Economic Recovery from the COVID-19 Pandemic with a Timeline Developed Based on Forecasted Advancements in Medical Treatments (Part I)

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INTRODUCTION

This white paper will attempt to build an economic recovery timeline based upon medical initiatives currently underway to combat the COVID-19 pandemic.

This timeline can then be applied to asset-liability management analysis to measure, monitor, and mitigate credit, interest rate, and liquidity risks.

KEY TAKEAWAY
This white paper demonstrates how we prospectively worked to incorporate major macroeconomic events into our clients' ALM and credit risk analyses.

HOW CAN WE HELP YOU?
Founded in 2003, Wilary Winn LLC and its sister company, Wilary Winn Risk Management LLC, provide independent, objective, fee-based advice to nearly 600 financial institutions located across the country.

We provide the following services:

CECL & ALM
Holistic solutions to measure, monitor and mitigate interest rate, liquidity, and credit risk on an integrated basis.

MERGERS & ACQUISITIONS
Independent, fee-based determinations of fair value for mergers and acquisitions.

VALUATION OF LOAN SERVICING
Comprehensive and cost-effective valuations of servicing arising from the sale of residential mortgage, SBA 7(a), auto, home equity and commercial loans.

ADDITIONAL SERVICES
Services to support our CECL, ALM, Fair Value and Loan Servicing product offerings.

Economic Recovery from the COVID-19 Pandemic with a Timeline Developed Based on Forecasted Advancements in Medical Treatments (Part I)

As of mid-April 2020, 46 states and Washington D.C. have enacted polices to close nonessential businesses in response to the COVID-19 pandemic. While specific guidance and levels of COVID-19 activity vary from state to state, the state shutdown and distancing policies have substantially slowed the spread of COVID-19 and saved lives. At this time, preliminary planning has begun at both the national and state levels on how to best reopen the United States economy. Part of this process involves measuring the current economic environment and building a forecast from the current state based on our ability as a country to effectively measure and treat COVID-19. In reopening America for business, politicians will determine a course of action based largely upon their work with healthcare leaders to understand the current and future treatments available for COVID-19 patients in addition to understanding our current COVID-19 testing capabilities and its upcoming expansion.

Since medical science will largely determine the timing of our economic recovery and whether there are multiple starts and stops along the way, it is critical to understand the initiatives underway in the medical field to battle the COVID-19 outbreak. Wilary Winn Risk Management provides advice and support to community banks and credit unions throughout the United States whose financial performance will be dictated by the pace of the economic recovery which in turn relies on medical advancements in both preventing and treating COVID-19. Ultimately, medical science will play a major role in our return to "normal" – children in school, employees returning to the office, eating meals in restaurants, attending concerts, taking vacations, etc. and also determine whether we have a V-shaped or U-shaped economic recovery. This timeline can then be applied to asset-liability management analysis to measure, monitor, and mitigate credit, interest rate, and liquidity risks. Within the paper, we provide specific strategic recommendations.

Economy – April 2020

Economists had a difficult time at first forecasting the impact related to the COVID-19 virus shutdowns as there is no relevant precedent in the United States from which to draw experience since the last major pandemic in the United States occurred in 1918. Now that the initial economic numbers related to the COVID-19 pandemic shutdowns have been released, econometric models have been adjusted and forecasts are being published. Economists from Goldman Sachs predict Gross Domestic Product in the 1st Quarter of 2020 for the United States, which will be released on April 29, will be a decline of 9% on an annual basis. This decline is mostly due to March 2020 activity as January and February were largely business activity as usual for the United States. Economist Dr. Elliot Eisenberg expects a decline of 5% for 1st Quarter 2020. The expectation for 2nd Quarter 2020 GDP from Goldman Sachs is an annualized decline of 34%. JPMorgan economists are predicting a more severe 40% annualized decline. Dr. Eisenberg expects a 24% decline. With respect to forecasted unemployment, Goldman Sachs economists expect 19.8 million jobs lost in the United States which will ultimately push the unemployment rate to a peak around 15.6% for the United States. JPMorgan economists are predicting 25 million jobs lost and a peak unemployment rate of 20%. These job loss numbers include individuals who have been furloughed by their companies.

JPMorgan economists are forecasting rebounds in the 3rd and 4th Quarters with growth of 23% and 13%, respectively. Goldman Sachs economists are predicting a 19% rebound in the 3rd Quarter.

The Federal Government has undertaken massive and unprecedented fiscal and monetary stimulus in response to the COVID-19 pandemic. The stated objective of current policy for the Federal Government is

to use its power to maximize liquidity. Since liquidity issues potentially lead to solvency issues, the Federal Government will provide additional liquidity to keep businesses and markets functioning as well as possible given the pandemic situation. The recently enacted Coronavirus Aid, Relief, and Economic Security ("CARES") Act includes over $2 trillion in relief, including:

- $301 billion in direct cash payments
- $500 billion in government lending
- $367 billion in small business loan and grant programs
- $250 billion to expand unemployment insurance
- $221 billion in business tax cuts
- $150 billion in money for state governments
- $130 billion for hospitals and other healthcare providers
- $25 billion for public transit
- $32 billion for airlines
- $48 billion for agriculture and nutrition programs
- $27 billion to fund drugs and vaccines for the coronavirus
- $10 billion for the postal service
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Actions taken by the Federal Reserve thus far to improve financial market liquidity include:

- Expanded reverse repo operations adding $2 trillion of liquidity
- Cut Fed Funds rate to a range of 0.00% to 0.25%
- Restarted quantitative easing with purchases of Treasury and mortgage-backed securities
- Lowered the interest rate on the discount window by 1.5% to a rate of 0.25%
- Lowered reserve requirements to zero
- Started a Commercial Paper Funding Facility and Primary Dealer Credit Facility to provide additional liquidity for commercial paper, short-term unsecured loans, municipal bonds and investment grade corporate debt
- Started a Money Market Mutual Fund Liquidity Facility
- Started purchasing commercial mortgage-backed securities
- Started Primary and Secondary Market Corporate Credit Facilities to purchase corporate bonds
    - Purchases of non-investment grade bonds is possible if:
        - Bonds were investment grade as of 3/22/2020
        - Current rating is at least BB-
        - Maturity is 4 years or less
        - Limit of 25% of original issuance
- Restarted the Term Asset Backed Securities Loan Facility to purchase asset backed securities

Federal actions of this magnitude are unprecedented from a historical perspective. Due to the substantial economic impact related to the COVID-19 pandemic, substantial solutions were needed as a response to avoid a depression. It is worth noting that the CARES Act passed in the Senate with a vote tally of 96-0, reflecting bipartisan support for the relief effort.

Medical Science and COVID-19—Repurposed Drugs—April 2020

The treatments available currently to provide relief for COVID-19 positive patients are repurposed drugs. These drugs were originally developed to treat other diseases, but some have proven effective in helping patients recover from COVID-19 infections. Currently the medical process to deal with COVID-19 can be described as trial and error. Worth noting is that doctors dealing with an onslaught of patients cannot wait for conclusive studies and off-label drug use is allowed when no other therapies are available. Following are the repurposed drugs that are being provided to patients to provide relief from the effects of COVID-19:

- Remdesivir – unapproved drug from Gilead Sciences originally developed to fight Ebola

- Hydroxychloroquine – decades-old-approved malaria drug manufactured by Novartis that also treats rheumatoid arthritis and lupus
- Favipiravir – a flu treatment from Toyoma Chemical
- Ruxolitinib – cancer drug from Novartis that heals damage/infections in the immune system
- Baricitinib – an anti-inflammatory drug developed by Eli Lilly

Of these repurposed drug treatments, Remdesivir currently shows the most promise. The University of Chicago's phase 3 drug trial found that most of its patients had "rapid recoveries in fever and respiratory symptoms" and were discharged in less than a week. Worth noting, the trial was small with only 125 patients of which 113 were severely ill. Some patients were provided with Remdesivir doses for 5 days others for 10. Some recovered before all the anticipated doses were provided. Gilead Sciences plans to enroll 4,000 people in its next trial. Trial testing data on Remdesivir on patients with moderate systems is expected to be released in May. In another small study, Remdesivir helped 68% of patients with severe breathing problems due to COVID-19 to improve. Also, 60% of those that relied on a ventilator and took the drug were able to wean themselves off the machines after 18 days. Expect an accelerated approval of Remdesivir with expanded availability under an emergency use authorization. The production of Remdesivir is a long, linear chemical synthesis process which is both resource and time intensive. With respect to the supply of Remdesivir, Gilead Sciences states the following production targets:

- More than 140,000 treatment courses by the end of May 2020
- More than 500,000 treatment courses by October 2020
- More than 1 million treatment courses by December 2020
- Several million treatment courses in 2021, if required.

Another repurposed drug showing some promise in treating COVID-19 patients is Hydroxychloroquine. This drug was used by doctors in China with reported success. The drug works as an immunosuppressive. This helps patients whose immune system is "over attacking" the COVID-19 virus. Federal regulators have fast tracked approvals for coronavirus research and there are currently more than a dozen formal studies underway. New York University plans to complete its study by June or July. Vanderbilt University is also conducted a study of 500. Side effects of this drug include muscle weakness and heart arrhythmia. There is skepticism among doctors with Hydroxychloroquine as a COVID-19 treatment.

Favipiravir, traditionally a flu treatment, has proven to be safe and it is being researched as a COVID-19 treatment. It was used by Chinese doctors as a treatment with some reported success.

Ruxolitinib is available on an emergency use basis for the sickest COVID-19 patients as a way to suppress severe breathing problems. Its primary use historically has been as a cancer treatment.

Baricitinib is being tested by Eli Lilly in severe COVID-19 patients. There is some evidence that the drug lowers the viral loan in infected patients. Testing results are anticipated this summer.

Some of these drugs listed previously are being combined with others in "cocktail" treatments. Proper dosages and mix are ongoing challenges for these "cocktail" treatments. Through trial-and-error knowledge is gained, analyzed and shared each day.

Although not a repurposed drug treatment, convalescent plasma is an established approach to combat outbreaks. This approach uses immune cells extracted from the blood of people who have recovered from COVID-19. The drawback to this approach is limited supply. Emergent BioSolutions are trying to overcome this supply challenge by taking plasma from horses.

Medical Science and COVID-19 – Specifically Designed Treatments

Future treatments for COVID-19 patients will be specifically designed to combat COVID-19 based on our scientific understanding of COVID-19 itself. Following is a list of some of the organizations working on solutions in this area:

- Regeneron
- GigaGen
- Rockefeller University
- Bellerophon Therapeutics

Regeneron is a biotechnology firm working on treatments to neutralize the virus. At Regeneron mice bred with human like immune systems are infected with COVID-19. Antibodies produced by the mice are researched for the ones that most effectively neutralize the virus. Regeneron plans to manufacture the most powerful candidates for human testing. At this point Regeneron has identified hundreds of antibodies. Trials are expected to begin in early summer.

GigaGen is a biotech startup identifying and synthesizing antibodies recovered from COVID-19 patients with the goal of mass production to treat patients. The therapy in development, rCIG, reproduces whole antibody repertoires of recovered COVID-19 patients. GigoGens goal is to reach doctors' offices by early 2021.

Rockefeller University is researching a protein called LY6E that can block a virus's ability to make copies of itself. The hope is to develop therapies based on LY6E.

Bellerophon Therapeutics is working on a new breathing system to feed more oxygen to the lungs. Ideally this solution is used for moderate symptom patients to avoid ventilators.

Medical Science and COVID-19 – Vaccines – April 2020

The only way to avoid new waves of infections is to develop a vaccine against COVID-19. Typically, vaccines take years to develop. The leading pharmaceutical companies are working on developing vaccines in record time. Following is a list of leading companies with accelerated vaccine development initiatives underway:

- GlaxoSmithKline
- Sanofi
- Moderna
- Johnson & Johnson
- Pfizer

GlaxoSmithKline and Sanofi are collaborating as a way to shorten development time on a vaccine. Sanofi plans to offer its S-protein antigen and GlaxoSmithKline will contribute its adjuvant to allow larger amounts of vaccine to be produced. The expectation is to start clinical trials in the 2nd half of 2020 and if effective the vaccine could be available in late 2021. If this vaccine works, the plan is to produce up to 600 million doses in 2021.

Moderna Therapeutics developed its mRNA vaccine in a record 42 days after genetic sequencing was released in mid-January. This vaccine can be scaled up quickly because a lab can be used to synthesize the correct genetic viral sequences (as opposed to waiting for the virus to grow). Moderna received $483 million in federal funding to accelerate development of its potential coronavirus vaccine. The funding will be used to accelerate manufacturing efforts as manufacturing will be scaled up as trials are underway. Phase 1 trials began in Seattle in mid-March. Phase 2 trials are expected to begin in the 2nd Quarter. Phase 3 is expected to occur in the fall and if all goes well a commercially available vaccine is expected to be widely available in 2021.

Johnson & Johnson has selected its lead COVID-19 vaccine candidate. The potential vaccine was developed using fragments of the SARS-CoV-2 spike protein. The company expects human clinical studies to begin by September 2020. Emergency use authorization is expected in early 2021. Expected completion is mid-2021. Johnson & Johnson is planning to produce between 600 million and 900 million doses by the end of the 1st Quarter 2021 for emergency cases. The investment in this project with the Department of Health & Human Services and Johnson & Johnson is $1 billion.

Pfizer is developing a vaccine that works by restricting the virus's ability to replicate or expand. Testing is scheduled to begin in the summer of 2020. With respect to overall project timing, Pfizer has stated two years or less.

Medical Science and COVID-19 – Testing – April 2020

Abbott Laboratories is the current leader when it comes to COVID-19 testing. The company has launched three coronavirus tests in the U.S. and is currently working on a fourth. One of its tests, the one which indicates whether a person had COVID-19 in the past and was either asymptomatic or recovered, will have 4 million tests shipped this month (April) with plans to ramp up to 20 million shipments per month beginning in June.

While testing efforts are being ramped up quickly, the current state as of mid-April, is that there are approximately 145,000 samples being tested each day (about 4.3 million monthly) according to the federal Centers for Disease Control and Prevention. Approximately 1% of the U.S. population has been tested for COVID-19.

The Rockefeller Foundation is planning to release a report outlining the scope of work to get the U.S. to safely return to work, school and leisure time activities. The plan involves 20 to 30 million tests daily which will cost between $100 billion and $500 billion (depending on how long testing is needed). Other health experts state lower daily testing is needed with estimated amounts ranging in the millions per day to tens of millions per day, which is still much higher than the 145,000 per day the U.S. is currently performing.

Testing is critical due to asymptomatic carriers of COVID-19. Asymptomatic carriers are typically identified through testing people who were in close contact with COVID-19 patients. There is some data from China and other studies that suggests up to 25% of those infected with COVID-19 show no symptoms.

South Korea and Germany have used aggressive testing as a way to control the spread of COVID-19. Both countries have tested more of their overall population than the United States. However, the United States is on an upward trajectory in this area.

Apple and Google have worked together to develop smart phone applications to assist medical professionals with contact tracing. With the app, bluetooth radios are used to track physical proximity between phones. If someone later receives a positive COVID-19 diagnosis, they can report it through the app and any app users who have been in recent contact will receive a notification.

Political Environment Related To Reopening The U.S. Economy – April 2020

On April 16, 2020, President Trump released an 18-page plan titled "Opening Up America Again" which outlines conditions for parts of the United States to start relaxing the measures imposed to slow the

spread of COVID-19. The guidelines do not offer specific dates for states to reopen their economies. The ultimate decision to lift the restrictions will be made by state governors as states are not legally required to follow the instructions from the White House. Initial opinions suggest the new guidance puts pressure on governors to loosen their restrictions.

Before proceeding to phased opening, the following criteria needs to be met:
- 14-day downward trajectory of covid-like symptom cases reported
- 14-day downward trajectory of positive COVID-19 tests
- Robust testing program for at-risk healthcare workers
- Hospitals must have the ability to treat all patients without crisis care

State preparedness responsibilities detailed in the Opening Up America Again report include:
- Ability to quickly set up safe and efficient screening and testing sites for symptomatic individuals and trace contacts of COVID-positive results
- Ability to quickly and independently supply Personal Protective Equipment and critical medical equipment to handle dramatic surge in need
- Ability to surge ICU capacity
- Protect the health and safety of:
    - Workers in critical industries
    - Those living and working in high-risk facilities
    - Employees and users of mass transit
- Advise citizens regarding protocols for social distancing and face coverings
- Monitor conditions and immediately take steps to limit and mitigate any rebounds or outbreaks by re-starting a phase or returning to an earlier phase, depending on severity

In Phase One, employers should encourage telework. Workers should return to the workplace in phases. Common areas in the office should be closed. Special accommodations should be strongly considered for personnel who are members of a vulnerable population.

In Phase One, schools remain closed. Visits to senior living facilities and hospitals should be prohibited. Large venues (sit-down dining, movie theaters, etc.) can operate under strict physical distancing protocols. Elective surgeries can resume. Gyms can open with strict physical distancing and sanitation protocols. Bars remain closed.

In Phase Two employers can open common areas with social distancing. Non-essential travel can resume, and schools can reopen. Large venues can operate under moderate physical distancing protocols. Bars may operate with diminished standing-room occupancy.

In Phase Three worksites are unrestricted. Visits to senior care facilities and hospitals can resume.

Switching from the President to the Governors, as they will ultimately decide when restrictions are lifted, California Governor Gavin Newsome has proven to be a leader. California was the first state to issue stay-at-home orders. Governor Newsome released 6 key indicators on April 14 as a guide towards making a decision on loosening statewide restrictions. The six key indicators are:
- Ability to monitor and protect through testing, contract tracing, isolating, and supporting those exposed
- Ability to prevent infection in people who are more at risk
- Ability for hospitals and health systems to handle surges
- Ability to develop therapeutics to meet the demand
- Ability for businesses, schools, and childcare facilities to support physical distancing
- Ability to determine when to reinstitute stay-at-home orders

The Governors of California, Oregon and Washington are working together on restriction policies. Similarly, the Governors of New York, New Jersey, Connecticut, Delaware, Pennsylvania, Rhode Island, and Massachusetts are coordinating efforts. In the Midwest, Governors from Michigan, Ohio, Wisconsin, Minnesota, Illinois, Indiana, and Kentucky are working together to coordinate the reopening of the Midwest regional economy.

Worth noting is that there have been protests against stay-at-home orders in Michigan, Ohio, Kentucky, Minnesota, North Carolina and Utah.

Estimated Recovery Timeline – April 2020

Estimating an economic recovery timeline from a pandemic is challenging or almost impossible to accurately predict. Certainly, when an effect vaccine is disbursed amongst the population, it will be business as usual. Given the brainpower and support provided to the leading pharmaceutical companies, a vaccine will likely be available in the 2nd or 3rd Quarters of 2021, which is record time for a vaccine. Remedies developed specifically to combat COVID-19 will likely be available in the 4th Quarter of 2020 or 1st Quarter of 2021. These medicines will be superior to the repurposed drug treatments available today. Until then, treatments will likely consist of "cocktails" using Remdesivir or Hydroxychloroquine. These repurposed drugs will save many lives until better treatments are available.

In the meantime, testing is essential and needs to be scaled up dramatically due to asymptomatic carriers. We need to follow Germany's lead here in testing more of the country's population. My estimate is that testing will be reasonably sufficient in the United States sometime in the 3rd Quarter of 2020.

With state Governors and/or Governor groups making decisions or reopening or lessening restrictions in their states, expect choppy economic activity in the 3rd Quarter based on which parts of the country are open and what stage they are in. A secondary outbreak is a major concern and could set us back.

Progress on the medical front will be tracked and analyzed by Wilary Winn. We will discuss this information during our credit meetings and communicate this information to our clients.