

Public Policy, Economics and Municipal Credit Research

8 April 2020

#virus

US Public Policy, Municipals, and US Economics Research

Phase Four Stimulus: CARES Act 2.0

- As COVID-19 continues to spread and the economy deteriorates, Speaker Nancy Pelosi (D-CA) has shifted discussion about a fourth stimulus package focused on recovery policies (eg, infrastructure) to one of emergency preparedness, healthcare, and strengthening the social safety net by bolstering the CARES Act, often referred to as the Phase Three stimulus package.
- Current epidemiological models forecast that the virus will peak in different regions in the US from mid-April through late May. Our Data Science team found that the growth rate of confirmed COVID-19 new cases is slowing in New York, reflecting the effect of social distancing policies, and has fallen nationwide as well. This is a promising sign that the epidemiological models – which account for the social distancing measures – may be accurate at projecting the peaks of the virus in different regions in the US.
- We expect real GDP growth in Q1 to fall by 1.5% q/q saar, and look for a substantial drop of -35% in Q2. Thereafter, we expect activity to recover sharply, but we forecast Q4/Q4 growth to be down 4.7%, as much of the lost services sector activity will likely not be made up. We expect the unemployment rate to peak at 13.6% and decline to 8.5% in Q4. In 2021, we forecast above-trend growth and look for the unemployment rate to fall to 5.0% by year-end.
- Although negotiations continue, we think there is bipartisan support for a Phase Four stimulus package, it may surpass \$1trn and pass in the coming two months. We expect this package will focus on emergency healthcare support, financial assistance for individuals and businesses, expanded social safety provisions, and support for state and local governments. Phase Four may be affected by a possible smaller package (\$200-500bn) focused on financial assistance for small businesses (sometimes referred to as Phase 3.5) that may pass Congress in the coming weeks.
- States and local municipalities received \$150bn in the Phase Three package; however, these governments may need more assistance, given resource constraints. We estimate that their tax revenues will drop by about \$350bn, expenses will increase, and assets of defined benefits pension plans took a \$750-800bn mark-to-market hit.
- Aside from the additional monetary aid to municipalities, tax-exempt advance refundings as well as Build America Bonds (BABs), might possibly be resurrected, which will provide issuers with much-needed flexibility in accessing the primary market, although we have not heard any public statements made on this subject recently.

Public Policy Research Shawn Golhar +1 212 526 0172 shawn.golhar@barclays.com BCI, US

Municipal Research Mikhail Foux +1 212 526 7849 mikhail.foux@barclays.com BCI, US

Economics Research
Michael Gapen
+1 212 526 8536
michael.gapen@barclays.com
BCI, US

www.barclays.com

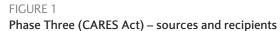
COVID-19's Impact on Framing a Phase Four Package

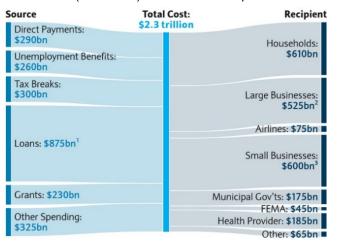
As the cases and fatalities continue to mount in the US, Speaker Nancy Pelosi (D-CA) has shifted discussion about a stimulus package focused on recovery policies – such as infrastructure – to one of emergency preparedness, healthcare, and strengthening the social safety net by bolstering the previous stimulus measures. As we wrote in our *Global Outlook*, the CARES Act – the Phase Three stimulus package signed on 27 March 2020 and expected to cost at least \$2.3trn – will not be enough for households, businesses, and state and municipal governments (Figure 1). A Phase Four stimulus package – structured as a second installment of the CARES Act – may be the start of several measures from Congress that could stretch well after the November elections. We continue to expect legislation focused on the national recovery, which may include infrastructure funding; however, it will likely not come until after the US is past the emergency phase of the crisis.

Rolling COVID-19 Peaks Expected across the US

Future Congressional action will depend on the spread of COVID-19 and the impact on healthcare and the economy. Current epidemiological models forecast that COVID-19 will peak in different regions in the US from mid-April through late May (Figure 2). Although the president outlined federal guidelines for social distancing and lockdowns, it has been up to the governors to interpret and enforce these policies. Given the exponential growth rate, the lack of a national lockdown may lead to rolling peaks across the US over the next two months with renewed concerns about subsequent outbreaks.

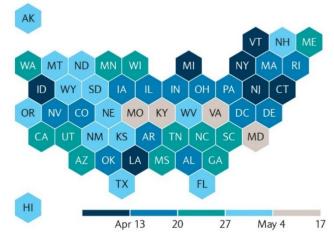
Political voting preferences may have played a role in enforcing lockdowns. A recent study at the University of Washington found that on any given day during the epidemic, Republican governors have been 42% less likely than Democratic ones to mandate social-distancing measures (defined as bans on large gatherings, school closures, business/restaurant restrictions, and stay-at-home orders). When they implemented these policies, they have done so, on average, two days later. For states that President Trump won at least 58% of the vote in by 2016, these measures were delayed by an additional day. When adjusted for population density to take into account the urban/rural – and corresponding Democratic/Republican divide – researchers still found a "clear association" between the results of the 2016 presidential election and the response to the virus.¹





Note: (1) up to \$366bn forgiven; (2) includes \$454bn to set up a \$4.5tn Fed facility; and (3) includes \$170bn of tax cuts for businesses other than corporations. Source: Committee for a Responsible Federal Budget, Barclays Research

FIGURE 2 Hospital demand is projected to peak in April to May



Source: Institute for Health Metrics and Evaluation, Axios, Barclays Research

¹ Source: "Pandemic Politics: Timing State-Level Social Distancing Responses to COVID-19," multiple authors at the University of Washington, 28 March 2020; "American states' responses to the coronavirus follow party lines," *The Economist*, 2 April 2020.

Lastly, according to our colleagues in our Data Science team, the effect of social distancing should appear in the data for states that were early to implement these measures.² For instance, in New York it found that the growth rate of confirmed COVID-19 new cases is currently slowing, reflecting the effect of social distancing policies, and that it has fallen nationwide as well. This is a promising sign that the epidemiological models may be accurate at projecting the peaks of the virus in different regions in the US.

US Economic Outlook: Stay-at-home orders lead to cliff-effects on activity

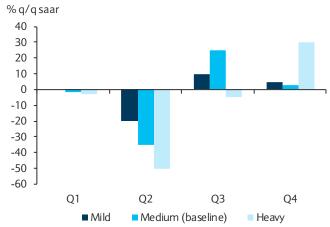
While the Congressional Budget Office (CBO) continues to update its model, as of now, its analyses assume that social distancing measures will decrease by three-quarters, but not entirely, by the second half of 2020. With that caveat, their preliminary estimates for Q2, as 2 April 2020, show a 7% decline GDP and unemployment rate over 10%. Longer term, it currently projects unemployment by the end of 2021 of about 9%.

In our revised 2020-21 US outlook (see *Stay-at-home orders lead to cliff-effects on economic activity*, 2 April 2020), we detail why we believe the US economy is already in recession based on incoming data that point to cliff-effects in activity. In particular, the unprecedented rise in initial jobless claims suggests the unemployment rate in April will rise well above the peak reached in the global financial crisis. We expect real GDP growth in Q1 to fall by 1.5% q/q saar, and look for a substantial drop of -35% in Q2 (Figures 3 and 4).³ Thereafter, we expect activity to recover sharply, although we forecast Q4/Q4 growth to be down 4.7% because much of the lost services sector activity will likely not be made up. We expect the unemployment rate to peak at 13.6% and decline to 8.5% in Q4. In 2021, we forecast above-trend growth as we expect the economy to be supported by fiscal and monetary policy, and look for the unemployment rate to fall to 5.0% by year-end. In our revised inflation outlook, we assume declines in energy prices, a stronger trade-weighted value of the dollar, and persistently high unemployment will outweigh the effects of any supply chain disruptions. As a result, our forecast for core CPI falls to 1.3% y/y in early 2021 before finishing the year at only 1.6%.

FIGURE 3
Revised GDP growth scenarios...

US 2020 real GDP growth: Scenarios				
%q/q saar	Pre-COVID- 19	Mild	Medium (baseline)	Heavy
Q1	1.5	0.0	-1.5	-3.0
Q2	2.0	-20.0	-35.0	-50.0
Q3	2.5	10.0	25.0	-5.0
Q4	2.0	5.0	3.0	30.0
Q4/Q4	2.0	-2.0	-4.7	-12.0
% y/y	2.0	-1.9	-4.5	-11.1

FIGURE 4 ...include much deeper declines in Q2 and y/y



Source: Barclays Research

Source: Barclays Research

² Refer to Barclays Research – US COVID-19 case growth is finally slowing, but economic damage is not, 6 April 2020.

³ Given the elevated uncertainty, we think providing one modal baseline path is less informative and we have altered our normal presentation of the US outlook to include alternative scenarios. Our "mild" outbreak scenario includes assumes the US and global economy suppresses the outbreak more quickly and returns to normal functioning in May, versus June in our medium (baseline) outbreak scenario. Our "heavy" outbreak scenario also includes second-round effects from credit frictions, distressed events, and additional layoffs.

Our outlook for the US economy is somewhat more favourable than that of the CBO for two reasons. We are somewhat more optimistic about the ability of states to remove state-wide stay-at-home orders in the coming months and we are also pencilling in additional Phase Four fiscal spending on the order of \$500bn each for this year and next (eg, over and above our estimates for Phases One through Three). The CBO is constrained to forecast under a "constant policies" assumption; we are under no such restriction. Additional fiscal spending supports our outlook for above-trend growth in 2021 and a more rapid decline in unemployment relative to CBO baseline assumptions.

Possible Components of the Phase Four Stimulus

Expressing a sense of emergency, Speaker Pelosi quickly pivoted her focus from recovery policies to the need for a fourth bipartisan bill that expands on the CARES Act.⁴ While negotiations continue, the total cost of a Phase Four stimulus package may surpass \$1trn and we think there is a high likelihood it passes in the coming two months. In addition, given the economic challenges for small business, Congress is currently negotiating a smaller package (Phase 3.5) focused on small businesses. With the goal of passing a Phase 3.5 in the coming weeks, Speaker Pelosi and Congressional Democrats may aim to include the following provisions in a Phase Four plan:

- Healthcare and emergency preparedness: Funding for PPE (personal protective equipment) for healthcare and other frontline workers. Securing enough PPE and other healthcare supplies has been a significant challenge across the US. In fact, the Department of Health and Human Services (HHS) recently issued a report (Refer to "Hospital Experiences Responding to the COVID-19 Pandemic: Results of a National Pulse Survey March 23–27, 2020," Office of Inspector General, US Department of Health and Human Services, Apr 2020) that detailed "severe shortages" of supplies, insufficient testing kits, uncertainty about availability from the federal government, increased supplier prices, challenges maintaining adequate staffing, inconsistent guidance from the federal, state, and local authorities, amongst other issues. Failing to secure enough PPE may lead to additional fatalities.
- Assistance for state and local governments: Funding for municipalities to replace lost/depressed revenues and cover higher expenses. While Congress continues to negotiate, our research in this report shows that tax revenues will drop by about \$350bn, expenses will increase, and assets of defined benefits pension plans may experience a \$750-800bn mark-to-market hit.
- Rebate checks for individuals: An additional one to three months of direct financial assistance. For qualified Americans, the previous checks were \$1,200 per individual, \$2,400 for married filing jointly, and \$500 per child. The Joint Committee on Taxation estimated that the current cost of the rebate program was \$292bn. According to the US Treasury, the majority of the Phase Three payments will be made in April. The IRS plans to prioritize payments according to financial need so those that qualify at the higher end of the income spectrum will receive payments as late as September. As a point of comparison, there was a lag of at least 12 weeks for direct payments to individuals under the Economic Stimulus Act of 2008 under President George W Bush.
- Unemployment insurance: Expand funding to assist those who have lost their jobs.
- Paid sick leave: Eliminate some employer exemptions from the CARES Act (e.g., exempts companies with 500+ employees) and expand benefits.

⁴ "Pelosi Pares Goals for Next Stimulus...," *Bloomberg*, 3 April 2020.

- Nutritional/food support: Expand SNAP (Supplemental Nutrition Assistance Program) funding.
- Small-business financial assistance: Provide additional funding for small businesses. While this is on their list, at the time of this publication, a portion (\$200-250bn) of Phase 3.5 may provide supplemental funding to expand the Paycheck Protection Program (PPP), which was originally funded with \$349bn.
- **Sector-specific assistance:** Several industries are advocating for additional financial assistance.
- Tax law changes: Some Democrats have called for an increase to the SALT deduction as well as making the change retroactive to allow taxpayers to re-file previous 2018 and 2019 returns. Not surprisingly, Republicans immediately rejected the idea and we do not expect this to be included in Phase Four, at this time.

In terms of timing, given the record number of unemployment claims, a collapsing labor market, and a healthcare sector at capacity, Speaker Pelosi aims to have a Phase Four bill ready for negotiation later in April. Although Congress is not currently scheduled to back in session at the Capitol until 20 April, Majority Leader Steny Hoyer (D-MD), the number two in the House Democratic leadership, recently informed his colleagues to maintain "very flexible" schedules as they may have to return to Washington before the April 20. Senate Republicans expressed a more cautious approach as many want to see the effect of Phase Three and the mitigation measures.

Additional Help for Municipalities is Needed

The CARES Act provided substantial help to states and municipalities (in addition to individuals and businesses, which in the end will also help local economies), including the \$150bn direct aid program to states and local municipalities, \$30bn for an Education Stabilization Fund, \$25bn to transit providers and \$100bn for hospital providers. Although it is definitely a good start in our view, many local policymakers have been arguing that much more is needed to address the economic damage caused by the COVID-19 pandemic. Consequently, a significant portion of the Phase Four stimulus may be dedicated to provide additional help to states and local municipalities.

Tax Revenue Losses Are Staggering

The majority of states were in a relatively good shape prior to the COVID-19 crisis, with their "rainy day fund" balances at the all-time record (Figure 5). There are some outliers, but overall states and local municipalities have been benefited from strong economic growth, robust housing and equity prices, and the Tax Reform of 2017, which created additional revenue for high tax states. Up until this pandemic, the main sources of revenue for municipalities – property tax, individual income tax, and sales tax – constituted the bulk of revenues alongside corporate income tax (Figure 6).

To provide historical context to the potential deterioration in state revenues, we look to the global financial crisis. In 2007, total revenue for the US states amounted to \$1.995trn. By 2009, total revenue at the state level fell to \$1.133trn, for a decline of 43.2%. The combination of lower revenues and balanced budget amendments was a factor in reducing employment at the state and local level by about 800,000 over a four-year period. Employment at the state and local level did not begin rising until five years after the end of the recession. We believe policymakers would prefer to avoid repeating this scenario following the COVID-19 outbreak, where state budgets and the state employment situation are impaired for several years or more.

If we assume that municipal revenues follow the ups and downs of the US GDP, we can project their movement over time (Figure 7). Using this approach, we expect states and local municipalities lose about \$350bn in revenue: about \$110bn in FY20, and close to \$240bn in FY21. In reality, we might actually see an even larger revenue drop, and the Federal government may not be inclined to absorb all the lost revenue because it would be expected to rebound as the economy recovered.

Thus far we have discussed just the revenue part of the equation; expenses will also have to increase significantly, as they will have to be supporting hospitals, schools etc. In essence, the ultimate effect on the finances is actually much larger than \$350bn.

Moreover, by moving the deadline for filing taxes to 15 July, states/municipalities were also negatively affected, as states get a substantial portion of their tax payments close to the deadline, which in 2020 partially will end up being paid in the next fiscal year. In the past week, the State of New Jersey moved the end of its fiscal year to 30 September. In general, states should have authority to do this, and it is probably the right thing to do for most of them in the current environment, because delaying the end of the tax year will give states a much clearer picture of their finances, in our view. Meanwhile, emergency spending appropriations will need to be approved to bridge the gap.

Pension assets are taking a big hit

In addition to the immediate effect from lower tax receipts, there is a medium-term challenge to states - underfunded pension liabilities for defined benefit pension plans. Underfunded pension liabilities have been always at the forefront of municipal investors' minds, as these underfundings were already more than \$4trn at the end of 2019, bringing funding levels to just 55%, with some outliers such as Illinois, New Jersey, and Kentucky faring much worse than the rest.

Most of these pension plans used relatively aggressive asset return assumptions (7-7.5%), although as a result of a massive bull market in equities in the past several years, most pension funds were actually able to reach their targets. Moreover, given such aggressive return assumptions, most pension funds were forced to put the bulk of their assets into equities and other investments with higher risk profiles (Figure 8).

It worked well during the bull market, but this sudden bear market that started in March has put a major dent in the pension funds' funding levels. Although valuations might recover somewhat by the end of the year, based on the year-to-date performance of the

FIGURE 5 States' Rainy Day Funds at Record Highs

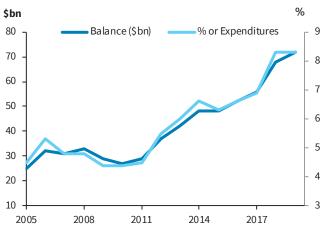
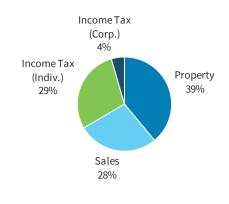


FIGURE 6 Tax Revenue Breakdown by Type (2019)



Source: US Census

Source: NASBO

major equity and fixed income indexes, we estimate that mark-to-market losses for most defined benefit pension funds this year are on the order of \$750-800bn.

In addition to the tax revenue losses discussed in the previous section, it is clear to us that after the COVID-19 crisis is over, many states will find themselves in a much more difficult position with respect to their pension liabilities, which will likely force them to make hard decisions.

Expanding the Federal Reserve Act to Permit Purchases of Municipals

In one of the most important provisions of the CARES Act, the Treasury contributed up to \$454bn to Federal Reserve lending facilities that would have the ability to purchase the bonds of, or extend loans to, corporates and municipalities. These lending facilities would be conducted under section 13(3) of the Federal Reserve Act and need approval from the Treasury. Treasury also needs to contribute a capital buffer to indemnify the Fed against potential losses. The Fed can leverage this capital contribution and, based on ratios observed during the global financial crisis, could possible extend credit up to \$4trn if the entire \$454bn in funding were applied and demand for the facility was high. Section 13(3) emergency lending authority is needed for the Fed to extend credit to corporates and municipalities since the Fed does not have express authority to purchase corporate bonds or municipal debt outright as part of its open-market authority. At present the Fed can only purchase Treasury securities, government-backed agency securities, and municipal debt with remaining maturity of six months or less. Decisions to purchase US Treasury or agency mortgage-backed securities as part of the Fed's open-market authority can be undertaken with approval from the FOMC and does not require approval from Treasury or the invoking of "unusual and exigent circumstances" under section 13(3).

However, some Democrats want to expand the Fed's authority to buy munis even further. Senator Bob Menendez (D-NJ) proposed to amend the Federal Reserve Act in order to allow the Fed purchase municipal bonds at times of stress as part of its open-market capabilities and authorize the Fed to have another congressionally mandated goal that designates it to be the buyer of last resort of the debt of troubled states and municipalities. This would greatly expand the Fed's authority in the area of municipal securities and would put municipals on equal footing with regard to Treasuries and mortgages in future rounds of large-scale asset purchases. That said, as we noted in Municipal Strategy: What Munis the Fed Will Likely Buy (30 Mar 2020), the Fed may be reluctant to use its potential expanded authority when it comes to purchasing municipals. Historically, the Fed has preferred to stay

FIGURE 7 Tax Revenues for States and Local Governments (seasonally adjusted)

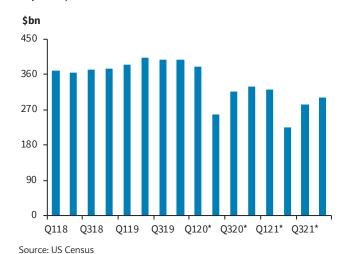
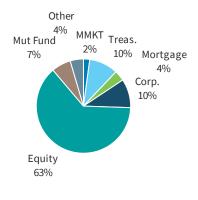


FIGURE 8 Defined Benefit Pension Plans (by type)



Source: Fed Flow of Funds

out of decisions regarding troubled financial states because this is viewed as more properly under the purview of the Treasury. In addition, decisions to purchase the debt of some states and not others could leave the Fed open to potential political criticism. Finally, the municipal market has many layers and issuers that could complicate the design of any purchase strategy. In our view, the Fed would prefer to support municipals, if needed, through section 13(3) since it does so as an agent of the Treasury and not as a principal through direct purchases.

Bringing Back Primary Tools

As one of the main goals of the Phase Four is expected to be to provide additional help to municipalities, we believe that some market tools might be resurrected to ease access to the primary market. For example, we might see tax-exempt advance refundings that were sunset in the aftermath of the 2017 tax reform, as well as Build America Bonds (BABs), albeit with a lower federal subsidy, potentially brought back. Both programs would not cost that much money to the federal government, but could provide much needed flexibility to issuers. If not on a permanent basis, these two programs may be brought back for a period of 12-24 months.

Analyst Certification

We, Mikhail Foux, Michael Gapen and Shawn Golhar, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

Important Disclosures:

Barclays Research is produced by the Investment Bank of Barclays Bank PLC and its affiliates (collectively and each individually, "Barclays").

All authors contributing to this research report are Research Analysts unless otherwise indicated. The publication date at the top of the report reflects the local time where the report was produced and may differ from the release date provided in GMT.

Availability of Disclosures:

For current important disclosures regarding any issuers which are the subject of this research report please refer to https://publicresearch.barclays.com or alternatively send a written request to: Barclays Research Compliance, 745 Seventh Avenue, 13th Floor, New York, NY 10019 or call +1-212-526-1072.

Barclays Capital Inc. and/or one of its affiliates does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that Barclays may have a conflict of interest that could affect the objectivity of this report. Barclays Capital Inc. and/or one of its affiliates regularly trades, generally deals as principal and generally provides liquidity (as market maker or otherwise) in the debt securities that are the subject of this research report (and related derivatives thereof). Barclays trading desks may have either a long and / or short position in such securities, other financial instruments and / or derivatives, which may pose a conflict with the interests of investing customers. Where permitted and subject to appropriate information barrier restrictions, Barclays fixed income research analysts regularly interact with its trading desk personnel regarding current market conditions and prices. Barclays fixed income research analysts receive compensation based on various factors including, but not limited to, the quality of their work, the overall performance of the firm (including the profitability of the Investment Banking Department), the profitability and revenues of the Markets business and the potential interest of the firm's investing clients in research with respect to the asset class covered by the analyst. To the extent that any historical pricing information was obtained from Barclays trading desks, the firm makes no representation that it is accurate or complete. All levels, prices and spreads are historical and do not necessarily represent current market levels, prices or spreads, some or all of which may have changed since the publication of this document. Barclays Research Department produces various types of research including, but not limited to, fundamental analysis, equity-linked analysis, quantitative analysis, and trade ideas. Recommendations and trade ideas contained in one type of Barclays Research may differ from those contained in other types of Barclays Research, whether as a result of differing time horizons, methodologies, or otherwise. In order to access Barclays Statement regarding Research Dissemination Policies and Procedures, please refer to https://publicresearch.barcap.com/S/RD.htm. In order to access Barclays Research Conflict Management Policy Statement, please refer to: https://publicresearch.barcap.com/S/CM.htm.

All pricing information is indicative only. Unless otherwise indicated, prices are sourced from Refinitiv and reflect the closing price in the relevant trading market, which may not be the last available price at the time of publication.

Types of investment recommendations produced by Barclays FICC Research:

In addition to any ratings assigned under Barclays' formal rating systems, this publication may contain investment recommendations in the form of trade ideas, thematic screens, scorecards or portfolio recommendations that have been produced by analysts in FICC Research. Any such investment recommendations produced by non-Credit Research teams shall remain open until they are subsequently amended, rebalanced or closed in a future research report. Any such investment recommendations produced by the Credit Research teams are valid at current market conditions and may not be otherwise relied upon.

Disclosure of other investment recommendations produced by Barclays FICC Research:

Barclays FICC Research may have published other investment recommendations in respect of the same securities/instruments recommended in this research report during the preceding 12 months. To view all investment recommendations published by Barclays FICC Research in the preceding 12 months please refer to https://live.barcap.com/go/research/Recommendations.

Legal entities involved in producing Barclays Research:

Barclays Bank PLC (Barclays, UK)

Barclays Capital Inc. (BCI, US)

Barclays Bank Ireland PLC, Frankfurt Branch (BBI, Frankfurt)

Barclays Bank Ireland PLC, Paris Branch (BBI, Paris)

Barclays Bank Ireland PLC, Milan Branch (BBI, Milan)

Barclays Securities Japan Limited (BSJL, Japan)

Barclays Bank PLC, Hong Kong branch (Barclays Bank, Hong Kong)

Barclays Capital Canada Inc. (BCCI, Canada)

Barclays Bank Mexico, S.A. (BBMX, Mexico)

Barclays Securities (India) Private Limited (BSIPL, India)

Barclays Bank PLC, India branch (Barclays Bank, India)

Barclays Bank PLC, Singapore branch (Barclays Bank, Singapore)

Barclays Bank PLC, DIFC Branch (Barclays Bank, DIFC)

Disclaimer

This publication has been produced by Barclays Research Department in the Investment Bank of Barclays Bank PLC and/or one or more of its affiliates (collectively and each individually, "Barclays"). It has been prepared for institutional investors and not for retail investors. It has been distributed by one

or more Barclays affiliated legal entities listed below. It is provided to our clients for information purposes only, and Barclays makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to any data included in this publication. To the extent that this publication states on the front page that it is intended for institutional investors and is not subject to all of the independence and disclosure standards applicable to debt research reports prepared for retail investors under U.S. FINRA Rule 2242, it is an "institutional debt research report" and distribution to retail investors is strictly prohibited. Barclays also distributes such institutional debt research reports to various issuers, media, regulatory and academic organisations for their own internal informational news gathering, regulatory or academic purposes and not for the purpose of making investment decisions regarding any debt securities. Media organisations are prohibited from re-publishing any opinion or recommendation concerning a debt issuer or debt security contained in any Barclays institutional debt research report. Any such recipients that do not want to continue receiving Barclays institutional debt research reports should contact debtresearch@barclays.com. Clients that are subscribed to receive equity research reports, will not receive certain cross asset research reports co-authored by equity and FICC research analysts that are distributed as "institutional debt research reports" unless they have agreed to accept such reports. Eligible clients may get access to such cross asset reports by contacting debtresearch@barclays.com. Barclays will not treat unauthorized recipients of this report as its clients and accepts no liability for use by them of the contents which may not be suitable for their personal use. Prices shown are indicative and Barclays is not offering to buy or sell or soliciting offers to buy or sell any financial instrument.

Without limiting any of the foregoing and to the extent permitted by law, in no event shall Barclays, nor any affiliate, nor any of their respective officers, directors, partners, or employees have any liability for (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified of the possibility of such damages, arising from any use of this publication or its contents.

Other than disclosures relating to Barclays, the information contained in this publication has been obtained from sources that Barclays Research believes to be reliable, but Barclays does not represent or warrant that it is accurate or complete. Barclays is not responsible for, and makes no warranties whatsoever as to, the information or opinions contained in any written, electronic, audio or video presentations of third parties that are accessible via a direct hyperlink in this publication or via a hyperlink to a third-party web site ('Third-Party Content'). Any such Third-Party Content has not been adopted or endorsed by Barclays, does not represent the views or opinions of Barclays, and is not incorporated by reference into this publication. Third-Party Content is provided for information purposes only and Barclays has not independently verified its accuracy or completeness.

The views in this publication are solely and exclusively those of the authoring analyst(s) and are subject to change, and Barclays Research has no obligation to update its opinions or the information in this publication. Unless otherwise disclosed herein, the analysts who authored this report have not received any compensation from the subject companies in the past 12 months. If this publication contains recommendations, they are general recommendations that were prepared independently of any other interests, including those of Barclays and/or its affiliates, and/or the subject companies. This publication does not contain personal investment recommendations or investment advice or take into account the individual financial circumstances or investment objectives of the clients who receive it. The securities and other investments discussed herein may not be suitable for all investors. Barclays is not a fiduciary to any recipient of this publication. Investors must independently evaluate the merits and risks of the investments discussed herein, consult any independent advisors they believe necessary, and exercise independent judgment with regard to any investment decision. The value of and income from any investment may fluctuate from day to day as a result of changes in relevant economic markets (including changes in market liquidity). The information herein is not intended to predict actual results, which may differ substantially from those reflected. Past performance is not necessarily indicative of future results. The information provided does not constitute a financial benchmark and should not be used as a submission or contribution of input data for the purposes of determining a financial benchmark.

United Kingdom: This document is being distributed (1) only by or with the approval of an authorised person (Barclays Bank PLC) or (2) to, and is directed at (a) persons in the United Kingdom having professional experience in matters relating to investments and who fall within the definition of "investment professionals" in Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the "Order"); or (b) high net worth companies, unincorporated associations and partnerships and trustees of high value trusts as described in Article 49(2) of the Order; or (c) other persons to whom it may otherwise lawfully be communicated (all such persons being "Relevant Persons"). Any investment or investment activity to which this communication relates is only available to and will only be engaged in with Relevant Persons. Any other persons who receive this communication should not rely on or act upon it. Barclays Bank PLC is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority and is a member of the London Stock Exchange.

European Economic Area ("EEA"): This material is being distributed in the EEA by Barclays Bank PLC. Barclays Bank PLC is not registered in France with the Autorité des marchés financiers or the Autorité de contrôle prudentiel.

Americas: The Investment Bank of Barclays Bank PLC undertakes U.S. securities business in the name of its wholly owned subsidiary Barclays Capital Inc., a FINRA and SIPC member. Barclays Capital Inc., a U.S. registered broker/dealer, is distributing this material in the United States and, in connection therewith accepts responsibility for its contents. Any U.S. person wishing to effect a transaction in any security discussed herein should do so only by contacting a representative of Barclays Capital Inc. in the U.S. at 745 Seventh Avenue, New York, New York 10019.

Non-U.S. persons should contact and execute transactions through a Barclays Bank PLC branch or affiliate in their home jurisdiction unless local regulations permit otherwise.

This material is distributed in Canada by Barclays Capital Canada Inc., a registered investment dealer, a Dealer Member of IIROC (www.iiroc.ca), and a Member of the Canadian Investor Protection Fund (CIPF).

This material is distributed in Mexico by Barclays Bank Mexico, S.A. This material is distributed in the Cayman Islands and in the Bahamas by Barclays Capital Inc., which it is not licensed or registered to conduct and does not conduct business in, from or within those jurisdictions and has not filed this material with any regulatory body in those jurisdictions.

Japan: This material is being distributed to institutional investors in Japan by Barclays Securities Japan Limited. Barclays Securities Japan Limited is a joint-stock company incorporated in Japan with registered office of 6-10-1 Roppongi, Minato-ku, Tokyo 106-6131, Japan. It is a subsidiary of Barclays Bank PLC and a registered financial instruments firm regulated by the Financial Services Agency of Japan. Registered Number: Kanto Zaimukyokucho (kinsho) No. 143

Asia Pacific (excluding Japan): Barclays Bank PLC, Hong Kong Branch is distributing this material in Hong Kong as an authorised institution regulated by the Hong Kong Monetary Authority. Registered Office: 41/F, Cheung Kong Center, 2 Queen's Road Central, Hong Kong.

All Indian securities-related research and other equity research produced by Barclays' Investment Bank are distributed in India by Barclays Securities (India) Private Limited (BSIPL). BSIPL is a company incorporated under the Companies Act, 1956 having CIN U67120MH2006PTC161063. BSIPL is registered and regulated by the Securities and Exchange Board of India (SEBI) as a Research Analyst: INH000001519; Portfolio Manager INP000002585;

Stock Broker/Trading and Clearing Member: National Stock Exchange of India Limited (NSE) Capital Market INB231292732, NSE Futures & Options INF231292732, NSE Currency derivatives INE231450334, Bombay Stock Exchange Limited (BSE) Capital Market INB011292738, BSE Futures & Options INF011292738; Depository Participant (DP) with the National Securities & Depositories Limited (NSDL): DP ID: IN-DP-NSDL-299-2008; Investment Adviser: INA000000391. The registered office of BSIPL is at 208, Ceejay House, Shivsagar Estate, Dr. A. Besant Road, Worli, Mumbai – 400 018, India. Telephone No: +91 2267196000. Fax number: +91 22 67196100. Any other reports produced by Barclays' Investment Bank are distributed in India by Barclays Bank PLC, India Branch, an associate of BSIPL in India that is registered with Reserve Bank of India (RBI) as a Banking Company under the provisions of The Banking Regulation Act, 1949 (Regn No BOM43) and registered with SEBI as Merchant Banker (Regn No INM000002129) and also as Banker to the Issue (Regn No INBI00000950). Barclays Investments and Loans (India) Limited, registered with RBI as Non Banking Financial Company (Regn No RBI CoR-07-00258), and Barclays Wealth Trustees (India) Private Limited, registered with Registrar of Companies (CIN U93000MH2008PTC188438), are associates of BSIPL in India that are not authorised to distribute any reports produced by Barclays' Investment Bank. This material is distributed in Singapore by the Singapore branch of Barclays Bank PLC, a bank licensed in Singapore by the Monetary Authority of Singapore. For matters in connection with this material, recipients in Singapore may contact the Singapore branch of Barclays Bank PLC, whose registered address is 10 Marina Boulevard, #23-01 Marina Bay Financial Centre Tower 2, Singapore 018983.

This material is distributed to persons in Australia by Barclays Bank PLC or one of the Barclays group entities. None of Barclays Bank PLC, nor such Barclays group entity, holds an Australian financial services licence and instead relies on an exemption from the requirement to hold such a licence. This material is intended to only be distributed to "wholesale clients" as defined by the Australian Corporations Act 2001. This material is distributed in New Zealand by Barclays Bank PLC, but it has not been registered, filed or approved by any New Zealand regulatory authority or under or in accordance with the Financial Markets Conduct Act of 2013, and this material is not a disclosure document under New Zealand law.

Middle East: Nothing herein should be considered investment advice as defined in the Israeli Regulation of Investment Advisory, Investment Marketing and Portfolio Management Law, 1995 ("Advisory Law"). This document is being made to eligible clients (as defined under the Advisory Law) only. Barclays Israeli branch previously held an investment marketing license with the Israel Securities Authority but it cancelled such license on 30/11/2014 as it solely provides its services to eligible clients pursuant to available exemptions under the Advisory Law, therefore a license with the Israel Securities Authority is not required. Accordingly, Barclays does not maintain an insurance coverage pursuant to the Advisory Law.

This material is distributed in the United Arab Emirates (including the Dubai International Financial Centre) and Qatar by Barclays Bank PLC. Barclays Bank PLC in the Dubai International Financial Centre (Registered No. 0060) is regulated by the Dubai Financial Services Authority (DFSA). Principal place of business in the Dubai International Financial Centre: The Gate Village, Building 4, Level 4, PO Box 506504, Dubai, United Arab Emirates. Barclays Bank PLC-DIFC Branch, may only undertake the financial services activities that fall within the scope of its existing DFSA licence. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority. Barclays Bank PLC in the UAE is regulated by the Central Bank of the UAE and is licensed to conduct business activities as a branch of a commercial bank incorporated outside the UAE in Dubai (Licence No.: 13/1844/2008, Registered Office: Building No. 6, Burj Dubai Business Hub, Sheikh Zayed Road, Dubai City) and Abu Dhabi (Licence No.: 13/952/2008, Registered Office: Al Jazira Towers, Hamdan Street, PO Box 2734, Abu Dhabi). This material does not constitute or form part of any offer to issue or sell, or any solicitation of any offer to subscribe for or purchase, any securities or investment products in the UAE (including the Dubai International Financial Centre) and accordingly should not be construed as such. Furthermore, this information is being made available on the basis that the recipient acknowledges and understands that the entities and securities to which it may relate have not been approved, licensed by or registered with the UAE Central Bank, the Dubai Financial Services Authority or any other relevant licensing authority or governmental agency in the UAE. The content of this report has not been approved by or filed with the UAE Central Bank or Dubai Financial Services Authority. Barclays Bank PLC in the Qatar Financial Centre (Registered No. 00018) is authorised by the Qatar Financial Centre Regulatory Authority (QFCRA). Barclays Bank PLC-QFC Branch may only undertake the regulated activities that fall within the scope of its existing QFCRA licence. Principal place of business in Qatar: Qatar Financial Centre, Office 1002, 10th Floor, QFC Tower, Diplomatic Area, West Bay, PO Box 15891, Doha, Qatar. Related financial products or services are only available to Business Customers as defined by the Qatar Financial Centre Regulatory Authority.

Russia: This material is not intended for investors who are not Qualified Investors according to the laws of the Russian Federation as it might contain information about or description of the features of financial instruments not admitted for public offering and/or circulation in the Russian Federation and thus not eligible for non-Qualified Investors. If you are not a Qualified Investor according to the laws of the Russian Federation, please dispose of any copy of this material in your possession.

IRS Circular 230 Prepared Materials Disclaimer: Barclays does not provide tax advice and nothing contained herein should be construed to be tax advice. Please be advised that any discussion of U.S. tax matters contained herein (including any attachments) (i) is not intended or written to be used, and cannot be used, by you for the purpose of avoiding U.S. tax-related penalties; and (ii) was written to support the promotion or marketing of the transactions or other matters addressed herein. Accordingly, you should seek advice based on your particular circumstances from an independent tax advisor.

© Copyright Barclays Bank PLC (2020). All rights reserved. No part of this publication may be reproduced or redistributed in any manner without the prior written permission of Barclays. Barclays Bank PLC is registered in England No. 1026167. Registered office 1 Churchill Place, London, E14 5HP. Additional information regarding this publication will be furnished upon request.