21 Jun 2019 12:47:55 ET | 24 pages

Western Europe

European Credit Focus

Trading HY credit in the age of QE infinity

- **To (QE) infinity and beyond!** — With inflation fast disappearing central bankers are back to making dovish noises with the potential for more QE in Europe this year. A flood of new liquidity will indeed buoy risk sentiment, but for investors it will be key to differentiate between systemic and idiosyncratic risk.

- **Be short idiosyncratic risk —** The widest names in Xover have continuously and significantly underperformed for the last 5 years. The grab for yield has simply not extended this far down the credit spectrum - and with good reason, given the steady trickle of defaults we have seen. Even if QE resumes we fear it will remain hard to prop up failing corporates.

- **Where are markets pricing this the most? —** We find that markets tend to be efficient when predicting default timing for names with small debt stacks, but not for large debt stacks. We analysed the degree of idiosyncratic risk inherent in the widest Xover names: PIZEXP, BOPRLN, COFP, CMACG, HEMABV, TTMTIN, MTNLN, HEMABV, ICELTD using our time-to-default indicator.

- **Be long systemic risk** — Better quality HY still has risk premia left. The tighter half of Xover names outperformed iTraxx Main during ECB's CSPP, and then some of this reversed in '18.

Arup Ghosh AC
+44-20-3569-3957
arup.ghosh@citi.com

Aritra Banerjee
+44-20-3569-4544
aritra.banerjee@citi.com

Christopher F Chapman
+44-20-3569-5720
christopher.chapman@citi.com

To (QE) infinity and beyond!

It's been 12 years and $10 trillion (worth of global QE) since the Great Recession, but the global economy still seems unable to reach escape velocity. Like astronauts who edged too close to an event horizon, we seem stuck in time, fighting but unable to escape the "black hole" of Japanification.

With inflation fast disappearing central bankers are back to making dovish noises. US treasuries are pricing in at least another 50bp of rates cuts by year end with the first cut coming perhaps next month. In Europe Mario Draghi seems keen to hand markets a parting gift in his final year as ECB president which might comprise of rate cuts and possibly even more QE (Why re-visiting 33% is the big news)

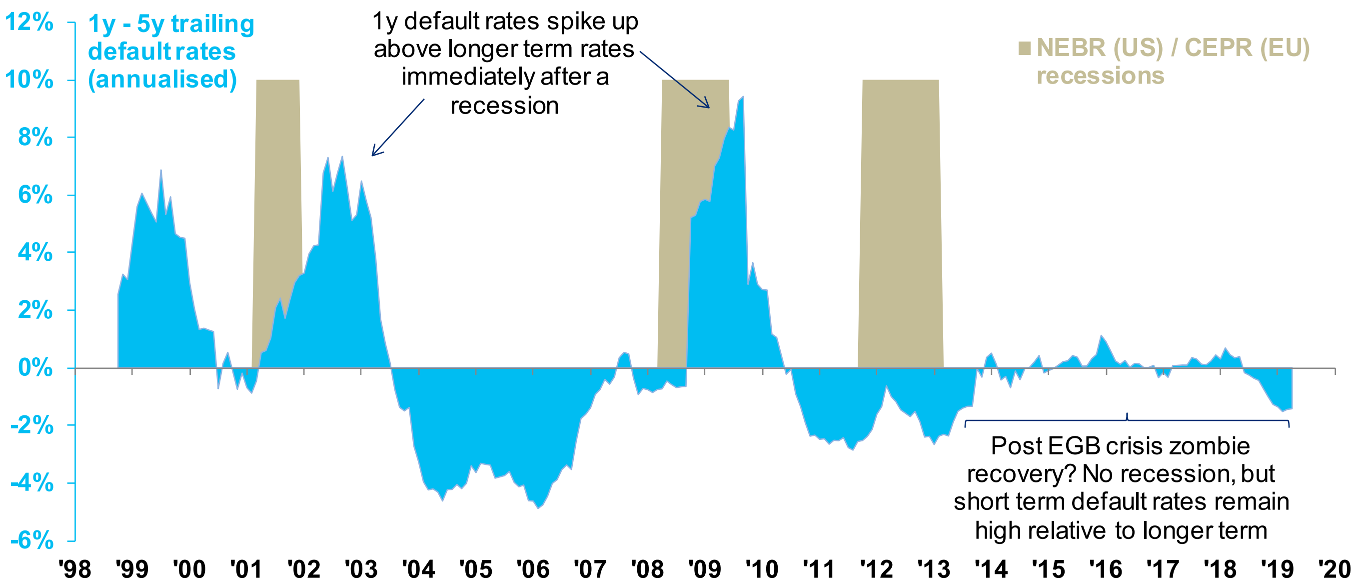
But what exactly will be different this time? Will the next trillion dollars of asset purchases be the boost that we need to break away from the Japanification event-horizon? Or the trillion after that? Personally, we doubt even QE-infinity will be sufficient to drag us away from "Japanification"; monetary policy has had its day. However, that is not to say that this next round of stimulus won't have any market effects at all (or social effects, but that's another story).

For markets, the key distinction will be between systemic and idiosyncratic risk. As always, the new flood of liquidity will buoy systemic risk, but we fear it is going to be harder this time around to prop up failing corporates. The last round of stimulus merely postponed the day of reckoning for faltering credits in Europe. Those defaults are coming through now, with 3 CDS auctions scheduled in Europe in the first 6 months of this year. Despite more QE, we expect this trend to continue driving further bifurcation in risk pricing across the credit spectrum. We recommend investors go long systemic risk while shorting select idiosyncratic risk in Xover.

Zombiefication; or the mystery of the flat default rate curve

Default is of course the end-game in credit and though infrequent, default rates pick-up shortly after periods of economic weakness. A recession typically sees defaults spike after about 12 months, while likewise a boom sees defaults drop, again after a lag (Figure 1)

Figure 1. European corporate default rate curve: 1y vs 5y trailing annualised default rates



Source: Citi Research, Moodys

The last few years however have been an anomaly. Post the Eurozone recession in 2012-13 there was no short term spike in default rates as usual. But as time passed neither did the usual normalization of the default rate curve materialize. Trailing 1y default rates remained elevated compared to longer term average, only beginning to normalize a little in 2019.

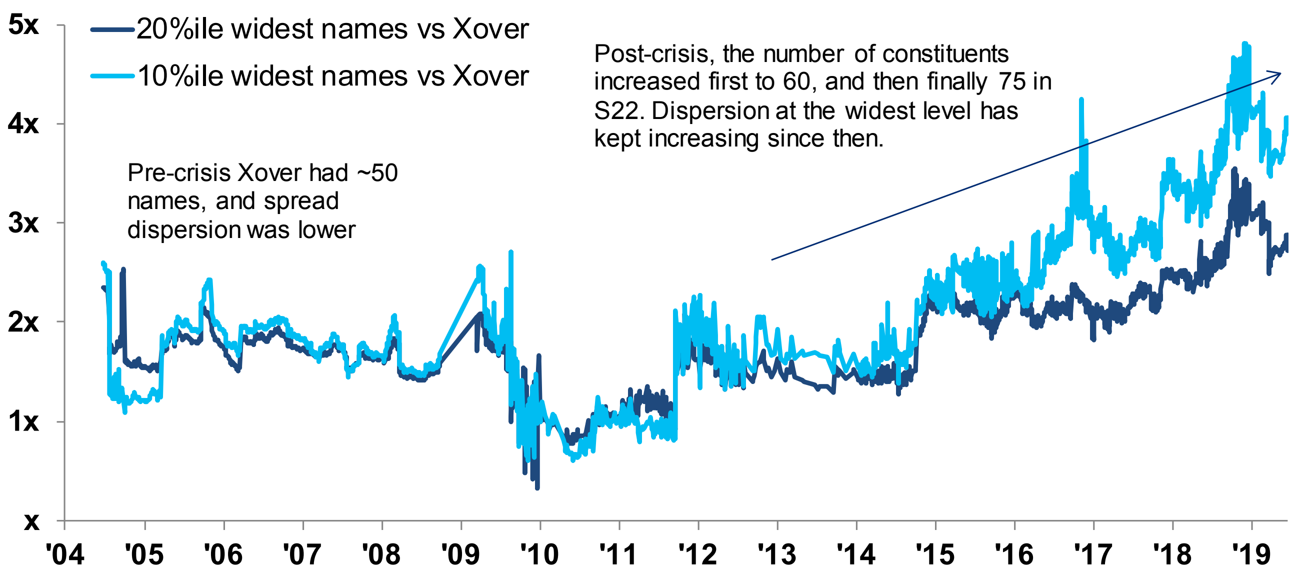
We believe it was the unprecedented amount of liquidity pumped into global markets (including ECB QE) that caused this change in dynamic. Cheap financing gave faltering corporates a lifeline which would not have existed in normal circumstances. This just delayed the inevitable and what would in past cycles have manifested as a spike in defaults just got spread out over time.

Be short idiosyncratic risk: underperformance to continue

Spread dispersion in European HY CDS tells a similar story. After 2014, the widest names in Xover started underperforming the rest and have continued to do so ever since. This is especially striking given that the rules based nature of Xover index construction means distressed or defaulted names are periodically swept out of the index (Astaldi, New Look, Isolux, Portel, Abengoa in the last 3 years). Thus the "widest names" basket for Xover is refreshed with better quality names every 6 months. Nonetheless the underperformance of this cohort (vs the rest) has continued unabated.

Quite clearly, the grab for yield has not extended this far down the credit spectrum - and with good reason given the slow but steady trickle of defaults of the last few years. We do not expect this trend to change any time soon.

Figure 2. Spread ratio of 10 & 20%ile widest names in iTraxx Xover vs the index itself



Source: Citi Research, Markit

So are the widest Xover names an indiscriminate "sell"?

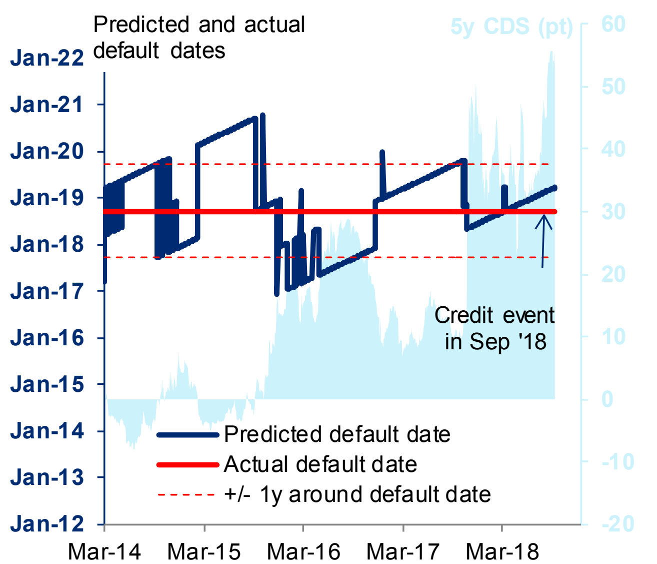
The short answer is no. Of course, when trading credits at the distressed end of the spectrum, fundamental analysis is key and investors need to have strong views on the underlying credits before putting trades on whether long or short. We do not recommend investing in HY or distressed space merely on the strength of macro or technical views. That said, for investors who have the requisite analytic bandwidth to consider investing in these names, we suggest paying attention to the CDS market, from which it is possible to extract useful, trade – relevant information.

Predicting default timing: what the CDS curve can tell us

In particular, an oft overlooked feature of the HY CDS market is that (a) names trading in points upfront can have meaningful liquidity across the curve (depending on debt maturity profiles), and (b) the steepness of the upfront curve signals where the inflection points are, i.e., when default is most likely to happen for a given credit.

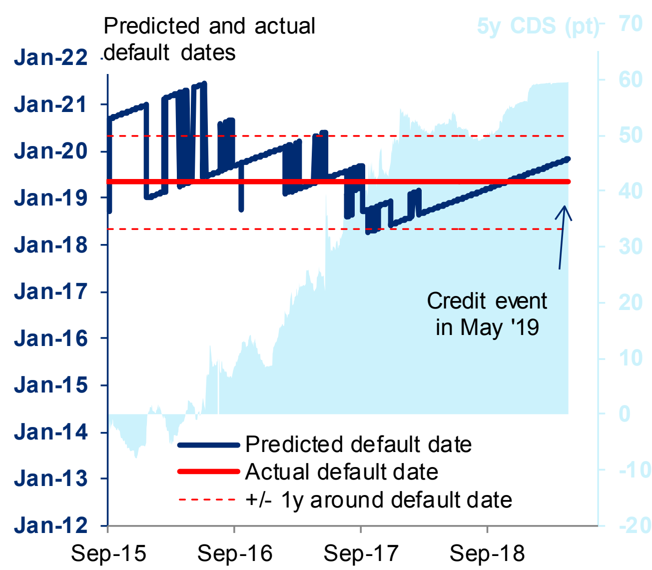
We give details of the methodology in the appendix, but a short summary is that we use the 1year forward default rates implied by CDS curves to pick the point where the maximum likelihood of default is priced in for a credit, and take this as the CDS market's "predicted" default date. Historically, this has been a good predictor of default dates for names like Astaldi and New Look which only have a light footprint in HY indices (Figure 3 and Figure 4). In both these cases, the CDS market, through the entire history of the credit priced the time of default to within +/- 1 year of the actual (eventual) date of default. Even more strikingly, this predictor stayed remarkably stable even as the credit traded across a wide range of spreads.

Figure 3. Astaldi, CDS-predicted default date vs actual (HY bond index weight: 0.2% before bankruptcy event)



Source: Citi Research, Markit, ISDA

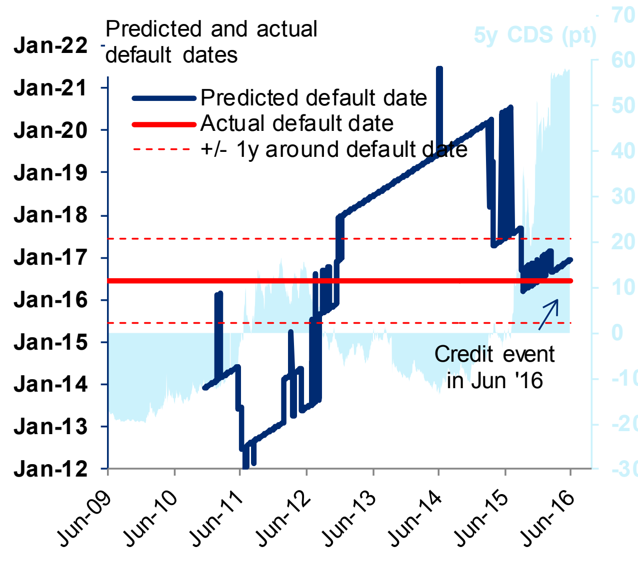
Figure 4. New Look, CDS-predicted default date vs actual (Index weight: 0.15% before Failure-to-Pay event)



Source: Citi Research, Markit, ISDA

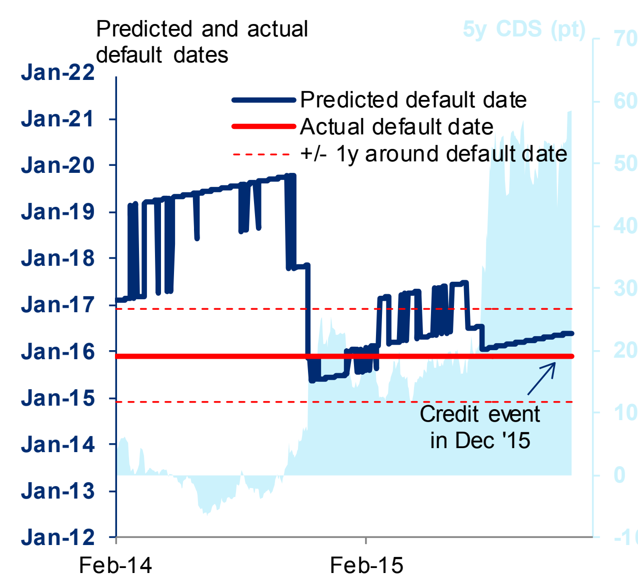
However, our analysis flagged up an important issue: this indicator is over-optimistic for names which have a larger than average weighting in the benchmark HY indices (with avg ~ 0.3%). We believe this is because the current hunt for yield means investors are inevitably compelled to have at least some exposure to names that have a large debt stack. This was the case for Abengoa and Portel in the past, where this default predictor did not do such a good job. For both names, leading up to default, the estimator was quite over-optimistic; i.e., there was not enough risk-aversion towards the short-dated maturities. However it is also important to note that for Portel, the indicator was too *pessimistic* at one point back in 2011, i.e., well before the current liquidity regime was in place.

Figure 5. Portel, CDS-predicted default date date vs actual (Index weight: 0.68% around before bankruptcy event)



Source: Citi Research, Markit, ISDA

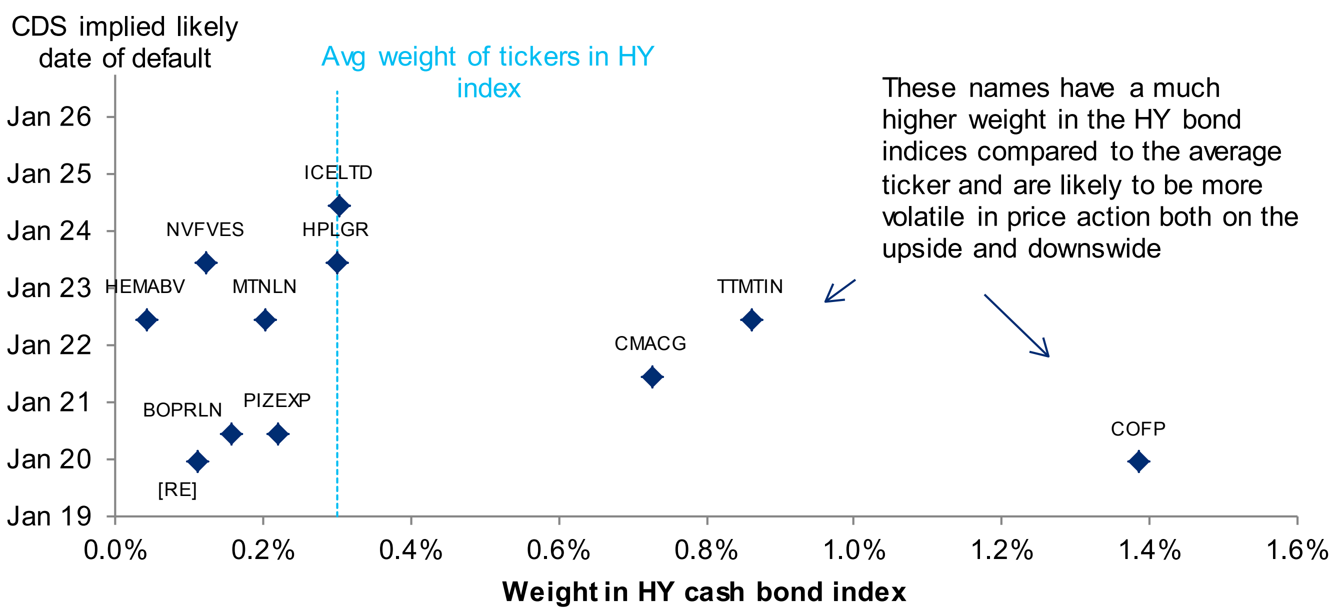
Figure 6. Abengoa, CDS-predicted default date date vs actual (Index weight: 0.6% before Failure-to-Pay event)



Source: Citi Research, Markit, ISDA

So what does this mean for investors contemplating the current crop of names trading around or above 500bp as potential investments? We show below the CDS-implied likely dates of default for the widest names in Xover S31, versus the weighting of those names in the Bloomberg Barclays Pan European HY ex-Fin index.

Figure 7. CDS-implied likely time to credit event for widest Xover names plotted vs the average weight of the credits in the HY cash index



Source: Citi Research, Bloomberg. We denote the weights in the Bloomberg Barclays Pan European HY ex Fin index. [RE] stands for restricted

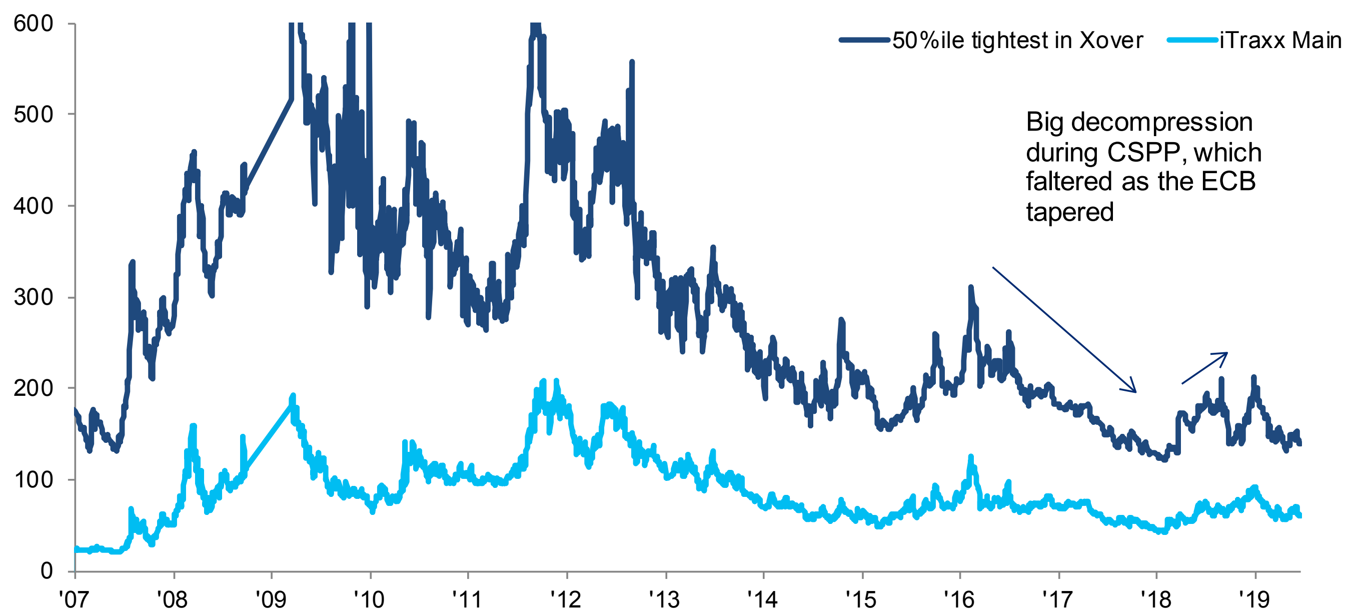
It is of course not surprising to see names like Pizza Express, Boparan and Casino (trading between 25 to 45pts at the 5y) priced by the market as being likely to default in the short term. However, the key takeaway comes from observing how the weighting of the names in the HY cash indices varies from the average. The market's probably doing a good job of pricing risk for the names on the left of the chart. The names on the very right are likely to be more volatile in price action to the upside and downside given their large debt stack.

Be long systemic risk: better quality HY credits still have some risk premia left

The other half of our trade is to be long systemic risk which we recommend doing through the tighter half of Xover constituents. Interestingly, in 2016, this basket of names rallied significantly on the back of ECB's CSPP, though these credits were not being bought by the ECB directly. Nonetheless, investors crowded out by the ECB's buying of IG corporates piled into these names. This technical reversed somewhat when the ECB started tapering its Asset Purchase Programme.

Now, with potentially a restart of the APP around the corner, we feel it's inevitable that investors will need to be overweight this part of the credit market to be able to deliver any returns at all.

Figure 8. Spread on a basket of the tightest 50%ile names in Xover vs iTraxx Main



Source: Citi Research

Of course, even here credit selection cannot be ignored completely, but investors should have a bit more breathing space, especially compared to names at the very widest end of the spectrum that we flagged in the previous section. The key point is that central banks are engaged in pushing liquidity through the financial system by trickle-down and likely to succeed. As the ECB buys bonds of IG corporates, current holders of those bonds will move on to riskier parts of the credit spectrum, but only up to a point. Thus better quality HY names will see more crowding of longs even as investors remain wary of taking risk at the very distressed end.

Appendix: using CDS curves to predict default timings

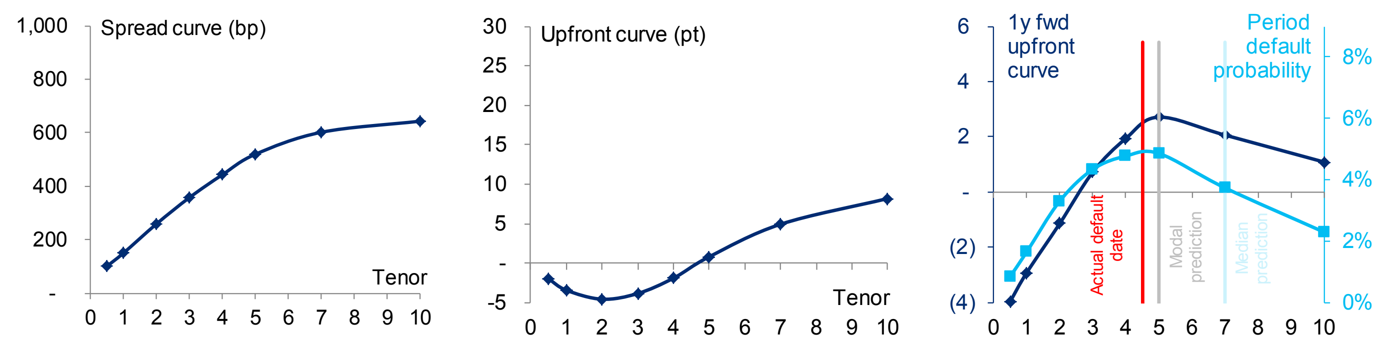
Standard CDS pricing models bootstrap a default probability density function (PDF) out of a CDS spread curve. Using these probabilities it is possible to come up with various metrics of CDS-implied time to default: expected, median and modal.

Our analysis shows that the first two measures tend to systematically, and until close to event significantly, over – estimate the final time to default for distressed credits. The fundamental reason for this is because CDS curves are generically steep in the current environment of uber-liquidity and thus display greater risk aversion over the long term. In other words markets tend to price that a struggling corporate will probably manage to refi in the short term and only go on to default later down the road. This of course works until it doesn't.

We find the third measure - the mode of the default PDF - has been the best predictor for when a distressed name is likely to suffer an actual credit event. There is again a fundamental and intuitive reason. The default PDF is closely linked to the *shape* of the upfront curve, i.e., how much more investors have to pay (in total) to hedge default for another year. In other words the mode, i.e., the point where the upfront curve is steepest, flags which part of the curve sees the biggest increase in price of protection. Most often this tends to be around a choke point, like a large maturity. Thus the most important metric for distressed names tends to be this modal measure.

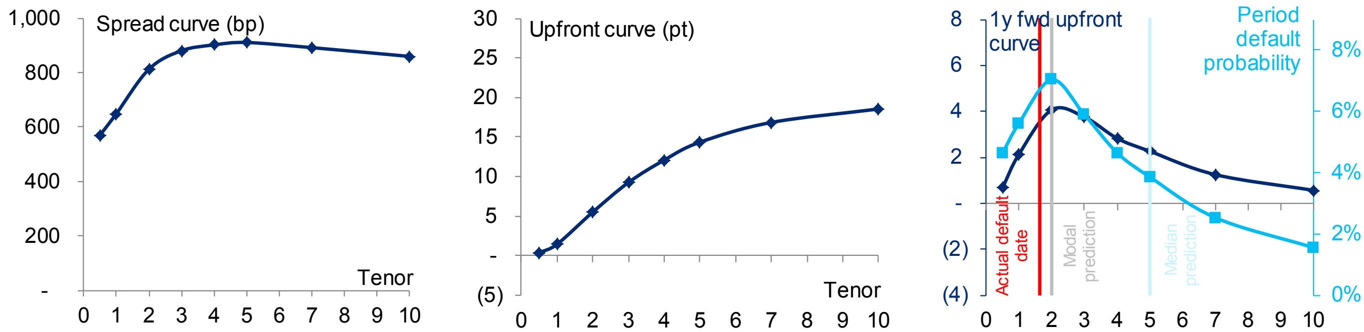
The next set of charts shows the evolution of the Astaldi CDS curve from 2014 till just before default in 2018. As is evident: (a) the mode of the PDF coincides closely with the steepest part of the upfront curve, (b) the mode does a pretty good job of predicting the final default date even as the spread and curve varies, (c) the median over estimates the final time to default until the curve gets really inverted and default seems imminent. This also holds true for the expectation which we have not shown in the charts for the sake of clarity.

Figure 9. Astaldi, Mar '14: spread, upfront, default PDF and 1y forward upfront curve



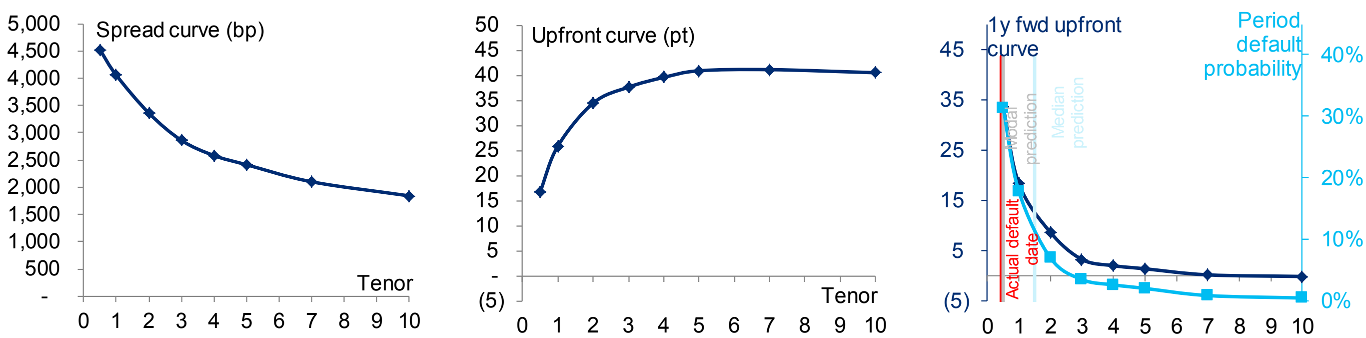
Source: Citi Research, Markit

Figure 10. Astaldi, Feb '17: spread, upfront, default PDF and 1y forward upfront curve



Source: Citi Research, Markit

Figure 11. Astaldi, Apr '18: spread, upfront, default PDF and 1y forward upfront curve



Source: Citi Research, Markit

Figure 12. Recent Publications

Date	Title
31 May 2019	Global Credit Focus - Italy again: "break glass" in case of emergency
29 May 2019	Third time lucky: New Look Credit Event
26 Apr 2019	Credit market liquidity: what trades in CDS and why
5 Apr 2019	How substantial is 'the ETF bid'?
29 Mar 2019	Clues from FX: What happens to credit if Brexit goes wrong?
21 Mar 2019	Trading European Bank Cap Structure through Indices: At1s the sweet spot, hedge with SenFin payers
08 Mar 19	A fix for the CDS market? ISDA proposes amendment to avoid 'manufactured' credit events
01 Mar 19	Keep on rolling
Feb 2019	The Ultimate Credit Derivatives Handbook - What Works In Real Life And Other Fun Stuff That No-one Ever Told You About
08 Feb 19	The downgrade effect
18 Jan 19	'Cliff-edge' Brexit – 8 practical questions for credit markets
Jan 2019	Swimming Against The Tide - Global Credit Derivatives Outlook 2019
16 Nov 18	Desperate for returns in a scary market? Take a look at options
19 Oct 18	European Credit Derivatives Focus - Astaldi: Why you should watch the auction
05 Oct 18	The end of CSPP: how much is in the price
21 Sep 18	Positioning for Q4: living on the edge of greed and fear
10 Sep 18	Back to fundamentals: What to avoid in IG
23 Aug 18	Now truly a 'Crossover' Index? What to expect from the S30 roll
10 Aug 18	I Know What You Did Last Summer (in Credit)
27 Jul 18	The taming of the skew (iTraxx version)
13 Jul 18	Main-IG: The case for compression
29 Jun 18	When's a good time to buy iTraxx protection?
15 Jun 18	Italian CDS — some contracts are more equal than others
31 May 18	Viva l'iTraxx!
18 May 18	Italy CDS: Quantos revisited
18 May 18	Interest rates and the "shape" of iBoxx
04 May 18	Credit and the monetary cycle
09 Apr 18	Pinning the tail on the market: how options drive iTraxx spreads
06 Apr 18	2018 Credit derivatives survey
23 Mar 18	Come fly with Main...
23 Feb 18	Everything you wanted to know about the iTraxx "roll" but were afraid to ask
02 Feb 18	The Italian election: A five star hedge
19 Jan 18	Is the future of CDS in doubt?
17 Jan 18	European Credit Derivatives Outlook 2018 Presentation

Source: Citi Research

Credit Derivatives Analytics ChartPack

Cross Asset Returns

Rolling cumulative returns for long risk positions across various cash and derivative instruments in credit, equities and rates.

Figure 13. Credit and Cross-Asset Returns*

CDS Indices

	1m	3m	12m
Main	0.7%	0.8%	2.2%
Sen. Fin.	0.9%	0.8%	2.4%
Xover	1.9%	1.4%	5.2%
SubFin	1.9%	1.9%	5.3%
CDX IG	0.9%	1.3%	3.0%
CDX HY	1.7%	2.2%	5.8%

iTraxx Main Steepeners (DV01-weighted)

	1m	3m	12m
3s5s	-0.1%	-0.1%	-0.3%
5s10s	0.1%	0.3%	0.6%

Sell Straddle Delta-hedged

	1m	3m	12m
Main 1m	0.0%	0.0%	0.5%
Main 3m	0.0%	0.0%	0.2%
Xover 1m	0.0%	-0.1%	1.5%
Xover 3m	-0.1%	0.0%	0.7%

Cash Indices

	1m	3m	12m
€ iBoxx IG Corp.	0.4%	0.8%	0.7%
€ iBoxx Senior Fins	1.0%	1.2%	2.6%
€ iBoxx HY Corp.	0.2%	0.5%	0.5%
iBoxx USD Corp	0.2%	0.4%	0.6%
$ HY Market	0.8%	0.6%	1.3%

Equity indices

	1m	3m	12m
SX5E	3.38%	4.9%	4.5%
SX7E	-3.28%	-7.1%	-19.0%
SPX	4.19%	5.2%	9.3%

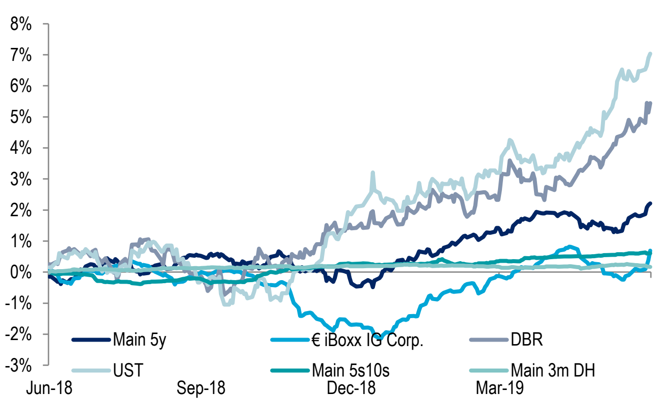
Rates

	1m	3m	12m
DBR	1.9%	3.1%	5.4%
UST	2.6%	3.8%	7.0%

*Note: Index: Excess returns, index rolled every 6m, 5y Index. Curves: DV01-neutral, OTR index. Options: ATMF straddle, delta hedged daily, rolled every month. Cash indices: Total Index Returns. Equities: Total returns including dividends. Rates: Total Index Return

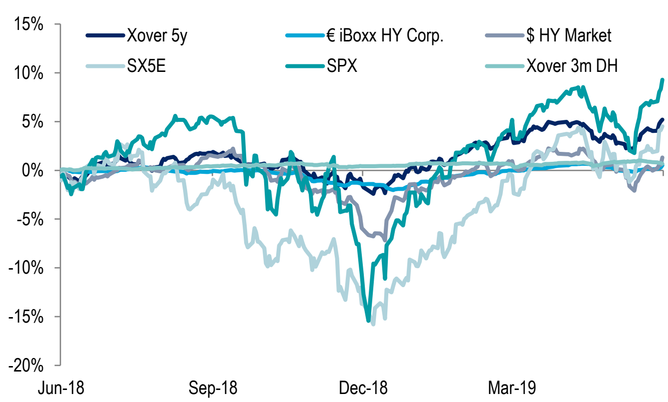
Source: Citi Research, Markit, Bloomberg

Figure 14. Cumulative Returns: 'Low Beta' Instruments



Source: Citi Research, Markit, Bloomberg

Figure 15. Cumulative Returns: 'High Beta' Instruments

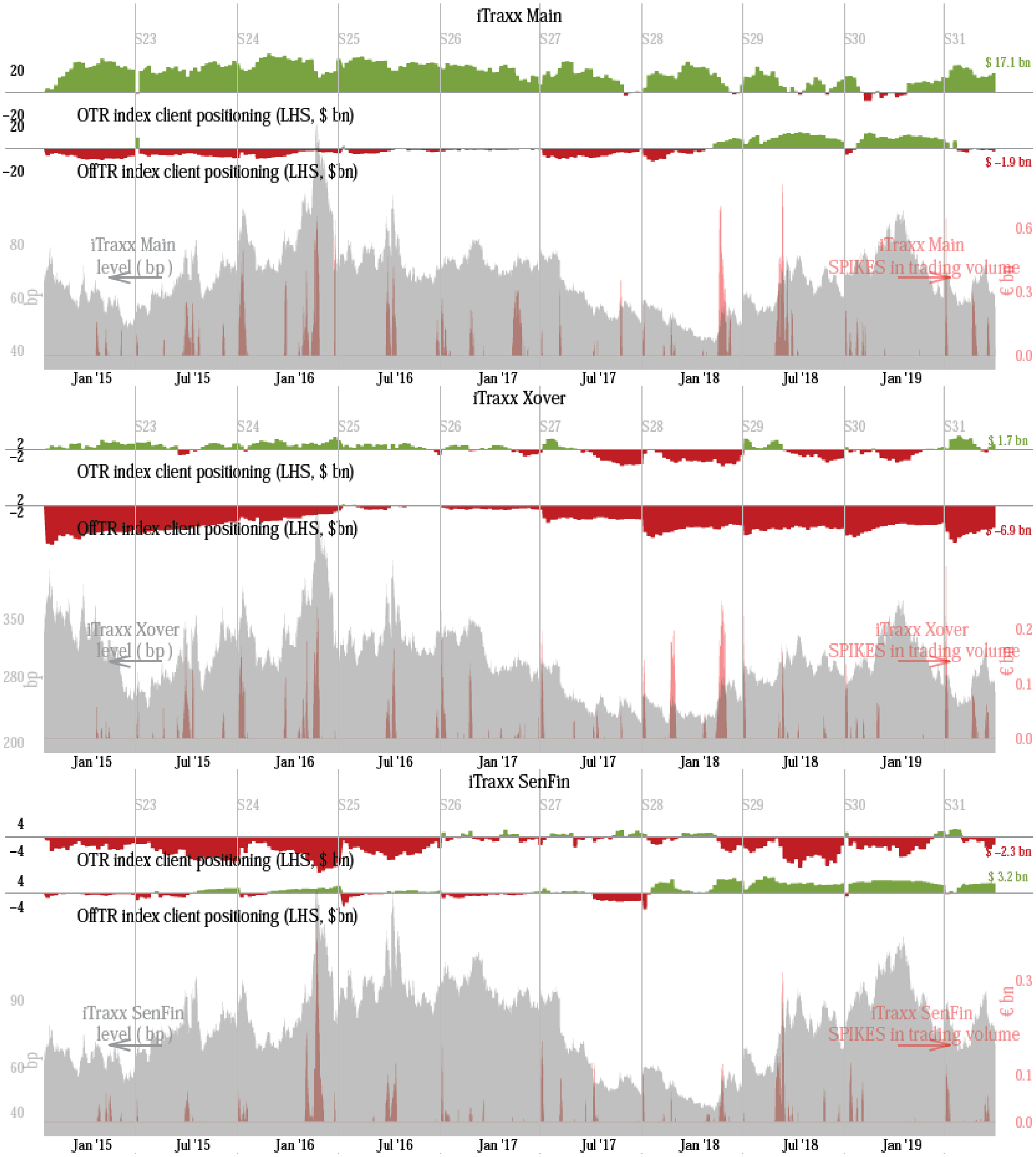


Source: Citi Research, Markit, Bloomberg

iTraxx trading spikes

We track "spikes" in iTraxx trading volumes on SDR as potential drivers of index spreads. For more details: [The Ultimate Credit Derivatives Handbook]

Figure 16. iTraxx indices: Trading Volumes (5 day cumulative), OTR indices

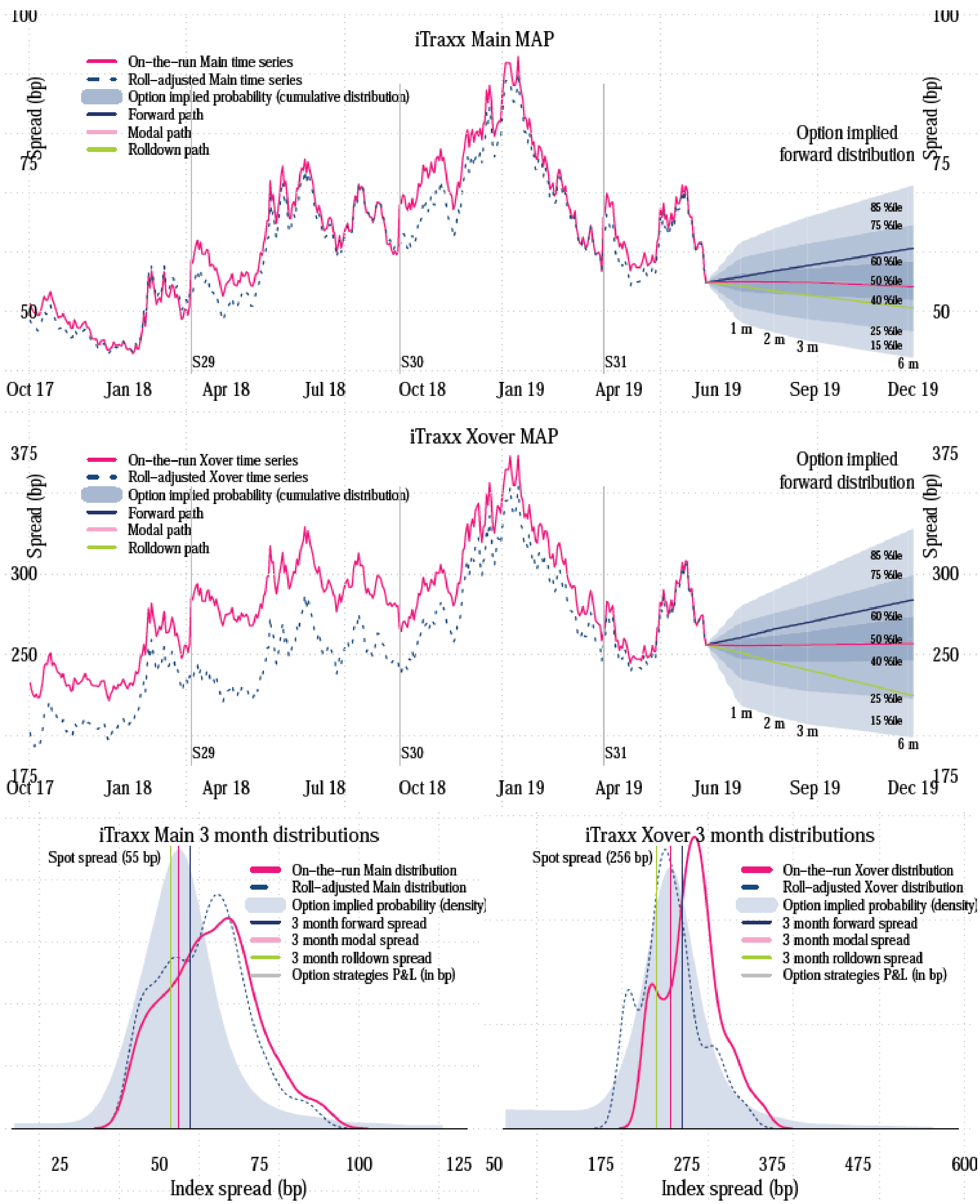


Source: Citi Research Markit, Bloomberg. Note: Volume spikes show deviation of short-term volumes over long term (3day median over 60day 70%ile trading volume, hourly periods)

iTraxx MAPs

These charts summarize historical and forward-looking market-implied information for the iTraxx indices. For more details: [Introducing Citi iTraxx Multi-Aspect Plots]

Figure 17. iTraxx spread forecasts (option implied and forwards) vs. historical



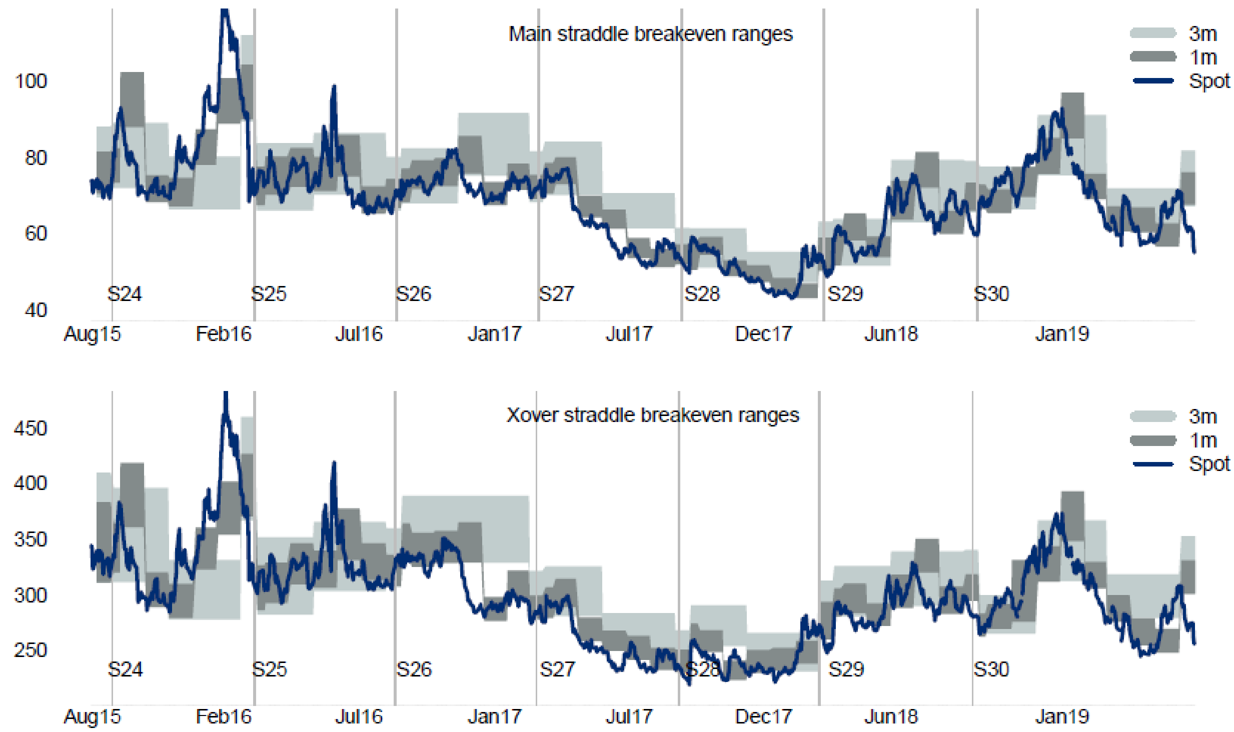
Past performance is no guarantee of future results. Options probabilities are based on current pricing and market conditions; as such, does not guarantee future performance. Calculations do not consider fees and other transaction costs.

Source: Citi Research, Markit, Bloomberg

Cross-Asset Volatility

The below charts show breakeven ranges on ATM straddles for iTraxx Main and Crossover, as well as our cross-asset volatility indices.

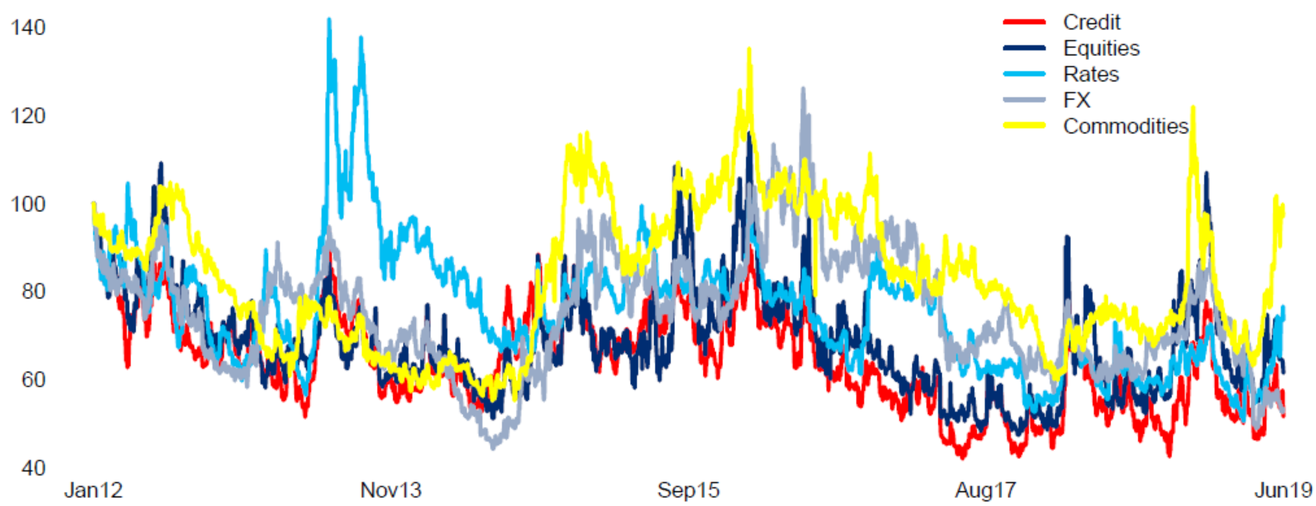
Figure 18. Credit ATMF Straddle Breakeven Ranges*



*Here, we plot the spot spreads along with breakeven ranges on 1m and 3m straddles, rebalancing at the same periodicity and also adjusting for the roll

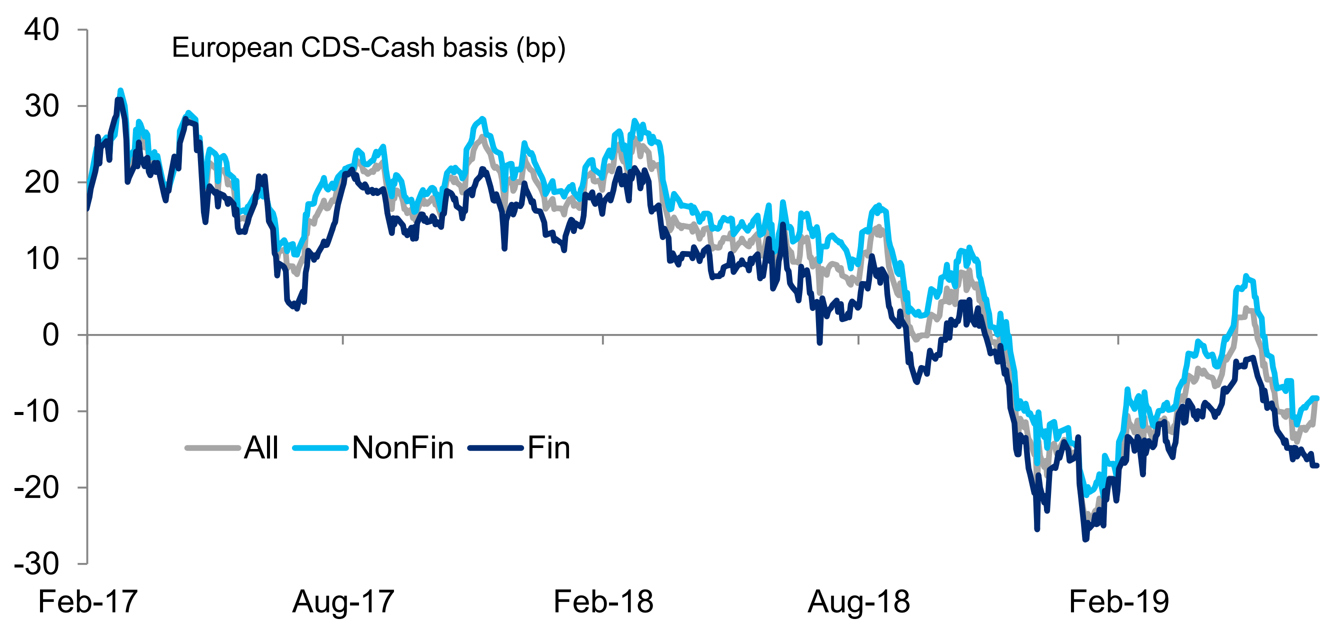
Source: Citi Research

Figure 19. Global Cross-Asset Volatility Indices*



*Our Cross-Asset volatility indices reflect a weighted metric of ATM implied volatility in each asset class
Source: Citi Research

Figure 20. € cash-CDS basis, iBoxx Corporates, maturity-matched, bp



Source: Citi Research, Markit, Bloomberg

The Week Ahead

After all the excitement provided by the central banks this week, focus is likely to shift back towards politics next week. Hopes and expectations have waxed and waned around the G20 (Thursday). While it seems likely that Xi and Trump will meet, and that the meeting will be described as ‘productive’, a tangible change of course from the two economic powers may be more elusive. However, a long scheduled meeting (Tuesday) between Trump advisors and a number of America’s Middle Eastern allies may be more immediately market moving depending on the level of pressure that it exerts on Iran. It comes in the same week as Iran says it will exceed its allowed stockpile of uranium under the JCPA.

Data is relatively light. The most significant, in our view, is likely to be the German IFO survey (Monday), which is forecast to show declines across the board. US data is predicted to be mixed: the positive signs from personal income and spending (Friday) may be balanced with what are forecast to be weak capital goods orders (Wednesday). There are plenty of Fed speakers too – watch Powell on Tuesday in particular for either any sign of dismay at the extent of the market’s bullish reaction to the FOMC meeting, or conversely for reinforcement of it.

Figure 21. Economic Releases

Monday 24 June	Consensus Forecast	Last
Germany: IFO Business Climate - Jun	97.5	97.9
Germany: IFO Current Assessment - Jun	100	100.6
Germany: IFO Expectations - Jun	95	95.3
Germany: Import Price Index MoM - May	--	0.30%
Germany: Import Price Index YoY - May	--	1.40%
US: Chicago Fed Nat Activity Index - May	0.1	4.5
US: Dallas Fed Manf. Activity - Jun	1	-5.3
Tuesday 25 June	**Consensus Forecast**	**Last**
US: Conf. Board Consumer Confidence - Jun	132	134.1
US: Fed's Barkin Speaks in Ottawa		
US: Fed's Bostic Speaks on Housing		
US: Fed's Bullard Gives Welcoming Remarks at Lecture in St. Louis		
US: Fed's Williams Makes Opening Remarks at Finance Forum		
US: FHFA House Price Index MoM - Apr	--	0.10%
US: New Home Sales - May	685k	673k
US: New Home Sales MoM - May	1.80%	-6.90%
US: Powell Discusses Economic Outlook and Monetary Policy		
US: Richmond Fed Manufact. Index - Jun	7	5
Wednesday 26 June	**Consensus Forecast**	**Last**
Germany: GfK Consumer Confidence - Jul	10	10.1
UK: BOE's Carney, Cunliffe, Tenreyro and Saunders Speak		
US: Cap Goods Orders Nondef Ex Air - May P		-1.00%
US: Cap Goods Ship Nondef Ex Air - May P	--	
US: Durable Goods Orders - May P		-2.10%
US: Durables Ex Transportation - May P	0.10%	
US: Wholesale Inventories MoM - May P	--	0.80%
Thursday 27 June	**Consensus Forecast**	**Last**
China: Industrial Profits YoY - May	--	-3.70%
Eurozone: Consumer Confidence - Jun F	--	-7.2
Eurozone: Economic Confidence - Jun	104.9	105.1
Eurozone: Industrial Confidence - Jun	-3.1	-2.9
Germany: CPI EU Harmonized MoM - Jun P	0.20%	0.30%
Germany: CPI EU Harmonized YoY - Jun P	1.50%	1.30%
Germany: CPI MoM - Jun P	0.30%	0.20%
Germany: CPI YoY - Jun P	1.60%	1.40%
Germany: Retail Sales MoM - May	0.50%	-2.00%
Germany: Retail Sales NSA YoY - May	--	4.00%
US: Core PCE QoQ - 1Q T	--	1.00%
US: GDP Annualized QoQ - 1Q T	3.20%	3.10%
US: GDP Price Index - 1Q T	0.80%	0.80%
US: Kansas City Fed Manf. Activity - Jun	--	4
US: Pending Home Sales MoM - May	1.00%	-1.50%
US: Personal Consumption - 1Q T	1.40%	1.30%
Friday 28 June	**Consensus Forecast**	**Last**
Eurozone: CPI Core YoY - Jun A	0.80%	0.80%
Eurozone: CPI Estimate YoY - Jun	1.30%	1.20%
UK: Current Account Balance - 1Q	-31.6b	-23.7b
UK: GDP QoQ - 1Q F	0.50%	0.50%
UK: GDP YoY - 1Q F	1.80%	1.80%
UK: GfK Consumer Confidence - Jun	-11	-10
UK: Nationwide House PX MoM - Jun	--	-0.20%
UK: Nationwide House Px NSA YoY - Jun	--	0.60%
UK: Total Business Investment QoQ - 1Q F	--	0.50%
US: MNI Chicago PMI - Jun	54	54.2
US: PCE Core Deflator YoY - May	1.60%	1.60%
US: PCE Deflator YoY - May	1.50%	1.50%
US: Personal Income - May	0.30%	0.50%
US: Personal Spending - May	0.40%	0.30%
US: U. of Mich. Sentiment - Jun F	97.1	97.9

Source: Citi Research, Bloomberg

Figure 22. Earnings Releases

Monday 24 June	
BTG PLC	
Tuesday 25 June	
FedEx Corp, Lennar Corp, Micron Technology Inc	
Wednesday 26 June	
General Mills Inc, IHS Markit Ltd, Paychex Inc	
Thursday 27 June	
Accenture PLC, Conagra Brands Inc, Greene King PLC, Hennes & Mauritz AB, McCormick & Co Inc/MD, NIKE Inc, Walgreens Boots Alliance Inc	
Friday 28 June	
Constellation Brands Inc	

Source: Bloomberg.

The portion of this research report regarding non-OCC issued options is not intended for US clients other than Qualified Institutional Buyers. Investing in options is not suitable for all investors. Please see the disclosures concerning the risks of investing in options below and discuss with your Financial Advisor whether this particular options strategy is suitable for you. Interested investors should contact our trading desk for updated price and liquidity information. Also, complex option strategies may entail higher commissions costs.

Options Risk Disclosure - Please Read Carefully

This section discusses possible options strategies that you may choose to employ in conjunction with the company securities discussed herein. If you choose to engage in the options transactions discussed within this document, you must have an approved options account and will be subject to certain criteria which may ultimately prevent you from engaging in certain option strategies. It is important for you as an investor to know and understand that Options do involve risk and sometimes, significant risk, therefore may not be appropriate for all investors. If you buy options, the maximum loss is the premium. If you sell put options, the risk is the entire notional below the strike. If you sell call options, the risk is unlimited. The actual profit or loss from any trade will depend on the price at which the trades are executed. The prices used herein are historical and may not be available when your order is entered. Commissions and other transaction costs are not considered in these examples.

Please speak to your Financial Advisor to ensure you have a full understanding of the risk and reward of the strategy you are considering. Strategies that are opened or closed differently than what is discussed in this document could have a significantly different outcome from what is described. It should be noted that certain Index options might have special settlement dates or settlement requirements that are different from traditional equity options. Commissions, taxes, and margin costs have not been included but will affect the outcome of any option transaction and should be considered. However, they can have a significant impact on the profitability of options transactions and should be considered carefully before entering into any option strategy. Because of the importance of tax considerations to all option transactions, the investor considering options should consult with his/her tax advisor as to how their tax situation is affected by the outcome of contemplated options transactions. Certain options trades/strategies must be executed in a margin account. Transactions executed in a margin account can require the investor to periodically deposit additional collateral into the account in order to maintain the positions. The preceding language is not a full description of all possible risks associated with options trading.

For a more complete description on the uses and risks of options, please see the document titled Characteristics and Risks of Standardized Options. If you would like an additional copy of this document please contact Citigroup Global Markets Inc., Options Department, 390 Greenwich Street, New York, NY 10013. Options are not suitable for all investors. Before entering into any transaction using listed options, investors should read and understand the current Options Clearing Corp. Disclosure Document (Characteristics and Risks of Standardized Options) at https://www.theocc.com/components/docs/riskstoc.pdf , https://www.theocc.com/components/docs/about/publications/october_2018_supplement.pdf and https://www.theocc.com/components/docs/about/publications/november_2012_supplement.pdf. Investing in options other than Standardized Options may entail additional risks.

Appendix A-1

Analyst Certification

The research analysts primarily responsible for the preparation and content of this research report are either (i) designated by "AC" in the author block or (ii) listed in bold alongside content which is attributable to that analyst. If multiple AC analysts are designated in the author block, each analyst is certifying with respect to the entire research report other than (a) content attributable to another AC certifying analyst listed in bold alongside the content and (b) views expressed solely with respect to a specific issuer which are attributable to another AC certifying analyst identified in the price charts or rating history tables for that issuer shown below. Each of these analysts certify, with respect to the sections of the report for which they are responsible: (1) that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc. and its affiliates; and (2) no part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in this report.

IMPORTANT DISCLOSURES

Within the past 12 months, Citigroup Global Markets Inc. or its affiliates has acted as manager or co-manager of an offering of securities of United States.

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of United States.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from United States.

Citigroup Global Markets Inc. or an affiliate received compensation for products and services other than investment banking services from United States in the past 12 months.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as investment banking client(s): United States.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, securities-related: United States.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, non-securities-related: United States.

Citigroup Global Markets Inc. and/or its affiliates has a significant financial interest in relation to United States. (For an explanation of the determination of significant financial interest, please refer to the policy for managing conflicts of interest which can be found at www.citiVelocity.com.)

Disclosure for investors in the Republic of Turkey: Under Capital Markets Law of Turkey (Law No: 6362), the investment information, comments and recommendations stated here, are not within the scope of investment advisory activity. Investment advisory service is provided in accordance with a contract of engagement on investment advisory concluded between brokerage houses, portfolio management companies, non-deposit banks and clients. Comments and recommendations stated here rely on the individual opinions of the ones providing these comments and recommendations. These opinions may not fit to your financial status, risk and return preferences. For this reason, to make an investment decision by relying solely to this information stated here may not bring about outcomes that fit your expectations. Furthermore, Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies and/or trades on securities covered in this research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report, however investors should also note that the Firm has in place organisational and administrative arrangements to manage potential conflicts of interest of this nature.

Analysts' compensation is determined by Citi Research management and Citigroup's senior management and is based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates (the "Firm"). Compensation is not linked to specific transactions or recommendations. Like all Firm employees, analysts receive compensation that is impacted by overall Firm profitability which includes investment banking, sales and trading, and principal trading revenues. One factor in equity research analyst compensation is arranging corporate access events between institutional clients and the management teams of covered companies. Typically, company management is more likely to participate when the analyst has a positive view of the company.

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Unless stated otherwise neither the Research Analyst nor any member of their team has viewed the material operations of the Companies for which an investment view has been provided within the past 12 months.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 30th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures. Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Pursuant to the Market Abuse Regulation a history of all Citi Research recommendations published during the preceding 12-month period can be accessed via Citi Velocity (https://www.citivelocity.com/cv2) or your standard distribution portal. Historical disclosures (for up to the past three years) will be provided upon request.

NON-US RESEARCH ANALYST DISCLOSURES

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the FINRA Rule 2241 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

Citigroup Global Markets Ltd	Arup Ghosh; Aritra Banerjee; Christopher F Chapman

OTHER DISCLOSURES

Any price(s) of instruments mentioned in recommendations are as of the prior day's market close on the primary market for the instrument, unless otherwise stated.

The completion and first dissemination of any recommendations made within this research report are as of the Eastern date-time displayed at the top of the Product. If the Product references views of other analysts then please refer to the price chart or rating history table for the date/time of completion and first dissemination with respect to that view.

European regulations require that where a recommendation differs from any of the author's previous recommendations concerning the same financial instrument or issuer that has been published during the preceding 12-month period that the change(s) and the date of that previous recommendation are indicated. Please refer to the trade history in the published research or contact the research analyst.

European regulations require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to Citi Research's Products can be found at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures.

The proportion of all Citi Research research recommendations that were the equivalent to "Buy","Hold","Sell" at the end of each quarter over the prior 12 months (with the % of these that had received investment firm services from Citi in the prior 12 months shown in brackets) is as follows: Q1 2019 Buy 33% (70%), Hold 43% (64%), Sell 23% (57%), RV 0.8% (85%); Q4 2018 Buy 33% (69%), Hold 43% (62%), Sell 23% (59%), RV 0.6% (100%); Q3 2018 Buy 33% (69%), Hold 43% (64%), Sell 23% (58%), RV 0.6% (99%); Q2 2018 Buy 33% (70%), Hold 43% (64%), Sell 23% (57%), RV 0.6% (89%). For the purposes of disclosing recommendations other than for equity or high yield recommendations (whose definitions can be found in their corresponding disclosure sections), "Buy" means a positive directional trade idea; "Sell" means a negative directional trade idea; and "Relative Value" means any trade idea which does not have a clear direction to the investment strategy.

European regulations require a 5 year price history when past performance of a security is referenced. CitiVelocity's Charting Tool (https://www.citivelocity.com/cv2/#go/CHARTING_3_Equities) provides the facility to create customisable price charts including a five year option. This tool can be found in the Data & Analytics section under any of the asset class menus in CitiVelocity (https://www.citivelocity.com/). For further information contact CitiVelocity support (https://www.citivelocity.com/cv2/go/CLIENT_SUPPORT). The source for all referenced prices, unless otherwise stated, is DataCentral, which sources price information from Thomson Reuters. Past performance is not a guarantee or reliable indicator of future results. Forecasts are not a guarantee or reliable indicator of future performance.

Investors should always consider the investment objectives, risks, and charges and expenses of an ETF carefully before investing. The applicable prospectus and key investor information document (as applicable) for an ETF should contain this and other information about such ETF. It is important to read carefully any such prospectus before investing. Clients may obtain prospectuses and key investor information documents for ETFs from the applicable distributor or authorized participant, the exchange upon which an ETF is listed and/or from the applicable website of the applicable ETF issuer. The value of the investments and any accruing income may fall or rise. Any past performance, prediction or forecast is not indicative of future or likely performance. Any information on ETFs contained herein is provided strictly for illustrative purposes and should not be deemed an offer to sell or a solicitation of an offer to purchase units of any ETF either explicitly or implicitly. The opinions expressed are those of the authors and do not necessarily reflect the views of ETF issuers, any of their agents or their affiliates.

Citigroup Global Markets India Private Limited and/or its affiliates may have, from time to time, actual or beneficial ownership of 1% or more in the debt securities of the subject issuer.

Citi Research generally disseminates its research to the Firm's global institutional and retail clients via both proprietary (e.g., Citi Velocity and Citi Personal Wealth Management) and non-proprietary electronic distribution platforms. Certain research may be disseminated only via the Firm's proprietary distribution platforms; however such research will not contain changes to earnings forecasts, target price, investment or risk rating or investment thesis or be otherwise inconsistent with the author's previously published research. Certain research is made available only to institutional investors to satisfy regulatory requirements. Individual Citi Research analysts may also opt to circulate published research to one or more clients by email; such email distribution is discretionary and is done only after the research has been disseminated. The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with the Firm and legal and regulatory constraints.

Pursuant to Comissão de Valores Mobiliários Rule 598 and ASIC Regulatory Guide 264, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies) or visiting company sites. Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental equity or credit research report, it is the intention of Citi Research to provide research coverage of the covered issuers, including in response to news affecting the issuer. For non-fundamental research reports, Citi Research may not provide regular updates to the views, recommendations and facts included in the reports. Notwithstanding that Citi Research maintains coverage on, makes recommendations concerning or discusses issuers, Citi Research may be periodically restricted from referencing certain issuers due to legal or policy reasons. Where a component of a published trade idea is subject to a restriction, the trade idea will be removed from any list of open trade ideas included in the Product. Upon the lifting of the restriction, the trade idea will either be re-instated in the open trade ideas list if the analyst continues to support it or it will be officially closed. Citi Research may provide different research products and services to different classes of customers (for example, based upon long-term or short-term investment horizons) that may lead to differing conclusions or recommendations that could impact the price of a security contrary to the recommendations in the alternative research product, provided that each is consistent with the rating system for each respective product.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

Important Disclosures for Bell Potter Customers: Bell Potter is making this Product available to its clients pursuant to an agreement with Citigroup Global Markets Australia Pty Limited. Neither Citigroup Global Markets Australia Pty Limited nor any of its affiliates has made any determination as to the suitability of the information provided herein and clients should consult with their Bell Potter financial advisor before making any investment decision.

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by. The Product is made available in **Australia** through Citigroup Global Markets Australia Pty Limited. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. Citigroup Global Markets Australia Pty Limited is not an Authorised Deposit-Taking Institution under the Banking Act 1959, nor is it regulated by the Australian Prudential Regulation Authority. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários ("CVM"), BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBIMA – Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais. Av. Paulista, 1111 - 14º andar(parte) - CEP: 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in **Germany** either by Citigroup Global Markets Europe AG ("CGME"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGME, Reuterweg 16, 60323 Frankfurt am Main or by Citigroup Global Markets Limited, which is authorised by the PRA and regulated by the FCA and the PRA. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited (CGM), which is regulated by the Securities and Exchange Board of India (SEBI), as a Research Analyst (SEBI Registration No. INH000000438). CGM is also actively involved in the business of merchant banking and stock brokerage in India, and is registered with SEBI in this regard. CGM's registered office is at 1202, 12th Floor, FIFC, G Block, Bandra Kurla Complex, Bandra East, Mumbai – 400098. CGM's Corporate Identity Number is U99999MH2000PTC126657, and its contact details are: Tel:+9102261759999 Fax:+9102261759961. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A, Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Japan** by Citigroup Global Markets Japan

Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Otemachi Park Building, 1-1-1 Otemachi, Chiyoda-ku, Tokyo 100-8132 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The product is made available in the **Kingdom of Saudi Arabia** in accordance with Saudi laws through Citigroup Saudi Arabia, which is regulated by the Capital Market Authority (CMA) under CMA license (17184-31). 2239 Al Urubah Rd – Al Olaya Dist. Unit No. 18, Riyadh 12214 – 9597, Kingdom Of Saudi Arabia. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. http://dis.kofia.or.kr/websquare/index.jsp?w2xPath=/wq/fundMgr/DISFundMgrAnalystList.xml&divisionId=MDIS03002002000000&serviceId=SDIS03002002000. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. This research report is intended to be provided only to Professional Investors as defined in the Financial Investment Services and Capital Market Act and its Enforcement Decree in Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) (“CGMM”) to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Citibanamex Casa de Bolsa, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Citibanamex which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to ‘wholesale clients’ only as defined by s5C(1) of the Financial Advisers Act 2008 (‘FAA’) through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through AO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. (“CGMSPL”), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold//Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the license scope and the applicable laws and regulations in the Republic of China. CGMTS is regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS]. Pursuant to the applicable laws and regulations in the Republic of China, the recipient of the Product shall not take advantage of such Product to involve in any matters in which the recipient may have conflicts of interest. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 399 Interchange 21 Building, 18th Floor, Sukhumvit Road, Klongtoey Nua, Wattana ,Bangkok 10110, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets