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COVID-19: The Global Shutdown

In the first months of 2020, a pandemic overwhelmed the world. COVID-19, commonly known as the coronavirus, spread from China and created a severe public health emergency across countries. On March 12, 2020, COVID-19 was declared a pandemic.

The outbreak affected all facets of society. First and foremost, people worried about the potential number of fatalities and sick patients. Concerns about overwhelming the health care system led countries to enforce measures to spread out the impact of the virus on the population at any point in time. As there was no cure or vaccine for the virus as of 2020, society needed to rely on the actions of all people to keep cases at a manageable number over time. The concept of “flattening the curve” came out of dire situations in China and Italy, where so many people had coronavirus at any one point in time that hospital beds were overrun and protective equipment could not be replenished in time for medical staff and other essential workers to safely attend to patients. Policies to flatten the curve would delay the peak of the crisis, buying time for hospitals to take care of the sick and world scientists to develop better treatments and hopefully discover a vaccine. Bringing the number of infected cases to a manageable level relied heavily on actions that limited interactions between people. To enforce this process, multiple governments closed restaurants, public spaces and private activities.

Economically, the virus produced a major shock, first through China’s initial contraction of the disease at the start of 2020. Then workplace absences disrupted supply chains, creating a supply shock in the global economy. Flights were canceled and often banned between countries, and passenger temperature checks were taken at airports and other transport hubs. Large-scale events were cancelled, quickly followed by even small gatherings. Businesses closed and communities had to redefine socializing to be limited to virtual interactions. Many governments imposed mandatory closures of activities deemed nonessential, forcing individuals to stay home. Lower consumer demand, investment uncertainty, and liquidity constraints for firms and individuals produced a demand shock. The world went into a state of unprecedented shutdown. World trade, tourism, capital flows, remittances, and commodity prices collapsed. Prior to the coronavirus outbreak, the global GDP growth rate for 2020 was expected to be close to 2.3%. As of April 2020, multilateral organizations estimated that GDP would contract by 3% – way worse than the 0.1% contraction of 2009, and the deepest dive since the Great

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Depression (See **Exhibits 1^a and 2**).¹ Three months into 2020, the economy had tanked even lower than in 2008 – indeed, what the International Monetary Fund (IMF) labeled “the Great Lockdown” had induced what would be known as the “mother of all crises”.

While an immediate fear of the disease’s impact on human life permeated society, the world battled another concern for the severe economic downturn that was brought about by attempts to suppress the virus. As Harvard Professor Carmen Reinhart noticed, “this time was truly different.”² How much were policymakers and individuals willing to give up in order to keep their communities safe? Was there a terrible choice – either damage livelihoods through extended lockdowns, or sacrifice thousands or even millions of lives to the virus – or were policies reinforcing? What policy options existed to mitigate the financial and economic distress of containment, and what factors did different countries weigh in deciding which paths to choose? What was the role of government, businesses, communities and individuals? After the worst of the health crisis was mitigated, what kind of shape would world economies take?

The Pandemic: Impact of the Virus

Coronaviruses were a type of virus that could cause acute symptoms and illness in animals or humans. Coronaviruses such as the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) were known to cause severe infections.³ COVID-19 was the most recent disease, identified in December 2019 in Wuhan Hubei Province, China (see **Exhibit 3**). On January 7, 2020, Chinese authorities isolated the new type of coronavirus, and the genetic sequenced was shared on January 12, 2020.⁴ The first lab-confirmed case outside of China was diagnosed in Thailand on January 13, 2020, with confirmed cases then spreading to Japan (January 16) and South Korea (January 20). The first case reported in the United States was of a 35-year-old man in Snohomish County, Washington, who had returned from a trip to Wuhan (January 21).⁵ From then on, the disease spread worldwide at an exponential rate. On February 11, the World Health Organization (WHO) officially named the disease COVID-19 – an acronym for “coronavirus disease 2019.”⁶ It was not until March 11, 2020 that the WHO declared it a “Public Health Emerging of International Concern.” The delay in declaring a pandemic – a disease that spreads across multiple countries around the world at the same time – and the role of General Director Tedros Adhanom Ghebreyesus, was widely criticized.⁷ By the end of April 2020, there were active COVID-19 cases in 187 countries (See **Exhibit 4^b**).

According to the WHO, the Center of Disease Control and Prevention (CDC) and John Hopkins Medicine, COVID-19 symptoms included dry cough, fever, shortness of breath, muscle aches, tiredness, sore throat, unexplained loss of taste or smell, diarrhea and headaches. COVID-19 could be severe and caused deaths. Some people became infected and were asymptomatic, while others became seriously ill. In some cases, COVID-19 led to severe respiratory problems, kidney failure, heart problems, blood clots or death. Older people, and those with pre-existing medical conditions such as heart and lung problems, diabetes, high blood pressure, or cancer, were at higher risk of developing serious symptoms.⁸ Authorities cautioned, however, that “anyone who caught COVID-19 could become seriously ill”, with younger populations and even children dying from the disease.⁹

^a International Monetary Fund Data Mapper – For live updates of real GDP growth, see: https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOORLD

^b Johns Hopkins COVID-19 Dashboard – This map tracks COVID-19 cases, including recoveries, deaths and current cases. For live updates, see: <https://coronavirus.jhu.edu/map.html>.

The new coronavirus spread from person to person, mainly through respiratory droplets. It was noted that people with very mild symptoms of COVID-19 or no symptoms could transmit the virus, hampering tracing and containment. The WHO noted that “People can catch COVID-19 if they breathe in these droplets from a person infected with the virus. This is why it is important to stay at least 1 metre (3 feet) away from others. These droplets can land on objects and surfaces around the person such as tables, doorknobs and handrails. People can become infected by touching these objects or surfaces, then touching their eyes, nose or mouth.”¹⁰

As of 2020, there was no COVID-19 vaccine and few proven treatments. Research on the virus was carried out by universities, labs, biotechnology, pharma and health care companies in what became a race against time to understand how the virus spread, its effects, and treatments using traditional and experimental approaches (See **Exhibit 5^c**). Within months of the spread of the disease, several firms had attempted promising trials.¹¹ Cambridge-based Moderna started clinical trials on March 15, 2020 using RNA technology. The company made a pact with Lonza Group AG to manufacture 1 billion doses of experimental vaccines a year.¹² Inovio prototyped DNA technology while Novavax and Johnson & Johnson pursued more traditional approaches with the hope that existing manufacturing capabilities would allow for faster and lower costs of scaling up vaccine production. Oxford University was hopeful that its efforts could allow for emergency use of a potential vaccine as early as fall 2020.¹³ Several drugs were given emergency use approval,¹⁴ such as Remdesivir, which trials showed helped patients accelerate recovery.¹⁵

Dr. Anthony S. Fauci, head of immunology at the National Institute of Allergy and Infectious Diseases (NIAID) and the top infectious disease expert on the Trump Administration’s coronavirus task force, estimated that a vaccine would not be available for mass use before 2021 and “could arrive in at least 12 to 18 months.”¹⁶ One concern was that vaccines could inadvertently cause disease enhancement, in which vaccinated people could develop more severe symptoms than unvaccinated people. Animal testing of early SARS and MERS vaccines had displayed these complications.¹⁷ Even if a vaccine were to be developed quickly, poor countries worried about limited access to vaccines.

Health Concerns and Policies: Containment Measures

With no vaccine for COVID-19 as of 2020, the world depended on non-pharmaceutical interventions (NPIs) to keep down rates of infection. Additional scientific and medical prevention guidelines included frequent handwashing with soap water or alcohol-based disinfectants, coughing into the bend of one’s elbow, staying home, and wearing face coverings.¹⁸ Face coverings were already common in many Asian countries, and were slowly included on the list of prevention measures worldwide. COVID-19 emerged in a period of close international integration and could spread through asymptomatic carriers, leading to faster transmission than in previous pandemics.¹⁹ As such, the rapid global spread of COVID-19 called for unprecedented, large-scale containment.

Experts looked to the last pandemic of this magnitude – the Spanish Influenza from 1918-1920 – for signs of what was to come. The Spanish Influenza infected one-third of the world’s population and caused 50 million deaths worldwide, including 0.66% of the U.S. population. Research found that cities that had implemented early and extensive NPIs suffered fewer economic consequences in the medium term relative to other cities.²⁰ Another lesson was that pandemics can have long-lasting negative effects on the economy. A reduction in the labor force, due to mortalities in 1918 and lockdowns in 2019, raised

^c Milken Institute Vaccine Tracker – This institute tracks publicly-available information on various types of treatment and vaccine research for COVID-19. For live updates, see: <https://milkeninstitute.org/covid-19-tracker>.

the ratio of capital to labor and lowered the rate of return to capital, slowing capital accumulation and GDP growth for potentially many years.²¹ Additionally, pandemics historically depressed aggregate demand and generated decades of low interest rates due to high precautionary saving and low investment.²² The extent to which these trends applied to COVID-19 depended on decisions on containment, fiscal policy, and monetary policy.

Society adopted “social distancing” measures to reduce human interaction and contact, with countries adhering to this ethos with varying levels of stringency.^d Many cities, regions and nations enforced generalized lockdowns, which was an accepted method to keep down infection rates amidst a lack of information on who was susceptible or infected.

Other strategies involved mass testing for the virus, using representative regional samples rather than just testing suspicious cases. Some countries also arranged contact tracing measures to track and test people who had come into contact with the infected. However, some groups worried about the loss of privacy implications of widespread tracing measures. COVID-19 had more severe effects on the elderly and sick, so a less economy-striking strategy could focus on just isolating these vulnerable populations. The tradeoff between reducing the risk of spreading the virus and achieving a sustainable state of the economy remained a battle that each country needed to weigh.

China As the first country to be affected by coronavirus, China enforced restrictions on movement throughout the country. The earliest known case of COVID-19 was found in Wuhan, China on Dec 10th, 2019. It was not until December 31st that the World Health Organization (WHO) China Country Office was informed of cases of pneumonia unknown etiology (unknown cause) detected in Wuhan City, Hubei Province of China. From December 31st, 2019 through January 3rd, 2020, a total of 44 case-patients with pneumonia of unknown etiology were reported to the WHO by the national authorities in China.²³ During this reported period, the causal agent was not identified. The first dead occurred on January 9th, 2020.²⁴

Although health officials were still tracing the exact source of this new coronavirus, early hypotheses linked the first case to a seafood market in Wuhan, China. On January 11th and 12th, the WHO received further information from China’s National Health Commission that the outbreak was associated with exposures to one seafood market in Wuhan City.²⁵ The Commission later noted, however, that “the individual with the first reported case became ill on Dec. 1, 2019, and had no link to the seafood market.” The lack of transparency and delays in reporting were widely criticized, although many countries censured their positions.²⁶

By mid-January, Wuhan had become the center of the epidemic, and Chinese authorities stopped movement in and out of 16 cities in Hubei Province – a population of 60 million people. 760 million people were ordered to stay home except to obtain groceries and medical help. Though considered authoritarian at the time, these strict social distancing measures would soon be replicated in some form across the world. From March 16th, anyone who arrived in Beijing from abroad had to undertake 14 days of quarantine. From March 28th, the travel restriction intensified by temporarily suspending entry of foreign nationals.²⁷

^d Oxford’s Coronavirus Government Response Tracker – This tracker maps government responses, including containment and closures (such as restrictions and cancellations of events, business and school closures), health responses (such as contact tracing and testing) and economic measures (such as income support and fiscal policies) and various other data visualization tools relating to COVID-19. For live updates, see: <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>.

Italy Italy was next to be placed under the international spotlight as cases rose and the COVID-related death toll surpassed that of China. The first case was reported on January 31st from Chinese tourists in Rome who tested positive for the virus. A cluster in Lombardy was later confirmed, with 16 cases on February 21st, leading the spread of the virus to all regions of the country. By late March, 5,500 Italians had lost their lives and 60,000 Italians had contracted the infection, leading the government to enforce draconian lockdown policies. Schools shut down and public gatherings were banned. On March 10, the entire country went on national lockdown as non-essential economic activities were closed and people were advised to stay at home except for essential purposes.²⁸ As the first Western country to enforce such stringent measures, Italy's actions slowed the virus and set a precedent that other countries would soon follow.

Iran Iran had the next cluster of outbreaks and was one of the hardest hit countries in the Middle East. Within seven days of its first case, Iran had 100 confirmed cases – the quickest rate of any country at the time—including several public officials. The alarming spread occurred in part due to the country's decision to delay canceling public events, as the outbreak coincided with Iran's parliamentary election on February 21st.²⁹ The death toll reached over 2000 in a month, and was a sobering example of the need for rapid containment at the start of an outbreak.

United States On March 11th, the U.S. announced that it would close its borders to most European countries. Shortly afterwards, on March 19th, the State Department advised citizens to avoid all international travel. Individual states, beginning with California, issued stay-at-home orders to limit social interaction in the hopes of containing the virus. New York emerged as the nation's worst-hit state, and accounted for almost half of all U.S. COVID-19 cases by the end of March. With its first official case confirmed on March 1st, over half of the state's cases were in New York City.³⁰

The U.S. suffered from poor coordination and inconsistent messaging on containment response. At the federal level, the country lacked a national plan. President Trump provided mixed messages, encouraging Americans to attend Easter services and then urging people to stay indoors through the end of April.³¹ The absence of nationwide coordination at the federal level was a concern among experts. Moreover, in the United States, governors, not the White House, had the authority to enforce social distancing restrictions. State governors held police powers to close restaurants and enforce curfews, but local officials were reluctant to absorb the accompanying political costs without clear federal directives. State Governors, such as New York's Andrew Cuomo, were widely praised for their daily briefings and handling of the crisis.³² These political conflicts created a fragmented response across the U.S.^e For example, Republican Governor Ron DeSantis of Florida delayed closing beaches to avoid harming the tourism industry. Political scientist Scot Greer, at the University of Michigan, pointed out that when Donald Trump was discouraging people from lockdown, DeSantis would have little political cover to anger his pro-Trump voter base. By mid-April, the U.S. was leading the world in coronavirus cases, with a total confirmed number of 561,000.

The European Union The European Union also seemed to be following a decentralized approach, with countries instituting their own policies first as cases surged. On March 17th, however, the EU announced a 30-day travel ban for most visitors from outside EU countries and enforced restrictions on internal movement. All non-essential travel was banned from March 25th until April 3rd, and people had to provide a written declaration to justify being outside. All schools, museums, food services and retail stores were closed. The only industries that remained physically open were ones

^e Federal Reserve Bank of St. Louis Timeline of Events Related to the COVID-19 Pandemic – Documents major U.S. events and decisions. For live updates, see: <https://fraser.stlouisfed.org/timeline/covid-19-pandemic>.

deemed essential, such as grocery stores, pharmacies and banks. Recreational activities were mostly prohibited, with the exception of solo jogging near the home.³³ Containment responses brought leaders such as German chancellor and scientist Angela Merkel into the spotlight. Merkel was applauded for her rational yet moving appeal to the notion of social cohesion, and Germany responded well by complying with social distancing.³⁴

Sweden enacted a relatively relaxed approach to managing COVID-19, inciting skepticism by some. The government banned gatherings of more than 50 people, but its restrictions were lax compared to its Nordic neighbors.³⁵ Unlike Denmark and Norway, Sweden did not close schools, cancel domestic flights or recommend widespread social distancing. Instead, the country advised that the vulnerable self-isolate.³⁶ This approach received criticism when Sweden saw a fatality rate of 7.7% of COVID-positive people by April 8th, compared to rates of 1.5% in Norway and 3.8% in Denmark.³⁷ Minister of Health Lena Hallengren insisted that Sweden had considered its unique position in avoiding a national lockdown, such as its universal healthcare access and “intensive care capacity of around 20 per cent at national level.”³⁸ In the meantime, the Swedish government considered devising a longer-term and sustainable strategy.

United Kingdom The U.K. distanced itself from its European partners following the outcome to exit the EU.³⁹ Unlike most other European countries, the U.K. initially took a bold approach of managing the virus by attempting to establish “herd immunity”. The U.K. did not shut down large gatherings or enforce social distancing, but instead suppressed the virus through gradual restrictions. The theory behind “herd immunity” suggested that the U.K. could control the spread of COVID-19 if a high enough proportion of society caught the virus and became immune. It was estimated that the U.K. could achieve herd immunity if 60% of the population became immune to COVID-19. Simulations of overrun hospitals and medical supplies caused the U.K. to change course on March 16th to reflect social distancing practices in other countries. By March 20th, Prime Minister Johnson had ordered all restaurants, gyms and public establishments to close.⁴⁰ On March 27th, Johnson announced that he had tested positive for coronavirus.⁴¹

Other Approaches Leaders of Brazil, Mexico and India, among others, handled containment in ways that were ill-received by the international audience. Brazilian president Jair Bolsonaro disregarded the outbreak as a “little flu”, opposing key ministers and 24 of 27 governors. Amid Bolsonaro’s threats to fire Health Minister Luiz Henrique Mandetta and insistence that isolation would cost jobs, “the governors across Brazil have never been as united as we are now,” said São Paulo governor João Doria, who advocated for self-isolation.⁴² Mexico’s social distancing measures were similarly initiated by mayors and governors, not the national government. Through the end of March, President Obrador urged Mexicans not to fear COVID-19 and advised to “continue taking your family out to eat...because that strengthens the economy.”⁴³ India’s prime minister took the pandemic seriously, but also incited criticism. On the evening of March 24th, Prime Minister Narendra Modi announced onerous restrictions that would come into force four hours later. The sudden announcement caught people off guard, especially as all businesses – including grocery stores and pharmacies – were immediately closed.⁴⁴ This raised concerns for especially the most vulnerable members of society, who would not have the means to survive at least three weeks of limited access to food and basic needs.

The African continent was one of the last to see cases of the virus. Although the spread seemed more limited, the WHO was concerned about limited testing capacities. Director John Nkengasong of the Africa Centers for Disease Control and Prevention stated that the organization had a target of conducting 1 million tests in Africa over four weeks and 10 million over four months starting in late April, but that reaching these goals would be challenging in African countries due to strained testing

capacities. “It is an uphill battle to build health systems while you need them...That is what we are actually doing now. We are playing catch-up and that is a very, very tough thing to do.”⁴⁵ South Africa’s government implemented a 21-day lockdown starting on March 26th. Nigeria issued stay-at-home orders on March 30th for a more than month-long lockdown in major cities. On March 27th, Kenya implemented an evening curfew that was quickly copied by Senegal, Cote d’Ivoire and Sudan.⁴⁶

Korea, Taiwan and other countries received praise for transparency of cases and rapid containment actions. South Korea was one of the earliest countries to report cases of COVID-19. The country had learned the importance of rapid testing in 2015 when it had experienced the largest Middle East Respiratory Syndrome (MERS) outbreak outside of the Middle East. Between January 19 – February 18, 2020, Korea had a total of 30 cases and was lauded for its policy of widespread testing. Then a woman known as Patient 31 passed the infection to a large number of people, showing the world how quickly the virus could spread from just one person who interacted with crowds.⁴⁷ Korea’s coronavirus cases rose to 10,500 by mid-April. Despite the outbreak that followed Patient 31, Korea’s continued approach of transparent testing and social distancing appeared to restrain the virus to manageable levels.

Taiwan was also an outlier to the norm of enforcing strict social distancing mechanisms. Taiwan, however, received international attention for its success in battling the pandemic. Due to previous experience with SARS, Taiwan did not wait for the World Health Organization to announce a need for action. Taiwan is not recognized as a member of the WHO due to its complicated relationship with China. Instead, Taiwan stopped flights from China and other places with rising COVID-19 cases, broadcasted advice on ways to avoid spreading the virus, and held frequent press conferences to update the public.⁴⁸ Thanks to effective initial control of the virus, Taiwan appeared to be managing the crisis without freezing social life.⁴⁹

Like Taiwan, Iceland focused its efforts on rapid testing rather than locking down the country. Iceland’s small population allowed the government to radically test even those who showed no symptoms.⁵⁰ Though this approach seemed to successfully track the virus in time to prevent spread, it was unclear whether countries with larger populations would be able to adopt a similar approach.

New Zealand also took advantage of its small population and island advantage to make a bold goal – eliminate the virus altogether. The nation shut borders to nonresidents and enforced strict lockdowns. The government’s response garnered an approval rate of 84%, which many attributed to Prime Minister Jacinda Ardern’s consistent yet empathetic messaging.⁵¹ The high level of compliance in places such as New Zealand and Taiwan brought attention to the importance of leadership for social cohesion. As circumstances around the globe would attest, how leaders communicated policies seemed to be just as important as the actual policy decisions in determining a nation’s ability to contain the virus.

Recurring Outbreaks In June 2020, South Korea was the first country to announce that it had experienced a second wave of coronavirus outbreak.⁵² This raised concerns for other nations as pockets of outbreaks began reemerging in countries that had reopened, such as Germany and China. After having reopened, California experienced a surge of almost 75% increases in daily cases in June compared to May.⁵³ These attempts at reopening revealed a stark reality that reductions in outbreaks could quickly bounce back and required community vigilance. As of July 2020, there remained concerns that repeat “waves” of outbreaks would occur in countries in stages of reopening.

Economic Disruption

A Supply Shock

To ease the burden on health systems, policymakers needed to enforce lockdowns to enable social distancing. The ensuing economic effects were enormous. China's shutdowns and slowdown in production of goods caused a ripple effect on countries that relied on components supplied by, and for, Chinese factories. China was the world's largest exporter, producing close to 15% of global products and services. In Wuhan, the epicenter of the outbreak, approximately 500 manufacturing facilities were producing technology and consumer electronics, apparel and textiles, steel and alloys, and others.⁵⁴ As restrictions spread across China, firms all over the world, from Hyundai and Chrysler to Apple, were impacted. Forbes reported that 95% of Fortune 1000 firms were seeing supply chain disruptions.⁵⁵ The U.N. Conference on Trade and Development announced that worldwide foreign direct investment was on track to decline by 40% in 2020, which would cause "lasting damage to global production networks and supply chains."⁵⁶

An additional burden on the global market took the form of a lack of supply of medical equipment. In a short period, restrictions spread to an increasing range of products, beginning with personal protective equipment and later expanding to medicines. Global shortages prompted the European Commission to launch an accelerated joint procurement procedure with 26 Member States.⁵⁷

As in the past, governments looked to businesses to assist with meeting the need for equipment. Among others, GE and Ford revamped their production lines to produce hand sanitizers and respirators.⁵⁸ Businesses such as Uber offered discounted rides to healthcare workers, and banks worked with small businesses to defer credit card payments and provide grant programs.⁵⁹ Of course, the ultimate help that the world sought was a vaccine, which could also come from the private sector.

Social distancing and the closing of borders disrupted even essential supply chains, sometimes in unexpected ways. Countries such as the U.K. depend on seasonal migrant workers to undertake jobs such as fruit picking. In normal years, the U.K. receives 80,000 overseas workers to pick crops. By April 2020, only a third of the usual number of migrant pickers had arrived. Concordia, a work placements charity, attributed the drop to the fact that "the candidate is unable to accept the length of contract, that the farm is too far away from their home, that they don't want to travel [or] commute, care responsibilities that prevent full-time work or that they only want to do part-time work."⁶⁰ The U.S. and Canada's agricultural production depended on pollination via imported queen bees from countries such as Australia and Chile. Restrictions on flights and on the movement of beekeepers between states jeopardized this process.⁶¹

In late April, Tyson Foods, the largest U.S. meat company, warned that slaughterhouse closures due to the virus could break the meat supply chain. Donald Trump issued an executive order to require meat-processing factories to stay open, but concerns of safety and liability shut down meat processing plants and predicted a future meat shortage.⁶² Ironically, despite the impending food shortage, agricultural supply chain disruptions led to food being wasted. A lack of demand from restaurants and cafeterias forced agricultural producers to dump large quantities of food that could not be resized for smaller household consumption. In anticipation of further increased demand, farmers smashed eggs instead of hatching them for chicken slaughter – just one of many examples of supply chain chaos.⁶³

In addition to disruptions to major agricultural industries, the means of food production and distribution changed dramatically. Tufts University professor Tim Griffin estimated that pre-coronavirus, "roughly half the food spending in the U.S. was what we call away from home." Now he

estimates that 90% of household food spending is used to cook at home. Farm food suppliers responded to increased demand for home delivery and drive-by pick-ups from individual buyers rather than large drops at grocery stores. Farm laborers, supermarket employees, and other essential workers in food production and distribution needed to change the way they served the public to allow for social distancing and minimal contact with products.⁶⁴ All stages in the supply chain were affected by containment measures.

A Demand Shock

For the first time since the Great Depression, both wealthy and developing economies were in recession. According to an IMF estimate in April 2020, the cumulative output loss from the first two years of the pandemic was projected to be \$9 trillion.⁶⁵ Harvard economist Kenneth S. Rogoff observed that 2020 experienced “the deepest dive on record for the global economy for over 100 years. Everything depends on how long it lasts, but if this goes on for a long time, it’s certainly going to be the mother of all financial crises.”⁶⁶ In the U.S. alone, unemployment benefit claims rose to a record-breaking 9.9 million from March 26 – April 2, shattering the Great Recession peak of 665,000 in March 2009 and the all-time claims of 695,000 in October 1982.⁶⁷ As workers were laid off and firms stopped investing or even went bankrupt, labor demand decreased. This combination of shocks amplified challenges in the economy. Layoffs made it difficult for companies to hire, which slowed recovery.⁶⁸ COVID-19 presented a unique challenge compared to previous crises. While the Global Financial Crisis had similarly highlighted the dangers of increasingly intertwined economies during a crisis, it had affected mostly developed economies, and particularly those that were tied to the U.S.⁶⁹

Investors hoped that the recession would be a short-lived freeze in the economy, but others were less optimistic. Even if the disease could be contained, the world that would emerge would be choked with the repercussions of mass joblessness and widespread bankruptcy, which would hamper investment and innovation. The stock market dropped in the first months of 2020 (See **Exhibit 6**). If the Great Depression were any indicator, people would continue saving for years after the pandemic. With consumer spending accounting for two-thirds of global economic activity, the aftermath of the pandemic would see a continued drop in purchasing behavior. It seemed unlikely that social distancing measures would disappear completely, and the ensuing effects on mental health and consumer spending could not be projected. The world looked to China as a predictor of consumer confidence, since it was the first country to report the virus. By March 2020, China had returned to manufacturing but not to spending. Industrial output rebounded to almost record levels, yet shaken by job loss and confinement, Chinese consumers spent one-sixth of the amount that they had spent on retail the previous March.⁷⁰ When Germany became the first European country to reopen shops, a similar lack of retail spending further illustrated low consumer confidence. These early examples of reduced spending did not bode well for the recovery of the global economy.

The drop in international demand of goods would continue to depress the economy. The World Trade Organization (WTO) forecasted a global trade volume contraction between 13-32% compared to the previous year. “We project that trade in 2020 will fall steeply in every region of the world and basically across all sectors,” WTO director Roberto Azevedo said.⁷¹ Lack of demand for commodities affected natural resource demand from copper giants Chile and Peru, zinc countries of Brazil and India, and the oil producers of Colombia, Algeria, Mozambique and Iraq.⁷² By late March, oil prices alone had declined to the lowest levels since 2003 (See **Exhibit 7**).⁷³

The shutdown in China in early 2020 sunk a demand in fossil fuels. Riyadh pleaded with Moscow to cut production and keep prices high, but such an action would only support America’s shale industry. Moscow initially refused, and on March 7th Riyadh announced that it would continue

production. Oil prices collapsed to a historic low, and markets quickly followed. Central banks undertook massive efforts to keep the ensuing recession from spiraling further.⁷⁴ On April 12th, the Organization of the Petroleum Exporting Countries (OPEC) reached an agreement with oil-producing countries to cut 9.7 million barrels a day from May. The May benchmark for oil fell into the negatives, implying that people would pay to get rid of their oil. Traders worried that the U.S. would run out of oil storage space. These fears added to doubts that OPEC's agreement with oil producers to cut production would be insufficient in protecting markets from the record surplus that had resulted from a worldwide collapse in demand due to lockdowns.⁷⁵ Indeed, all economies were predicted to suffer from the effects of the pandemic.

For developing countries, the situation looked especially dire. As U.N. trade body director Richard Kozul-Wright observed, the "economic shocks have actually hit most of [the developing countries] before the health shocks have really begin to hit."⁷⁶ Economists expected to see collapses in access to foreign income and capital markets (see **Exhibit 8**) Several factors limited access to foreign income, including a drop in commodity prices, a halt in tourism, and collapse in remittances.⁷⁷ Countries such as Haiti, Kyrgyzstan and Nepal were highly dependent on remittances, which collapsed during the economic recession.⁷⁸ Developing countries faced further challenges due to limited access to capital markets. Countries with inflexible exchange rates struggled to adjust to access capital markets. Ethiopia and Sri Lanka had crawling pegs, and El Salvador and Panama had dollarized exchange rates. In a normal economy, this dependency on other currencies increased stability; during the coronavirus crisis, however, these rigid approaches limited the countries' central banks from lending beyond short-term emergency funds.⁷⁹

Differences in demographics and socioeconomic factors between wealthy and poorer countries also factored into decisions about when a country needed to choose to flatten the curve or spare the economy. Developing countries tended to have younger populations, with large informal sectors and, in some countries, smaller networks of human interaction.⁸⁰ While these factors could lessen the severity of the effects and spread of the virus, developing countries faced additional response capacity challenges of fewer doctors and limited hospital beds and medical supplies. With fewer resources per capita and weaker border controls, these nations faced risks that could offset demographic advantages.

After the immediate medical capacity crisis, the predicted food shortage crisis was expected to be particularly disastrous for developing nations. In 2019, 135 million people experienced acute food insecurity. A UN report revealed that people weakened by existing food crises would be especially vulnerable to the coronavirus. "We must keep critical food supply chains operating, so people have access to life sustaining food...to keep people in crisis fed and alive," the study said. A lack of food is often associated with a lack of healthcare, and the report showed that African countries such as Yemen and the Democratic Republic of the Congo would be disproportionately affected.⁸¹ A UN policy brief also showed that the Arab region would be severely impacted due to its high dependence on food imports and medical supplies, and estimated that 8.3 million people in the region would fall into poverty due to the coronavirus.⁸²

Economic Policies

Forecasters warned that the economic impact of the pandemic would cause a deep recession.⁸³ Kristalina Georgieva, Managing Director of the IMF, described this crisis as unique because it was "more complex, with interlinked shocks to our health and our economies that have brought our way of life to an almost complete stop; more uncertain, as we are learning only gradually how to treat the novel

virus, make containment most effective, and restart our economies; and truly global.”⁸⁴ The IMF projected that at least 170 countries worldwide would see their income per capita fall.⁸⁵

Debates on how individual countries or even counties would save their economies and return to normal life were on everyone’s minds. When could people return to work? Which critical and least-crowded activities be allowed to re-open? Even if leaders gradually allowed people to return to previous lifestyles, how would the world have changed with no apparent cure for an ongoing virus? Governments and multilateral agencies around the world reacted to these concerns with bold measures and packages.^f

Fiscal Policy

Effective fiscal policy was seen as a major factor in sustaining the economy amidst unprecedented global lockdown. COVID-19 was not a permanent shock, but a short-term disaster. A consensus led by multilateral organizations emerged that countries needed to spend as much as possible to mitigate the economic costs. Long-term and non-essential expenditure was placed on halt as governments attempted to address healthcare, unemployment and financial needs. However, countries and states lacked a fiscal buffer due to previous expansionary policies and high debt. These existing burdens were magnified by declined tax revenue and increased expenditure, along with other COVID-19 effects.

On March 6th, Congress passed an emergency fiscal package of \$8.3 billion to target the healthcare crisis. Additional measures soon followed to assist the labor force and free up liquidity. The U.S. pushed back dates to pay 2019 taxes to July 15th, freeing up approximately \$300 billion of short-term liquidity. In addition to healthcare bottlenecks that resulted directly from COVID-19, countries faced fiscal stimulus needs due to lockdowns and layoffs. On March 25th, the U.S. Senate passed legislation to approve the largest stimulus package in recent memory, which would provide \$2 trillion to shield American families and businesses from financial consequences. The legislation would allocate \$116 billion to healthcare needs and equipment. It would also compensate employees who were affected by Covid-19 due to sick leave or unemployment, and provide one-time checks of \$1,200 to Americans below certain income thresholds.⁸⁶ The package would also provide \$350 billion in loans to small businesses, and \$500 billion in corporate aid to backstop Federal Reserve loans and assist companies deemed crucial to national security, such as Boeing and General Electric.⁸⁷ The Congressional Budget Office projected the fiscal deficits to be the highest since 1945, and debt to be the highest in U.S. history.^g

European countries also created stimulus packages to keep the economy afloat. On March 18th, the European Central Bank launched a Pandemic Emergency Purchase Program worth €750 billion, or 6.5% of GDP, to support governments in a quick response to the virus and related challenges. EU leaders agreed to a €25 billion investment fund to tackle COVID-related economic distress.⁸⁸ The European Commission (EC) guaranteed €8 billion specifically to small and medium enterprises (SMEs) and mid-cap firms, and provided “credit holidays” for debtors who were affected by the virus. The EC also allocated resources to healthcare and unemployment reinsurance.

On top of resources for European countries, individual countries established fiscal injections and programs to increase liquidity. For example, Italy allocated €25 billion, or 1.5% of GDP, to the

^f IMF Policy Responses to COVID-19 – This policy tracker summarizes the severity of COVID-19 cases, and fiscal, monetary, exchange rate and balance of payments policy responses by country. For live updates, see: <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>.

^g For live updates of the U.S. fiscal outlook, see: <https://www.cbo.gov/topics/covid-19>.

pandemic. The funding contributed to the health system, supported disrupted employment, delayed mortgage payments, and increased capacity for SME credit guarantees. Italy also deferred tax and payment deadlines for at least March and April. Germany broadened existing programs to ease firms' access to affordable loans, and enabled tax payment deferrals for businesses while committing targeted funding to small firms and self-employed individuals for running costs for three months.

Among countries' approaches to dealing with the financial repercussions of COVID-19 included direct demand stimulus packages amounting to \$5 trillion. For many countries, such as China, stimulus took the form of income tax cuts and subsidies for individuals and small businesses that were impacted by business shutdowns.⁸⁹ China's government planned to increase its budget deficit by up to 4% of GDP when the 2020 budget was passed in April.⁹⁰

Another approach that was taken in tandem with some direct stimulus packages was establishing programs to combat unemployment.^h Controversial short-term work subsidies allowed employers who experienced temporary reductions in demand to weather these periods without the costly process of laying off and then rehiring their employees. Many countries, including Denmark, Ireland, Japan, the U.S. and U.K. implemented these policies. Australian economists even went so far as to estimate that their government's employer wage subsidy "saved" between 686,000 and 1 million jobs.⁹¹ The negative side to preserving short-term work was that it could prevent workers from pivoting to high-productivity firms during recessions. The policy debate between meeting short-term versus medium-term needs continued as the results of workforce-preserving subsidies emerged.

Monetary Policy

Since the Global Financial Crisis in 2008, the world economy had depended heavily on government stimulus. Central banks created markets and distributed property rights, injecting monetary stimulus into the economy, and companies had borrowed significant amounts coming into 2019.⁹² As during the GFC, the negative economic growth from COVID-19 was expected to last at least a year. Additionally, both crises necessitated a coordinated global response as international trade and commodities tanked.⁹³

U.S. Fed Countries took similar approaches to monetary policy, slashing interest rates on loans. In the U.S., the Fed lowered bank loan rates and temporarily relaxed regulatory requirements in order to encourage bank lending. The period in March 2020 was reminiscent of March 2009, when the U.S. tackled a severe recession by cutting interest rates to near zero percent.⁹⁴ The Fed cut the target rate for funds by 1.5 percentage points since March 3 to 0-0.25%, and purchased \$500Bn of Treasuries and \$200Bn of agency MBS. On March 23rd, the Federal Open Market Committee (FOMC) announced credit erasing measures and established two facilities – the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate (SMCCF) – to support credit to large firms. Combined with the new Term Asset-Backed Securities Loan Facility (TALF), these facilities would enable up to \$5 trillion of Fed purchases. The FOMC lowered the discount rate on primary credit and extended lending term discounts to 90 days. The Fed used \$1.3 trillion of common equity and \$2.9 trillion in high-quality liquid assets to encourage banks to tap their capital and liquidity buffers. The Fed also purchased large amounts of securities – a tactic employed during the Great Recession to allow credit to continue to flow. The Fed pledged an open-ended overall amount of securities but announced that in the first week

^h Harvard Kennedy School Employment Response Tracker – This tracker observes government policies for supporting employment. For live updates, see: <https://www.hks.harvard.edu/centers/wiener/programs/project-on-workforce/covid-19-employment-response>.

of the new program, it would purchase \$375 billion in Treasury securities and \$250 billion in mortgage-backed securities.⁹⁵

The Fed also instituted enormous lending facilities to support banks and businesses. Among these, the new Primary Corporate Credit Facility (PMCCF) supported credit for large employers to issue new bonds and loans, with the option to defer interest and principle payments for six months.⁹⁶ The Main Street Lending Program supported lending to small and medium-sized businesses that were in good financial standing pre-coronavirus.⁹⁷ To support state and local governments, the Fed established the Municipal Liquidity Facility to purchase up to \$500 billion of short-term notes to support counties and cities.⁹⁸ In addition to similar new programs, the Fed also re-launched crisis-era lending facilities such as the Money Market Mutual Fund Liquidity Facility (MMLF) to ease the flow of credit to households and businesses.⁹⁹ Created during the 2008 Financial Crisis, the MMLF enabled banks to take out loans that would not count against their leverage and capital requirements.

One suggestion for improving liquidity was to increase the number of countries with access to Federal Reserve swap lines, which provided credit for central banks to meet their day-to-day operations. In this way, struggling banks could maintain their reserve requirements in times of crisis, which would also assure investors and banks that it is safe to trade in a currency. The Federal Reserve cut lending rates for central banks from Canada, England, the Eurozone, Japan, and Switzerland, and extended swap lines to include the central banks of Australia, Brazil, Denmark, Korea, Mexico, New Zealand, Norway, Singapore, and Sweden.¹⁰⁰

Europe The European Central Bank (ECB) chose a different approach from major central banks such as the Bank of England and Federal Reserve. Rather than cut key interest rates, the ECB instituted cheap loans for banks and increased bond purchases from a bond-buying program of €20 billion to €120 billion.¹⁰¹ Despite these actions to induce confidence in the market, European stock indexes continued to fall and yields increased on 10-year Italian government bonds. The ECB additionally signaled flexible treatment of bad-loan portfolios among European banks by allowing lenders to tap capital and liquidity buffers.

Emerging Markets Emerging markets also tackled the negative effects of the crisis by focusing on liquidity. As in past crises, governments and central banks interfered with interest and loan rates in attempts to keep markets running (See **Exhibit 9**). From the 2014 oil shock to Shanghai's stock market plunge in 2015, the economy had relied on monetary injections and policies to recover. For example, in 2015 the People's Bank of China (PBC) had injected \$101 billion into the economy, reduced reserve requirements by 50 basis points to 18%, and cut the one-year benchmark bank lending rate by 25 basis points to 4.6%.¹⁰² The PBC took a similar approach in 2020, issuing 2-3% of special central government bonds in addition to local government bonds.¹⁰³ The PBC delayed loan payments for SMEs and households, supported bond issuance to finance SME lending, and eased housing policies by local governments. China also raised the ceiling on cross-border financing by 25% for banks and enterprises. On March 30th, the People's Bank of China cut interest rates on bank loans by the largest margin since 2015.¹⁰⁴ The country also injected the equivalent of \$7 billion USD into the economy, with a record-low, 7-day reverse repurchase rate of 2.20%.¹⁰⁵ Offering funds at a lower rate would keep market interbank rates low, thus increasing liquidity. China received a torrent of applications for debt relief from crisis-hit "Belt and Road Initiative" countries but seemed unlikely to forgive the loans.¹⁰⁶ Brazil's central bank lowered the policy rate by a historical low of 3.75%, reduced reserve requirements from 25 to 17

ⁱ For live updates of the European Central Bank response, see: <https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200416~4d6bd9b9c0.en.html>.

bps, and provided loans to financial institutions backed by private corporate bonds. Its exchange rate depreciated by 37% since the end of 2019.¹⁰⁷

Central banks and governments bolstered economies with loans and credit. As of April 2020, 84 countries totaling 283 programs had introduced social protection and job programs relating to COVID-19. The most common programs took the form of non-contributory social assistance (150 programs), social insurance (91) and supply-side labor market interventions (42). Over a third of these total programs consisted of cash transfers to people in need. For example, the Philippines introduced five new cash programs alongside an existing program.¹⁰⁸ Even countries that had not introduced new programs modified existing interventions. Many increased coverage, offered higher benefit levels, allowed advance payments, simplified administrative requirements, or incorporated COVID-response schemes into existing platforms.¹⁰⁹ Interestingly, no low-income country created COVID-specific response programs. All regions, however, provided social protection and job responses. It remained to be seen whether the same tactics that had been used in past years could persist in the face of a yet-incurable virus that had spread all across the world.

Other Policies

Kristalina Georgiva, Managing Director of the IMF, noted that “a global crisis like no other needs a global response like no other.”¹¹⁰ The IMF provided rapid-disbursing emergency financing of up to \$50 billion for vulnerable countries. \$10 billion of this amount would be available at zero interest for low-income countries.¹¹¹ On March 3rd, the World Bank announced up to \$12 billion in immediate support for COVID-19 response across member countries. Over the coming months, additional funding poured in as nations attempted to support people amid the immediate effects of the virus and containment measures. As of May 2020, more than 90 countries had sought assistance from the IMF. The World Bank initiated debt relief for the poorest countries, assisting 93 countries and an upcoming additional 18 countries with COVID-related health projects in April.^j

In March 2020, the U.N. called for \$2.5 trillion for debt forgiveness and health recovery for the world’s 76 poorest countries.¹¹² On March 25th, the IMF and World Bank called on “all official bilateral creditors to [immediately] suspend debt payments from IDA countries that request forbearance.”¹¹³ Starting May 1st, the poorest countries that qualified for International Development Association financing were allowed to suspend their debt payments.¹¹⁴ With global remittances projected to drop by 20% in 2020, keeping remittance channels open and managing debt became crucial for the world’s most vulnerable populations.

Along with market concerns, developing countries faced the added challenge of a public health emergency. Population density combined with insufficient hospital infrastructure amplified the dangers of the pandemic in poorer countries. Many feared policies aimed at restricting world trade of medical equipment. Just seven countries accounted for 70% of ventilator exports. As leaders of nations such as Sweden restricted exports of personal protective equipment, the implications of hoarding could be catastrophic for countries with insufficient supplies.¹¹⁵ As of mid-April, less than 10% of America’s

^j See <https://www.imf.org/en/Topics/imf-and-covid19/COVID-Lending-Tracker> for live updates of IMF support to countries and <https://maps.worldbank.org> for an interactive map of the World Bank COVID-19 projects.

stimulus spending was for the healthcare sector, despite a desperate need for funds to compensate for a fragmented healthcare system.^{k116}

The World After COVID-19

The world was in shock as the virus death toll rose, unemployment skyrocketed, and people were confined to their homes. Some experts questioned why many countries seemed so unprepared for the pandemic, considering experts and government officials had raised concerns about pandemics for years. Virologist Stephen Morse coined the term “emerging viruses” in a series of academic papers in 1990, where he warned about the devastating implications of viral epidemics.¹¹⁷ In 2012, a survey from the World Economic Forum and Accenture assessed the risk of a disruption in the global supply chain and included “Pandemic” among the 18 categories of plausible risk.¹¹⁸ It assigned a probability of 11 percent to such a pandemic (against, for instance, 19 percent assigned to global energy shortage or 17 percent assigned to shortage of labor), making the probability of a pandemic not unlikely. In 2015, Bill Gates shared a model of how a flu epidemic could spread, inciting journalist Ezra Klein to write that “a pandemic disease is the most predictable catastrophe in the history of the human race, if only because it has happened to the human race so many, many times before.”¹¹⁹ There was no shortage of warnings, yet the world was surprised by COVID-19.

Even amidst immediate concerns for the health of loved ones, people wondered how the world would change once the COVID-19 crisis was over. How would social interactions transform as generations scarred by the pandemic moved on with their lives? Would the economy ever recover from a long period of uncertainty and joblessness?

Countries began discussing how to gradually reopen the economy. On April 20th, Germany allowed smaller stores to open after a month-long shutdown.¹²⁰ Gyms, restaurants, and large stores remained closed, but Europe’s biggest economy planned to open schools, beginning with older students, on May 4th.¹²¹ On April 14th, Italy opened bookstores and laundromats, the Czech Republic opened athletic stadiums at limited capacities, and many non-essential employees in Spain returned to work. Norway prioritized reopening schools, allowing kindergartens to open from April 20th and young students to resume school a week later.¹²² Iran, the Middle East’s worst-hit country, opened low-risk businesses from April 18th in the capital. While prevention measures remained in most of China, Wuhan eased restrictions on outbound travel on April 8th, after a 76-day lockdown.¹²³ In the U.S., state decisions to reopen remained uncoordinated. Georgia, Alaska and Oklahoma were among the first to reopen restaurants and businesses. Georgia especially came under the spotlight as gyms and personal-care businesses opened on April 24th.¹²⁴

Former U.S. Treasury Secretary Larry Summers attributed the drop in economic performance not to lockdown policies, but to the virus itself. “You can open up the economy all you want, but when they’re hiring refrigerator trucks to deliver dead bodies to transport them to the morgues, not many people are going to go out of their houses...so blaming the economic collapse on the policy, rather than

^k Harvard Coronavirus Economic Tracker - This global policy tracker collects real-time data on fiscal policy, monetary policy, and lockdowns relating to COVID-19. For live updates, see: <https://projects.iq.harvard.edu/covidpt/global-policy-tracker>.

Oxford’s Coronavirus Government Response Tracker - This tracker maps government responses, including containment and closures (such as restrictions and cancellations of events, business and school closures), health responses (such as contact tracing and testing) and economic measures (such as income support and fiscal policies) and various other data visualization tools relating to COVID-19. For live updates, see: <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>.

on the problem, is fallacious in the same way that observing that wherever you see a lot of oncologists, you'll tend to see a lot of people dying of cancer and inferring that that means that oncologists kill people."¹²⁵ While some urged political leaders to reopen the economy even for temporary economic relief, Summers responded, "Yeah we could create a near-term bit of economic growth by letting it all go, but if that leads us back to the widespread spread of contagious disease, ultimately we're going to be behind."

The COVID-19 pandemic inflicted high costs to well-being and the economy. The world had changed dramatically over just a few months, where people faced a reality that a small handful of infected people could spread to thousands in just a few days. The initial period of containment needed to eventually transition into a second period of recovery, and policymakers debated how to ease restrictions while maintaining social distancing and public safety. As people spent weeks and even months holed up at home, limited to conveying their fears through virtual means, they wondered what "normal" would look like in a world post-coronavirus.

Exhibit 1 Real GDP Growth (Annual Percent Change)



Source: "Real GDP Growth," IMF Datamapper, World Economic Outlook, May 4, 2020. https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOORLD, accessed May 4, 2020.

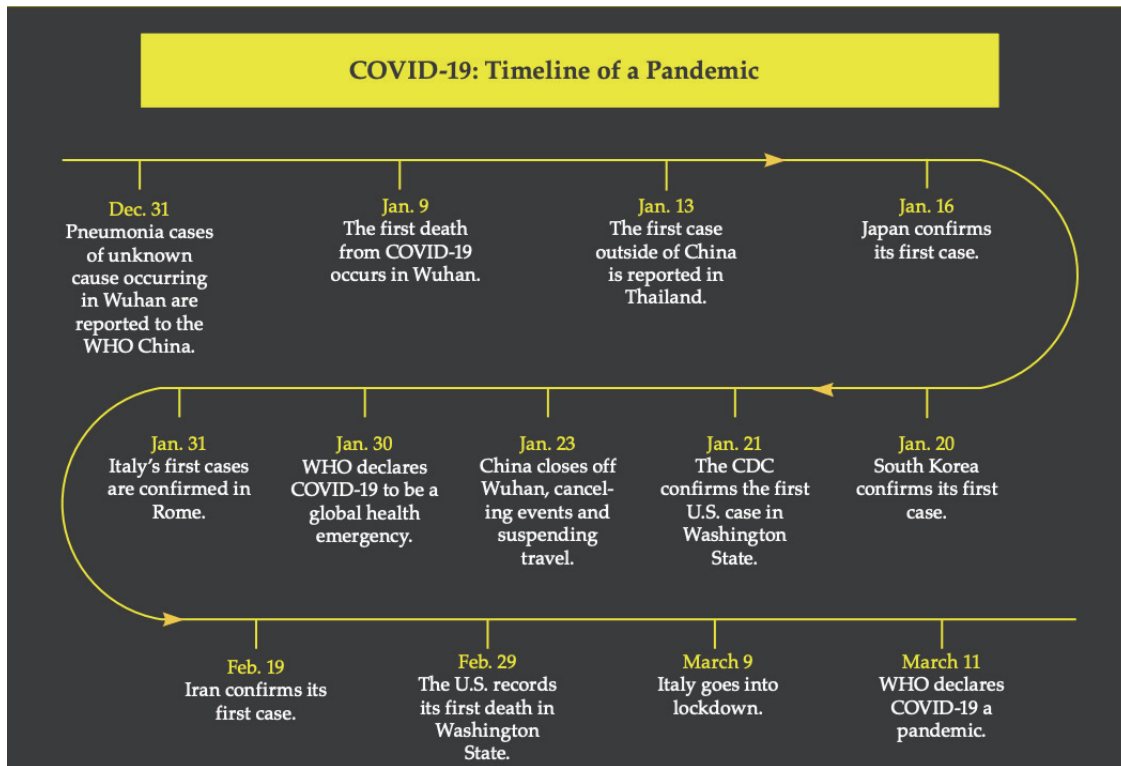
Exhibit 2 Economic Growth Projections

The COVID-19 pandemic will severely impact growth across all regions.

(real GDP, annual percent change)	PROJECTIONS		
	2019	2020	2021
World Output	2.9	-3.0	5.8
Advanced Economies	1.7	-6.1	4.5
United States	2.3	-5.9	4.7
Euro Area	1.2	-7.5	4.7
Germany	0.6	-7.0	5.2
France	1.3	-7.2	4.5
Italy	0.3	-9.1	4.8
Spain	2.0	-8.0	4.3
Japan	0.7	-5.2	3.0
United Kingdom	1.4	-6.5	4.0
Canada	1.6	-6.2	4.2
Other Advanced Economies	1.7	-4.6	4.5
Emerging Markets and Developing Economies	3.7	-1.0	6.6
Emerging and Developing Asia	5.5	1.0	8.5
China	6.1	1.2	9.2
India	4.2	1.9	7.4
ASEAN-5	4.8	-0.6	7.8
Emerging and Developing Europe	2.1	-5.2	4.2
Russia	1.3	-5.5	3.5
Latin America and the Caribbean	0.1	-5.2	3.4
Brazil	1.1	-5.3	2.9
Mexico	-0.1	-6.6	3.0
Middle East and Central Asia	1.2	-2.8	4.0
Saudi Arabia	0.3	-2.3	2.9
Sub-Saharan Africa	3.1	-1.6	4.1
Nigeria	2.2	-3.4	2.4
South Africa	0.2	-5.8	4.0
Low-Income Developing Countries	5.1	0.4	5.6

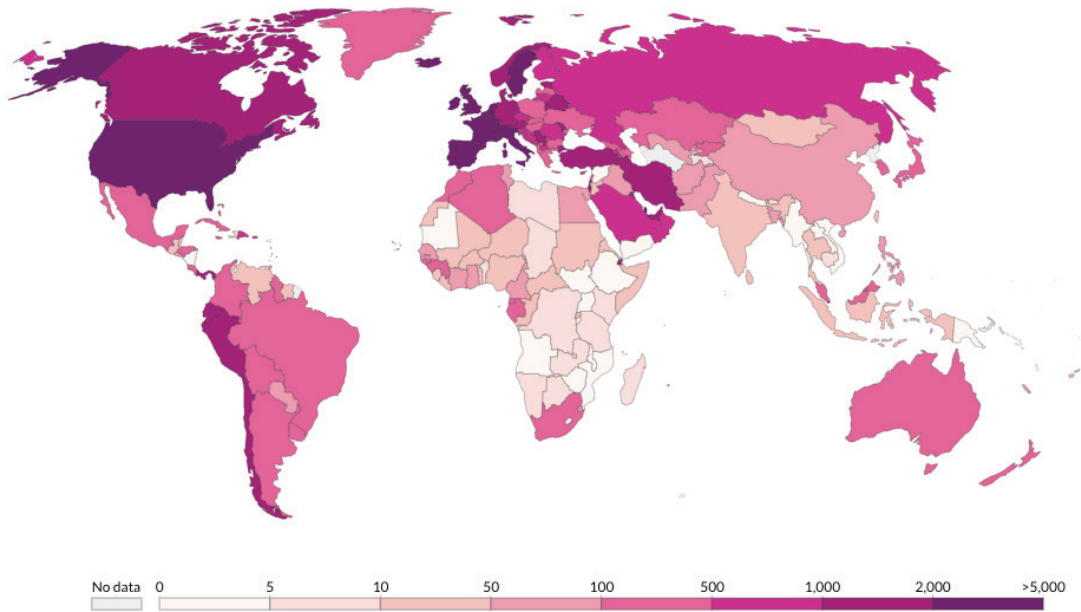
Source: "Latest World Economic Outlook Growth Projections," IMF, World Economic Outlook, <https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020>, accessed May 4, 2020.

Exhibit 3 Timeline of Events



Source: Created by casewriter, May 4, 2020.

Exhibit 4 Total Confirmed COVID-19 Cases Per Million People



Source: European CDC – Situation Update Worldwide – Last updated 4th May, 11:45 (London time)

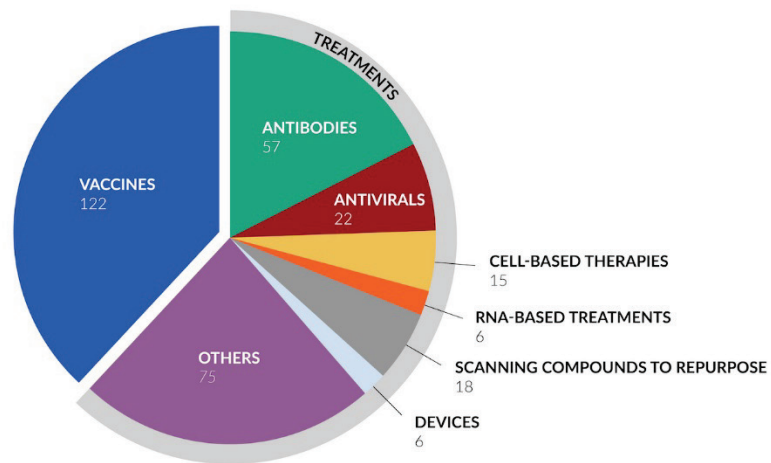
OurWorldInData.org/coronavirus • CC BY

Source: Our World in Data, <https://ourworldindata.org/grapher/total-confirmed-cases-of-covid-19-per-million-people?year=2020-05-04>, accessed May 4, 2020.

Exhibit 5 Count of Treatments and Vaccines



COVID-19 TREATMENT AND VACCINE TRACKER



Updated: May 4, 2020

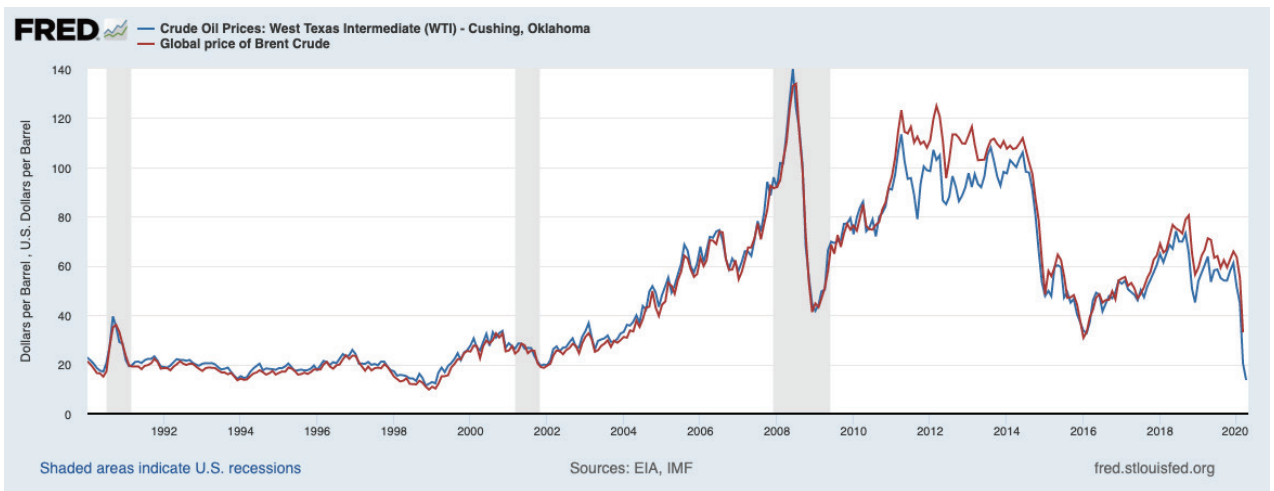
Source: FasterCures, a center of the Milken Institute, May 4, 2020, <https://milkeninstitute.org/covid-19-tracker>.

Exhibit 6 Stock Market in 2020



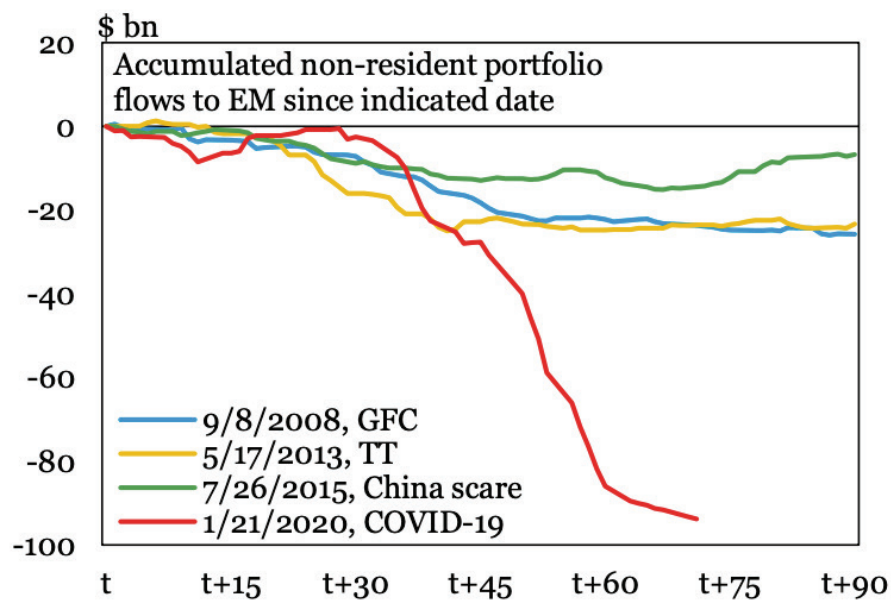
Source: Bloomberg, 27 April, 2020, accessed May 4, 2020.

Exhibit 7 Crude Oil Prices



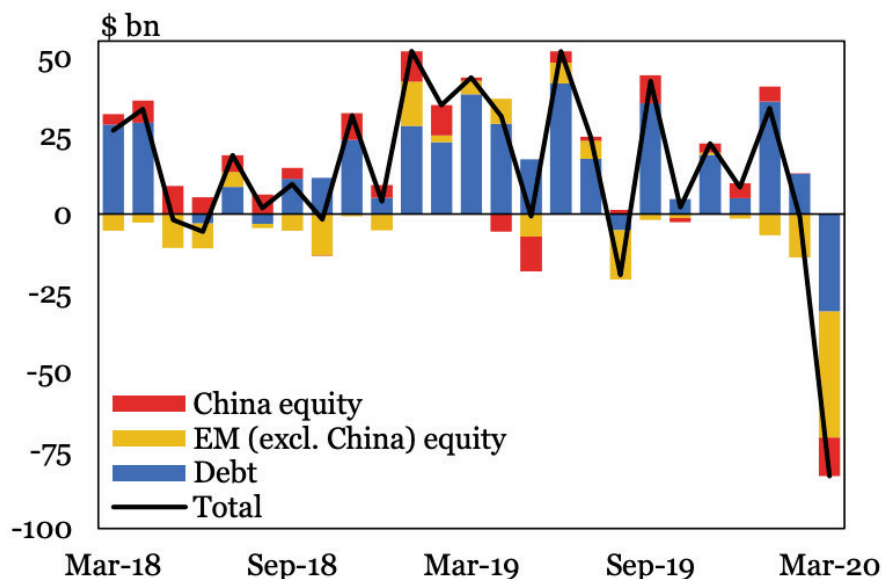
Source: Federal Reserve Bank of St. Louis, April 27, 2020. <https://fred.stlouisfed.org/series/DCOILWTICO>, accessed May 4, 2020.

Exhibit 8 Stress Episodes for Capital Flows



Source: Institute of International Finance, © 2020, <https://www.iif.com/Publications/ID/3829/IIF-Capital-Flows-Tracker-The-COVID-19-Cliff>, accessed May 4, 2020.

Exhibit 9 Non-Resident Portfolio Flows to Emerging Markets



Source: Haver, Institute of International Finance, © 2020, <https://www.iif.com/Publications/ID/3829/IIF-Capital-Flows-Tracker-The-COVID-19-Cliff>, accessed May 4, 2020.

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