

Investment Grade

Reassessing at Wider Levels

IG bonds were not immune to the risk-off sentiment this week. Although BBBs outpaced As beta-adjusted, the sell-off was relatively duration agnostic. We estimate which sectors are most vulnerable to a slowdown in demand and/or disruption in the supply chain due to the spread of COVID-19 and highlight relevant opportunities.

Concerns about the spread of COVID-19 have spurred a five-day sell-off in both equity and credit markets, with the S&P 500 down 12% and US corporate spreads wider by 10bp as of midday Thursday. Heightened worries of a slowdown in global economic activity have also led to a rally in safe haven assets, with 10y and 30y Treasury yields declining more than 20bp and both reaching all-time lows. BBB debt has widened more than A paper in nominal terms, but has actually outperformed on a beta-adjusted basis. In fact, the compression seen in the BBB/A ratio as index spreads remained range-round for the previous two months only accelerated during the recent rout in valuations. Figure 1 shows the BBB/A ratio for industrial corporate debt, which is now at the lowest level since June 2019 and closer to longer-term averages.

When sell-offs of this magnitude occur in a short period of time, the aggregate indices are unlikely to fully reflect the magnitude of the move given that only a subset of bonds trade actively on any day. Therefore, in order to garner a better understanding of market moves we focus on securities that have traded actively in the past week. This cohort, which comprises about 30% of the index by market value but has a similar rating/duration breakdown, has widened 12bp w/w, compared with a 10bp move in the US Corporate Index over the same period. Note that all spreads moves are through Wednesday's close.

Figure 2 shows the spread move since Thursday of the most actively traded bonds across the curve, broken down by ratings bucket. Across maturity buckets, BBB spreads have widened 14-17bp, outperforming single-As, which are 8-12bp wider, on a beta-adjusted basis. The sell-off has been relatively duration agnostic, with 10s30s curves less than 2bp steeper for both As and BBBs. Historically, curves steepen when yields decline, although this effect has been subdued recently, as yield-focused demand from domestic insurance and international has remained elevated even as yields have decreased (see [Demand in the Face of Lower Yields](#)). However, we expect the magnitude and pace of the Treasury rally to weigh on long-dated demand, at least in the near term. In addition, once primary markets re-open, there is an increased likelihood that 30y issuance will pick up at historically low all-in yield levels, further reducing the attractiveness of long-dated debt. Therefore, we recommend rotating out of 30y debt and into the 5-7y bucket, especially for A rated paper, where 5s30s curves are flatter.

This document 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. Barclays trades the securities covered in this report for its own account and on a discretionary basis on behalf of certain clients. Such trading interests may be contrary to the recommendations offered in this report.

Please see analyst certifications and important disclosures beginning on page 6 .

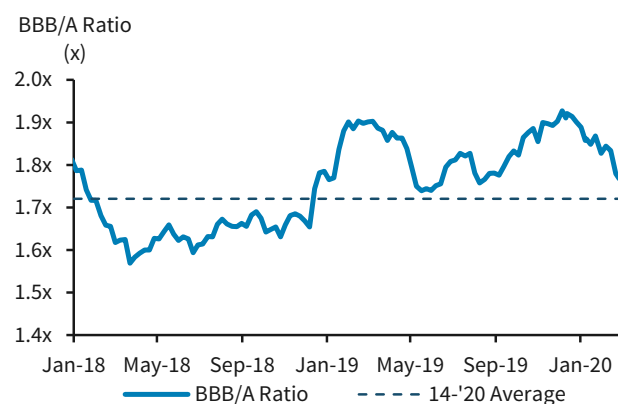
Completed: 28-Feb-20, 01:47 GMT Released: 28-Feb-20, 11:30 GMT Restricted - External

| CORE

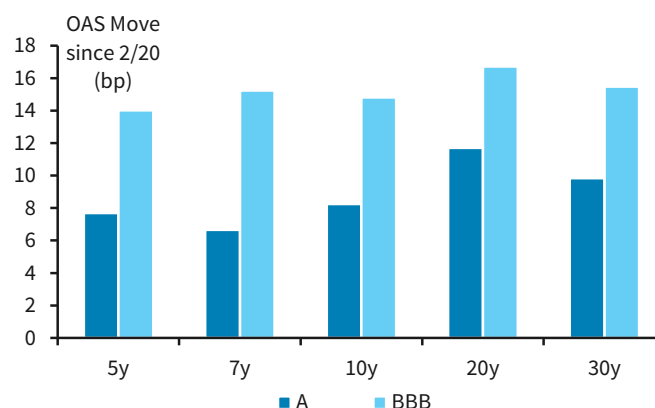
Shobhit Gupta
+1 212 412 2056
shobhit.gupta@barclays.com
BCI, US

Bradford Elliott, CFA
+1 212 526 6704
bradford.elliott@barclays.com
BCI, US

Steve Wang
+1 212 526 4620
steve.wang2@barclays.com
BCI, US

FIGURE 1. BBB/A Ratio Compression Accelerated during the Recent Sell-off

Note: Industrial debt only.
Source: Bloomberg, Barclays Research

FIGURE 2. Non-financial OAS Move since February 20 by Maturity

Source: Bloomberg, Barclays Research

Figure 3 highlights the worst and best performing sectors since the market close on Thursday. The sectors most susceptible to a global slowdown in demand and/or significant supply chain disruptions appear to have underperformed. Automotive companies are broadly affected from both a demand and a supply perspective, and Barclays fundamental analysts recently detailed which companies are most exposed (see [Global Autos & Auto Parts: Coronavirus impact on global autos](#)). Leisure and gaming sectors have underperformed largely because of worries about a decline in consumer demand for cruises and casino trips. Energy sectors have reacted to the approximately 25% decline in oil, and although metals prices have held in, the metals and chemicals sectors have underperformed because of their higher exposure to China (see [Swap Opportunities Amid Volatility](#)).

Turning to the best performing sectors, non-cyclicals have led the way, as investors have preferred companies with more stable business models. While the outperformance is justified in some cases, four sectors stand out. In particular, consumer products, food & beverage, retail, and aerospace & defense have performed well, with their perceived defensiveness likely supporting valuations. While these are, in fact, more insulated from the direct effects of the virus, many of these sectors were facing significant headwinds before virus concerns took over market sentiment. Retail, consumer products, and food & beverage companies are in the midst of secular shifts in their industries, which should limit their defensiveness in a broader market sell-off. Risks in aerospace & defense are more idiosyncratic, with uncertainty surrounding the return of the Boeing 737 Max dampening sentiment in the sector (see [HG Aerospace & Defense: High Quality Problems](#)). On balance, we believe these sectors are at risk of underperforming the broader index.

FIGURE 3. Worst and Best Performing Sectors

Worst Performing Sectors			Best Performing Sectors		
Sector	4-day OAS chg (bp)	YTD OAS chg*	Sector	4-day OAS chg (bp)	YTD OAS chg*
Leisure	81	45	Food and Beverage	4	7
Automotive	23	24	Pharmaceuticals	9	13
Independent	23	37	Supermarkets	9	24
Chemicals	23	17	Retailers	10	16
Paper	22	13	Consumer Cyc Serv.	10	15
Midstream	22	25	Consumer Products	10	13
Gaming	20	16	Wireless	10	13

Worst Performing Sectors			Best Performing Sectors		
Sector	4-day OAS chg (bp)	YTD OAS chg*	Sector	4-day OAS chg (bp)	YTD OAS chg*
Oil Field Services	20	25	Technology	10	15
Metals and Mining	19	16	Wirelines	10	22

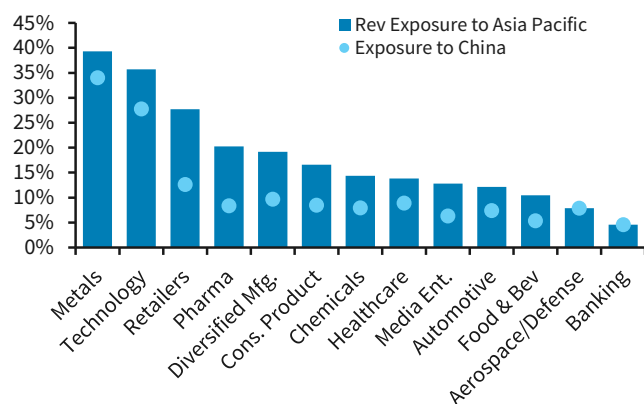
* US Corporate Index average.

Source: Bloomberg, Barclays Research

Extending the analysis to single names, quantifying the effect of the virus, and determining the most vulnerable companies is not a straight-forward exercise. The effect on companies is two-pronged, through the demand side of the economy as households cut back on consumption and spending and the through global supply chains as factories shut down and production capacity is underutilized.

- First, to identify the companies most exposed to weakened demand, we look at the aggregated revenue exposure to China and the Asia Pacific region. Where available, we identify revenue exposure for individual companies and aggregate it at a sector level (Figure 4). Not surprisingly, metals & mining and technology companies screen as having the highest revenue exposure to the region, while the banking, aerospace & defense, and food & beverage sectors are most insulated.
- Second, using sector level import/export data from China, we estimate which sectors are most vulnerable to a potential disruption in the global supply chain. Because these data are usually not available at the ticker level, we use aggregate data from the US Census Bureau and the Bureau of Economic Analysis, combined with qualitative opinions from Barclays' fundamental analysts, to fine-tune the supply-chain exposure estimates (see [There's a New Tariff in Town](#) for more details on the methodology).

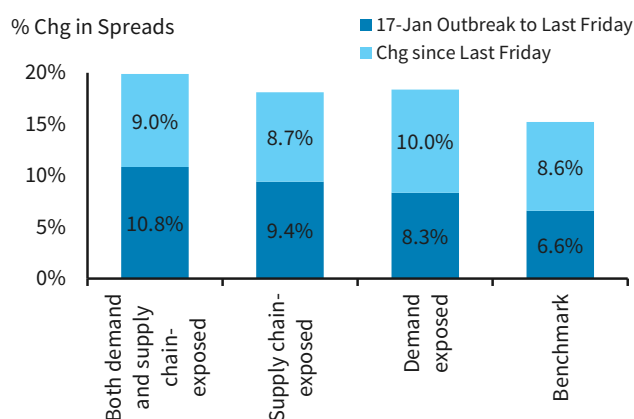
FIGURE 4. Investment Grade Corporate Aggregate Sector Revenue Exposure to Asia Pacific Region



Note: Data limited by availability of geographical revenue breakdown. Also exclude sectors where less than three data points.

Source: Bloomberg, Factset, Barclays Research

FIGURE 5. Spread Performance of Companies with Supply and Demand Exposure to Asia



Source: Bloomberg, Factset, Barclays Research

Combining the two factors, we construct a list of US investment grade companies that are vulnerable from a demand or supply perspective, or both. Figure 5 shows the relative performance of these three cohorts versus the index. Companies with heightened exposure to both demand and supply-chain disruptions have fared the worst since the outbreak, widening 16bp, or about 20% of their starting spread, from levels on January 17, when the outbreak began.

Zooming in on the sell-off this week in particular, demand-exposed names have fared worse than supply chain-exposed names, a marked contrast from their performance from January 17 to last Friday. With the number of new cases in China on the decline, the risk of meaningful supply chain disruptions have decreased and been superseded by concerns that a global outbreak will weigh on demand.

Figure 6 highlights single names that are exposed to both of the above factors, ie, from a supply-chain and a demand perspective. Across the investment grade market, these should be the companies most vulnerable to a continued worsening of the virus outbreak and can serve as a starting point for investors assessing their exposure to this risk.

FIGURE 6. Tickers Exposed from a Supply and Demand Perspective

Ticker	Mkt. Value (\$bn)	Rating	Sector	APAC Rev %	China Export/Sales	China Import/Sales	3-day chg vs Index (bp)	Chg as a % of Starting Spread
STX	4.0	BAA3	Technology	23%	1%	12%	26	14%
SWK	5.1	A3/BAA1	Building Materials	9%	1%	24%	12	12%
ETN	4.8	BAA1	Diversified Manuf.	12%	1%	8%	8	11%
INTC	27.0	A1	Technology	28%	5%	4%	7	11%
NKE	4.0	A1	Retailers	29%	1%	46%	6	10%
AAPL	75.8	AA1	Technology	32%	2%	46%	6	10%
QCOM	14.6	A3	Technology	65%	2%	46%	8	10%
TPR	1.7	BAA3	Retailers	27%	1%	46%	14	10%
AVGO	26.6	BAA3	Technology	66%	5%	4%	11	10%
TEL	2.5	A3	Technology	33%	1%	11%	8	9%
MMM	14.3	A1	Diversified Manuf.	31%	0%	9%	6	9%
BDX	11.3	BAA3	Healthcare	16%	1%	4%	8	9%
APH	2.3	BAA1	Technology	42%	1%	11%	7	8%
TRMB	1.5	BAA3	Technology	13%	2%	46%	10	8%
BA	19.5	A3	Aerospace/Defense	26%	5%	0%	9	8%
LEG	1.7	BAA2	Diversified Manuf.	12%	0%	20%	8	7%
TMO	7.0	BAA1	Healthcare	14%	4%	2%	5	7%
GLW	5.5	BAA1	Technology	32%	1%	12%	14	7%
MOS	4.4	BAA3	Chemicals	3%	0%	1%	10	7%
JNPR	1.9	BAA2	Technology	18%	0%	16%	9	7%
DHR	5.4	A3/BAA1	Healthcare	16%	3%	7%	5	7%
WHR	2.7	BAA2	Consumer Products	8%	3%	61%	7	6%
WY	5.0	BAA2	Paper	7%	0%	0%	6	6%
ROK	1.6	A2	Diversified Manuf.	14%	4%	5%	3	4%
A	1.9	BAA1	Healthcare	20%	6%	5%	2	3%
FTV	2.4	BAA2	Diversified Manuf.	11%	3%	7%	2	2%

Source: Factset, U.S. Census Bureau and Bureau of Economic Analysis, Bloomberg, Barclays Research

Separately, we identify tickers whose recent spread performance appears dislocated compared with their exposure to virus risk, in our opinion. Specifically, Figure 7 highlights long ideas in 10y debt that has underperformed as a percent of starting spread but is from issuers with little revenue or supply chain exposure to the Asia Pacific region. On the flip side, some tickers have outperformed despite significant exposure to the region from either a demand or a supply perspective (the credits highlighted in blue) and appear rich.

FIGURE 7. Long and Short Ideas Based on Supply and Demand from APAC

Ticker	Mkt. Value (\$bn)	Rating	Sector	APAC Rev %	10y OAS chg as % of Starting Spread
Long Ideas					
GD	8.9	A2	Aerospace/Defense	6%	26%

Ticker	Mkt. Value (\$bn)	Rating	Sector	APAC Rev %	10y OAS chg as % of Starting Spread
CRM	2.7	A3	Technology	10%	21%
UTX	31.2	BAA1/BAA2	Diversified Manufacturing	7%	21%
OMC	3.6	BAA1	Media Entertainment	11%	14%
ADBE	1.1	A2	Technology	15%	12%
Short Ideas					
MU	4.3	BAA3	Technology	51%	10%
KEYS	1.4	BAA2	Technology	43%	10%
DHR	1.6	A3/BAA1	Healthcare	16%	9%
NXPI	4.1	BAA3	Technology	48%	8%
BIDU	5.8	A3	Technology	100%	5%
TGT	10.2	A2	Retailers	N/A	10%
DLTR	3.8	BAA3	Retailers	N/A	8%
JWN	2.1	BAA1	Retailers	N/A	5%

Source: Factset, Bloomberg, Barclays Research

Analyst(s) Certification(s):

We, Shobhit Gupta, Bradford Elliott, CFA and Steve Wang, 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:

This document 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. Barclays trades the securities covered in this report for its own account and on a discretionary basis on behalf of certain clients. Such trading interests may be contrary to the recommendations offered in this report.

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>.

Materially Mentioned Issuers/Bonds

ADOBE INC, CD/CE/J

Representative Bond: ADBE 2.15 02/01/27 (USD 101.82, 26-Feb-2020)

BAIDU INC, Market Weight, CD/CE/FC/J

Representative Bond: BIDU 3 5/8 07/06/27 (USD 107.81, 26-Feb-2020)

DANAHER CORP, A/CD/CE/D/E/J/K/L/M/N

Representative Bond: DHR 3.35 09/15/25 (USD 108.45, 26-Feb-2020)

DOLLAR TREE INC, CD/CE/J

Representative Bond: DLTR 4.2 05/15/28 (USD 110.53, 26-Feb-2020)

GENERAL DYNAMICS CORP, CD/CE/J/K/M/N

Representative Bond: GD 3 3/4 05/15/28 (USD 112.56, 26-Feb-2020)

KEYSIGHT TECHNOLOGIES INC, A/CD/CE/D/J/K/L/M/N

Representative Bond: KEYS 3 10/30/29 (USD 104.38, 26-Feb-2020)

MICRON TECHNOLOGY INC, CD/CE/J

Representative Bond: MU 5.327 02/06/29 (USD 116.25, 26-Feb-2020)

NORDSTROM INC, Market Weight, CD/CE/J

Representative Bond: JWN 4.0 10/15/2021 (USD 102.91, 26-Feb-2020)

NXP BV / NXP FUNDING LLC / NXP USA INC, Market Weight, A/CD/D/E/J/K/L/M

Representative Bond: NXPI 3 7/8 06/18/26 (USD 107.75, 26-Feb-2020)

Representative Bond: NXPI 3 7/8 06/18/26 (USD 108.13, 26-Feb-2020)

Representative Bond: NXPI 4.3 06/18/29 (USD 111.88, 26-Feb-2020)

Representative Bond: NXPI 4.3 06/18/29 (USD 111.88, 26-Feb-2020)

OMNICOM GROUP INC, A/CD/CE/D/FB/J/K/L/M/N

Representative Bond: OMC 2.45 04/30/30 (USD 100.02, 26-Feb-2020)

SALESFORCE.COM INC, CD/CE/D/J/K/L/M

Representative Bond: CRM 3.7 04/11/28 (USD 111.88, 26-Feb-2020)

TARGET CORP, Market Weight, A/CD/CE/D/J/K/L/M/N

Representative Bond: TGT 3 1/2 07/01/24 (USD 108.74, 26-Feb-2020)

UNITED TECHNOLOGIES CORP, Overweight, A/CD/CE/D/FA/FB/J/K/L/M/N

Representative Bond: UTX 4 5/8 11/16/48 (USD 131.96, 26-Feb-2020)

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.

Disclosure Legend:

A: Barclays Bank PLC and/or an affiliate has been lead manager or co-lead manager of a publicly disclosed offer of securities of the issuer in the previous 12 months.

B: An employee or non-executive director of Barclays PLC is a director of this issuer.

CD: Barclays Bank PLC and/or an affiliate is a market-maker in debt securities issued by this issuer.

CE: Barclays Bank PLC and/or an affiliate is a market-maker in equity securities issued by this issuer.

D: Barclays Bank PLC and/or an affiliate has received compensation for investment banking services from this issuer in the past 12 months.

E: Barclays Bank PLC and/or an affiliate expects to receive or intends to seek compensation for investment banking services from this issuer within the next 3 months.

FA: Barclays Bank PLC and/or an affiliate beneficially owns 1% or more of a class of equity securities of this issuer, as calculated in accordance with US regulations.

FB: Barclays Bank PLC and/or an affiliate beneficially owns a long position of more than 0.5% of a class of equity securities of this issuer, as calculated in accordance with EU regulations.

FC: Barclays Bank PLC and/or an affiliate beneficially owns a short position of more than 0.5% of a class of equity securities of this issuer, as calculated in accordance with EU regulations.

FD: Barclays Bank PLC and/or an affiliate beneficially owns 1% or more of a class of equity securities of this issuer, as calculated in accordance with South Korean regulations.

GD: One of the Research Analysts on the fundamental credit coverage team (or a member of his or her household) has a long position in the common equity securities of this issuer.

GE: One of the Research Analysts on the fundamental equity coverage team (or a member of his or her household) has a long position in the common equity securities of this issuer.

H: This issuer beneficially owns more than 5% of any class of common equity securities of Barclays PLC.

I: Barclays Bank PLC and/or an affiliate is party to an agreement with this issuer for the provision of financial services to Barclays Bank PLC and/or an affiliate.

J: Barclays Bank PLC and/or an affiliate is a liquidity provider and/or trades regularly in the securities of this issuer and/or in any related derivatives.

K: Barclays Bank PLC and/or an affiliate has received non-investment banking related compensation (including compensation for brokerage services, if applicable) from this issuer within the past 12 months.

L: This issuer is, or during the past 12 months has been, an investment banking client of Barclays Bank PLC and/or an affiliate.

M: This issuer is, or during the past 12 months has been, a non-investment banking client (securities related services) of Barclays Bank PLC and/or an affiliate.

N: This issuer is, or during the past 12 months has been, a non-investment banking client (non-securities related services) of Barclays Bank PLC and/or an affiliate.

O: Not in use.

P: A partner, director or officer of Barclays Capital Canada Inc. has, during the preceding 12 months, provided services to the subject company for remuneration, other than normal course investment advisory or trade execution services.

Q: Barclays Bank PLC and/or an affiliate is a Corporate Broker to this issuer.

R: Barclays Capital Canada Inc. and/or an affiliate has received compensation for investment banking services from this issuer in the past 12 months.

S: This issuer is a Corporate Broker to Barclays PLC.

T: Barclays Bank PLC and/or an affiliate is providing equity advisory services to this issuer.

U: The equity securities of this Canadian issuer include subordinate voting restricted shares.

V: The equity securities of this Canadian issuer include non-voting restricted shares.

**Explanation of the Barclays Research Corporate Credit Sector Rating System
Overweight (OW):**

For sectors rated against the Bloomberg Barclays U.S. Credit Index, the Bloomberg Barclays Pan-European Credit Index, the Bloomberg Barclays EM Asia USD High Grade Credit Index or the Bloomberg Barclays EM USD Corporate and Quasi-Sovereign Index, the analyst expects the six-month excess return of the sector to exceed the six-month excess return of the relevant index.

For sectors rated against the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index, the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials, the Bloomberg Barclays Pan-European High Yield Finance Index or the Bloomberg Barclays EM Asia USD High Yield Corporate Credit Index, the analyst expects the six-month total return of the sector to exceed the six-month total return of the relevant index.

Market Weight (MW):

For sectors rated against the Bloomberg Barclays U.S. Credit Index, the Bloomberg Barclays Pan-European Credit Index, the Bloomberg Barclays EM Asia USD High Grade Credit Index or the Bloomberg Barclays EM USD Corporate and Quasi-Sovereign Index, the analyst expects the six-month excess return of the sector to be in line with the six-month excess return of the relevant index.

For sectors rated against the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index, the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials, the Bloomberg Barclays Pan-European High Yield Finance Index or the Bloomberg Barclays EM Asia USD High Yield Corporate Credit Index, the analyst expects the six-month total return of the sector to be in line with the six-month total return of the relevant index.

Underweight (UW):

For sectors rated against the Bloomberg Barclays U.S. Credit Index, the Bloomberg Barclays Pan-European Credit Index, the Bloomberg Barclays EM Asia USD High Grade Credit Index or the Bloomberg Barclays EM USD Corporate and Quasi-Sovereign Index, the analyst expects the six-month excess return of the sector to be less than the six-month excess return of the relevant index.

For sectors rated against the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index, the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials, the Bloomberg Barclays Pan-European High Yield Finance Index or the Bloomberg Barclays EM Asia USD High Yield Corporate Credit Index, the analyst expects the six-month total return of the sector to be less than the six-month total return of the relevant index.

Sector definitions:

Sectors in U.S. High Grade Research are defined using the sector definitions of the Bloomberg Barclays U.S. Credit Index and are rated against the Bloomberg Barclays U.S. Credit Index.

Sectors in U.S. High Yield Research are defined using the sector definitions of the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index and are rated against the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index.

Sectors in European High Grade Research are defined using the sector definitions of the Bloomberg Barclays Pan-European Credit Index and are rated against the Bloomberg Barclays Pan-European Credit Index.

Sectors in Industrials and Utilities in European High Yield Research are defined using the sector definitions of the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials and are rated against the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials.

Sectors in Financials in European High Yield Research are defined using the sector definitions of the Bloomberg Barclays Pan-European High Yield Finance Index and are rated against the Bloomberg Barclays Pan-European High Yield Finance Index.

Sectors in Asia High Grade Research are defined on Barclays Live and are rated against the Bloomberg Barclays EM Asia USD High Grade Credit Index.

Sectors in Asia High Yield Research are defined on Barclays Live and are rated against the Bloomberg Barclays EM Asia USD High Yield Corporate Credit Index.

Sectors in EEMEA and Latin America Research are defined on Barclays Live and are rated against the Bloomberg Barclays EM USD Corporate and Quasi Sovereign Index. These sectors may contain both High Grade and High Yield issuers.

To view sector definitions and monthly sector returns for Asia, EEMEA and Latin America Research, go to <https://live.barcap.com/go/research/EMSectorReturns> on Barclays Live.

Explanation of the Barclays Research Corporate Credit Rating System

For all High Grade issuers covered in the US, Europe or Asia, and for all issuers in Latin America and EEMEA, the credit rating system is based on the analyst's view of the expected excess return over a six-month period of the issuer's index-eligible corporate debt securities* relative to the expected excess return of the relevant sector, as specified on the report.

Overweight (OW): The analyst expects the six-month excess return of the issuer's index-eligible corporate debt securities to exceed the six-month expected excess return of the relevant sector.

Market Weight (MW): The analyst expects the six-month excess return of the issuer's index-eligible corporate debt securities to be in line with the six-month expected excess return of the relevant sector.

Underweight (UW): The analyst expects the six-month excess return of the issuer's index-eligible corporate debt securities to be less than the six-month expected excess return of the relevant sector.

Rating Suspended (RS): The rating has been suspended temporarily due to market events that make coverage impracticable or to comply with applicable regulations and/or firm policies in certain circumstances including where the Investment Bank of Barclays Bank PLC is acting in an advisory capacity in a merger or strategic transaction involving the company.

Coverage Suspended (CS): Coverage of this issuer has been temporarily suspended.

Not Covered (NC): Barclays' fundamental credit research team does not provide formal, continuous coverage of this issuer and has not assigned a rating to the issuer or its debt securities. Any analysis, opinion or trade recommendation provided on a Not Covered issuer or its debt securities is valid

only as of the publication date of this report and there should be no expectation that additional reports relating to the Not Covered issuer or its debt securities will be published thereafter.

For all High Yield issuers (excluding those covered in EEMEA or Latin America), the credit rating system is based on the analyst's view of the expected total returns over a six-month period of the rated debt security relative to the expected total return of the relevant sector, as specified on the report.

Overweight (OW): The analyst expects the six-month total return of the debt security subject to this rating to exceed the six-month expected total return of the relevant sector.

Market Weight (MW): The analyst expects the six-month total return of the debt security subject to this rating to be in line with the six-month expected total return of the relevant sector.

Underweight (UW): The analyst expects the six-month total return of the rated debt security subject to this rating to be less than the six-month expected total return of the relevant sector.

Rating Suspended (RS): The rating has been suspended temporarily due to market events that make coverage impracticable or to comply with applicable regulations and/or firm policies in certain circumstances including where the Investment Bank of Barclays Bank PLC is acting in an advisory capacity in a merger or strategic transaction involving the company.

Coverage Suspended (CS): Coverage of this issuer has been temporarily suspended.

Not Covered (NC): Barclays' fundamental credit research team does not provide formal, continuous coverage of this issuer and has not assigned a rating to the issuer or its debt securities. Any analysis, opinion or trade recommendation provided on a Not Covered issuer or its debt securities is valid only as of the publication date of this report and there should be no expectation that additional reports relating to the Not Covered issuer or its debt securities will be published thereafter.

Where a recommendation is made at the issuer level, it does not apply to any sanctioned securities, where trading in such securities would be prohibited under applicable law, including sanctions laws and regulations.

*In EEMEA and Latin America (and in certain other limited instances in other regions), analysts may occasionally rate issuers that are not part of the Bloomberg Barclays U.S. Credit Index, the Bloomberg Barclays Pan-European Credit Index, the Bloomberg Barclays EM Asia USD High Grade Credit Index or Bloomberg Barclays EM USD Corporate and Quasi Sovereign Index. In such cases the rating will reflect the analyst's view of the expected excess return over a six-month period of the issuer's corporate debt securities relative to the expected excess return of the relevant sector, as specified on the report.

Distribution of ratings assigned by Barclays Corporate Credit Research at the issuer level:

27% have been assigned an Overweight rating which, for purposes of mandatory regulatory disclosures, is classified as a Buy rating; 59% of issuers with this rating category are investment banking clients of the Firm; 77% of the issuers with this rating have received financial services from the Firm.

46% have been assigned Market Weight rating which, for purposes of mandatory regulatory disclosures, is classified as a Hold rating; 60% of issuers with this rating category are investment banking clients of the Firm; 83% of the issuers with this rating have received financial services from the Firm.

27% have been assigned an Underweight rating which, for purposes of mandatory regulatory disclosures, is classified as a Sell rating; 48% of issuers with this rating category are investment banking clients of the Firm; 79% of the issuers with this rating have received financial services from the Firm.

Explanation of the Barclays EM Sovereign Credit Issuer Rating System

Overweight (OW):

The analyst expects the six-month excess return of the country's index eligible bonds to exceed the six-month excess return of the Bloomberg Barclays EM USD Sovereign Index.

Market Weight (MW):

The analyst expects the six-month excess return of the country's index eligible bonds to be in line with the six-month excess return of the Bloomberg Barclays EM USD Sovereign Index.

Underweight (UW):

The analyst expects the six-month excess return of the country's index eligible bonds to be less than the six-month excess return of the Bloomberg Barclays EM USD Sovereign Index.

Rating Suspended (RS):

The rating has been suspended temporarily due to market events that make coverage impracticable or to comply with applicable regulations and/or firm policies in certain circumstances including where the Investment Bank of Barclays Bank PLC is acting in an advisory capacity.

Distribution of ratings assigned by Barclays Emerging Markets Sovereign Research at the issuer level:

32% have been assigned an Overweight rating which, for purposes of mandatory regulatory disclosures, is classified as a Buy rating; 9% of issuers with this rating category are investment banking clients of the Firm; 64% of the issuers with this rating have received financial services from the Firm.

35% have been assigned Market Weight rating which, for purposes of mandatory regulatory disclosures, is classified as a Hold rating; 8% of issuers with this rating category are investment banking clients of the Firm; 83% of the issuers with this rating have received financial services from the Firm.

32% have been assigned an Underweight rating which, for purposes of mandatory regulatory disclosures, is classified as a Sell rating; 9% of issuers with this rating category are investment banking clients of the Firm; 91% of the issuers with this rating have received financial services from the Firm.

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 Zaimukyokuchō (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. None of Barclays Bank PLC, nor any other 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.

BRCF2242