>33%</td>
<td></td>
<td>46%</td>
<td></td>
</tr>
<tr>
<td>Going to a work conference</td>
<td>6%</td>
<td>9%</td>
<td>11%</td>
<td>19%</td>
<td></td>
<td>49%</td>
<td></td>
</tr>
<tr>
<td>Going to a political rally</td>
<td>7%</td>
<td>9%</td>
<td>22%</td>
<td></td>
<td></td>
<td>55%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Morning Consult, When Consumers Say They’ll Feel OK About Dining Out and Other Activities. Survey of 2,200 US adults taken between April 7-9, 2020.
Activity Importance & Risk Matrix for Re-Opening

As the US and other economies move towards a gradual re-opening, higher importance and lower risk activities will return at a more rapid pace than higher risk and non-essential services.

# Risk Considerations in a Phased Re-Opening

Johns Hopkins’ Bloomberg School for Public Health produced a high-level risk assessment of various sectors and activities to assist US Governors as they begin phased re-opening of the economy.

Sector risk assessment: Contact Intensity refers to contact type (close to distant); # of Contacts addresses the number of people in the setting.

### "Nonessential" Businesses

<table>
<thead>
<tr>
<th>Category</th>
<th>Contact Intensity</th>
<th># of Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurants</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Bars</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Salons / spas</td>
<td>Medium/High</td>
<td>Low</td>
</tr>
<tr>
<td>Retailers</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Shopping malls</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Fitness centers</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Theaters &amp; museums</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Large venues</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

### Schools & Childcare Facilities

- Childcare facilities: High, Medium/High
- Schools: High, High
- Contact school sports: High, Medium/High
- Noncontact school sports: Low, Medium
- Summer camps: High, High
- Higher education: High, High
- Residence halls: High, Medium

### Outdoor Spaces

- Parks / walking paths: Low, Low
- Athletic fields: Medium, Medium
- Pools: Medium, Low
- Beaches: Low, High
- Playgrounds: Medium, Medium

### Community Gathering Spaces

<table>
<thead>
<tr>
<th>Category</th>
<th>Contact Intensity</th>
<th># of Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Places of worship</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Libraries</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Community centers</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buses</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Metros / rail</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Airplanes</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Rideshare / taxis</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Mass Gatherings

- Sporting events: High, High
- Sports training: High, Medium
- Religious mass gatherings: High, High
- Business mass gatherings: High, High
- Concerts / festivals: High, High
- Political rallies / polling centers: High, High

### Interpersonal Gatherings

- Small social gatherings (birthday parties): High, Medium
- Large social gatherings (weddings): High, High

Industry sectors that are high beta to the economy's performance and discretionary consumer spending have been most adversely impacted in US corporate credit markets.

<table>
<thead>
<tr>
<th>Industry</th>
<th>USD IG spread change since February 21 (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure</td>
<td>379 bps</td>
</tr>
<tr>
<td>Financial services</td>
<td>248 bps</td>
</tr>
<tr>
<td>Energy</td>
<td>236 bps</td>
</tr>
<tr>
<td>Auto</td>
<td>227 bps</td>
</tr>
<tr>
<td>Real estate</td>
<td>216 bps</td>
</tr>
<tr>
<td>Basic industry</td>
<td>162 bps</td>
</tr>
<tr>
<td>Index</td>
<td>124 bps</td>
</tr>
<tr>
<td>Banking</td>
<td>120 bps</td>
</tr>
<tr>
<td>Insurance</td>
<td>117 bps</td>
</tr>
<tr>
<td>Services</td>
<td>114 bps</td>
</tr>
<tr>
<td>Capital goods</td>
<td>114 bps</td>
</tr>
<tr>
<td>Transportation</td>
<td>112 bps</td>
</tr>
<tr>
<td>Utility</td>
<td>94 bps</td>
</tr>
<tr>
<td>Media</td>
<td>93 bps</td>
</tr>
<tr>
<td>Consumer goods</td>
<td>91 bps</td>
</tr>
<tr>
<td>Telecom</td>
<td>86 bps</td>
</tr>
<tr>
<td>Tech</td>
<td>82 bps</td>
</tr>
<tr>
<td>Retail</td>
<td>82 bps</td>
</tr>
<tr>
<td>Health care</td>
<td>66 bps</td>
</tr>
</tbody>
</table>

Re-Opening the Economy

Phased-In Re-Opening
Hierarchy of Activity Resumption

The Mandated Recession
Crisis from the Bottom
Monetary & Fiscal Bridges
According to DB’s US Economics Research team, US high frequency economic data has plunged as much as 25 standard deviations from average, the largest in a century. Similarly, consensus Q2 GDP forecasts of a 30-40% contraction are 3-4x the largest quarterly decline in the modern era. Baseline expectations for the 2H are for just a 40% recovery of lost output, with a full recovery not expected until between late 2021 and early 2023, depending on virus severity.

Source: (1-2) Bloomberg. Data as of April 28, 2020. CBO is Congressional Budget Office.
Selected 2020 S&P 500 Earnings Estimates

With visibility on earnings exceptionally low, over 75% of S&P 500 companies have already suspended guidance. Consensus earnings forecasts for full year 2020 have also declined sharply from +9% in January to (-20%) today, with many projecting even sharper declines. On a more granular level, sector differentiation remains high, with technology and defensive industries strongly outperforming cyclicals and energy.

Full year 2020 S&P 500 EPS growth estimates, y/y

<table>
<thead>
<tr>
<th>(-30%)</th>
<th>(-20%)</th>
<th>(-10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-33%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-24%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-24%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-21%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-20%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-18%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-15%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(-14%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The “Mandated” Global Recession

The global economy entered this COVID-19 period vulnerable after the US-China trade war with global growth only 3% by year end, and 23 major economies in a manufacturing recession last summer. With a low starting point, the “Great Lockdown” recession is expected to be the steepest in almost a century, and only the 5th global recession in the post WWII period. The IMF is forecasting a (-3%) contraction in global growth in 2020, much sharper than the (-0.1%) decline during the 2008 financial crisis.

<table>
<thead>
<tr>
<th>Country</th>
<th>Current view</th>
<th>January view</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro Area</td>
<td>-6.9%</td>
<td>1.0%</td>
</tr>
<tr>
<td>UK</td>
<td>-6.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Mexico</td>
<td>-6.1%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Germany</td>
<td>-5.3%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Japan</td>
<td>-4.9%</td>
<td>0.1%</td>
</tr>
<tr>
<td>US</td>
<td>-4.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>World</td>
<td>-3.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Brazil</td>
<td>-2.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>China</td>
<td>-0.5%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

Outsized GDP Contraction for Large Oil Producers

The dual shock of oil’s decline will have an outsized impact on the fiscal balances and rate of GDP contraction for larger oil producing nations in particular, especially in EM.

2020 GDP forecast (y/y)

Source: (1) IMF.

Venezuela
Mexico
Ecuador
Norway
Canada
Iran
Argentina
Brazil
Russia
UAE
Nigeria
Saudi Arabia
Kuwait
Indonesia
0.5%
Re-Opening the Economy

Phased-In Re-Opening
Hierarchy of Activity Resumption
The Mandated Recession

Crisis from the Bottom
Monetary & Fiscal Bridges
Small Business & the “Crisis from the Bottom”

The COVID-19 virus and the “economics of stoppage” have created a “crisis from the bottom” for the 30 million small and medium sized businesses that employ over 130mm in the US alone. Scalability therefore becomes a core challenge of the policy response, as does the viability of many business models, even with Government support.

Source: Small Business Administration. Statista. DB Markets Research (Torsten Slok).

<table>
<thead>
<tr>
<th># of small businesses in the US</th>
<th># of women-owned businesses in the US</th>
<th># of restaurants in the US</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 million</td>
<td>12 million</td>
<td>&gt;1 million</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of US employment by small business</th>
<th>% of US employment by small &amp; medium sized business</th>
<th>Total annual sales of US small business</th>
<th># of US businesses that fail annually (1,600 / day)</th>
<th># of US businesses created annually (1,500 / day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48%</td>
<td>83%</td>
<td>$8.8 trillion</td>
<td>600k</td>
<td>550k</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% of US corporate revenue from small &amp; medium business</th>
<th># of US businesses created annually (1,500 / day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>550k</td>
</tr>
</tbody>
</table>

Source: Small Business Administration. Statista. DB Markets Research (Torsten Slok).
A March survey by the National Federation of Independent Business (NFIB) showed that half of the US’s small businesses don’t expect to be able to survive under current economic conditions for more than two months.

How long will you be able to operate under current economic conditions?

- 72% responded 3-4 months, or less
- Less than 1 month: 15%
- 1-2 months: 35%
- 3-4 months: 22%
- 5-6 months: 10%
- 7-12 months: 6%
- More than 12 months: 13%

Source: (1) Bloomberg. NFIB March 30 survey of 627 firms.
$729 Bn Aid for Small Businesses

More than half of the $729 Bn allocated to relief for small businesses in the US fiscal stimulus plans has been allocated. Similar to other programs, scalability and slow processing remain formidable challenges.

Number of approved PPP loans by loan size

- $150K and Under: 74%
- $150K - $350K: 14%
- $350K - $1M: 8%
- $1M - $2M: 3%
- $2M - $5M: 1%
- $5M and Above: 0%

PPP loan dollars by sector

- Real Estate and Rental and Leasing: 3.1%
- Transportation and Warehousing: 3.1%
- Finance and Insurance: 2.4%
- Educational Services: 2.4%
- Information: 2.0%
- Arts, Entertainment, and Recreation: 1.4%
- Agriculture, Forestry, Fishing and Hunting: 1.3%
- Mining: 1.1%
- Management of Companies and Enterprises: 0.3%
- Public Administration: 0.3%
- Utilities: 0.3%
- Other Services (except Public Administration): 5%
- Administrative, Waste Management & Remediation Services: 4%
- Healthcare and Social Assistance: 12%
- Construction: 13%
- Professional, Scientific, and Technical Services: 13%
- Wholesale Trade: 6%
- Accommodation & Food Services: 9%
- Retail Trade: 8%
- Other – Sectors under 4%

Europe’s Vulnerable Labor Market Structure

Numerous countries across Southern Europe have a more vulnerable labor market structure, by virtue of both higher dependence on tourism, as well as the smaller average size of companies driving employment.

Companies with fewer than 50 employees (% of employment)

<table>
<thead>
<tr>
<th>Country</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Italy</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Portugal</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Spain</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Latvia</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Estonia</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Belgium</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Ireland</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Lithuania</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Austria</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>France</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Finland</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Germany</td>
<td>0</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
</tr>
</tbody>
</table>

Source: FT. Moodys “Coronavirus’ lasting credit impact will depend on crisis duration and fiscal exit strategies.”
Re-Opening the Economy

Phased-In Re-Opening
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The Mandated Recession
Crisis from the Bottom

Monetary & Fiscal Bridges
## The Fed’s 2020 Crisis Playbook

Leveraging the 2008-9 playbook, the Fed’s policy response has been swift and comprehensive in alleviating market dislocations and restoring functionality to markets. The Fed, however, cannot fight the virus, and cannot create demand.

### Easing Financial Conditions
- **Emergency interest rate cut**
  Fed Funds Rate to 0% lower bound
- **Bank repo facilities**
  Current estimated capacity around $3 trillion
- **Lower bank reserve requirements**
  Cut to 0%
- **Revised discount window terms**
  25 bps, 90 days
- **Primary Dealer Credit Facility**
  Discount Window rate, up to 90 days
- **Paycheck Protection Program Liquidity Facility**
  Eligible collateral of up to $659 bn from PPP loans
- **Unlimited Quantitative Easing**
  Over $1 trillion UST and $250 billion MBS purchases in April
- **Central Bank swap lines**
  14 global central banks at reduced rates and extended terms

### Addressing Market Dislocations
- **US Dollar repo facility**
  US Dollar liquidity for USD $3 trillion of foreign CB UST holdings
- **Money Market Mutual Fund Liquidity Facility**
  Eligible size of potential purchases around $700 billion
- **Commercial Paper Funding Facility**
  Eligible size of potential market estimated at over $1 trillion
- **Main Street Business Lending Program**
  Up to $600 bn in lending
- **Primary Market Corporate Credit Facility**
  Up to $500 bn new financing
- **Secondary Market Corporate Credit Facility**
  Up to $250 bn new financing
- **Term Asset-Backed Securities Loan Facility**
  Up to $100 bn new financing
- **Municipal Liquidity Facility**
  Up to $500 bn in lending

### Restoring Funding Markets
- **Primary Dealer Credit Facility**
  Discount Window rate, up to 90 days
- **Paycheck Protection Program Liquidity Facility**
  Eligible collateral of up to $659 bn from PPP loans
- **Unlimited Quantitative Easing**
  Over $1 trillion UST and $250 billion MBS purchases in April
- **Central Bank swap lines**
  14 global central banks at reduced rates and extended terms

Source: Federal Reserve
Record $3.3 Trillion US Fiscal Stimulus

At roughly 15% of GDP, the $3.3 trillion US fiscal response to COVID-19 has been the largest in history. Remarkably, it may not be enough. Similar to the Fed monetary response, the policy objective has been less about stimulus, and more about providing “continuity” for hospitals, businesses and individuals - a bridge to the post-virus period of stoppage.

- **$729B** Small business loans & grants
- **$397B** Direct payments and tax credits for families
- **$500B** Business, local government loans & financial assistance
- **$315B** Tax Provisions
- **$352B** Employer Payroll Tax Deferral
- **$140B** State and local Corona Relief Fund
- **$125B** Unemployment insurance expansion (est.)
- **$300B** Tax Deadline Delay (April 15 to July 15)
- **$17B** National Security companies
- **$29B** Specific to airlines
- **$12B** National Security
- **$25B** National Security
- **$246B** Education Stabilization
- **$11B** Food Stamps
- **$24B** Agricultural Relief
- **$11B** Food Stamps
- **$10B** Agricultural Relief
- **$36B** Other

Source: DB Global Markets Research (Ryan, Luzzetti, Weidner. “Higher debt is a necessary price to pay”; “What’s in the $2 trillion stimulus package?”). US Senate, Committee for a Responsible Federal Budget, Bloomberg Research
“Few people realize the immensity of vacancy in which the dust of the universe swims.”

H.G. Wells, prolific English author, in The War of the Worlds (1897)
Consumer Psyche & Change

Fear & Public Opinion
Unemployment Scars
Discretionary Spending Pullback
Rising Savings Rate
The Contact Free Economy
Higher Tolerance for Government Support

Unlike the 2009 financial crisis, bipartisan support is much more aligned with a greater role of Government in the COVID-19 crisis response. In addition to being an economic crisis “from the bottom” as opposed to a “Wall Street bailout,” the moral imperatives of an expanded Government role during a health crisis are more clear.


<table>
<thead>
<tr>
<th></th>
<th>2009 approval*</th>
<th>2020 approval*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Republicans</td>
<td>Democrats</td>
</tr>
<tr>
<td>2009 approval*</td>
<td>26%</td>
<td>78%</td>
</tr>
</tbody>
</table>

Infectious Disease Spread a Top Concern for Americans

In the wake of the COVID-19 outbreak, a new Pew Research poll found that Americans ranked the spread of infectious diseases as the top international threat to the United States.

% who say __ is a major threat, minor threat, or not a threat to the United States

<table>
<thead>
<tr>
<th>Threat</th>
<th>Major threat</th>
<th>Minor threat</th>
<th>Not a threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>The spread of infectious diseases</td>
<td>79%</td>
<td>19%</td>
<td>2%</td>
</tr>
<tr>
<td>Terrorism</td>
<td>73%</td>
<td>25%</td>
<td>2%</td>
</tr>
<tr>
<td>The spread of nuclear weapons</td>
<td>73%</td>
<td>23%</td>
<td>3%</td>
</tr>
<tr>
<td>Cyberattacks from other countries</td>
<td>72%</td>
<td>25%</td>
<td>3%</td>
</tr>
<tr>
<td>China’s power and influence</td>
<td>62%</td>
<td>29%</td>
<td>7%</td>
</tr>
<tr>
<td>Global climate change</td>
<td>60%</td>
<td>27%</td>
<td>12%</td>
</tr>
<tr>
<td>Russia’s power and influence</td>
<td>56%</td>
<td>35%</td>
<td>7%</td>
</tr>
<tr>
<td>The condition of the global economy</td>
<td>55%</td>
<td>37%</td>
<td>7%</td>
</tr>
<tr>
<td>Global poverty</td>
<td>49%</td>
<td>40%</td>
<td>11%</td>
</tr>
<tr>
<td>Migrating populations</td>
<td>42%</td>
<td>39%</td>
<td>19%</td>
</tr>
<tr>
<td>Long-standing geopolitical tensions</td>
<td>39%</td>
<td>48%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Democrats and Republicans Similarly Concerned on Infectious Disease Spread

While Democrats show more worry on climate change and Russia, and Republicans exhibit higher concern on immigration, the threat posed by the spread of infectious disease is a rare point of agreement for both Republicans and Democrats.

% who say ___ is a major threat to the United States

<table>
<thead>
<tr>
<th>Threat</th>
<th>Democrats</th>
<th>Republicans</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global climate change</td>
<td>31%</td>
<td>88%</td>
<td>+57</td>
</tr>
<tr>
<td>Russia’s power and influence</td>
<td>46%</td>
<td>68%</td>
<td>+22</td>
</tr>
<tr>
<td>Global poverty</td>
<td>38%</td>
<td>57%</td>
<td>+19</td>
</tr>
<tr>
<td>The condition of the global economy</td>
<td>46%</td>
<td>63%</td>
<td>+17</td>
</tr>
<tr>
<td>Long-standing conflicts between countries or ethnic groups</td>
<td>35%</td>
<td>43%</td>
<td>+8</td>
</tr>
<tr>
<td>The spread of infectious diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The spread of nuclear weapons</td>
<td>77%</td>
<td>72%</td>
<td>+5</td>
</tr>
<tr>
<td>Cyberattacks from other countries</td>
<td>72%</td>
<td>73%</td>
<td>-1</td>
</tr>
<tr>
<td>China’s power and influence</td>
<td>62%</td>
<td>68%</td>
<td>-6</td>
</tr>
<tr>
<td>Terrorism</td>
<td>69%</td>
<td>77%</td>
<td>-8</td>
</tr>
<tr>
<td>Migrating populations</td>
<td>29%</td>
<td>58%</td>
<td>-29</td>
</tr>
</tbody>
</table>

Consumer Psyche & Change

Fear & Public Opinion
Unemployment Scars
Discretionary Spending Pullback
Rising Savings Rate
The Contact Free Economy
Historic Rise in Unemployment

With over 26 million new jobless claims, the US has undone the job creation of the entire post crisis decade in just 5 weeks. For perspective, DB and consensus forecasts for peak US unemployment in Q2 are in the 17-20% area, nearly double the highest US unemployment rate of the post WWII era (which was just over 10% in 2009).

Weekly jobless claims, 1,000s

- 26,450,000 claims were filed in the last five weeks

Unemployment insurance claims (last 5 weeks)
- 26.5 million

Jobs created since Financial Crisis Recession
- 22.4 million

Jobs lost during Financial Crisis Recession
- 8.7 million

DB Baseline & Tail Risk Unemployment Projections

DB unemployment forecasts

Q2 2020 peak forecast

- Baseline scenario: 17%
- Protracted virus scenario: 30%

Year-end 2020 forecast

- Baseline scenario: 7%
- Protracted virus scenario: 10%

Year-end 2021 forecast

- Baseline scenario: 4%
- Protracted virus scenario: 6%

Source: (1) DB Global Markets Research (Luzzetti, Ryan, Weidner).
Small Business Layoffs

According to a Lending Tree Survey, 58% of small businesses have laid off employees due to coronavirus-related circumstances.

Have you laid off any employees due to coronavirus-related circumstances?

- Yes: 58%
- No: 42%

Small business layoffs have occurred across most major industries with accommodation and food services hit the hardest.

Percentage of small business owners who laid off employees due to coronavirus-related circumstances (by industry):

- Accommodation & food services: 82%
- Admin & support: 75%
- Mining, oil & gas extraction: 75%
- Arts & entertainment: 68%
- Manufacturing: 65%
- Health care & social assistance: 64%
- Construction: 62%
- Retail trade: 57%
- Other services: 56%
- Trans. & warehousing: 56%
- Agriculture: 50%
- Professional & technical services: 48%
- Educational services: 43%
- Finance & insurance: 36%
- Wholesale trade: 35%
- Real estate & rental leasing: 31%
- Information: 22%
- Management of companies: 20%

Source: (1-2) Lending Tree survey of 1,260 small business owners.
Consumer Psyche & Change

Fear & Public Opinion
Unemployment Scars

Discretionary Spending Pullback
Rising Savings Rate
The Contact Free Economy
March Retail Sales: Largest Monthly Decline

Despite frontloading of essential purchases ahead of lockdown orders, Retail Sales fell nearly 9% in March, their worst decline on record. With nearly 90% of the US under some form of social distancing order and non-essential businesses forced to close, the sharp decline in discretionary purchases far outweighed the rise in demand for essential goods.

March retail sales (m/m % change)

<table>
<thead>
<tr>
<th>Category</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing stores</td>
<td>-51%</td>
</tr>
<tr>
<td>Auto dealers</td>
<td>-27%</td>
</tr>
<tr>
<td>Furniture</td>
<td>-27%</td>
</tr>
<tr>
<td>Bars &amp; restaurants</td>
<td>-27%</td>
</tr>
<tr>
<td>Sporting goods</td>
<td>-23%</td>
</tr>
<tr>
<td>Department stores</td>
<td>-20%</td>
</tr>
<tr>
<td>Electronics</td>
<td>-15%</td>
</tr>
<tr>
<td>Total retail sales</td>
<td>-9%</td>
</tr>
<tr>
<td>Building materials</td>
<td>1%</td>
</tr>
<tr>
<td>Online</td>
<td>3%</td>
</tr>
<tr>
<td>Health stores</td>
<td>4%</td>
</tr>
<tr>
<td>Grocery sales</td>
<td>27%</td>
</tr>
</tbody>
</table>

Source: (1) Commerce Department. Seasonally adjusted.
Q2 Consumer Spending Projections

While US consumer spending is expected to decline in Q2 at the highest rate on record, there is significant variance between “essential” and “discretionary” spending.

DB Q2 US consumer spending forecast (q/q, annualized)

```
<table>
<thead>
<tr>
<th>Essential</th>
<th>Discretionary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Food, accommodation &amp; transportation services</td>
</tr>
<tr>
<td>13%</td>
<td>(-36%)</td>
</tr>
<tr>
<td>Health care</td>
<td>Auto &amp; other household durables</td>
</tr>
<tr>
<td>11%</td>
<td>(-60%)</td>
</tr>
</tbody>
</table>
```

“Nothing about re-opening the economy will be easy, but restarting businesses will be a lot more straightforward than restarting aggregate demand.”

Mark Zandi, Moody’s Chief US Economist

Source: (1) DB Global Markets Research (Luzzetti).
Consumer Psyche & Change

Fear & Public Opinion
Unemployment Scars
Discretionary Spending Pullback

Rising Savings Rate

The Contact Free Economy
The Savings Rate Increases After Recessions

Historically, US savings rates typically increase approximately 2%, but could rise 3% this time to 11% area. This, in turn, could impact as much as $500bn of growth in the US economy in 2021.

Source: (1) DB Global Markets Research (Slok, Weidner). FRED. US Census. BEA.
Consumer Psyche & Change

Fear & Public Opinion
Unemployment Scars
Discretionary Spending Pullback
Rising Savings Rate

The Contact Free Economy
Contact Free Economy

- Acceleration of personal technology adoption across age groups
- Acceleration of digital e-commerce trends
- More rapid adoption of digital payment technologies (less cash)
- Videoconference over audio and in-person alternatives
- Slow return to airline travel; rise of digital “experiences”
- More remote “work from home”
- Remote, computer-based learning gains on institutional platforms (i.e., universities)
- Virtual health and video-enabled fitness
- Proliferation of technology enabled, on-demand services
- Rise of telemedicine
  - Cost and speed advantages, with high quality
  - Point-of-care diagnostics
  - Connecting systems, automation and AI

The Acceleration Toward Digital Payment Systems

An interesting new report by DB Research Analyst Marion Laboure highlights the risk of virus transmission through physical currency use. Notably, human influenza virus has been found alive and infectious on banknotes for up to 17 days. To this end, China went so far as to destroy bank notes circulating in high risk areas for the COVID-19 virus. Looking ahead, COVID-19 global contagion may be the catalyst that drives acceleration in the US and Europe toward digital payment systems.

% of Population Using Internet

% who use the internet at least occasionally or report owning a smartphone

30 40 60 80 100%


Deutsche Bank | Life After COVID | April 2020

74
% of Population Using Social Media

% who use online social media sites like Facebook, Twitter

“These days everyone has the same data about the present, and the same ignorance regarding the future.”

Howard Marks, Co-Founder & Co-Chairman of Oaktree Capital Management
New World Order

Human Behavior Changes
Corporate Behavior Changes
Geopolitical Rebalancing
Navigating the Unknowns
Impact on the 2020 Election
Human Behavioral Changes

More rapid technology adoption and digitization
- Payment technologies
- E-commerce
- Virtual experiences and communication
- Remote work and learning
- Support for “on-demand” service sector (“demand to door”)

Increased consumer caution
- Essential purchases over discretionary (especially near term)
- Rising savings rates (2-3% higher typical for recession)
- Higher healthcare and insurance premiums and costs
- Possible slowdown in urbanization trends

More demands on government and public sector regarding:
- Social safety net
- Healthcare reform
- Labor protections

More tolerance of government incursion in the economy
- Increased regulation and private sector influence
- Privacy tradeoffs for health security
- Health and technology based surveillance
- Potential mandatory testing and vaccinations

Rise of virus-free credentials at point of entry
- Conditionality for entrance (buildings, airports, public spaces)
- Digitally enabled immunity passports
- Digitally enable virus testing results
- Contact tracing and surveillance
- Body temperature testing and recording apps

Emergence of new employer-employee social contracts
- Remote working frameworks and guidelines
- Technology enabled organizational behavior
- Regulation and workers’ rights

Rising inequality and political feedback loops
- Impact of COVID-19 on lower skilled jobs
- Impact of rising automation and digitization
- Digitally driven economic and education systems

New World Order

Human Behavior Changes

Corporate Behavior Changes

Geopolitical Rebalancing

Navigating the Unknowns

Impact on the 2020 Election
Corporate Behavior Changes

Rise of “stakeholder capitalism”
• Acceleration of ESG rebalancing to employees and customers
• Focus on the “triple bottom line”: profit, people and planet
• Resilience as a more important ESG factor
• Downward pressure on buybacks and dividends
• Community and employee investment priorities
• More attention to healthcare needs

“Resilience” as an elevated strategic priority
• Liquidity, funding and operational risk management
• Supply chain security over speed and cost
• Physical footprint risk and vulnerabilities
• Data and cyber security

Supply chains revisited
• Resilience and security prioritized over cost and speed (i.e., just-in-time supply chains)
• Diversifying exposures, and moving closer to home where possible
• Government mandates on proximity of pharma, medical and technology
• Re-examining China risk and profile
• Contingency planning for tail-risk scenarios

Capex reallocations toward strategic priorities
• Redirecting more constrained investment resources
• Ensuring revenue growth in the face of slower GDP growth
• Investing in digitization, security and the future

Corporate Behavior Changes

“Reputation” as an important part of brand
- Company role and behavior during the crisis
- Corporate leaders as early movers on social distancing
- Companies leading as technology and communication platform innovators
- Companies leading on PPE, ventilators and testing equipment
- Companies leading on virus R&D (vaccination, testing, treatments)

Centralized Treasury functionality
- COVID stretched business continuity challenges
- Management of FX cash pools, liquidity, hedging strategies, trade and supply chain finance

Accelerating digital transformation: more virtual, less physical
- Evolving technology channels for customer engagement
- Digital processes, automation and AI as productivity drivers
- Data driven strategy and decision-making
- Lighter physical space footprints
- Leaner employee headcount, slower rehiring
- More tolerance of remote working
- Lowering barriers for improvisation and experimentation

More nationalist protectionism in the corporate sector
- More protection for domestic companies
- Pushback on activist investors
- Pushback on unwanted acquirers and cross-border mergers
- Increased utilization of poison pills by companies

Industries More Exposed to China Off Shoring

COVID-19 will likely accelerate the bifurcation of the global economy and rerouting of global supply chains that had already begun with China’s rising labor costs and trade war acceleration. However, certain industry sectors are more likely candidates for reshoring than others.

**Observations**

- China’s virus containment errors likely to accelerate the “great de-coupling”
- Security of supply chains becoming more important than speed and cost considerations
- Tech, pharma and auto may be under highest pressure to re-shore closer to home
- Automation opportunities an important part of re-shoring decisions
- Rising non-tariff restrictions may become a catalyst (emerging tech or pharma restrictions)
- Industries where Chinese labor costs capped less vulnerable
- Certain high investment, capital intensive industries may take longer to move
- Supply chain diversification does not necessarily mean “back to the US”

New World Order

Human Behavior Changes
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Debt and deficit constraints, evolving priorities
- Higher allocation to healthcare (5-10% of GDP historically)
- Higher allocation to economic recovery
- Higher government bond issuance
- Higher sovereign risk premiums
- Higher taxes

Increased government spending on healthcare
- Capacity increases (hospitals, beds, ICUs)
- Equipment increases (PPE, ventilators, testing)
- R&D research (vaccines, treatments)
- Hospital, bed and ICU capacity
- Urban planning improvements

Government technology system upgrades
- Addressing decaying and outdated systems ill-equipped for crisis response
- Upgrading technology, coordination and communication capabilities
- Accessibility and payment processing technologies for unemployment
- Strengthening coordination and communication architecture in healthcare response
- Cyber and data security

Government incursions into the private Economy
- Side effect of being the “payer, lender and insurer” of last resort will encourage governments to take action to ensure resiliency (Source: McKinsey)
- Increased regulation of private sector
- Larger government role in public health (paid sick leave)
- Rules on domestic sourcing and workplace safety
- Protection of domestic industry

Source: Atlantic Council, Council of Foreign Relations, WSJ, Financial Times, NY Times, Deloitte, PWC, Brookings Institute, Hudson Institute, Henry Kissinger Institute, AEI, Center for American Progress, Harvard University, McKinsey Institute, Eurasia Group.
De-globalization trends accelerate
• Rising tariffs, declining trade volumes
• Populism and nationalism over multilateralism
• Less open immigration policy; tighter border controls
• More travel restrictions, especially to high risk virus areas
• Rising protection for domestic industry and companies
• On-shoring critical corporate supply chains closer to home

Acceleration of US - China decoupling and structural rivalry
• Continued rebalancing and unwind of co-dependencies (trade, tech, financial)
• US tech restrictions: semiconductors, telecommunications, AI, and aviation
• Expansion of US CFIUS, FIRRMA and national security investigations targeting China
• China investment and diversification strategies (i.e., Belt & Road)
• China accelerating domestic technology sourcing (Made in China 2025)
• Reinvigorated Chinese state support for technology and industry

Renewed challenges to Euro Area stability and currency union
• 3rd crisis in a decade (Euro, migrant, COVID)
• Sharper divisions (North-South), and stronger crisis mechanisms (ECB, ESM)
• Fiscal and growth constraints
• Impact of balance of power shifts globally

More structurally vulnerable EM complex
• Most highly impacted by de-globalization trends
• COVID-19 vulnerabilities high; policy response tools weak
• Significant fiscal sustainability, growth and funding concerns
• Socio-political and governance challenges rising

Source: Atlantic Council, Council of Foreign Relations, Foreign Affairs, NY Times, Deloitte, PWC, Brookings Institute, Henry Kissinger Institute, AEI, Center for American Progress, Harvard University, McKinsey Institute
Rising Debt & Deficits

The United States and numerous other global economies are expected to have a full decade of normal course debt/GDP growth in just 1-2 years. According to DB research, 2020 US deficits are expected to expand to 21%. US debt to GDP is projected to increase from 79% to 100% this year alone.

Fiscal balance, % of GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>2019</th>
<th>2020E</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>(-21.0%)</td>
<td>(-21.0%)</td>
</tr>
<tr>
<td>Italy</td>
<td>(-12.2%)</td>
<td>(-1.5%)</td>
</tr>
<tr>
<td>Spain</td>
<td>(-12.1%)</td>
<td>(-2.0%)</td>
</tr>
<tr>
<td>France</td>
<td>(-3.1%)</td>
<td>(-1.3%)</td>
</tr>
<tr>
<td>Germany</td>
<td>(-11.3%)</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Gross public debt, % of GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>2019</th>
<th>2020E</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>79.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Italy</td>
<td>135.3%</td>
<td>159.9%</td>
</tr>
<tr>
<td>Spain</td>
<td>95.9%</td>
<td>116.8%</td>
</tr>
<tr>
<td>France</td>
<td>99.2%</td>
<td>117.3%</td>
</tr>
<tr>
<td>Germany</td>
<td>59.2%</td>
<td>71.4%</td>
</tr>
</tbody>
</table>

Taxation in a Time of Crisis

While it may take years, higher taxes and fewer Government services are an inevitable response to the rising debt burdens of recent years. Over the last 150 years, the US has a strong historical precedent for higher taxation during times of great crisis.

Revenue Act of 1861
President Abraham Lincoln imposes import taxes and a 3% tax on high incomes to fund the Civil War.

Revenue Act of 1916 / War
President Woodrow Wilson reinstates the estate tax, raises the income tax on top earners to 15% and expands the corporate tax to pay for WWI. These taxes were significantly expanded in 1917, with the top bracket rising to 67%.

The Current Tax Payment Act of 1943
Passed into law under President Franklin D. Roosevelt, the US Treasury Department began tax withholding to finance WW2, with the top rate rising above 90%.
New World Order

Human Behavior Changes
Corporate Behavior Changes
Geopolitical Rebalancing

Navigating the Unknowns
Impact on the 2020 Election
Navigating the Unknowns

#1: Vaccination breakthrough
Number of new trials registered each week, globally

#2: Oil capitulation

#3: EM stress
Portfolio flows to EM, USD bn

#4: US Dollar strength
USD denominated EM non-financial corporate debt, USD tn

Source: (1) Anticovid by inato. (2) Bloomberg. Data as of April 28, 2020. (3-4) IIF. USD denominated EM debt is for the 22 emerging market economies tracked by the IIF. Data as of April 28, 2020. Fund flows are non-resident portfolio flows to EM.
Navigating the Unknowns

#5: Accelerated credit defaults
US speculative grade default rate forecast

#6: Bank sector financial stress
Allowance for loan and lease losses, all commercial banks, USD bn

#7: Euro Area stability
Italian 10 year government bonds

#8: Earnings uncertainty
S&P 500 full year 2020 consensus earnings forecast

New World Order

Human Behavior Changes
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Navigating the Unknowns

Impact on the 2020 Election
Labor Markets in US Election Battleground States

Labor markets in several of the key 2020 US Presidential election battleground states have been among the hardest hit, most notably: Pennsylvania, Michigan, Ohio, Florida, Arizona, Nevada, Colorado, Iowa and Virginia.
The States That Matter Most

While former Vice President Biden is currently leading in a majority of the states that matter most, many of the poll differentials are within the 3-5% margin of error.

<table>
<thead>
<tr>
<th>State</th>
<th>Trump</th>
<th>Biden</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennsylvania</td>
<td>41.3</td>
<td>48.0</td>
<td>Biden +6.7</td>
</tr>
<tr>
<td>Michigan</td>
<td>41.0</td>
<td>46.5</td>
<td>Biden +5.5</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>44.0</td>
<td>46.7</td>
<td>Biden +2.7</td>
</tr>
<tr>
<td>Ohio</td>
<td>44.0</td>
<td>45.0</td>
<td>Biden +1.0</td>
</tr>
<tr>
<td>Florida</td>
<td>43.3</td>
<td>46.5</td>
<td>Biden +3.2</td>
</tr>
<tr>
<td>North Carolina</td>
<td>47.3</td>
<td>46.0</td>
<td>Trump +1.3</td>
</tr>
<tr>
<td>Arizona</td>
<td>44.2</td>
<td>48.6</td>
<td>Biden +4.4</td>
</tr>
<tr>
<td>Colorado</td>
<td>43.0</td>
<td>46.0</td>
<td>Biden +3.0</td>
</tr>
<tr>
<td>Virginia</td>
<td>41.0</td>
<td>48.3</td>
<td>Biden +7.3</td>
</tr>
<tr>
<td>Iowa</td>
<td>51.0</td>
<td>41.0</td>
<td>Trump +10.0</td>
</tr>
<tr>
<td>Nevada</td>
<td>41.0</td>
<td>44.0</td>
<td>Biden +3.0</td>
</tr>
</tbody>
</table>

Source: (1) Real Clear Politics. Based on RCP Average when available. Ohio polling data is from 270tow in Iowa, Colorado, Nevada are FiveThirtyEight polls.
Voting in US Elections by Mail

While the majority of US states do not require a reason to vote by mail, 16 US states do require a reason to vote by mail. 5 US states already rely almost entirely on mail for elections.
When will this end?

When this ends...we will see entire nations come together to honour the bravery of those who showed up, day after day, night after night, to serve them.

*The Phoenix, a COVID-inspired video about love and loss, hope and strength, by Irish creative agency, The Tenth Man*
COVID-19 Reports

Feb 2020
Containing the Coronavirus

Mar 2020
Coronavirus Contagion

Mar 2020
Maximum Containment, Social Distancing & the Economics of Stoppage

Mar 2020
The COVID-19 Corporate Checklist

Apr 2020
The COVID-19 Global Policy Response

Apr 2020
The COVID-19 Global Policy Response
Past Reports
Past Reports

Feb 2020
The Road to 270

Jan 2020
This Time is Different

Nov 2019
Superpowers with Structural Issues

Oct 2019
Mixed Signals

Aug 2019
Accommodation, Escalation & Retaliation

Jun 2019
US Recession Watch

Apr 2019
Pervasive Forces

Mar 2019
The Watchman

Nov 2018
Reflections

Nov 2018
Perspectives on Markets & the 2018 US Midterms

Sep 2018
Thinking Differently About Trade Risk

Jul 2018
Delicate Balancing Act
Past Reports

May 2018
Underestimating US Tax Reform

Mar 2018
Regime Change

Dec 2017
The US Tax Cuts & Jobs Act

Nov 2017
A November to Remember

Nov 2017
Here Comes the Senate

Nov 2017
The House Moves First

Sep 2017
Power, Politics & Markets

Jul 2017
Bond Market Signals

May 2017
Tax Reform Lite

Apr 2017
Dovish Fed Liftoff

Feb 2017
The US Tax Code

Jan 2017
The First 100 Days
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Tom Joyce is a Managing Director and Capital Markets Strategist within Deutsche Bank’s Corporate Finance division. Based in New York, Tom heads a team that creates customized analytical content for multinational US corporates and Fortune 500 companies. His team provides in-depth analysis on the impact of economic, political, public policy and regulatory dynamics on the US credit, foreign exchange, rates and commodities markets.

Tom has nearly 25 years of Investment Banking experience at Lehman Brothers (10 years) and Deutsche Bank (14 years) in New York, London, Hong Kong, and San Francisco. Over the last 14 years, Tom created and built the Capital Markets Strategy role within Deutsche Bank’s Investment Bank. He has previously served as the host of the Corporate Finance Monday morning meeting (4 years) and the Managing Director Promotion Committee (2 years).

Tom’s educational background includes a year of study at Oxford University from 1991 - 1992, a Bachelor of Arts in Political Science from Holy Cross College in 1993, and a MBA from Kellogg Business School, Northwestern University in 2000.

Tom resides in New Canaan, CT with his wife and four sons, where he serves on the Board of Trustees of the New Canaan Library, and the Board of the New Canaan Football (Soccer) Club. He also coaches youth soccer, basketball and lacrosse.

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Frank Kelly is the Head of Government & Public Affairs for North and Latin Americas. In this role, he advises executive management on strategic issues across all business platforms while managing and coordinating relationships with elected officials and political and legislative bodies globally.

Additionally, he heads up the Bank’s U.S. Direct Investment Advisory Group (DIAG) providing strategic counsel to non-US companies engaged in cross-border mergers and acquisitions requiring regulatory and political approvals. Frank also serves as the Bank’s Chief Political Risk Strategist advising clients on geopolitical and domestic risk issues and their impact on markets and industry sectors.

He also represents Deutsche Bank on the Board of Directors of the Securities Industry and Financial Markets Association (SIFMA). Previously, Frank was the Bank’s Head of Communications & Public Affairs – Americas overseeing legislative and regulatory matters, corporate and internal communications, branding and advertising and conferences and events for Deutsche Bank in the Western Hemisphere.

Prior to joining Deutsche Bank, Frank held senior positions at both Charles Schwab & Co. and Merrill Lynch & Co, Inc.

Before joining the private sector, Frank served at the U.S. Securities and Exchange Commission as Chief Spokesman and Senior Policy Advisor to the Chairman as well as the US Department of Justice as Assistant to the Director for Policy Development managing international issues.

Prior to these posts, he served on the White House staff of George H. W. Bush and, earlier, on the staff of the Ronald Reagan White House where he started as a writer for President Reagan.

He is a member of the Council on Foreign Relations and the International Institute of Strategic Studies. He serves as a member of the Board of Directors of the American Council on Germany and American Institute for Contemporary German Studies.

Frank, his wife, Maura, and their two living children reside in Great Falls, Virginia.
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Prior to joining Capital Markets Strategy, Hailey spent nearly three years in Deutsche Bank’s Consumer Equity Specialty Sales group. As part of the Global Markets division, her team focused on providing insights, opinions, and flow updates on the consumer equity space to the bank’s largest institutional investor clients.

Hailey graduated with honors from the University of Michigan’s Ross School of Business with a BBA and a minor in International Studies.

In March 2020, Crane’s New York Business Magazine named Hailey one of the “Rising Star's in Banking and Finance.”

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