



# Global Macro Outlook: The worst is behind us Slow recovery ahead

May 2020

Torsten Slok, Ph.D.  
Chief Economist  
Managing Director  
60 Wall Street  
New York, New York 10005  
Tel: 212 250 2155  
Torsten.Slok@db.com

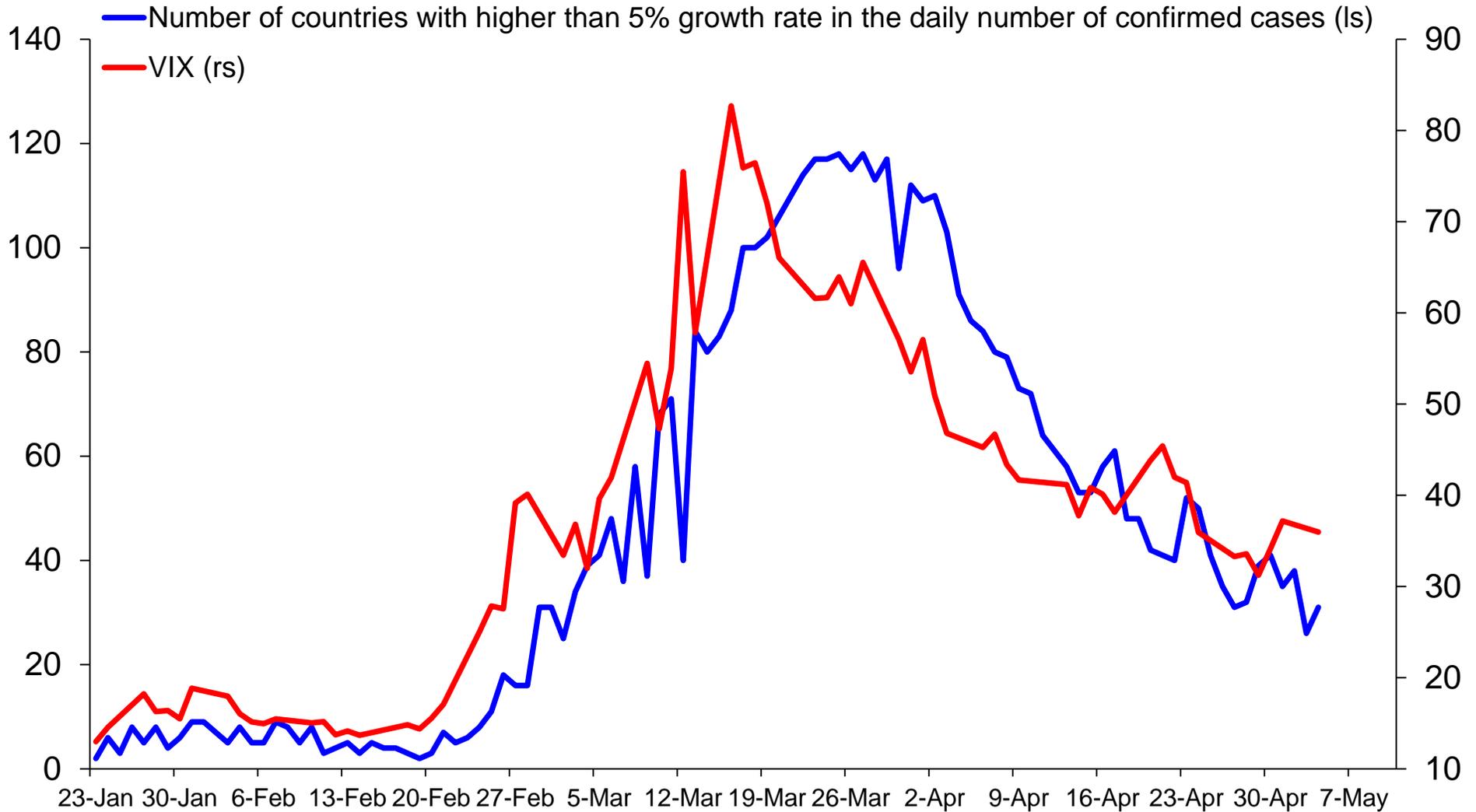
# Virus peaked six weeks ago and market stress is going away



# of countries

## Growth in new COVID-19 cases and VIX

Index



Source: JHU, Bloomberg Finance LP, DB Global Research

# Outline



1. COVID-19: Flattening the curve
2. Reopening the global economy
3. COVID-19 and global financial markets
4. The shape of the economic rebound

Investment implications for rates, FX, credit, and equities

# Behavioral changes slowing growth over the coming quarters



## Household sector

- Increase in precautionary savings for households, similar to what we saw after the Great Depression in the 1930s
- More space between seats at restaurants, cinemas, sport events, concerts, conferences, trains, busses, and airplanes
- Fewer people traveling on vacation and going out until we have a vaccine, all contributing to lower consumer spending
- Older generations staying at home until a vaccine is released, less willingness to put parents in retirement homes
- Limits on the number of people in supermarkets at the same time, more online shopping, more online doctor visits
- Fewer people going to fitness centers, doing group sports
- More people driving their own car to avoid public transportation
- Health insurance premiums going up

## Corporate sector

- Less business travel globally, more video conferencing
- Staggered work schedules, more distance between seats in offices, fewer cubicles
- More permanent work from home solutions, more disaster planning
- Fewer buybacks, lower dividend payouts
- Health insurance costs going up, higher insurance premiums
- Increased pressure for paid sick leave, health benefits, labor protection, including for gig workers

## Government sector

- Global restrictions on travel to and from high-risk areas, more fever scanners at airports, borders
- More regulation forcing households and corporates to hold, say, three months of cash in emergency savings
- More regulation and spending to ensure health care system is better prepared, a global covid-19 immunity registry
- Increased health safety regulations for retirements homes
- Stocking of medical supplies, including ventilators, domestically, a desire to be less dependent on other countries
- More systematic planning and preparedness, perhaps introduce better automatic stabilizers
- More supply of government bonds, increasing risk of a debt crisis



# 1. COVID-19: Flattening the curve

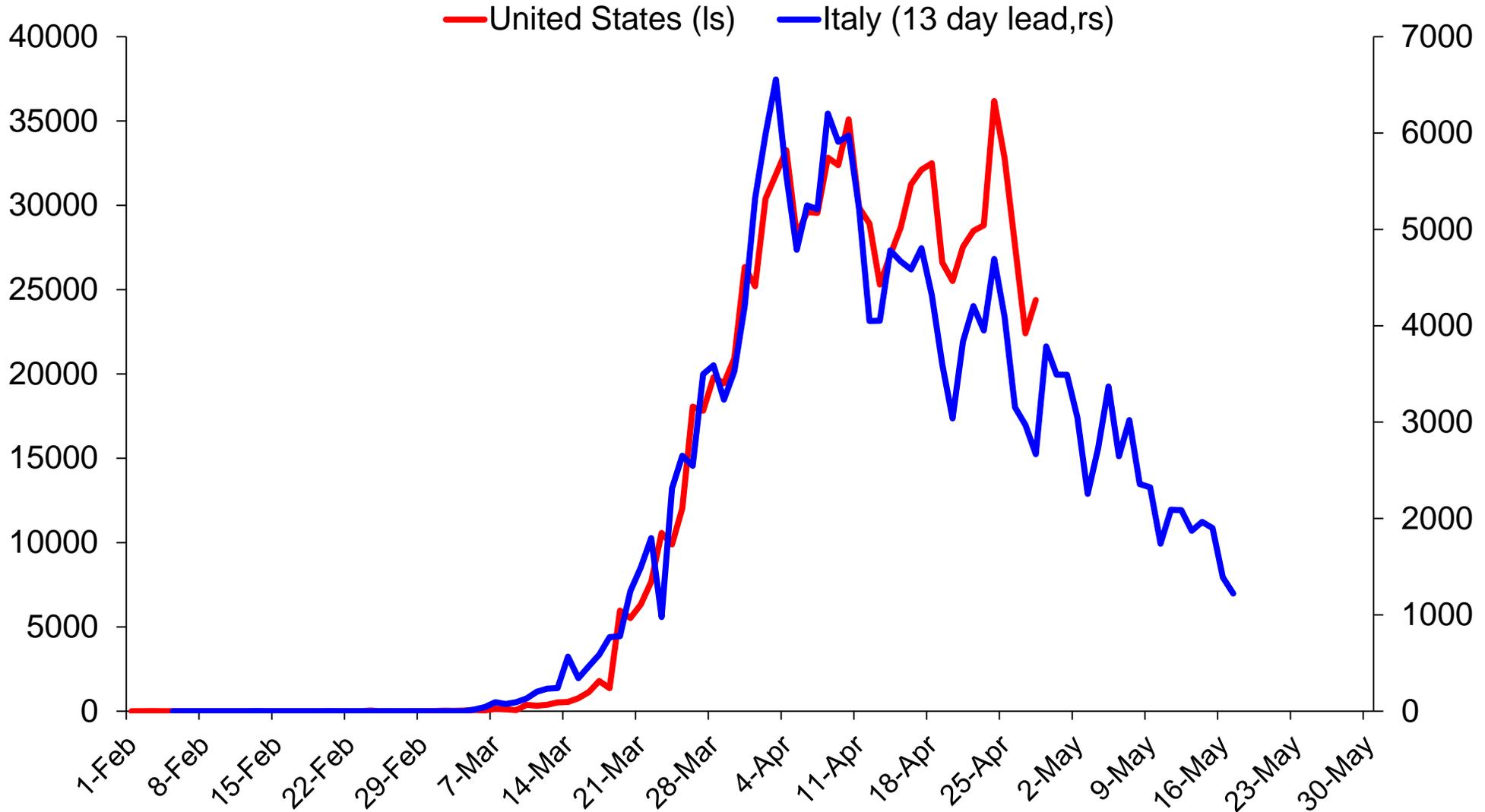
# Lack of social distancing means the US is now more than two weeks behind Italy



# of cases

### New Confirmed cases of COVID-19 in United States and Italy

# of cases



Source: JHU, WHO, DB Global Research



## 2. Reopening the global economy

# Re-opening the global economy: Three key questions



1. Which countries will open first?
2. Which sectors of the economy will open first?
3. Which parts of the population will go out first?

The answers to these questions are important for global asset allocation

# Potential dates for the initial lifting of restrictions

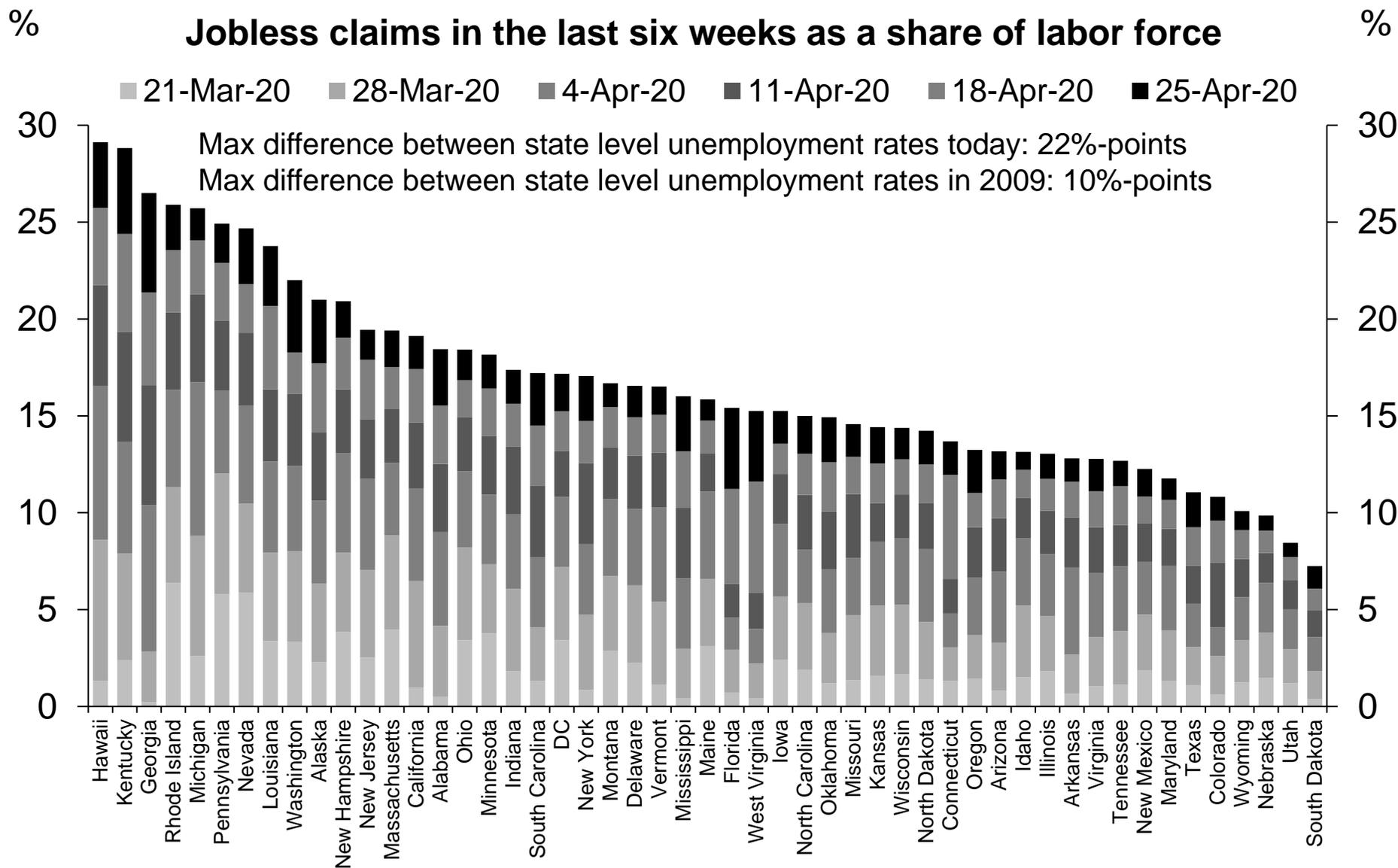


	End of announced lockdown (not including possible extensions)	Estimated date that restrictions will start to be lifted based on the Hubei experience	Estimated date of "containment" based on 2003 SARS experience
US	30-Apr	22-May	19-Jun
Italy	May 3	7-May	4-Jun
UK	May 7	23-May	20-Jun
Spain	May 10	18-May	15-Jun
France	May 11	18-May	15-Jun
Germany**	May 3	22-May	19-Jun

\* For US most state-level restrictions have been extended to early-to-mid May, with minor easing in places.. The 30 April date represents the date until which President Trump has issued social distancing guidelines. On 16 April, the President outlined guidelines for state authorities on easing restrictions. Recommendations include that states showing a downward trajectory in cases for at least two weeks can begin a three-phase process to reopen, with declines in cases to be assessed every two weeks before states can move onto the next phase. \*\* This is assumed to be a period of two generations of the covid-19 (max 28 days) in which there are no new cases. Hubei last declared a new case on 24 March so 'containment' would theoretically occur on 21 April. We deem these dates unlikely for the countries in this analysis, however, we include them here as a reference point \*\*\* Germany announced Wednesday that small shops (with a retail space of below 800 square meters) will be allowed to re-open from Monday April 20. Schools in the country will open their doors on Monday May 4. But Large, mass gatherings will remain banned until August 31.

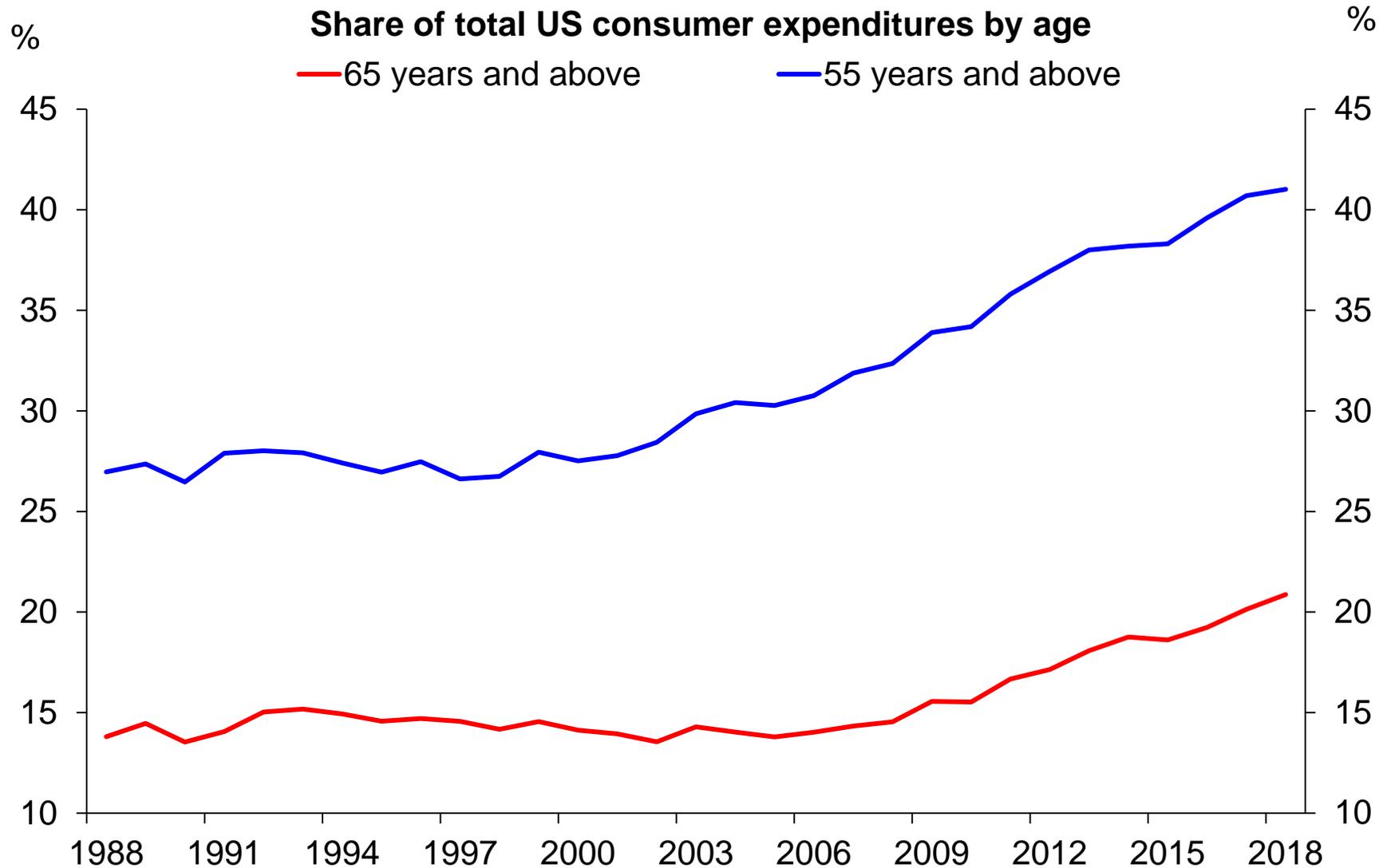
Source: Deutsche Bank, WHO, CDC, Worldometer, DB Global Research

# Currently very high unemployment rates in Hawaii, Kentucky, Georgia, Rhode Island, Michigan, and Pennsylvania



Source: Department of Labor, BLS, DB Global Research

# US: People over 55 years old account for 40% of consumer spending

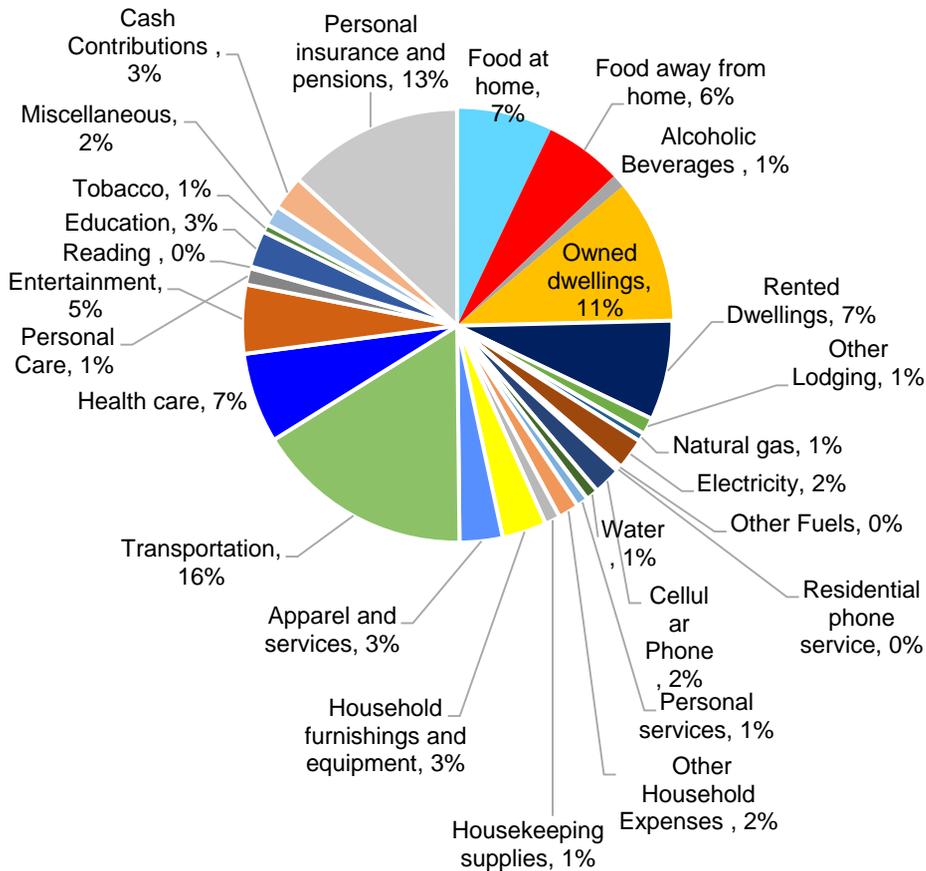


Source: BLS, Haver Analytics, DB Global Research

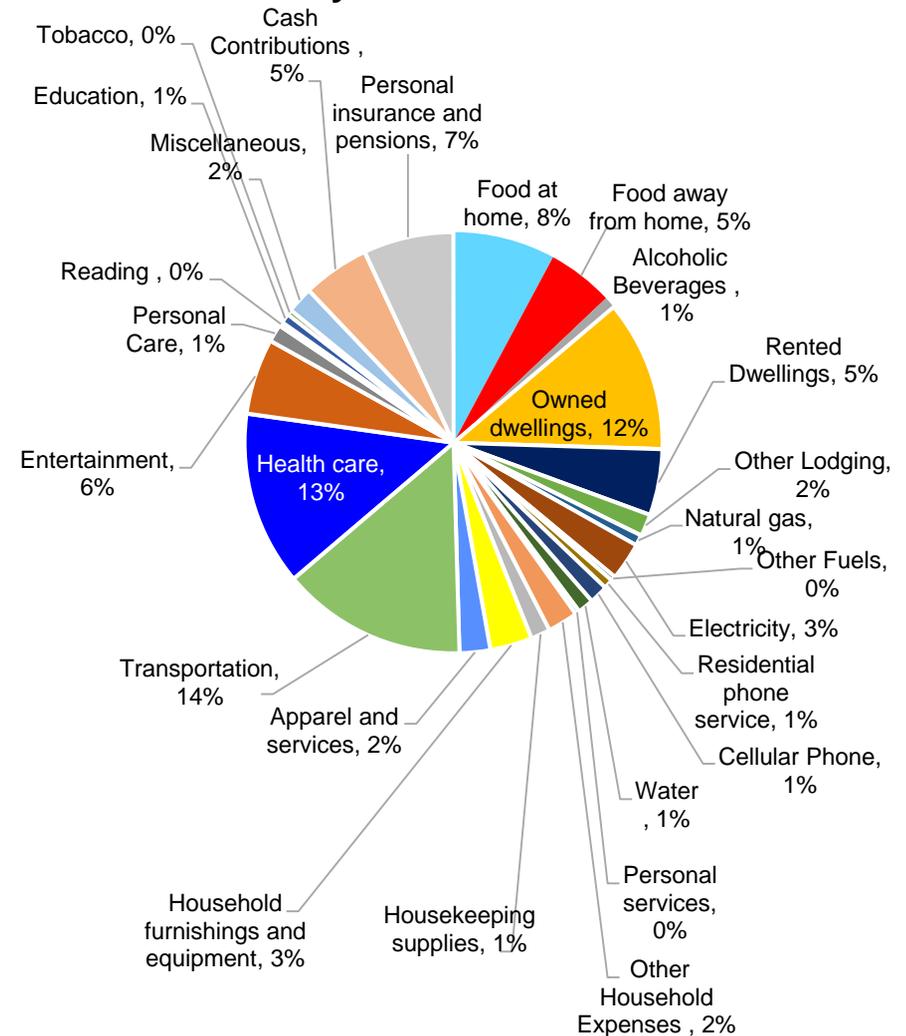
# Consumption patterns of US consumers above and below 65 years old



**Consumer expenditure by category :  
Under 65 years**

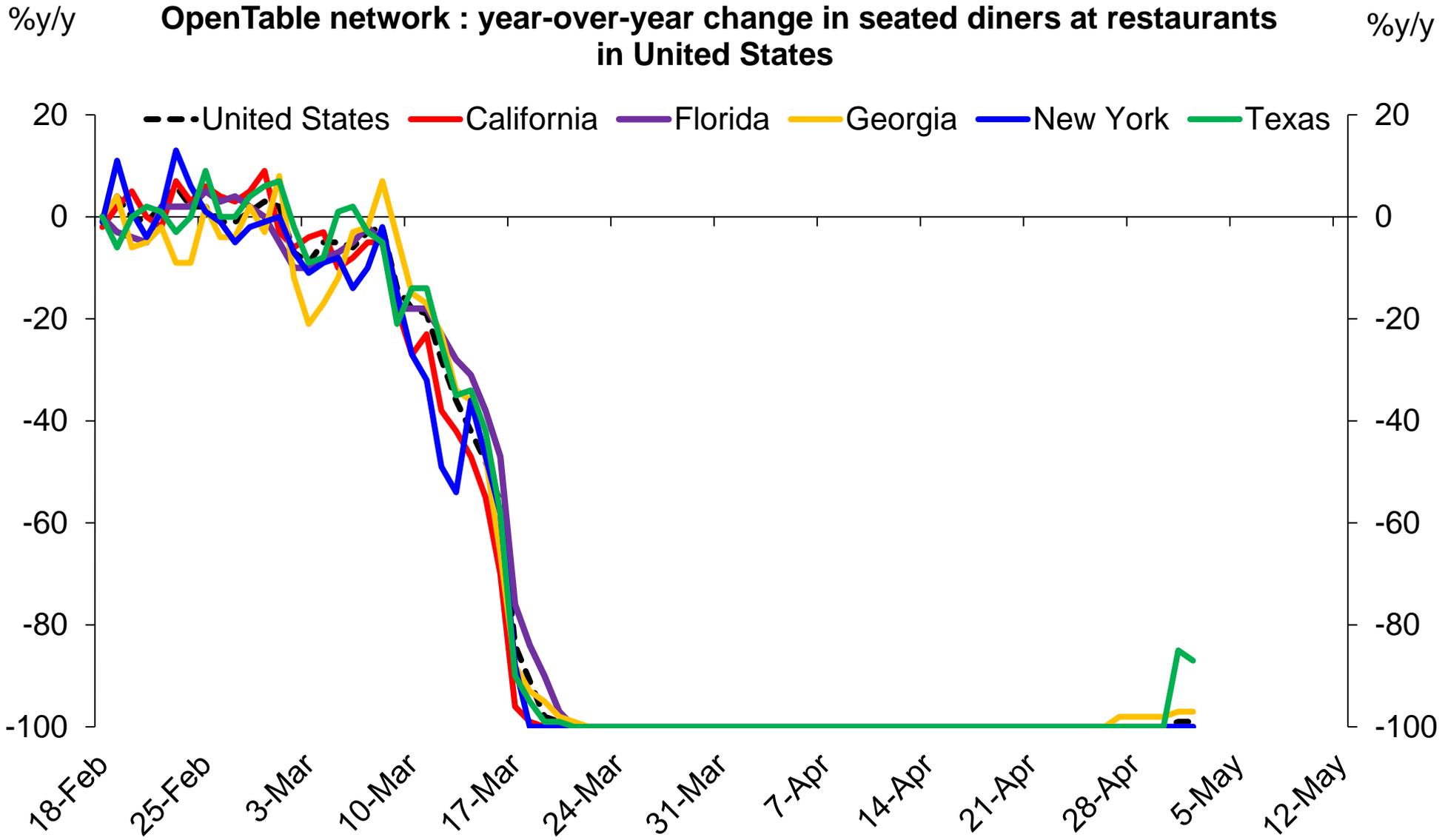


**Consumer expenditure by category :  
65 years and older**



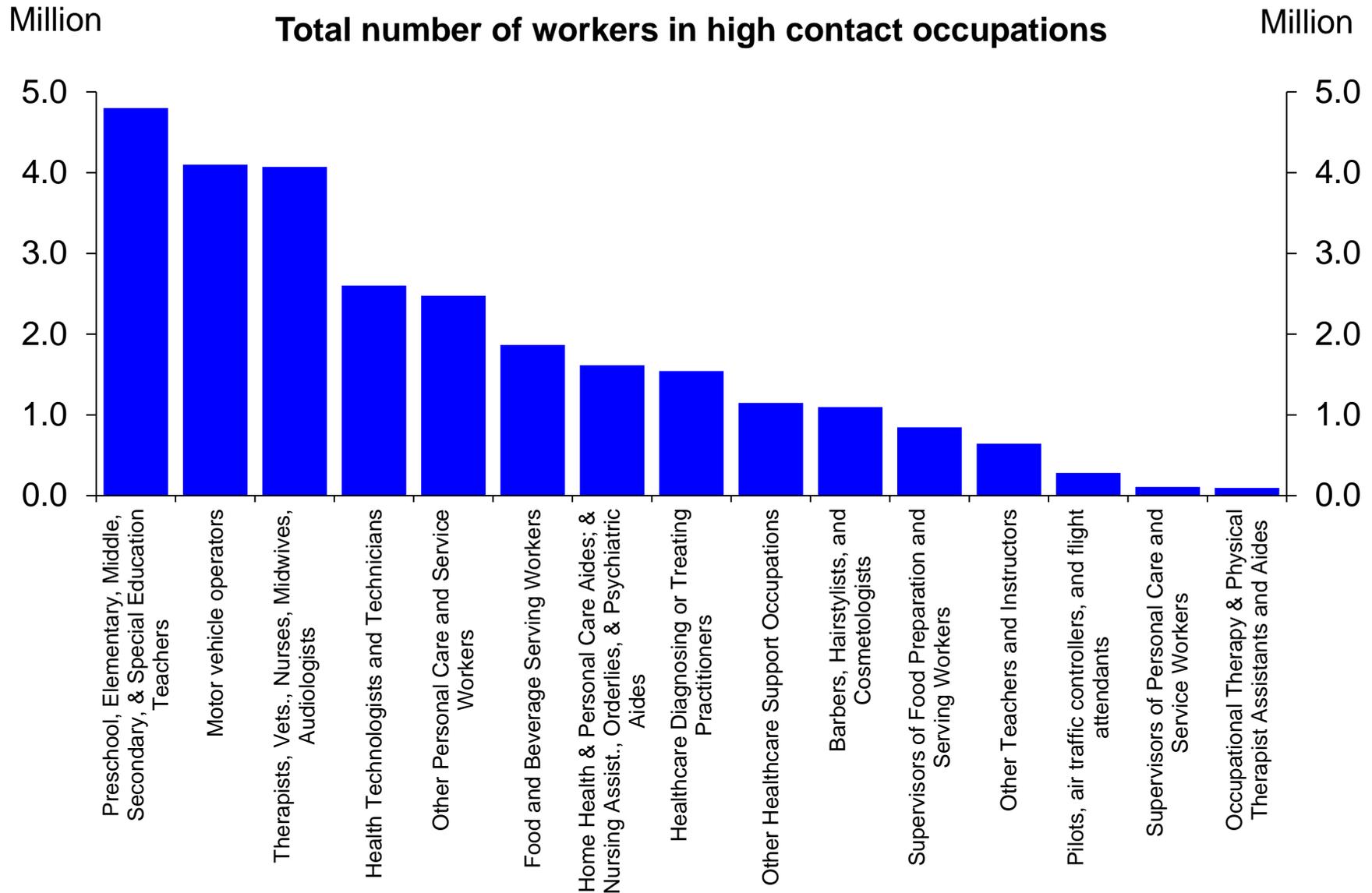
Note: Data for 2018. Source: BLS, Haver Analytics, DB Global Research

# Green shoots in restaurant bookings?



Source: OpenTable, DB Global Research

# Number of US workers in high contact intensity occupations

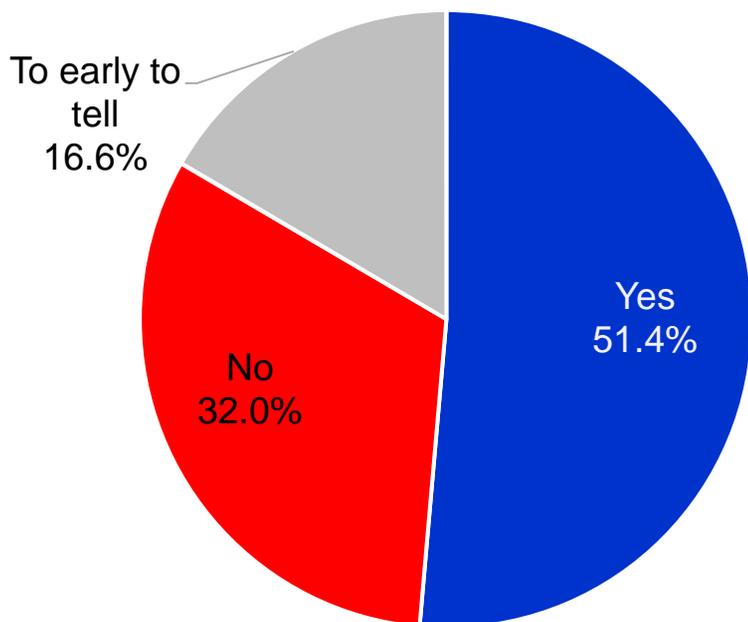


Source: St. Louis Fed, 2017 American Community Survey, O\*NET, DB Global Research

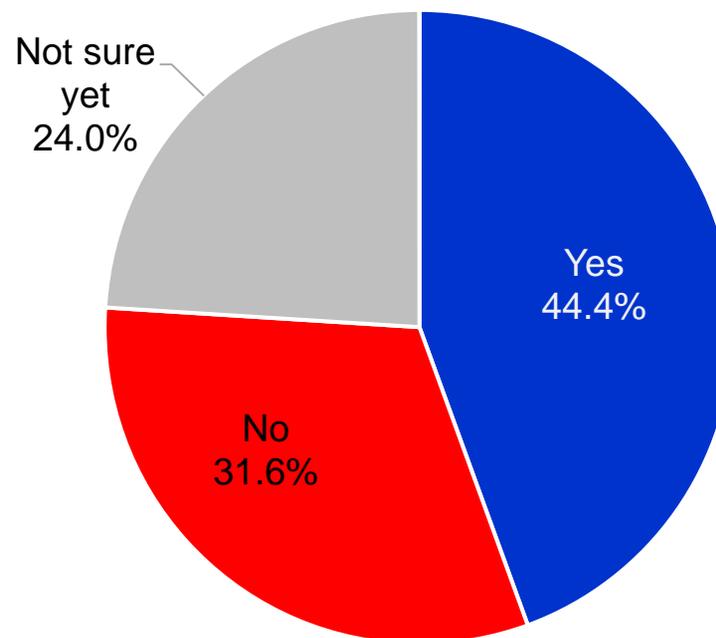
# More people would prefer to work from home permanently



**Survey: Would you rather work from home full time moving forward**



**Survey: Are you more productive working from home**

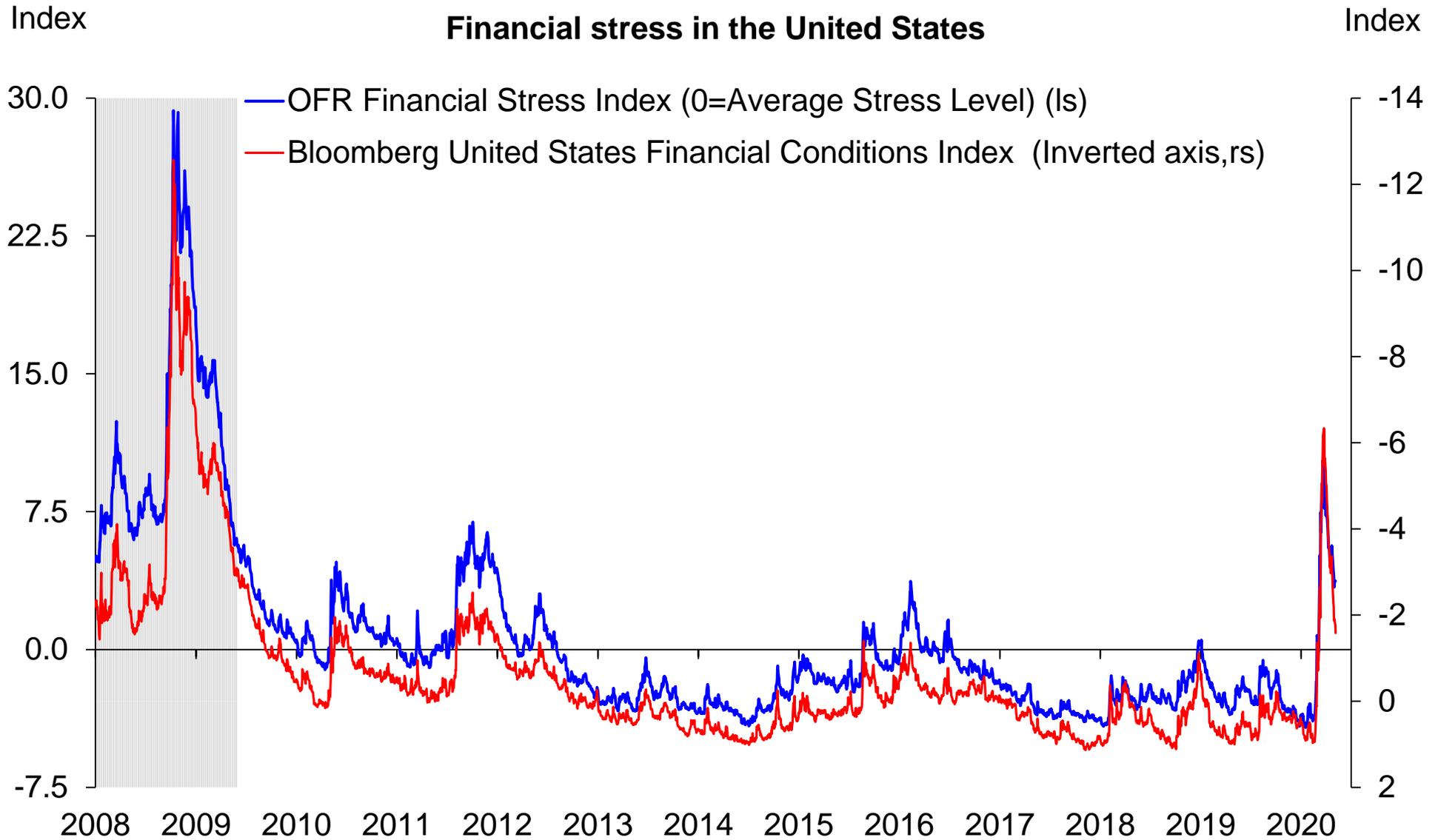


Source: Zippia Poll Survey , DB Global Research



# 3. COVID-19 and global financial markets

# US financial stress coming down from recent peak

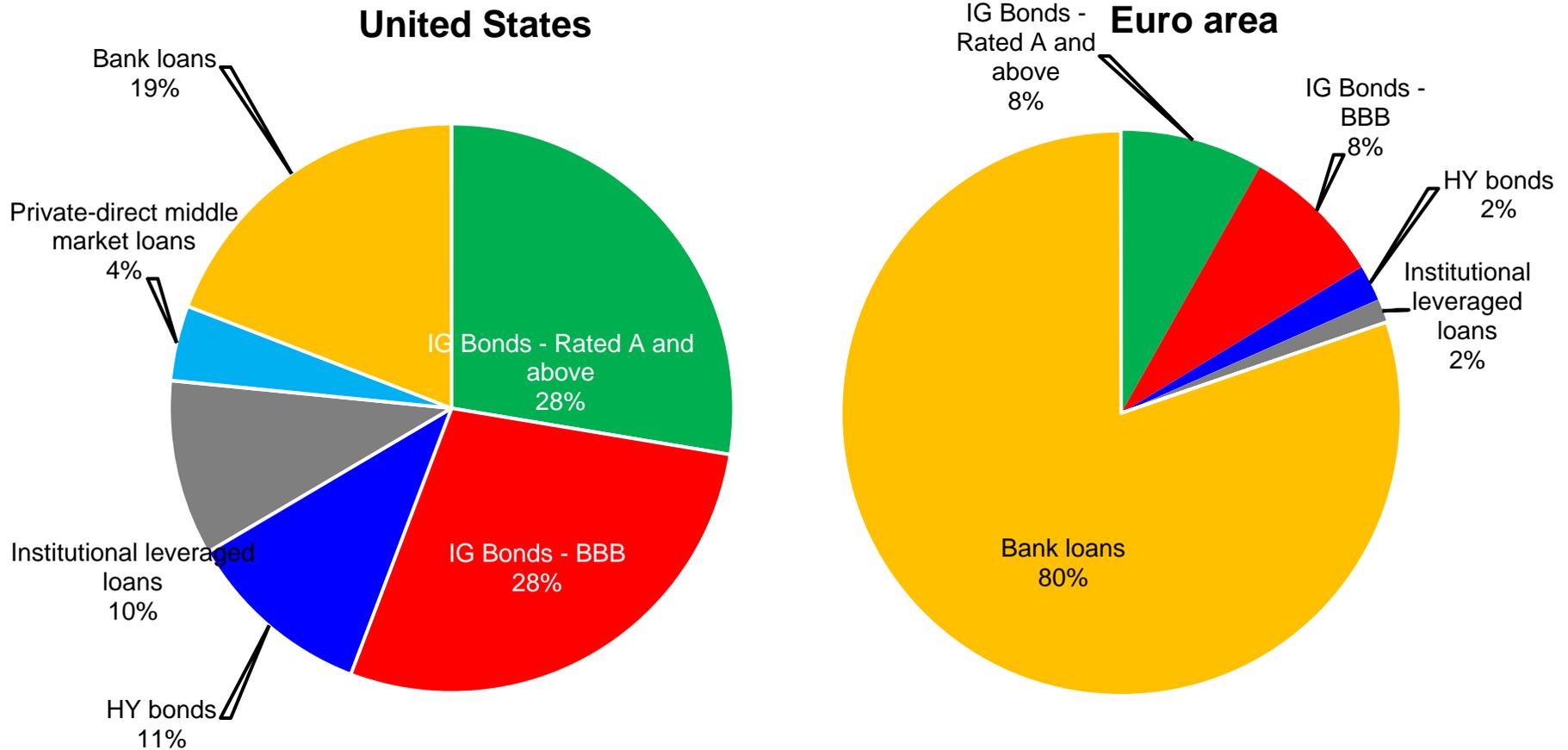


Source: OFR, Bloomberg Finance LP, Haver Analytics, DB Global Research

# US and European companies financed differently



## Sources of financing for the corporate sector



Source: Bloomberg Finance LP, IMF, DB Global Research



# 4. The shape of the economic rebound



Figure 8: DB forecast well below Consensus and IMF WEO

	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021
	%yoy		%yoy		%yoy		%yoy		%yoy	
	New Baseline		Protracted		Old baseline (March 30)		BlueChip (April 10)		IMFWEO (April 15)	
World	-5.9	5.3	-8.7	2.0	-3.2	6.5	-1.7	4.9	-3.2	6.0
US	-7.1	2.6	-11.5	0.6	-4.2	3.8	-4.0	4.0	-5.9	4.7
Euro Area	-12.0	5.0	-17.0	3.0	-6.9	4.8	-5.1	3.8	-7.5	4.7
Germany	-9.0	4.0	-12.0	1.0	-5.3	5.4	-4.9	4.3	-7.0	5.2
France	-14.0	6.0	-19.5	3.5	-6.8	4.2	-4.9	4.0	-7.2	4.5
Italy	-14.0	5.5	-21.0	5.0	-8.7	4.1			-9.1	4.8
Spain	-15.0	6.0	-19.5	2.5	-8.7	5.0			-8.0	4.3
UK	-11.5	3.0	-14.5	1.0	-6.5	5.2	-4.5	3.6	-6.5	4.0
Canada	-7.1	4.2	-10.0	0.4	1.7	1.8	-3.7	3.5	-6.2	4.2
Australia	-4.4	5.3	-9.9	3.7	-3.2	5.5	-2.2	4.0	-6.7	6.1
Japan	-6.5	1.2	-7.7	-0.5	-3.9	2.6	-2.8	1.6	-5.2	3.0
China	-1.1	9.5	-2.2	1.9	-1.4	11.9	1.4	7.7	1.2	9.2
South Korea	-1.0	3.0	-3.5	2.9	-1.0	3.5	-0.7	2.9	-1.2	3.4
India	-5.8	5.6	-8.1	5.0	0.2	8.0	1.8	6.3	1.9	7.4
Russia	-6.4	3.4	-8.1	1.6	-4.2	4.1	-2.5	2.7	-5.5	3.5
Turkey	-5.1	2.9	-7.8	2.1	-1.6	4.5				
South Africa	-9.0	0.1	-11.0	-2.0	-4.6	0.8			-5.8	4.0
Brazil	-6.2	2.0	-7.4	1.7	-2.8	2.2	-2.8	3.0	-5.3	2.9
Mexico	-7.9	3.9	-10.4	4.0	-6.1	1.9	-4.6	2.0	-6.6	3.0

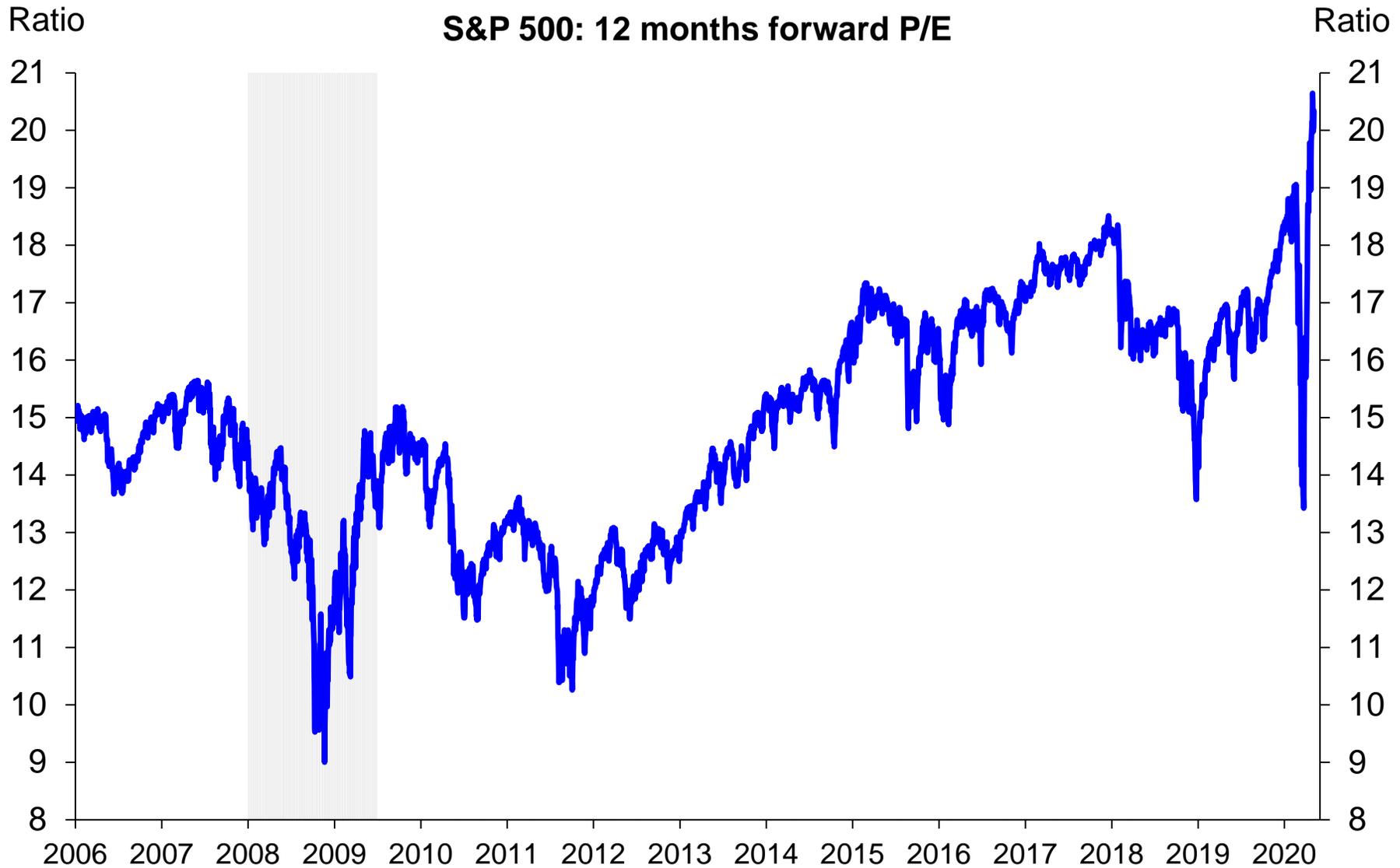
Source : Deutsche Bank

Source: DB Global Research



# Investment implications

# S&P500 forward multiple now at +20



Source: Bloomberg Finance LP, DB Global Research

# Investment implications summarized



Fed outlook – <b>Fed on hold</b>	GDP will decline 39% in Q2. The CBO estimates the unemployment rate will be 10% in 2020Q4.
Bond markets - <b>10s at 1% by end of year</b>	Fed tapering and exit from lockdown pushing long rates higher and curve steeper by end of 2020.
Credit - <b>Credit spreads narrower</b>	Fed support and more liquid markets will narrow IG and HY spreads over the coming quarters
Stock markets - <b>Flatter epi curve and recession curve</b>	Fed liquidity support and exit from lockdown will push equities higher. S&P500 will be 3250 by the end of 2020.
FX - <b>Dollar down</b>	EURUSD at 1.20 by year-end
Commodities - <b>Coronavirus and slower global growth</b>	40% of oil demand going to trucks and cars. Exit from lockdown pushing oil prices higher.
Emerging markets - <b>Hard hit by virus and low oil prices</b>	Coronavirus and low oil prices is negative for commodity exporters. Global recovery helpful for EM. Dovish Fed and ECB helpful for EM.

Source: DB Global Research



## Torsten Slok, Ph.D.

- **Chief Economist, Managing Director**
- **Deutsche Bank Securities, Inc.**
- **Torsten Slok joined Deutsche Bank Securities in the fall of 2005.**
- **Mr. Slok's Economics team has been top-ranked by Institutional Investor in fixed income and equities since 2010, including #1 in 2019.** Slok currently serves as a member of the Economic Club of New York
- Prior to joining the firm, Mr. Slok worked at the OECD in Paris in the Money and Finance Division and the Structural Policy Analysis Division. Before joining the OECD he worked for four years at the IMF in the Division responsible for writing the World Economic Outlook and the Division responsible for China, Hong Kong, and Mongolia.
- Mr. Slok studied at University of Copenhagen and Princeton University. He has published numerous journal articles and reviews on economics and policy analysis, including in Journal of International Economics, Journal of International Money and Finance, and The Econometric Journal.



# Appendix 1

## Important Disclosures

### \*Other Information Available upon Request

Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors . Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at <https://research.db.com/Research/Disclosures/CompanySearch>. Aside from within this report, important conflict disclosures can also be found at <https://research.db.com/Research/Topics/Equities?topicId=RB0002> under the “Disclosures Lookup” and “Legal” tabs. Investors are strongly encouraged to review this information before investing.

#### Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst about the subject issuers and the securities of those issuers. In addition, the undersigned lead analyst has not and will not receive any compensation for providing a specific recommendation or view in this report. Torsten Slok



## Additional Information

The information and opinions in this report were prepared by Deutsche Bank AG or one of its affiliates (collectively "Deutsche Bank"). Though the information herein is believed to be reliable and has been obtained from public sources believed to be reliable, Deutsche Bank makes no representation as to its accuracy or completeness. Hyperlinks to third-party websites in this report are provided for reader convenience only. Deutsche Bank neither endorses the content nor is responsible for the accuracy or security controls of those websites.

If you use the services of Deutsche Bank in connection with a purchase or sale of a security that is discussed in this report, or is included or discussed in another communication (oral or written) from a Deutsche Bank analyst, Deutsche Bank may act as principal for its own account or as agent for another person.

Deutsche Bank may consider this report in deciding to trade as principal. It may also engage in transactions, for its own account or with customers, in a manner inconsistent with the views taken in this research report. Others within Deutsche Bank, including strategists, sales staff and other analysts, may take views that are inconsistent with those taken in this research report. Deutsche Bank issues a variety of research products, including fundamental analysis, equity-linked analysis, quantitative analysis and trade ideas. Recommendations contained in one type of communication may differ from recommendations contained in others, whether as a result of differing time horizons, methodologies, perspectives or otherwise. Deutsche Bank and/or its affiliates may also be holding debt or equity securities of the issuers it writes on. Analysts are paid in part based on the profitability of Deutsche Bank AG and its affiliates, which includes investment banking, trading and principal trading revenues.

Opinions, estimates and projections constitute the current judgment of the author as of the date of this report. They do not necessarily reflect the opinions of Deutsche Bank and are subject to change without notice. Deutsche Bank provides liquidity for buyers and sellers of securities issued by the companies it covers. Deutsche Bank research analysts sometimes have shorter-term trade ideas that may be inconsistent with Deutsche Bank's existing longer-term ratings. Some trade ideas for equities are listed as Catalyst Calls ideas on the Research Website (<https://research.db.com/Research/>), and can be found on the general coverage list and also on the covered company's page. A Catalyst Call idea represents a high-conviction belief by an analyst that a stock will outperform or underperform the market and/or a specified sector over a time frame of no less than two weeks and no more than three months. In addition to Catalyst Calls ideas, analysts may occasionally discuss with our clients, and with Deutsche Bank salespersons and traders, trading strategies or ideas that reference catalysts or events that may have a near-term or medium-term impact on the market price of the securities discussed in this report, which impact may be directionally counter to the analysts' current 12-month view of total return or investment return as described herein. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a recipient thereof if an opinion, forecast or estimate changes or becomes inaccurate. Coverage and the frequency of changes in market conditions and in both general and company-specific economic prospects make it difficult to update research at defined intervals. Updates are at the sole discretion of the coverage analyst or of the Research Department Management, and the majority of reports are published at irregular intervals. This report is provided for informational purposes only and does not take into account the particular investment objectives, financial situations, or needs of individual clients. It is not an offer or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy. Target prices are inherently imprecise and a product of the analyst's judgment. The financial instruments discussed in this report may not be suitable for all investors, and investors must make their own informed investment decisions. Prices and availability of financial instruments are subject to change without notice, and investment transactions can lead to losses as a result of price fluctuations and other factors. If a financial instrument is denominated in a currency other than an investor's currency, a change in exchange rates may adversely affect the investment. Past performance is not necessarily indicative of future results. Performance calculations exclude transaction costs, unless otherwise indicated. Unless otherwise indicated, prices are current as of the end of the previous trading session and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is also sourced from Deutsche Bank, subject companies, and other parties.

The Deutsche Bank Research Department is independent of other business divisions of the Bank. Details regarding our organizational arrangements and information barriers we have to prevent and avoid conflicts of interest with respect to our research are available on our website (<https://research.db.com/Research/>) under Disclaimer.

Macroeconomic fluctuations often account for most of the risks associated with exposures to instruments that promise to pay fixed or variable interest rates. For an investor who is long fixed-rate instruments (thus receiving these cash flows), increases in interest rates naturally lift the discount factors applied to the expected cash flows and thus cause a loss. The longer the maturity of a certain cash flow and the higher the move in the discount factor, the higher will be the loss. Upside surprises in inflation, fiscal funding needs, and FX depreciation rates are among the most common adverse macroeconomic shocks to receivers. But counterparty exposure, issuer creditworthiness, client segmentation, regulation (including changes in assets holding limits for different types of investors), changes in tax policies, currency convertibility (which may constrain currency conversion, repatriation of profits and/or liquidation of positions), and settlement issues related to local clearing houses are also important risk factors. The sensitivity of fixed-income instruments to macroeconomic shocks may be mitigated by indexing the contracted cash flows to inflation, to FX depreciation, or to specified interest rates – these are common in emerging markets. The index fixings may – by construction – lag or mis-measure the actual move in the underlying variables they are intended to track. The choice of the proper fixing (or metric) is particularly important in swaps markets, where floating coupon rates (i.e., coupons indexed to a typically short-dated interest rate reference index) are exchanged for fixed coupons. Funding in a currency that differs from the currency in which coupons are denominated carries FX risk. Options on swaps (swaptions) the risks typical to options in addition to the risks related to rates movements.

Derivative transactions involve numerous risks including market, counterparty default and illiquidity risk. The appropriateness of these products for use by investors depends on the investors' own circumstances, including their tax position, their regulatory environment and the nature of their other assets and liabilities; as such, investors should take expert legal and financial advice before entering into any transaction similar to or inspired by the contents of this publication. The risk of loss in futures trading and options, foreign or domestic, can be substantial. As a result of the high degree of leverage obtainable in futures and options trading, losses may be incurred that are greater than the amount of funds initially deposited – up to theoretically unlimited losses. Trading in options involves risk and is not suitable for all investors. Prior to buying or selling an option, investors must review the "Characteristics and Risks of Standardized Options", at <http://www.optionsclearing.com/about/publications/character-risks.jsp>. If you are unable to access the website, please contact your Deutsche Bank representative for a copy of this important document.



Participants in foreign exchange transactions may incur risks arising from several factors, including the following: (i) exchange rates can be volatile and are subject to large fluctuations; (ii) the value of currencies may be affected by numerous market factors, including world and national economic, political and regulatory events, events in equity and debt markets and changes in interest rates; and (iii) currencies may be subject to devaluation or government-imposed exchange controls, which could affect the value of the currency. Investors in securities such as ADRs, whose values are affected by the currency of an underlying security, effectively assume currency risk.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction. Aside from within this report, important conflict disclosures can also be found at <https://research.db.com/Research/> on each company's research page. Investors are strongly encouraged to review this information before investing.

Deutsche Bank (which includes Deutsche Bank AG, its branches and affiliated companies) is not acting as a financial adviser, consultant or fiduciary to you or any of your agents (collectively, "You" or "Your") with respect to any information provided in this report. Deutsche Bank does not provide investment, legal, tax or accounting advice, Deutsche Bank is not acting as your impartial adviser, and does not express any opinion or recommendation whatsoever as to any strategies, products or any other information presented in the materials. Information contained herein is being provided solely on the basis that the recipient will make an independent assessment of the merits of any investment decision, and it does not constitute a recommendation of, or express an opinion on, any product or service or any trading strategy.

The information presented is general in nature and is not directed to retirement accounts or any specific person or account type, and is therefore provided to You on the express basis that it is not advice, and You may not rely upon it in making Your decision. The information we provide is being directed only to persons we believe to be financially sophisticated, who are capable of evaluating investment risks independently, both in general and with regard to particular transactions and investment strategies, and who understand that Deutsche Bank has financial interests in the offering of its products and services. If this is not the case, or if You are an IRA or other retail investor receiving this directly from us, we ask that you inform us immediately.

In July 2018, Deutsche Bank revised its rating system for short term ideas whereby the branding has been changed to Catalyst Calls ("CC") from SOLAR ideas; the rating categories for Catalyst Calls originated in the Americas region have been made consistent with the categories used by Analysts globally; and the effective time period for CCs has been reduced from a maximum of 180 days to 90 days.

United States: Approved and/or distributed by Deutsche Bank Securities Incorporated, a member of FINRA, NFA and SIPC. Analysts located outside of the United States are employed by non-US affiliates that are not subject to FINRA regulations.

Germany: Approved and/or distributed by Deutsche Bank AG, a joint stock corporation with limited liability incorporated in the Federal Republic of Germany with its principal office in Frankfurt am Main. Deutsche Bank AG is authorized under German Banking Law and is subject to supervision by the European Central Bank and by BaFin, Germany's Federal Financial Supervisory Authority.

United Kingdom: Approved and/or distributed by Deutsche Bank AG acting through its London Branch at Winchester House, 1 Great Winchester Street, London EC2N 2DB. Deutsche Bank AG in the United Kingdom is authorised by the Prudential Regulation Authority and is subject to limited regulation by the Prudential Regulation Authority and Financial Conduct Authority. Details about the extent of our authorisation and regulation are available on request.

Hong Kong SAR: Distributed by Deutsche Bank AG, Hong Kong Branch except for any research content relating to futures contracts within the meaning of the Hong Kong Securities and Futures Ordinance Cap. 571. The author(s) of a research report may not be licensed to carry on regulated activities in Hong Kong and, if not licensed, do not hold themselves out as being able to do so. The provisions set out above in the "Additional Information" section shall apply to the fullest extent permissible by local laws and regulations, including without limitation the Code of Conduct for Persons Licensed or Registered with the Securities and Futures Commission. This report is intended for distribution only to "professional investors" as defined in Part 1 of Schedule 1 of the SFO. This document must not be acted or relied on by persons who are not professional investors. Any investment or investment activity to which this document relates is only available to professional investors and will be engaged only with professional investors.

India: Prepared by Deutsche Equities India Private Limited (DEIPL) having CIN: U65990MH2002PTC137431 and registered office at 14th Floor, The Capital, C-70, G Block, Bandra Kurla Complex Mumbai (India) 400051. Tel: + 91 22 7180 4444. It is registered by the Securities and Exchange Board of India (SEBI) as a Stock broker bearing registration no.: INZ000252437; Merchant Banker bearing SEBI Registration no.: INM000010833 and Research Analyst bearing SEBI Registration no.: INH000001741. DEIPL may have received administrative warnings from the SEBI for breaches of Indian regulations. Deutsche Bank and/or its affiliate(s) may have debt holdings or positions in the subject company. With regard to information on associates, please refer to the "Shareholdings" section in the Annual Report at: <https://www.db.com/ir/en/annual-reports.htm>

Japan: Approved and/or distributed by Deutsche Securities Inc.(DSI). Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, Type II Financial Instruments Firms Association and The Financial Futures Association of Japan. Commissions and risks involved in stock transactions - for stock transactions, we charge stock commissions and consumption tax by multiplying the transaction amount by the commission rate agreed with each customer. Stock transactions can lead to losses as a result of share price fluctuations and other factors. Transactions in foreign stocks can lead to additional losses stemming from foreign exchange fluctuations. We may also charge commissions and fees for certain categories of investment advice, products and services. Recommended investment strategies, products and services carry the risk of losses to principal and other losses as a result of changes in market and/or economic trends, and/or fluctuations in market value. Before deciding on the purchase of financial products and/or services, customers should carefully read the relevant disclosures, prospectuses and other documentation. "Moody's", "Standard & Poor's", and "Fitch" mentioned in this report are not registered credit rating agencies in Japan unless Japan or "Nippon" is specifically designated in the name of the entity. Reports on Japanese listed companies not written by analysts of DSI are written by Deutsche Bank Group's analysts with the coverage companies specified by DSI. Some of the foreign securities stated on this report are not disclosed according to the Financial Instruments and Exchange Law of Japan. Target prices set by Deutsche Bank's equity analysts are based on a 12-month forecast period.

Korea: Distributed by Deutsche Securities Korea Co.



South Africa: Deutsche Bank AG Johannesburg is incorporated in the Federal Republic of Germany (Branch Register Number in South Africa: 1998/003298/10).

Singapore: This report is issued by Deutsche Bank AG, Singapore Branch (One Raffles Quay #18-00 South Tower Singapore 048583, +65 6423 8001), which may be contacted in respect of any matters arising from, or in connection with, this report. Where this report is issued or promulgated by Deutsche Bank in Singapore to a person who is not an accredited investor, expert investor or institutional investor (as defined in the applicable Singapore laws and regulations), they accept legal responsibility to such person for its contents.

Taiwan: Information on securities/investments that trade in Taiwan is for your reference only. Readers should independently evaluate investment risks and are solely responsible for their investment decisions. Deutsche Bank research may not be distributed to the Taiwan public media or quoted or used by the Taiwan public media without written consent. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation to trade in such securities/instruments. Deutsche Securities Asia Limited, Taipei Branch may not execute transactions for clients in these securities/instruments.

Qatar: Deutsche Bank AG in the Qatar Financial Centre (registered no. 00032) is regulated by the Qatar Financial Centre Regulatory Authority. Deutsche Bank AG - QFC Branch may undertake only the financial services activities that fall within the scope of its existing QFCRA license. Its principal place of business in the QFC: Qatar Financial Centre, Tower, West Bay, Level 5, PO Box 14928, Doha, Qatar. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available only to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

Russia: The information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.

Kingdom of Saudi Arabia: Deutsche Securities Saudi Arabia LLC Company (registered no. 07073-37) is regulated by the Capital Market Authority. Deutsche Securities Saudi Arabia may undertake only the financial services activities that fall within the scope of its existing CMA license. Its principal place of business in Saudi Arabia: King Fahad Road, Al Olaya District, P.O. Box 301809, Faisaliah Tower - 17th Floor, 11372 Riyadh, Saudi Arabia.

United Arab Emirates: Deutsche Bank AG in the Dubai International Financial Centre (registered no. 00045) is regulated by the Dubai Financial Services Authority. Deutsche Bank AG - DIFC Branch may only undertake the financial services activities that fall within the scope of its existing DFSA license. Principal place of business in the DIFC: Dubai International Financial Centre, The Gate Village, Building 5, PO Box 504902, Dubai, U.A.E. This information has been distributed by Deutsche Bank AG. Related financial products or services are available only to Professional Clients, as defined by the Dubai Financial Services Authority.

Australia and New Zealand: This research is intended only for "wholesale clients" within the meaning of the Australian Corporations Act and New Zealand Financial Advisors Act, respectively. Please refer to Australian specific research disclosures and related information at <https://australia.db.com/australia/content/research-information.html>. Where research refers to any particular financial product recipients of the research should consider any product disclosure statement, prospectus or other applicable disclosure document before making any decision about whether to acquire the product. In preparing this report, the primary analyst or an individual who assisted in the preparation of this report has likely been in contact with the company that is the subject of this research for confirmation/clarification of data, facts, statements, permission to use company-sourced material in the report, and/or site-visit attendance. Without prior approval from Research Management, analysts may not accept from current or potential Banking clients the costs of travel, accommodations, or other expenses incurred by analysts attending site visits, conferences, social events, and the like. Similarly, without prior approval from Research Management and Anti-Bribery and Corruption ("ABC") team, analysts may not accept perks or other items of value for their personal use from issuers they cover.

Additional information relative to securities, other financial products or issuers discussed in this report is available upon request. This report may not be reproduced, distributed or published without Deutsche Bank's prior written consent.

Backtested, hypothetical or simulated performance results have inherent limitations. Unlike an actual performance record based on trading actual client portfolios, simulated results are achieved by means of the retroactive application of a backtested model itself designed with the benefit of hindsight. Taking into account historical events the backtesting of performance also differs from actual account performance because an actual investment strategy may be adjusted any time, for any reason, including a response to material, economic or market factors. The backtested performance includes hypothetical results that do not reflect the reinvestment of dividends and other earnings or the deduction of advisory fees, brokerage or other commissions, and any other expenses that a client would have paid or actually paid. No representation is made that any trading strategy or account will or is likely to achieve profits or losses similar to those shown. Alternative modeling techniques or assumptions might produce significantly different results and prove to be more appropriate. Past hypothetical backtest results are neither an indicator nor guarantee of future returns. Actual results will vary, perhaps materially, from the analysis.

Copyright © 2020 Deutsche Bank AG