



## German labour market's glamour (partly) gone

- The COVID-19 pandemic and in particular the lock-down measures will push the German economy into its biggest slump since WW2. In our new baseline scenario, economic output in H1 2020 will shrink by 18% compared with the end of 2019. For the year as a whole, German GDP is expected to decline by around 9% in 2020 and then grow again by 4% in 2021. Should containment of the coronavirus prove more difficult, our protracted pandemic scenario assumes that GDP will fall by 15% in 2020, followed by only a meagre recovery of 1% in 2021.
- The COVID-19 pandemic hits the German labour market differently than the Global Financial Market Crisis of 2009. First, it is acting almost simultaneously as a supply shock and, as a result of the measures to restrict contact, as a demand shock. Second, is the speed and the might with which it has brought the economy to a standstill in many areas of Germany and around the world. Third, private consumption will suffer the biggest blow.
- Short-time workers are reaching up to 10 m during the COVID-19 crisis. The Federal Employment Agency (BA) only has figures with a delay of about three months. But, by April 26<sup>th</sup>, 751,000 companies had already registered for short-time work. This would imply an increase in the number of people actually on short-time work of up to 10 m. According to the BA, its financial reserve of EUR 26 billion will already be used up in 2020 making an additional transfer of EUR 4 to 5 billion from the federal government necessary.
- The number of persons unemployed will climb to 3 m. Despite the comprehensive measures to secure employment, which ultimately include support measures for companies, unemployment is likely to rise in 2020. Our baseline scenario implies an increase in the 2020 unemployment rate to 7% and only falling to 6% in 2021. Our protracted pandemic scenario implies an increase to almost 9% in 2020 and, due to a sluggish recovery and the lagged labour market response, an average of a good 8% in 2021.
- Employment is likely to fall in 2020 by a good 1%. Not least due to the impact on the personnel-intensive services sector, the number of people in employment is likely to fall by about 550,000 (1.2%) in 2020. This trend is also indicated by the latest data on the number of job vacancies currently available. In April, the BA number of job vacancies fell by 9.5% mom to 630,000.

Marc Schattenberg  
Economist  
+49-69-910-31875

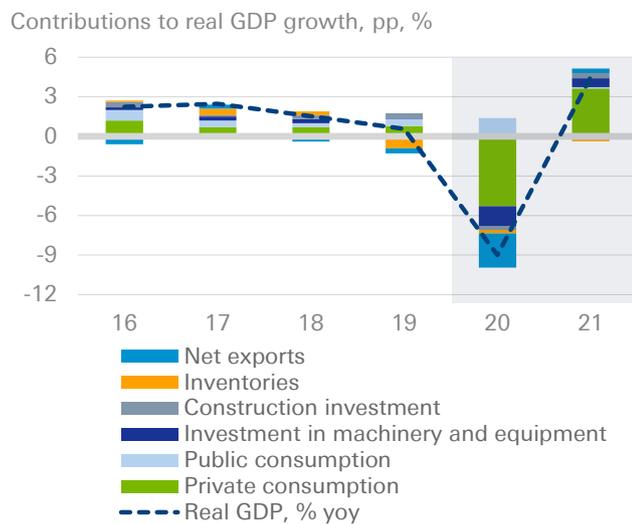


## COVID-19 pandemic: Ultimate test for resilience of the German labour market

The COVID-19 pandemic and in particular the lock-down measures will push the German economy into its biggest slump since WW2. In our new baseline scenario,<sup>1</sup> economic output in H1 2020 will shrink by 18% compared with the end of 2019. For the year as a whole, German GDP is expected to decline by around 9% in 2020 according to our baseline scenario and then grow again by 4% in 2021. This scenario is based on the assumption that the wave of infection reaches its peak in Q2 of this year. The containment measures, which had a particularly strong impact on the services sector, have been gradually reduced, so that domestic economic momentum should pick up again. Nevertheless, hygiene measures and social distancing will almost certainly persist for some time to come, hampering the revival of the service sector to some extent. For the export-oriented German economy, a recovery of the global economy is a prerequisite. In contrast to our previous scenarios from March,<sup>2</sup> our current forecast takes even more account of the fact that the recovery among our global trading partners is phase-delayed.

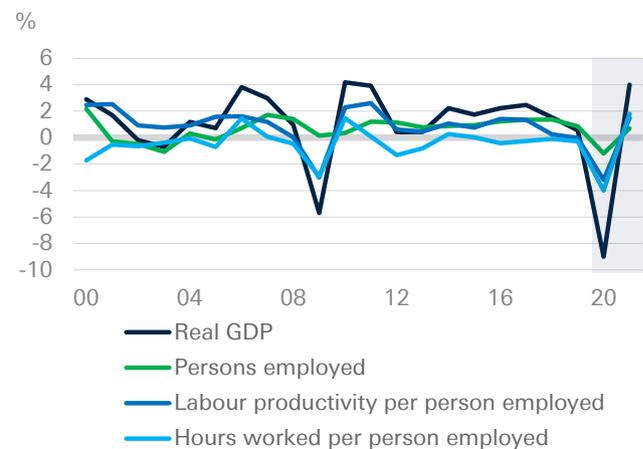
In a more pessimistic scenario of a protracted pandemic the measures to contain COVID-19 remain in place into H2 or have to be tightened up again noticeably after an easing. In this scenario, an even sharper decline in German GDP (-15%) is expected in 2020, followed by only a meagre recovery (1%) in 2021.

Figure 1: Germany: Real GDP growth and details (baseline)



Source : Federal Statistical Office, Deutsche Bank Research

Figure 2: Germany: Patterns of GDP, employment and labour productivity



Source : Federal Statistical Office, Deutsche Bank Research

With regard to the labour market, our baseline scenario suggests that companies will facilitate the expected loss of working hours (volume in 2020: -4% yoy) mainly through working time balances and short-time work. In essence, they hoard labour,

1 [Peter Hooper et al. \(2020\). World Outlook Update: Turning Gloomier. Deutsche Bank Research.](#)

2 [David Folkerts-Landau et al. \(2020\). Impact of Covid-19 on the global economy: Beyond the abyss. Deutsche Bank Research.](#)



to be well positioned for the expected recovery in the second half of 2020. This applies in particular to highly qualified employees. German companies successfully used this strategy during the Global Financial Crisis (GFC) in 2009. Despite the measures to safeguard jobs, the unemployment rate is expected to rise to around 7% on average in 2020 according to our baseline scenario. If the economy recovers in H2 2020 and continues to do so next year, the unemployment rate should fall back to 6% in 2021.

---

## COVID-19 pandemic hits German labour market differently than the Global Financial Market Crisis of 2009

From an economic perspective, several factors are exceptional in the current crisis. On the one hand, it is acting almost simultaneously as a supply shock and, as a result of the measures to restrict contact, as a demand shock. Second, is the speed with which the economy came to a standstill in many areas of Germany and around the world. Many classic growth engines in Asia, but also the USA, stuttered relatively quickly. Furthermore, it is the extent of the economic sectors affected. Third, private consumption will suffer the biggest blow. During previous periods of economic weakness, private consumption has always been a supporting pillar of the German economy and thus also provided a counterweight to employment losses in export-oriented companies. At present, however, the domestically oriented and personnel-intensive service sector is failing as a driver of employment, as the containment measures are having a particularly negative impact there. Therefore, the current situation is clearly different from the GFC of 2009 (German GDP -5.7% yoy). Nevertheless, the developments at that time and the economic policy countermeasures taken – especially those aimed at securing employment – provide important indications for the analysis of the current crisis. The starting position on the labour market at the beginning of 2020 was very solid after the record levels in the number of people in employment (2019 Q4: 45.3 million) overall, as well as in employees subject to social security contributions (2019 Q4: 33.7 million) and the lows (2019 Q1: 2.24 million) in the unemployment figures (2020 Q1: 2.27 million).

### Adjustment channels in case of reduced labour demand by enterprises

Companies whose business activities are impaired can adjust the volume of work through various channels. These include the reduction of working time balances, short-time working, holiday arrangements, accepting lower labour productivity, possibly reducing the use of temporary work and finally shedding labour or not filling vacancies. The former channels are particularly suitable for short-term adjustment to a severe but relatively short-lived economic slump as expected from the COVID-19 pandemic. The economic policy measures are aimed at safeguarding jobs and support the companies primarily with financial support for short-time working, but also measures to support liquidity so that redundancies can be avoided and companies can keep their highly qualified and often very company-specific trained staff. Moreover, due to rather long notice periods and other company agreements, layoffs in Germany take time and are usually expensive.

### Short-time working during the COVID-19 crisis and the use of working time accounts

In 2009 regulations on short-time working and the use of working time accounts demonstrated their effectiveness in safeguarding jobs. There was no sharp rise in unemployment. The seasonally-adjusted unemployment rate rose only from 7.6% in Q4 2008 to 8.3% in Q2 2009, only to fall steadily again in the following quarters.



Moreover, in the following recovery phase, companies' qualified, trained workforce was readily available. As a result, the German economic engine picked up speed comparatively quickly. Not least because of these positive experiences, the German government reacted to the economic slump in the wake of the COVID-19 pandemic by extending the regulations on short-time working.

When the short-time measures were announced in mid-March 2020, the government was expecting around 2.15 million short-time workers, primarily as a result of the extension of "Kurzarbeiter"-regulation to the temporary employment sector. It should be noted that only employees subject to social security contributions (2019: around 33.5 million compared to 45.3 million employees) will be able to benefit from the short-time working arrangements. During the GFC, the number of short-time workers peaked at 1.45 million (May 2009). The climax with respect to the number of companies filing for short-time work was reached in February 2010 with almost 84,000.

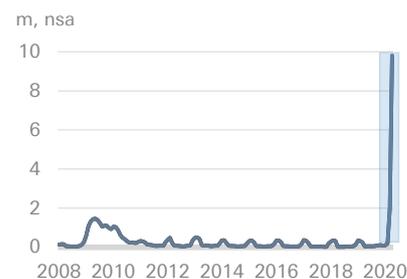
### Short-time workers reaching up to 10 m during the COVID-19 crisis

Because of the settlement procedure for short-time working compensation, the Federal Employment Agency (BA) only has figures on the workers affected with a delay of about three months. After notification of short-time work, the companies pay the employees not only the wages for the work performed but also the short-time work compensation in the corresponding month. A monthly payroll list with the reduced hours is then sent to the BA for reimbursement. By law, a company has up to three months to do this. Short-time work can also be limited to certain departments and can also be implemented to varying degrees. In addition, a number of companies are likely to have announced short-time working for the time being "as a precaution" in order to be able to implement it flexibly over the next 12 months.

According to the latest evaluation by the BA, 751,000 companies had already registered short-time work by 26 April 2020. This means that in March and April short-time work was announced for 10.1 million people, of which 2.6 million in March and 7.5 million in April. In other words, across all sectors, the proportion of people for whom short-time work was registered has jumped to 30% of all employees subject to social security contributions. However, it should be noted that short-time work is not likely to be implemented for all these employees. According to the survey, 1/3 of the companies (out of a total of 2.2 million companies) with at least one employee who is subject to social security contributions have now applied for short-time work. Around one-fifth of the people (2.2 million) for whom short-time work had been announced since March came from the three sectors of retail, catering and motor vehicle manufacturing.

Measured by the number of employees, the majority of German companies are small and medium-sized. A glance at the different size categories therefore makes the expected extent of short-time work even more tangible. To estimate the number of short-time workers implied by the latest BA survey, the average number of employees per company is decisive. Most companies have up to 50 employees subject to social security contributions, a comparatively small share have 250 or more. For this reason, it makes sense to consider the lower size classes. In addition, smaller companies in particular suffer from the COVID-19 crisis. According to the weighted average of the figures from the Federal Statistical Office's business register (last status 2017), enterprises in the classes from 0 to 9 and 10 to 49 have an average of 7.6 employees. If the group of 50 to 249 are also included, the weighted average is 11.1 employees. According to the above-mentioned special

Figure 3: Short-time workers



Source: Federal Employment Agency, Deutsche Bank Research



evaluation and with regard to these groups of companies, the number of short-time workers expected in the near future would be between 7 million and up to 10 million. After April 26th, further notifications have certainly been received. As a result, the number of short-time workers at the peak should be even above the upper end of our range.

If this scenario were to materialise, according to the BA, its reserve of EUR 26 billion would already be used up in 2020 making an additional transfer of EUR 4 to 5 billion from federal government necessary.

The latest results of an ifo company survey (5 May) also show that short-time working is now widespread in almost all sectors in Germany. The highest numbers are in restaurants and catering, with 99% of businesses making use of short-time work, as well as in hotels, with 97%. This is the result of surveys the ifo Institute conducted in April. The key sector of automotive engineering also reports particularly high figures, with 94% of companies implementing short-time work. The share in the retail trade now stands at 62% (ifo survey of 23 April: 55%). The average across all sectors is 50%.

### Support measures put into effect on an unprecedented scale

With retroactive effect from 1 March 2020, the German Federal Government, with its decisions of 23 March, has launched a comprehensive package of measures to support the German economy. In order to safeguard jobs, the regulations for short-time work (so far, short-time work compensation has generally amounted to 60% of the net remuneration lost, or 67% for parents.) were extended as follows:

- Notification of short-time work possible if at least 10% (previously 30%) of employees could be affected by a loss of working hours due to difficult economic developments.
- The build-up of negative working time balances ("minus hours") can be completely or partially dispensed with (negative working time balances have been mandatory up to now).
- Employees subject to social security contributions in the temporary work sector are now also entitled to short-time work.
- Social security contributions that employers have to pay for employees during short-time work are now paid in full by the BA.

The decisions of 23 April also adjusted the amount of compensations for the net loss remuneration. The measures, which are limited until the end of 2020, include.

- From the fourth month of reference, 70% (parents 77%) of the net loss of earnings will be covered.
- From the seventh reference month onwards, 80% (parents 87%) of the net loss of earnings is then covered.

In addition, the duration of unemployment benefit was extended by three months to 15 months. For unemployed persons over 50 years of age, the duration of entitlement will increase to 24 months. However, this is subject to prior employment subject to social security contributions for at least 24 or 48 months.

Overall, the Federal Government has put into effect the largest aid package to date (including the "Corona Shield for Germany") in the history of Germany with a



volume of around EUR 1.9 trillion.

### Short-time work serves as a bridging measure and should not be here to stay

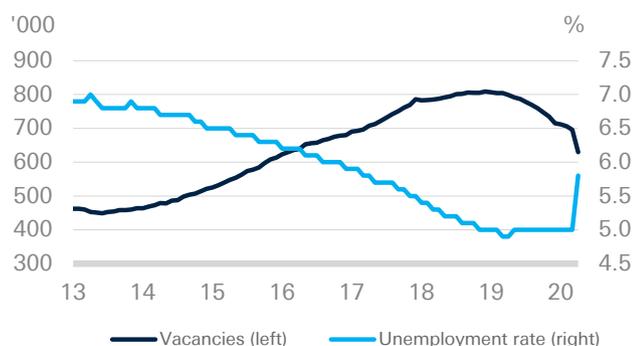
The regulations on short-time work allow for a subscription period of 12 months and can even be extended to 24 months in special cases. Nevertheless, this instrument primarily serves to bridge phases of economic weakness and cannot ensure the survival of structurally weak companies in the medium term. This would also provide employees with the illusion of having a safe job and reduce their incentive to look for other jobs. Short-time work must therefore not become a permanent solution, as this could lead to a real cut-off of employees from the labour market and ultimately restrict their mobility. A look at the labour market of the post-reunification period in eastern Germany underlines this. Even the increase to 80% (87% for parents) of the net loss of earnings that has now been decided should be reserved for those hardest hit and not be generalised. In addition, a discussion on the increase in unemployment benefits would be expected to follow.

Irrespective of this, there is also an economic incentive to use extended short-time working regulations beyond pure economic necessity given their financial relief effect. It should come as no surprise if this moral hazard played a role in the recent surge in notifications.

### Unemployment and employment in the COVID-19 crisis

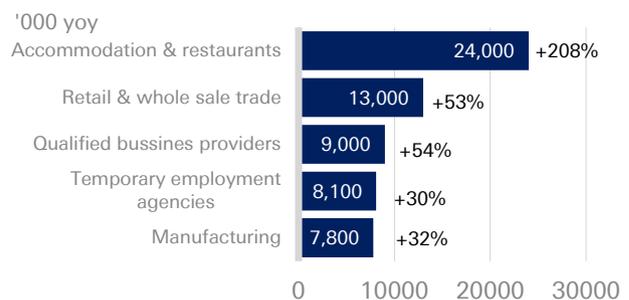
As a result of the extended measures to secure employment, many employees subject to social security contributions should not have to fear for their jobs in the short term. Nevertheless, a good 9 million workers are not protected by these measures. According to the data available for 2019, this includes some 4.15 million self-employed (including family members helping out) and 5.19 million marginally employed persons, i.e. persons in job opportunities (1-euro jobs), low wage or short-term employees. In particular, the gainful employment of marginal workers – often as a sideline in the service sector – is likely to suffer from the economic slump caused by the COVID-19 pandemic. Since these employment relationships are exempt from social security contributions, there are no claims to unemployment security benefits. The same applies to most self-employed persons, only a minority of whom make voluntary contributions to unemployment insurance. They would fall into the basic security by ALG II ("Hartz IV").

Figure 4: German labour market: COVID-19 with strong impact in April already



Source : Federal Employment Agency

Figure 5: COVID-19 and the increase in April unemployment (of previously employed persons)



Source : Federal Employment Agency



### Rise in unemployment to 3 m

Despite the exceptionally comprehensive measures to secure employment, which ultimately include support services for companies (emergency aid, KfW programmes, tax liquidity support, guarantees), unemployment is likely to rise in 2020. Based on correlation between GDP growth and changes in the unemployment rate ("Okuns Law") in the 2000-19 period a GDP decline of around 9% (our baseline scenario) implies an increase in the unemployment rate to 7%. The 4% pick-up in GDP growth assumed for 2021 would then imply a decline of almost 1 percentage point. For 2020, however, this estimate is likely to overstate the actual trend. A noticeable rise in the unemployment rate can only be expected with a time lag in the middle of the second half of 2020. Based on the development in 2009, but exacerbated by the fact that the service sector has been affected, we expect the monthly unemployment rate to peak slightly north of 8% and the annual average to rise to almost 7%. The average number of unemployed will thus rise by around 850,000. The unemployment rate should fall to 6% in 2021 as a result of the economic recovery.

Should our more pessimistic scenario materialise, the unemployment rate is expected to rise to an annual average of around 9% in 2020 and, as a result of a sluggish economic recovery and the lagged labour market response, on average 8% in 2021.

However, the expected increases in unemployment in both scenarios are not only linked to redundancies. The labour market is fundamentally becoming weaker. As a result, significantly fewer workers who were made redundant in winter due to seasonal factors are being re-employed. In addition, fewer labour market policy measures were initiated due to the contact restrictions.

### Employment is likely to fall in 2020 by a good 1%

Employment (2019: 45.3 million) and in particular the socio-economic situation of the population as a whole has been very positive in the recent past. Employment growth in the past year was mainly driven by service companies. In the manufacturing sector, on the other hand, it was already declining at the end of 2019. In contrast to the crisis in 2009, the domestically oriented service sector in particular is currently also being hit hard and can hardly be a counterweight to the weakness in employment in industry.

This is illustrated in particular by the latest PMIs. In April, these sentiment indicators plummeted to unprecedented lows of 15.9 points in services (a record low of 34.4 points also in industry). The Ifo Business Climate for the services sector also marked a record low in April 2020, both in terms of the assessment of the situation and expectations. The overall index fell to a historic low of 74.3 in April (March 85.9). As a result of the expected sharp economic slump of 9% and the particular impact on the personnel-intensive services sector, the number of people in employment is likely to fall by about 550,000 or 1.2% in 2020.

This trend is also indicated by the latest data on the number of job vacancies currently available. In April, the BA number of job vacancies fell by 9.5% mom or 65,000 to 630,000.

Despite the extensive support measures for the German economy, corporate business models could be put at risk or, for example, individual self-employed persons with a thin financial base could be threatened with closure. In addition, those in marginal employment will be affected above all by the problems in the



service sector. Even if the economic recovery we expect to see in 2021 with GDP growth of 4% materialises, companies are likely to be cautious about hiring new staff. In addition to layoffs, such caution could severely curb renewed employment growth. Given the pessimistic scenario described above, it is expected that the decline in employment could be even more severe in 2020 and that employment growth in the following year would be very weak.

### Collective wage bargaining 2020 and 2021

Given the severely clouded employment outlook, we expect job security to be given high priority in the coming collective bargaining negotiations. Following strong wage agreements in 2018 (2.9%) and 2019 (3%), the collective wage trend in 2020 and 2021 is likely to be a rather modest 1%. Due to a markedly negative wage drift effective wages will shrink in 2020. If the economic recovery takes place as in our baseline scenario, short-time work in particular is likely to be reduced in the coming year, which will again support effective earnings.

---

## Concluding Remarks

Before the outbreak of the COVID-19 pandemic, the employment boom of recent years had led to a general shortage of qualified workers and unemployment was reaching ever new lows. In view of the new economic conditions, these times are likely to be a thing of the past for the time being. Despite the sharp economic slump in 2020, however, it is plausible in our baseline scenario that companies will give priority to securing jobs wherever possible. This seems all the more likely given demographic change. In particular, the retirement of the baby boomers starting in the middle of the 2020s will noticeably reduce the number of workers.



# 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 risk and conflict disclosures can also be found at <https://research.db.com/Research/Topics/Equities?topicId=RB0002>. 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(s). In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report. Marc Schattenberg.



## 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 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 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, 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. Research reports on such futures contracts are not intended for access by persons who are located, incorporated, constituted or resident in Hong Kong. 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 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 Australia-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



---

## David Folkerts-Landau

Group Chief Economist and Global Head of Research

Pam Finelli  
Global Chief Operating Officer  
Research

Anthony Klarman  
Global Head of  
Debt Research

Michael Spencer  
Head of APAC Research

Steve Pollard  
Head of Americas Research  
Global Head of Company  
Research

Gerry Gallagher  
Head of European  
Company Research

Andreas Neubauer  
Head of Germany Research

Peter Milliken  
Head of APAC  
Company Research

Jim Reid  
Global Head of  
Thematic Research

Francis Yared  
Global Head of Rates Research

George Saravelos  
Global Head of FX Research

Peter Hooper  
Global Head of  
Economic Research

---

## International Production Locations

### Deutsche Bank AG

Deutsche Bank Place  
Level 16  
Corner of Hunter & Phillip Streets  
Sydney, NSW 2000  
Australia  
Tel: (61) 2 8258 1234

### Deutsche Bank AG

Equity Research  
Mainzer Landstrasse 11-17  
60329 Frankfurt am Main  
Germany  
Tel: (49) 69 910 00

### Deutsche Bank AG

Filiale Hongkong  
International Commerce Centre,  
1 Austin Road West, Kowloon,  
Hong Kong  
Tel: (852) 2203 8888

### Deutsche Securities Inc.

2-11-1 Nagatacho  
Sanno Park Tower  
Chiyoda-ku, Tokyo 100-6171  
Japan  
Tel: (81) 3 5156 6000

---

### Deutsche Bank AG London

1 Great Winchester Street  
London EC2N 2EQ  
United Kingdom  
Tel: (44) 20 7545 8000

### Deutsche Bank Securities Inc.

60 Wall Street  
New York, NY 10005  
United States of America  
Tel: (1) 212 250 2500

---