

Johannes Müller
Head of Macro Research



In a nutshell

- Trade tensions continue to grow. China and the United States are already in the middle of a tit-for-tat bilateral conflict.
- We introduce the first two of four tests we will be watching to assess the impact on financial markets.
- The likely negative effects on gross domestic product (GDP) look limited for the world as a whole. However, this is not as reassuring as you might think.

Too early to panic

Just how damaging have recent attacks on free trade been? We introduce two tests worth watching in coming months.

Just how damaging have recent attacks on free trade been? Back in May, we explained in a detailed [CIO Special](#) that "the results of this battle are likely to impact portfolio returns for years to come." Few months later, the time has come to take stock and update our thinking. For this brief update, we introduce two of the four yardsticks, which we are watching. The first concerns what actually happened, and what new trade risks and opportunities have lately appeared on the horizon. The second looks at the potential consequences on gross domestic product (GDP), both of the countries impacted and the world as a whole. So far, this looks limited. But as we explain in our conclusion, this is hardly reassuring.

1. Trade tensions continue to grow. China and the United States are already in the middle of a tit-for-tat bilateral conflict.

In January, the United States imposed tariffs on washing machines and solar panels, claiming these imports had caused "serious injuries" to U.S. manufacturers. Those tariffs mainly hit China, Vietnam, Korea and Malaysia. Citing national security, the Trump administration followed up with tariffs on steel and aluminum from a wide range of countries. Those countries include not just China, but also such traditional allies as the European Union (EU).

Mexico and Canada have not been spared either, even as the United States was trying to renegotiate the North American Free Trade Agreement (NAFTA). The NAFTA talks have lately resumed, but it is unclear how much progress can be made ahead of the U.S. midterm elections on November 6. But other sources of tensions are likely to keep investors on edge throughout the next couple of months.

China initially reacted with only very modest counter measures, targeting items such as fresh and dried fruits and pork products. The EU and Canada retaliated to the extent allowed under the rules of the World Trade Organisation (WTO) and initiated complaint proceedings against the United States at the WTO.

So far, relatively harmless. Unfortunately, things have not stopped there. Alleging that China has been violating the intellectual property rights of U.S. companies for years, the Trump administration has imposed a 25% punitive on 34 billion dollars worth of Chinese imports. It plans to follow up shortly with tariffs on another 16 billion dollars. Any Chinese retaliation is likely to be countered by U.S. tariffs on an additional 200 billion dollars of Chinese imports. In total, the United States has imposed tariffs on

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

imports worth some 89 billion dollars so far. Retaliatory measures already implemented or announced by its trading partners amount to 79 billion dollars of U.S. exports.¹

And the next targets are already in sight. President Trump has announced that he is prepared to impose tariffs on all 500 billion dollars worth of Chinese imports. Add threatened U.S. tariffs on some 350 billion dollars worth of cars and automotive parts, and you can see why many investors are worried. The EU reacted by dispatching the president of the European Commission, Jean-Claude Juncker to Washington on July 25. The visit went well, suggesting the EU car sector might be spared tariffs – at least for now.

The immediate relief in markets was tangible. However, keep in mind that not all that much was actually agreed. It remains exceedingly unlikely that the United States and the EU will make much progress "toward zero tariffs, zero non-tariff barriers and zero subsidies on non-auto industrial goods", the latest goal stated by President Trump. Given the prior history of transatlantic trade talks and the political realities on both sides of the Atlantic, anything along those lines is likely to take years. Our first test can focus as a corrective to market overreactions. By focusing on protectionist measures firmly announced, implemented or taken back, it avoids reading too much into any particular meeting or non-binding statement by any of the parties.

2. The impact on global GDP growth has been limited and is likely to remain so. However, this is not as reassuring as it might seem.

How bad could things get? That rather depends on how you look at the potential fallout. The impact on global GDP has been the focus of most attention by financial-market commentators. Estimates on the impact of even quite aggressive measures over the next few months or years tend to be fairly low. The next section will explain why this is hardly reassuring.

Estimating the impact of trade tensions on global GDP is far from straightforward. The difficulties in coming up with estimates start with the fact that nobody really knows how many billions of dollars will actually be impacted by any particular measure. That depends on how much buyers of any given good or service react to the increase of its price, due to tariff increases. It turn, this is a function of how tariffs and tariff exemptions will be enforced.² More broadly, it depends on how critical and special a good is, and how easy it is to source a similar product elsewhere – be it domestically or from a foreign source exempted from the measures. Moreover, both domestic and foreign producers will react to the new price signals. For example, the EU is rightly worried that in addition to hurting its

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

¹The Economist (2018a) has recently provided a very handy breakdown of the various measures (i.e. how many billion per sector) each country has implemented so far: <https://www.economist.com/graphic-detail/2018/07/20/donald-trump-is-fighting-trade-wars-on-severalfronts>. Its July 19 issue also contains an excellent briefing on the topic: <https://www.economist.com/briefing/2018/07/19/the-world-trading-system-is-under-attack>

²For an interesting account of the impact so far, see Crooks, E. and Fei, F. (2018) "Trade war winners and losers grapple with Trump tariff chaos: Companies bewildered by judgments on exemptions as backlog of decisions rises", Financial Times, July 24, <https://www.ft.com/content/675e439c-8c25-11e8-bf9e-8771d5404543>

steel producers directly, U.S. tariffs are also leading steel from other countries to be diverted to European markets.

Such effects are just one of many reasons why truly reliable estimates require the use of what is known as a "computable general equilibrium" (CGE) model. In such a model, everything sort of depends on everything else. What happens in the goods sector in any large country due to a tariff, for example, can potentially spill over to what happens to interest rates, currencies and unemployment both domestically and in the rest of the world. We said "sort of", because by necessity, such a model is a simplified version of the world. It can give you an indication of how a national economy and global GDP might react to changes in trade policy, not necessarily how they will react.

Central banks and international organizations, like the International Monetary Fund (IMF), are avid users of CGE models. They are also well aware of their limitations. One particular problem is that while CGE models use actual economic data, the results can only be as good as the data you put in. In the case of trade wars, there are precious few historic data points. That's fortunate from the point of view of global welfare in the past, but unfortunate in terms of the reliability of resulting estimates.

What CGE models do really well, however, is create awareness of the mental pitfalls that could easily result from looking at any given variable in isolation. For example, a surprising number of sell-side analysts claim that unless other countries retaliate, U.S. tariffs could actually increase U.S. GDP. The reasoning behind this idea is that tariffs increase import prices, which will give a boost to the domestic production of similar goods and services.

There are many problems with this reasoning. Three big ones stand out. First, it ignores the impact of a new U.S. tariff on the dollar. If exchange rates are flexible, CGE modelling (well founded on economic theory and history) suggests the strengthening of the dollar's real exchange rates.³ Second, new manufacturing capacity will not magically appear overnight, especially as the U.S. labor market is already tight. As we recently [pointed out](#), the United States is close to, if not a shade beyond full employment. Third, international manufacturing supply chains are a lot more complicated than it is possible to model in even the most sophisticated CGE model. A large chunk of Chinese exports to the United States (500 billion dollars or so) just reflects the attractiveness of China for the final assembly stage of goods designed by U.S. and European multinational firms – think of smartphones, for example.

As a result, any protectionist measures will almost certainly cause immediate efficiency losses. Even if domestic production substitutes for some of the items that were hit with tariffs, that production is likely to lead to a less efficient allocation of domestic resources. After all, goods and services – including intermediate goods and services sourced from profit-maximizing companies

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

³Davies (2018) provides an excellent introduction to the problem. Also see Obstfeld (2016) for details on the estimates cited in Davies (2018).
⁴Tariffs Do More Harm Than Good at Home", International Monetary Fund, <https://blogs.imf.org/2016/09/08/tariffs-do-more-harm-than-good-at-home/>

abroad – are generally imported for good reasons. It is often more efficient and cheaper to buy or make them elsewhere than to produce them domestically, which is why they are imported in the first place. Some of the efficiency gains that trade enables will likely be lost almost immediately due to tariffs, while in the longer term, productivity growth is also likely to be negatively affected. If competition is reduced, this may be made worse, for example by locking out more innovative foreign suppliers or competitors.

The size of such efficiency losses is hard to measure and estimate, but likely to be a key part of the costs of protectionism. Trade wars also increase uncertainty (how will supply chains be affected, will there be retaliation, etc.), and this can adversely affect activity by causing firms to cut back on capital spending and hiring. It also tends to lead investors to demand higher risk premiums, thereby tightening financial conditions.

So what does all that mean for global GDP? Well, the IMF recently estimated in its world economic outlook that the measures announced so far will only reduce the world's GDP by about 0.5 percentage points in total by 2020.⁴ Things could clearly get a lot worse, but the estimate also shows that the world economy can probably handle trade headwinds.

Overall, the results from our second test can be summed up as follows: For now we think that trade remains unlikely to trigger enough of a broader economic slowdown to cause market jitters in and of itself. Unfortunately, the immediate impact on GDP is not the only thing investors are likely to worry about, if trade tensions get out of hand.

Conclusion: Markets are likely to worry about more than just global GDP, or the still remote threat of a trade-war-triggered U.S. recession.

As a measure of the economic damage done, GDP has several disadvantages. The first is that it is inherently backward looking. One way around this is to rely on forecasts, which incorporate the latest findings from such sources as company surveys or financial-market indicators.⁵ Needless to say, we do that anyway in deriving our growth forecasts for the United States and other major economies. For now, we see some early warning signs, but no reason to panic. As we recently wrote, commenting on our [latest growth forecasts](#): "Make no mistake, in our opinion the impromptu attacks by the Trump administration on free trade are, to put it mildly, fundamentally misguided and frighteningly uninformed. (...) they also risk reducing the growth prospects of the U.S. and the world economy as a whole. To us, it seems obvious that eroding the rules-based international order underpinning global trade and undermining international supply chains will hurt

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

⁴This is based on "the increase in US tariffs on imported solar panels, washing machines, steel, aluminum, and a range of Chinese products, and the announced retaliatory measures by trading partners as of July 6", i.e. it does not, as yet consider the threat of tariffs on an additional 200 billion dollars worth of Chinese imports. For details, see https://www.imf.org/en/Publications/WEO/Issues/2018/07/02/world-economic-outlook-update-july-2018#_ftn1

⁵Irwin, N. (2018) has come up with quite a useful list of indicators investors can keep an eye on, in assessing the trade impact on the U.S. economy.

everyone involved, including emerging markets. However, it is also unlikely to cause a global recession anytime soon."

This hints at a second problem. It is quite possible for a trade war to cause damage to portfolios, without triggering a recession. GDP is designed to measure an economy's output in any given year, not how wealthy its citizens are. And when it comes to trade, it is helpful to return to the analogy we introduced in our May [CIO Special](#) on the topic. A useful way to think about the effects of trade is to imagine a secret technology, which "allows the United States to convert wheat, lumber and soy beans into cheap high-quality consumer goods, such as toys or washing machines." As with any new production process, some workers and sectors will inevitably lose out, while others will win. Our imaginary secret technology "will make U.S. farmers and farm workers better off. At the same time, those owning now uncompetitive factories making toys or washing machines will be worse off, and so will their workers. For the United States as a whole, though, trade is generally a good thing - in the same way, and for the same reasons that new technologies are. It benefits consumers."

To which we would only add that import tariffs on intermediates tend to have even worse welfare implications for the country imposing them. By targeting such inputs and intermediates as steel and aluminum car parts, they are likely to hurt even some of the industries other measures are trying to protect. Washing machines and carmakers are good examples.

Now, imagine the sole factory where this secret technology is applied being hit by a hurricane. How bad will the impact be? If the damage can quickly be repaired, not all that bad. That, broadly is how financial markets currently think about the ongoing trade conflict – a temporary interruption in business as usual. The owners of the factory might lose some profits, but profits should quickly recover, while much of the rest of the economy might remain largely unaffected. Indeed, it is even possible that after taking a hit from the hurricane, GDP growth could accelerate as the factory is rebuilt.

A lasting trade war, with protectionist measures permanently staying in place, is a different matter altogether. You can think of it as a man-made disaster that results in the factory being destroyed and our secret technology lost forever. That would clearly be very bad news for the owners of the factory, but also for anyone else who had made an investment decision thinking they could sell to the factory – the farmers, who specialized in wheat, lumber and soy beans, in our example. The damage to consumers, from having to pay more for their toys or washing machines, would be just as permanent. Very little of this wealth destruction would be readily visible in GDP growth over the short term.

A third problem with GDP as a measure of trade damage is that while investors rightly worry a lot about the next recession, what they really care about is the long-term prospects. International competition tends to spur innovation, by allowing countries to specialize in the bits of the global value chain they are best at.

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

So, if neither GDP nor our forecast for the next 12 months can tell you how trade might impact financial markets, what might? We are currently working on two additional measures that we hope will help. Our third yardstick to think about the damage done so far can be thought of as a market-derived trade fear index. It is going to include trade sensitive stock and commodity-markets indicators to give an indication of how long the conflict might last and how much it might hurt. Of course, there is no guarantee that markets will get it right. Our fourth yardstick will attempt to use game theory to predict how things might work out. This basically comes down to the question whether Donald Trump is serious about dismantling global value chains – or merely bluffing in search of a better deal. In the former case, the results could be devastating, even if countries try to maintain the rules-based global trading system.⁶

Political processes are notoriously difficult to forecast. Indeed, it is somewhat surprising that trade tensions have escalated as much as they already have. It is becoming increasingly clear that the Trump administration faces plenty of domestic opposition. The U.S. economy and U.S. financial markets appear a lot more exposed than GDP forecasts suggest. Estimates vary on how much, but the effects of disruptions to global supply chains could be severe. After all, much of U.S. trade in goods and services appears more like smartphones (designed by U.S., even if assembled in China) than, say, steel. The imports of final goods made elsewhere contain plenty of U.S. value added. Meanwhile, U.S. manufacturers get much of their inputs overseas.

The other week, the U.S. car industry provided an interesting example of how tricky protectionist measures are in an era of cross-border supply chains. At the public hearing on the proposed tariffs on cars and car parts, Europeans were not the only ones begging for mercy. So were representatives of U.S. carmakers. They pointed out that a 25% tariff on imported cars and parts might raise the cost of a typical imported car by 6000 dollars – but at the same time increase the cost of U.S. built ones by 2000 dollars.⁷ Shortly thereafter, the largest U.S. carmaker cut its earnings outlook, blaming tariffs.⁸

Such pressures might yet help secure the outcome many market observers were expecting earlier this year. As we previously wrote: "the United States might secure crowd-pleasing "concessions" for the benefit of politically well-connected industries, mainly at the expense of U.S. consumers.(...) the path towards "compromises" should be fairly easy. All it requires is for knowledgeable Chinese, European, Mexican and Canadian trade negotiators to follow the Korea strategy – allowing the United States to secure the occasional "concession" mostly at the expense of U.S. importers, and, ultimately, U.S. consumers."

The Juncker visit could prove another case in point. For now, it appears the EU's mere willingness to continue to talk about liquid natural gas and soy beans was enough to avoid a further escalation.

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

⁶For an indication and some estimates how bad things might get, see Krugman, P. (2018)

⁷<https://www.reuters.com/article/us-usa-trade-chamber-exclusive/top-u-s-business-group-assails-trumps-handling-of-trade-dispute-idUSKBN1JS0VL>

⁸<https://www.ft.com/content/43e889aa-8ffd-11e8-b639-7680cedcc421>

All articles are available on <https://go.dws.com/cio-view-articles>

As we will describe when introducing our last two tests, investors would be well advised not to overestimate the effects of both further escalation and climb-downs by any of the parties. The real question remains whether and how the rules-based multilateral trading framework under the WTO umbrella can adapt and survive. This probably becomes less likely with every new protectionist measure. And every protectionist measure also increases pressures for more interventions into the functioning of free markets – as the recent U.S. aid package for farmers shows.

From a market perspective, it would be very regrettable if the WTO and support for free trade and free markets more broadly continues to be undermined. For similar reasons, most U.S. businesses and their representatives do not appear all that keen on protectionist measures, however well intended. Top business groups such as the U.S. Chamber of Commerce are fighting publicly and hard against U.S. tariff plans.⁹ Quietly, so are their political allies among Republicans in Congress, especially in the Senate.¹⁰ Traditional free traders, including many of Republicans, are understandably worried. So are the business interests Donald Trump claims to promote. That old aphorism of Ronald Reagan comes to mind: "The most terrifying words in the English language are: I'm from the government and I'm here to help."

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

⁹<https://www.reuters.com/article/us-usa-trade-chamber-exclusive/top-u-s-business-group-assails-trumps-handling-of-trade-dispute-idUSKBN1JS0VL>

¹⁰<https://www.politico.com/story/2018/07/03/trump-tariffs-republicans-congress-hatch-687911>

All articles are available on <https://go.dws.com/cio-view-articles>

Glossary

Emerging markets (EM)

Emerging markets (EM) are economies not yet fully developed in terms of, amongst others, market efficiency and liquidity.

European Union (EU)

The **European Union (EU)** is a political and economic union of 28 member states located primarily in Europe.

Gross domestic product (GDP)

The **gross domestic product (GDP)** is the monetary value of all the finished goods and services produced within a country's borders in a specific time period.

International Monetary Fund (IMF)

The **International Monetary Fund (IMF)**, created in 1945 and headquartered in Washington, D.C., is an organization of 188 countries, working to foster global monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world.

North American Free Trade Agreement (NAFTA)

The North American Free Trade Agreement (NAFTA) is a trade agreement signed by Canada, Mexico and the United States, creating a trilateral trade bloc in North America, which came into force on January 1st, 1994.

World Trade Organization (WTO)

The World Trade Organization (WTO) is an international organization based in Switzerland, which regulates commerce between nations through mutually agreed rules.

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

Risk warning

Investments are subject to investment risk, including market fluctuations, regulatory change, possible delays in repayment and loss of income and principal invested. The value of investments can fall as well as rise and you might not get back the amount originally invested at any point in time.

Investments in Foreign Countries – Such investments may be in countries that prove to be politically or economically unstable. Furthermore, in the case of investments in foreign securities or other assets, any fluctuations in currency exchange rates will affect the value of the investments and any restrictions imposed to prevent capital flight may make it difficult or impossible to exchange or repatriate foreign currency.

Foreign Exchange/Currency – Such transactions involve multiple risks, including currency risk and settlement risk. Economic or financial instability, lack of timely or reliable financial information or unfavorable political or legal developments may substantially and permanently alter the conditions, terms, marketability or price of a foreign currency. Profits and losses in transactions in foreign exchange will also be affected by fluctuations in currency where there is a need to convert the product's denomination(s) to another currency. Time zone differences may cause several hours to elapse between a payment being made in one currency and an offsetting payment in another currency. Relevant movements in currencies during the settlement period may seriously erode potential profits or significantly increase any losses.

High Yield Fixed Income Securities – Investing in high yield bonds, which tend to be more volatile than investment grade fixed income securities, is speculative. These bonds are affected by interest rate changes and the creditworthiness of the issuers, and investing in high yield bonds poses additional credit risk, as well as greater risk of default.

Hedge Funds – An investment in hedge funds is speculative and involves a high degree of risk, and is suitable only for “Qualified Purchasers” as defined by the US Investment Company Act of 1940 and “Accredited Investors” as defined in Regulation D of the 1933 Securities Act. No assurance can be given that a hedge fund's investment objective will be achieved, or that investors will receive a return of all or part of their investment.

Commodities – The risk of loss in trading commodities can be substantial. The price of commodities (e.g., raw industrial materials such as gold, copper and aluminium) may be subject to substantial fluctuations over short periods of time and may be affected by unpredicted international monetary and political policies. Additionally, valuations of commodities may be susceptible to such adverse global economic, political or regulatory developments. Prospective investors must independently assess the appropriateness of an investment in commodities in light of their own financial condition and objectives. Not all affiliates

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

or subsidiaries of Deutsche Bank Group offer commodities or commodities-related products and services.

Investment in private equity funds is speculative and involves significant risks including illiquidity, heightened potential for loss and lack of transparency. The environment for private equity investments is increasingly volatile and competitive, and an investor should only invest in the fund if the investor can withstand a total loss. In light of the fact that there are restrictions on withdrawals, transfers and redemptions, and the Funds are not registered under the securities laws of any jurisdictions, an investment in the funds will be illiquid. Investors should be prepared to bear the financial risks of their investments for an indefinite period of time.

Investment in real estate may be or become nonperforming after acquisition for a wide variety of reasons. Nonperforming real estate investment may require substantial workout negotiations and/ or restructuring.

Environmental liabilities may pose a risk such that the owner or operator of real property may become liable for the costs of removal or remediation of certain hazardous substances released on, about, under, or in its property. Additionally, to the extent real estate investments are made in foreign countries, such countries may prove to be politically or economically unstable. Finally, exposure to fluctuations in currency exchange rates may affect the value of a real estate investment.

Structured solutions are not suitable for all investors due to potential illiquidity, optionality, time to redemption, and the payoff profile of the strategy. We or our affiliates or persons associated with us or such affiliates may: maintain a long or short position in securities referred to herein, or in related futures or options, purchase or sell, make a market in, or engage in any other transaction involving such securities, and earn brokerage or other compensation. Calculations of returns on the instruments may be linked to a referenced index or interest rate. In such cases, the investments may not be suitable for persons unfamiliar with such index or interest rates, or unwilling or unable to bear the risks associated with the transaction. Products denominated in a currency, other than the investor's home currency, will be subject to changes in exchange rates, which may have an adverse effect on the value, price or income return of the products. These products may not be readily realizable investments and are not traded on any regulated market.

Important Information – UK

Issued in the UK by Deutsche Asset Management (UK) Limited. Deutsche Asset Management (UK) Limited is authorised and regulated by the Financial Conduct Authority.

DWS is the brand name of DWS Group GmbH & Co. KGaA. The respective legal entities offering products or services under the DWS brand are specified in the respective contracts, sales materials and other product information documents. DWS, through DWS Group GmbH & Co. KGaA, its affiliated companies and its officers and employees (collectively "DWS") are communicating this document in good faith and on the following basis.

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

This document is a financial promotion and is for general information purposes only and consequently may not be complete or accurate for your specific purposes. It is not intended to be an offer or solicitation, advice or recommendation, or the basis for any contract to purchase or sell any security, or other instrument, or for DWS to enter into or arrange any type of transaction as a consequence of any information contained herein. It has been prepared without consideration of the investment needs, objectives or financial circumstances of any investor.

This document does not identify all the risks (direct and indirect) or other considerations which might be material to you when entering into a transaction. Before making an investment decision, investors need to consider, with or without the assistance of an investment adviser, whether the investments and strategies described or provided by DWS, are suitability and appropriate, in light of their particular investment needs, objectives and financial circumstances. We assume no responsibility to advise the recipients of this document with regard to changes in our views.

Past performance is no guarantee of future results.

The products mentioned in this document may be subject to investment risk including market fluctuations, regulatory change, counterparty risk, possible delays in repayment and loss of income and principal invested. Additionally, investments denominated in an alternative currency will be subject to currency risk, changes in exchange rates which may have an adverse effect on the value, price or income of the investment. The value of an investment can fall as well as rise and you might not get back the amount originally invested at any point in time.

We have gathered the information contained in this document from sources we believe to be reliable; but we do not guarantee the accuracy, completeness or fairness of such information and it should not be relied on as such. DWS has no obligation to update, modify or amend this document or to otherwise notify the recipient in the event that any matter stated herein, or any opinion, projection, forecast or estimate set forth herein, changes or subsequently becomes inaccurate.

DWS does not give taxation or legal advice. Prospective investors should seek advice from their own taxation agents and lawyers regarding the tax consequences on the purchase, ownership, disposal, redemption or transfer of the investments and strategies suggested by DWS. The relevant tax laws or regulations of the tax authorities may change at any time. DWS is not responsible for and has no obligation with respect to any tax implications on the investment suggested.

No assurance can be given that any investment described herein would yield favorable investment results or that the investment objectives will be achieved. In general, the securities and financial instruments presented herein are not insured by the Federal Deposit Insurance Corporation ("FDIC"), and are not guaranteed by or obligations of DWS or its affiliates. We or our affiliates or persons associated with us may act upon or use material in this report

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

prior to publication. DWS may engage in transactions in a manner inconsistent with the views discussed herein. Opinions expressed herein may differ from the opinions expressed by departments or other divisions or affiliates of DWS.

This document contains forward looking statements. Forward looking statements include, but are not limited to assumptions, estimates, projections, opinions, models and hypothetical performance analysis. The forward looking statements expressed constitute the author's judgment as of the date of this material. Forward looking statements involve significant elements of subjective judgments and analyses and changes thereto and/or consideration of different or additional factors could have a material impact on the results indicated. Therefore, actual results may vary, perhaps materially, from the results contained herein. No representation or warranty is made by DWS as to the reasonableness or completeness of such forward looking statements or to any other financial information contained in this document.

This document may not be reproduced or circulated without our written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries, including the United States. This document is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction, including the United States, where such distribution, publication, availability or use would be contrary to law or regulation or which would subject DWS to any registration or licensing requirement within such jurisdiction not currently met within such jurisdiction. Persons into whose possession this document may come are required to inform themselves of, and to observe, such restrictions.

DWS conducts its business according to the principle that it must manage conflicts of interest fairly, both between itself and its clients and between one client and another.

As a global financial services provider, DWS faces actual and potential Conflicts of Interest periodically. DWS's policy is to take all reasonable steps to maintain and operate effective organisational and administrative arrangements to identify and manage relevant conflicts. Senior management within the firm are responsible for ensuring that the firm's systems, controls and procedures are adequate to identify and manage Conflicts of Interest.

DWS is a trading name of Deutsche Asset Management (UK) Limited. Registered in England & Wales No 5233891. Registered Office: Winchester House, 1 Great Winchester Street, London EC2N 2DB. Deutsche Asset Management (UK) Limited is authorised and regulated by the Financial Conduct Authority. Financial Services Registration Number 429806.

This document may not be distributed in Canada, Japan, the United States of America, or to any U.S. person

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

Disclaimer EMEA

DWS represents the asset management activities conducted by DWS Group GmbH & Co. KGaA or any of its subsidiaries. Clients will be provided DWS products or services by one or more legal entities that will be identified to clients pursuant to the contracts, agreements, offering materials or other documentation relevant to such products or services. The information contained in this document does not constitute investment advice.

This document has been prepared without consideration of the investment needs, objectives or financial circumstances of any investor. Before making an investment decision, investors need to consider, with or without the assistance of an investment adviser, whether the investments and strategies described or provided by DWS, are appropriate, in light of their particular investment needs, objectives and financial circumstances. Furthermore, any report or analysis within this document is shown for information/discussion/illustrative purposes and does not constitute an offer, recommendation or solicitation to conclude a transaction and should not be treated as giving investment advice.

The terms of any investment will be exclusively subject to the detailed provisions, including risk considerations, contained in the Offering Documents. When making an investment decision, you should rely on the final documentation relating to the transaction and not the summary contained herein.

Investments are subject to various risks, including market fluctuations, regulatory change, possible delays in repayment and loss of income and principal invested. The value of investments can fall as well as rise and you may not recover the amount originally invested at any point in time. Furthermore, substantial fluctuations of the value of the investment are possible even over short periods of time.

This publication contains forward looking statements. Past performance is not a reliable indication of future results. Forward looking statements include, but are not limited to assumptions, estimates, projections, opinions, models and hypothetical performance analysis and involve significant elements of subjective judgments and analyses and changes thereto and/or consideration of different or additional factors could have a material impact on the results indicated. Therefore, actual results may vary, perhaps materially, from the results contained herein. No representation or warranty is made by Deutsche Asset Management Investment GmbH as to the reasonableness or completeness of such forward looking statements or to any other financial information contained herein.

This document may not be reproduced or circulated without our written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries, including the United States. Deutsche Asset Management Investment GmbH does not give tax or legal advice. All statements of opinion reflect the current assessment of

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

Deutsche Asset Management Investment GmbH and are subject to change without notice.

Kingdom of Bahrain

For Residents of the Kingdom of Bahrain: This document does not constitute an offer for sale of, or participation in, securities, derivatives or funds marketed in Bahrain within the meaning of Bahrain Monetary Agency Regulations. All applications for investment should be received and any allotments should be made, in each case from outside of Bahrain. This document has been prepared for private information purposes of intended investors only who will be institutions. No invitation shall be made to the public in the Kingdom of Bahrain and this document will not be issued, passed to, or made available to the public generally. The Central Bank (CBB) has not reviewed, nor has it approved, this document or the marketing of such securities, derivatives or funds in the Kingdom of Bahrain. Accordingly, the securities, derivatives or funds may not be offered or sold in Bahrain or to residents thereof except as permitted by Bahrain law. The CBB is not responsible for performance of the securities, derivatives or funds.

State of Kuwait

This document has been sent to you at your own request. This presentation is not for general circulation to the public in Kuwait. The Interests have not been licensed for offering in Kuwait by the Kuwait Capital Markets Authority or any other relevant Kuwaiti government agency. The offering of the Interests in Kuwait on the basis a private placement or public offering is, therefore, restricted in accordance with Decree Law No. 31 of 1990 and the implementing regulations thereto (as amended) and Law No. 7 of 2010 and the bylaws thereto (as amended). No private or public offering of the Interests is being made in Kuwait, and no agreement relating to the sale of the Interests will be concluded in Kuwait. No marketing or solicitation or inducement activities are being used to offer or market the Interests in Kuwait.

United Arab Emirates

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 only available to Professional Clients, as defined by the Dubai Financial Services Authority.

State of 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 only undertake the financial services activities that fall within the scope of its existing QFCRA license. Principal place of business in the QFC:

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)

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 to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

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 only undertake the financial services activities that fall within the scope of its existing CMA license. 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.

This document may not be distributed in Canada, Japan, the United States of America, or to any U.S. person.

© 2018 Deutsche Asset Management Investment GmbH. All rights reserved. No further distribution is allowed without prior written consent of the Issuer.

Publisher: Deutsche Asset Management Investment GmbH, Mainzer Landstraße 11-17, 60329 Frankfurt am Main, Germany

All opinions and claims are based upon data on 26/7/18 and may not come to pass. This information is subject to change at any time, based upon economic, market and other considerations and should not be construed as a recommendation. Past performance is not indicative of future returns. Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Deutsche Asset Management Investment GmbH

CRC 059519 (07/2018)