

BTPs caught between macro fundamentals and appetite for carry trades

by Chiara Cremonesi, FI Strategist (UniCredit Bank, London)

- In recent years, the performance of Italian government bonds has been influenced by a combination of political risk, macro fundamentals and appetite for carry trades. Given the variety of drivers, we have developed a framework to help us understand the fair value of BTPs.
- We present two fair-value models for the 10Y BTP spreads. The first is a quarterly model whose goal is to provide a fair value for BTPs based purely on the Italian macroeconomic outlook. According to this model, the 10Y BTP should be trading at around 130bp over swap (corresponding to around 170bp over Bunds), which is around 30bp wider than current levels.
- The second is a monthly model, which considers the risk-on/risk-off environment and the impact of QE, in addition to the economic and fiscal indicators. According to this model, the fair value for the 10Y BTP/Bund spread should be around 160bp, some 20bp higher than where it is trading now.
- While the two models clearly differ, they both indicate that BTPs are currently trading below fair value. We attribute this to the ongoing appetite for carry trades, which originates not only from the fact that the ECB is embarking on another round of QE but also to the fact that Italian government bonds are the only euro-denominated government bonds that have a positive yield from the 3/4Y maturity onwards (excluding Greek govies).

1. What is the fair value of 10Y BTPs?

BTPs have been tightening against the core since the end of May, initially as markets were pricing in more accommodative measures by the ECB. Following the Italian government reshuffle and the formation of the new PD-M5S coalition, the rally has accelerated and the 10Y BTP/Bund spread has reached 140bp, not far from the levels prevailing before the pressure started in May 2018.

The pressure experienced in 2018 originated partly from a deterioration in economic fundamentals, but more importantly, from the League-M5S government, a government including two parties with very different views, a tough stance towards the EU and little commitment to fiscal discipline (with unwarranted consequences on the public debt/GDP path). Now that the political premium is no longer priced in, will macro fundamentals once again drive BTP performance?

In our view, the return of QE in November is likely once again to blur the picture, as appetite for carry trades is clearly very strong at the moment and BTPs are the only asset class in the eurozone whose yield is in positive territory from the 3/4Y maturity onwards. Hence, yield hunting will probably be a much stronger driver than fundamentals going forward. Given the variety and change in drivers of BTP performance over the last few months, we have developed a framework to understand the fair value of BTPs.

In this piece, we will introduce two models for this purpose, a quarterly one strictly linked to macro fundamentals, and a monthly one, which also considers more short-term factors, such as risk appetite and the impact of QE.

The rationale of having two models lies in the fact that the quarterly model provides a strong hook to where 10Y BTPs should trade, taking into account only the macro fundamentals of the country, with relatively little change from one quarter to the next. It is therefore more suited to estimating the long-term structural equilibrium of the BTP spread.

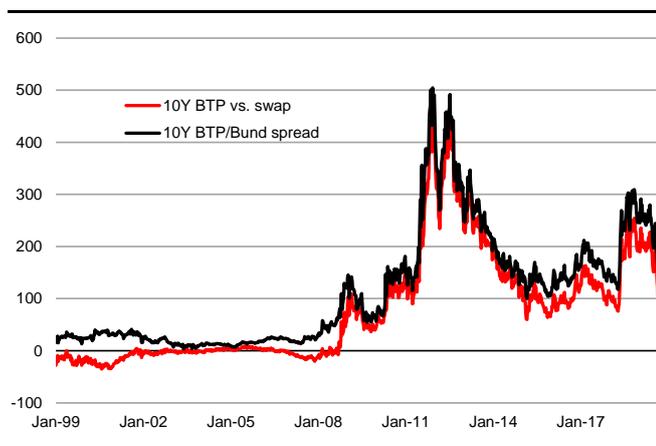
The monthly model is more appropriate for capturing market mood and sentiment in terms of the economic outlook and is therefore a useful tool to track short-term movements in BTPs.

In the quarterly, fundamentals-driven model, we use the 10Y BTP yield over swap as a dependent variable. This is because we are interested in the structural drivers of the Italian credit spread and the cleanest measure of Italian credit risk is Italian government bond yield spread over the swap yield, as it is not influenced by any other country-specific factors.

That said, the most common measure monitored by markets in the short-term is the 10Y BTP/Bund spread. Therefore, we found it useful to have an instrument that could track fair value of this spread on a monthly basis. Strictly speaking, the 10Y BTP/Bund spread is not as neat a measure as the 10Y BTP spread vs. swap, as Bund yields are also influenced by idiosyncratic factors, such as German economic performance and the scarcity of Bunds. We take these elements into account when building our monthly model.

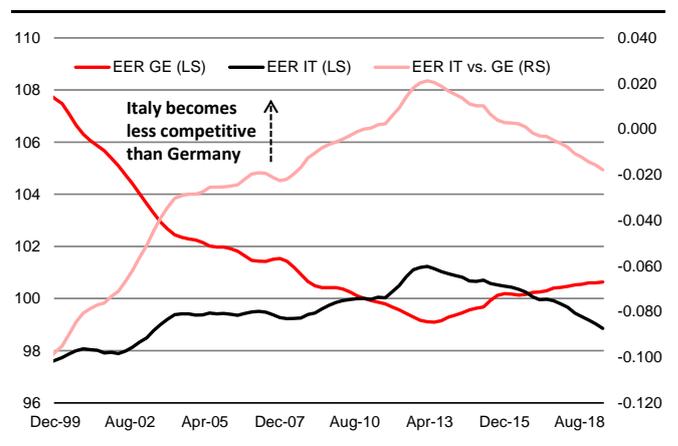
Chart 1 shows that, while the two measures of Italian credit spread differ slightly, their performance over time is very comparable.

CHART 1: 10Y BTP VS. SWAP VS. 10Y BTP/BUND SPREAD



Source: Bloomberg, UniCredit Research

CHART 2: EFFECTIVE EXCHANGE RATE, IT VS. GE



Source: Haver, UniCredit Research

2. Our quarterly model

We construct a model that regresses the 10Y BTP yield over swap on:

- Growth:** We take yoy quarterly real GDP growth. An increase in growth should lead to a tighter BTP spread over swap (coefficient sign should be negative).
- Debt:** We take the yoy change in the debt/GDP ratio differential between Italy and Germany¹. An increase in the divergence between the Italian and German debt/GDP ratio should lead to a widening of the BTP spread over swap (coefficient sign should be positive). We include the debt variable as the rate of divergence/convergence of the Italian debt/GDP ratio to that of Germany as it shows more stability throughout the sample than the Italy's debt/GDP ratio alone. Moreover, this variable includes the aspect of the divergence of Italy vs. Germany.
- EER:** We take the difference between the real effective exchange rate in Italy and the real effective exchange rate in Germany². This variable aims to capture external competitiveness and is widely used in the literature on sovereign spreads³. Chart 2 shows the performance of this variable since 1999.

An increase in the EER index (meaning that Italy becomes less competitive than Germany) should lead to widening of the BTP spread over swap (coefficient sign should be positive).

¹ We use Eurostat government debt/GDP ratio, we interpolate the annual value to get to quarterly values. Please note that the Italian debt series has been recently revised upward due to a methodological change by Eurostat, but data providers have not yet included the change in the data series.

² We take the natural logarithms of both EER. We use the HCPI deflated effective exchange rate with 19 trading partners

³ See for instance "Thou shalt not breach. The impact on sovereign spreads of noncomplying with EU fiscal rules" or "The determinants of sovereign bond yield spreads in the EMU"

We estimate the model in a quarterly sample going from 1Q99 to 2Q19 (latest available data). Table 1A and 1B shows the result of our quarterly model.

TABLE 1A: QUARTERLY MODEL RESULTS

	Growth	Change in debt/GDP diff.	EER	C
Coeff.	-7	9	1372	109
	**	***	***	***
R-squared	53.7%			

**significant at the 10% confidence level
***significant at the 5% confidence level

Source: Haver, Bloomberg, UniCredit Research

TABLE 1B: HOW DOES THE FIT CHANGE WITH ONE-STANDARD DEVIATION MOVEMENT IN THE INDEPENDENT VARIABLES

	Growth	Change in Debt/GDP diff.	EER
Coeff.	-14.8	32.3	46.5

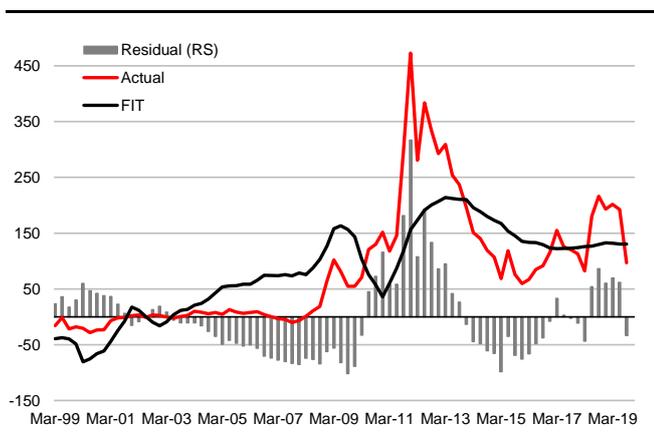
Source: Haver, Bloomberg, UniCredit Research

The R-squared of the regression is 54%; all the coefficients are significant at least at the 10% confidence level.

Coefficients show that:

- If yoy real GDP growth accelerates by 1pp from one quarter to the next, the 10Y BTP tightens 7bp against swap. If real GDP growth increases by one standard deviation, the 10Y BTP spread over swap declines 15bp.
- If the yoy change in the debt/GDP ratio differential increases by 1pp (so the rate of divergence between the Italian and German debt/GDP ratio increases), the 10Y BTP widens 9bp against swap. If the yoy change in the debt/GDP ratio differential increases by one standard deviation, the 10Y BTP widens 32bp against swap.
- A 0.01 increase in the EER differential causes a 14bp widening of BTPs against swap. A one standard deviation increase in the EER differential triggers a 47bp widening in the 10Y BTP-swap spread.

CHART 3: 10Y BTP OVER SWAP: OUR QUARTERLY MODEL



Source: Haver, Bloomberg, UniCredit Research

In other words, the relative competitiveness of Italy compared to Germany is the most relevant driver of the BTP spread, followed by the rate of divergence in Italy's debt/GDP ratio compared to that of Germany. Our analysis indicates that growth has not been such a relevant driver, or rather, that it becomes more relevant when it enters the equation in combination with debt.

Chart 3 shows that our fair value model has declined since the end of 2013 (by 80bp).

Why did this happen? Table 2 shows the contribution of our model's various independent variables to the decline in the fair value of 10Y BTP over swap in the period December 2013-June 2019. The decline was mainly due to an increase in relative competitiveness of Italy vs. Germany, then to a decline in the pace of divergence of the Italian debt/GDP ratio to German debt/GDP ratio, and lastly by a (moderate) increase in GDP growth.

TABLE 2: WHY THE BTP FAIR VALUE DECLINED BETWEEN THE END OF 2013 AND JUNE 2019

	Growth	Change in Debt/GDP diff.	EER	Fit
Change in the variable	0.70	-3.07	-0.03	
Change in the fit	-4.9	-27.7	-47.4	-80.0

Source: Haver, Bloomberg, UniCredit Research

Given that the model does not include any risk-off/risk-on variable, or ECB's QE, the residuals spike in 2011-12 during the eurozone debt crisis and the political crisis in Italy, as well as in 2018 (albeit to a lesser extent). On the other hand, residuals are almost always negative during QE, which is consistent with the idea that carry trade appetite is the main market driver during QE, while macro fundamentals matter less.

At the end of June 2019, our model indicated a fair value for the 10Y BTP over swap of 130bp (roughly corresponding to a 10Y BTP/Bund spread in the 180bp area), 60/65bp tighter than it was trading back then. The high residual indicated that BTPs included a political premium. The situation has completely changed during the summer, with BTPs rallying on a combination of very dovish market expectations on the ECB (and the resumption of QE) and a sharp improvement in the political outlook, which concluded with the formation of a new government, composed of the PD and M5S. At the end of September, we project the fair value of the 10Y BTP over swap will remain in the 130bp area, little changed from the previous quarter. If that is the case, this level would be some 30bp wider than where it is trading at the moment. Chart 3 shows that the September residual, if confirmed, would still be lower than the average residual during the first round of QE. This supports the case for more tightening of the 10Y BTP spread over swap going forward, as we expect.

What would it take to reduce the fair value? One of the most powerful drivers would be a decline in the pace of divergence between the Italian debt/GDP ratio and the German debt/GDP ratio. For instance a decline in the rate of yoy divergence from 5% to 4% would lead to a decline in the fair value of the 10Y BTP over swap from 130bp to 120bp. To obtain the same decline in fair value through an increase in growth, yoy quarterly real GDP growth would have to reach 1.7% (the last time this happened was in 2017).

Coefficients tend to be stable across different samples, for instance excluding the QE period or excluding the period from May 2018, when BTPs came under pressure due to political woes.

3. Our monthly model

Our quarterly model is very useful in providing a long-term anchor for evaluating BTPs. However, if we want to be able to evaluate the performance of BTPs in the short-term, a more high-frequency model is needed that also includes short-term market drivers, such as market volatility and risk appetite. Moreover, a monthly model for the 10Y BTP/Bund spread is a welcome addition in our toolbox of high-frequency models, which already include a model to evaluate the fair value of 10Y real Bund yields, as well as model for the 10Y BTP/SPGB spread⁴.

⁴ See Rates Perspectives - Scarcity of Bunds to keep real yields low and Rates Perspectives - 10Y BTP-SPGB spread: wide compared to fundamentals, but convergence to fair value is tricky

For this reason, we have developed a monthly model that regresses the 10Y BTP/Bund spread on the following variables:

- 1. An indicator of economic trends in the manufacturing and service sectors:** The differential in composite PMIs in Italy and Germany, taken as a 3M rolling average. The differential is calculated as Germany minus Italy, which means that the coefficient of the regression should have positive sign.
- 2. Debt:** We take the yoy change in the debt/GDP ratio differential between Italy and Germany, as in the quarterly model. Here we use quarterly data on consolidated gross general government debt as a percentage of GDP⁵ and interpolate them to get monthly data. The coefficient in this indicator is expected to be positive, as a growth in the debt differential between Italy and Germany should cause a widening of the 10Y BTP/Bund spread.
- 3. An indicator of equity market stress.** We use the 3M rolling average of the Euro area Systemic Stress Composite Indicator for the equity market⁶. We take this indicator lagged by one month in order to only capture the impact of an increase in the equity market stress on the sovereign spread and not vice versa. The indicator has been normalized so as to take values that fall within 0 and 1, where the closer the values are to 1, the higher the stress level. If this indicator rises, indicating more stress in the system, the BTP/Bund spread will likely widen.
- 4. An indicator of relative scarcity of government paper in Germany compared to Italy.** We compute this indicator as the difference between the percentage of debt held by foreign officials and the central bank (QE) in Germany and in Italy. When this indicator increases, it indicates that German government paper is getting relatively scarcer than Italian government paper. This usually leads to a widening of the 10Y BTP/Bund spread (so the sign of the coefficient should be positive).

Unlike the quarterly model based only on macro fundamentals, this model can only be estimated starting from 2004, because the IMF data on holdings on debt by foreign officials and the central bank are only available from that time.

Starting from 2004, the equity market stress indicator is not significant (although it does have the expected sign). The reason is that BTPs were not significantly impacted by generalized market volatility until 2010. Even during the 2008 crisis, we find that the correlation between our stress indicator for the equity market and the 10Y BTP/bund spread was rather weak. All this also reflects a rather poor performance of our model until 2010.

One solution would therefore be to re-estimate the model starting from 2010 leaving out the period from 2004 to 2010. Table 3A shows the result of our monthly model estimated from 2010. The R-squared of our model is 54%.

TABLE 3A: MONTHLY MODEL RESULTS IN A SAMPLE FROM 2010 UNTIL PRESENT

Sample: 2010-Now	PMI spread	Ch. in debt/GDP diff.	Mkt stress: stocks	Foreign and Eurosystem holdings	C
Coeff.	28	12	1000	486	-86
	***	***	***	***	*
R-squared	54%				

***significant at the 5% confidence level

Source: Haver, Bloomberg, UniCredit Research

TABLE 3B: HOW DOES THE FIT CHANGE WITH ONE-STANDARD DEVIATION MOVEMENT IN INDEPENDENT VARIABLES

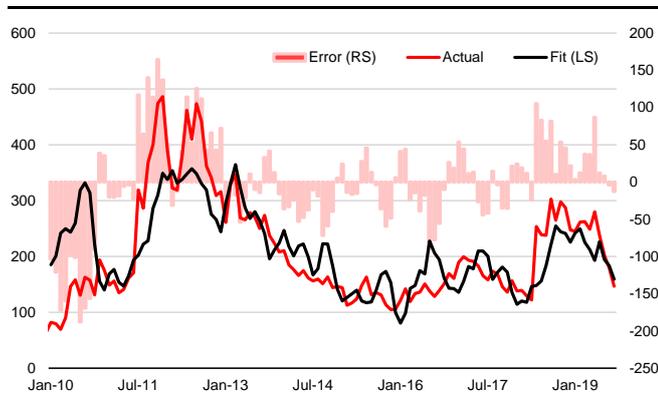
	PMI spread	Ch. in debt/GDP diff.	Mkt stress: stocks	Foreign and Eurosystem holdings
Coeff.	56	39	37	20

Source: Haver, Bloomberg, UniCredit Research

⁵ Please note that the Italian debt series has been recently revised upward due to a methodological change by Eurostat, but data providers have not yet included the change in the data series

⁶ The equity market component of the CISS is derived from 3 sub-components:
 1. The realized volatility of the non-financial sector stock market index, which is calculated taking the weekly average of absolute daily log returns.
 2. CMAX for the non-financial sector stock market index, which is calculated as the maximum cumulated index losses over a moving two-year window.
 3. Stock-bond correlation.

CHART 4: 10Y BTP/BUND, OUR MODEL ESTIMATED FROM 2010 UNTIL NOW



Source: Haver, Bloomberg, UniCredit Research

Coefficients of the regression show that:

1. If the differential in Composite PMIs between Germany and Italy increases by 1 point (in favor of Germany), the 10Y BTP/Bund spread increases by 28bp. A one standard-deviation-increase in the differential of Composite PMIs, leads to a 56bp increase in the 10Y BTP/Bund.
2. If the yearly change in the debt/GDP ratio differential in the two countries rises by 1pp (with debt increasing relatively more in Italy), the 10Y BTP/Bund spread widens 12bp. This is very similar to the 9bp we find in the quarterly model. A one-standard-deviation increase in the yoy change in the Italy/Germany debt/GDP ratio differential triggers a 39bp increase in the 10Y BTP/Bund spread.
3. If the 3M average of the stress indicator for equity markets increases by 0.01, the 10Y BTP/Bund spread widens by 10bp. If the 3M average of the stress indicator for equity markets increases by one standard deviation, the 10Y BTP/Bund spread widens by 37bp.
4. If the difference in percentage of public debt held by foreign officials and the domestic central bank in Germany and Italy increases by 1pp (so German debt becomes relatively scarcer than Italian debt), the 10Y BTP/Bund spread widens 4.8bp. A one-standard-deviation increase in this variable leads to a 20bp widening in the 10Y BTP/Bund spread.

This shows that the monthly version of our model also indicates that the rate of decline/increase in the debt/GDP ratio differential between Germany and Italy is a very relevant driver for the BTP/Bund spread, and at least as relevant as the ECB stress indicator for stocks. PMIs are an even stronger driver, suggesting that sentiment on the economic outlook, rather than actual growth that matters in driving BTP spreads.

Chart 4 shows that in 2010 our model returns very negative residuals, due to the fact that the euro area stress indicator for the equity market was showing rather high stress levels, which were not entirely reflected in a higher BTP/Bund spread. In 2011 and 2012, residuals were positive and very high, and this because of the political crisis in Italy and the eurozone debt crisis, which were extraordinary events that were not completely captured by any of the variables in our model. As expected, residuals started to be high and positive again between May 2018 and October 2018 and in the first part of 2019, due to political instability and a government unwilling to comply with fiscal discipline.

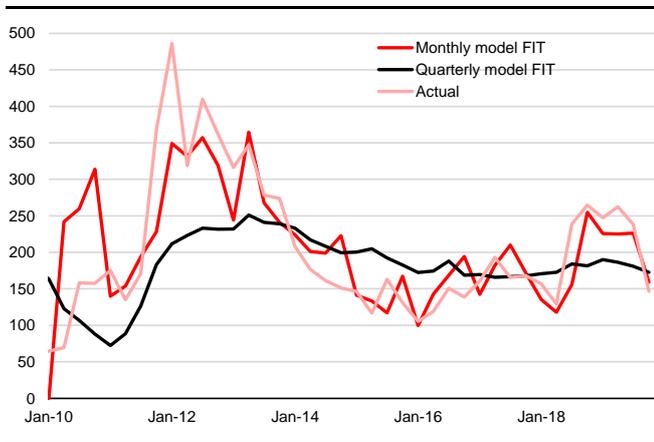
At the end of September, the fair value indicated by this model for the 10Y BTP/Bund spread is 160bp, around 20bp higher than where it is trading now. Note that the fair value of our model declined by more than 20bp between August and September, due to the weak PMIs in Germany.

4. Comparison between the quarterly and the monthly model and conclusion

We transformed the fit of our quarterly model in 10Y BTP/bund to make it comparable to the fit of our monthly model. Chart 5 and 6 show that aside from the 2010-12 period and the first part of QE (2015-16), the difference in fair value between the two models tend to be relatively small and this is especially true in the most recent period. More specifically, in June (latest data in Charts 5 and 6) both models predicted a lower fair value than to the one prevailing at the time, while at the moment, both models would indicate a higher fair value for the 10Y BTP/Bund spread.

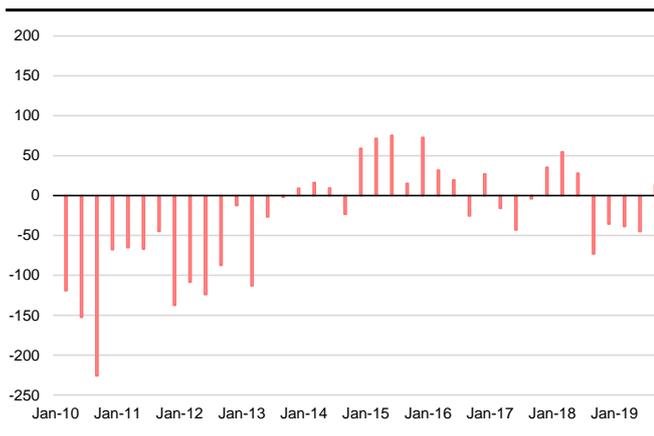
We attribute the negative residual prevailing in both models at the moment to the current appetite for carry trades, which not only originates from the fact that the ECB is about to embark on a new round of QE, but also to the fact that Italian govies are the only euro government bonds with positive yield from the 3/4Y maturity onwards (excluding Greek government bonds). The “value” of the appetite for carry trades currently stands at 20/30bp, according to our models, but could become higher in the next few months.

CHART 5: 10Y BTP/BUND: QUARTERLY AND MONTHLY MODEL, A COMPARISON



Source: Haver, Bloomberg, UniCredit Research

CHART 6: FAIR VALUE OF 10Y BTP/BUND: MONTHLY MODEL VS. QUARTERLY MODEL



Source: Haver, Bloomberg, UniCredit Research

Author

Chiara Cremonesi
FI Strategist
(UniCredit Bank, London)
+44 207 826-1771
chiara.cremonesi@unicredit.eu

Editor

Dr. Luca Cazzulani
Deputy Head of FI Strategy
(UniCredit Bank, Milan)
+39 02 8862-0640
luca.cazzulani@unicredit.eu

Previous editions of Rates Perspectives

- » ILBs pay higher Z-spreads than nominal bonds: We discuss the main drivers - 11 September 2019
- » ECB's QE 2: Number crunching and trade ideas - 24 July 2019
- » BTPi breakeven curve: Too flat and too low - 10 July 2019
- » Spain: Still a periphery country, judging from its foreign investors' base - 17 June 2019
- » SOFR and SONIA derivative markets: Small in size but growing - 24 May 2019
- » Flows of eurozone investors into USTs: another factor keeping UST real yields low - 8 May 2019
- » ECB tiering and money market rates: The devil is in the details - 16 April 2019
- » Who are the foreign investors in Italian government debt? A breakdown by geography and institution - 3 April 2019
- » Bund-swap has lagged Schatz in cheapening: why we expect a correction - 18 March 2019
- » Keeping in place the Fed's current monetary policy framework will likely benefit USTs - 4 March 2019
- » Euribor and ESTER: Where we stand, where we're going - 15 February 2019
- » Our scorecard for EMU countries: A useful tool for detecting misalignments in EGBs valuations - 30 January 2019
- » Six years after the introduction of CACs in the eurozone: Analyzing the effect on pricing - 10 January 2019
- » Supply Outlook 2019: primary market activity to gradually shift to shorter maturities - 6 December 2018
- » Scarcity of Bunds to keep real yields low - 29 October 2018
- » Measuring rating expectations for BTPs - 4 October 2018
- » Scarcity of Bunds (and safe eurozone paper) will remain an issue in 2019 - 17 September 2018
- » CCTs: a good buying opportunity on a medium-term horizon - 30 July 2018
- » ECB QE reinvestments: maturity matters - 18 July 2018
- » ECB forward guidance: we like 5/30Y flatteners and sovereign credit-risk exposure - 2 July 2018
- » Investing in USTs: to hedge or not to hedge? - 18 June 2018
- » Who holds the BTPs? Dissecting Italian public debt investor base - 5 June 2018
- » Italy funding, progress, cost and outlook: as good as it gets - 17 May 2018
- » A model for POLGB yields - 3 May 2018
- » 10Y BTP-SPGB spread: wide compared to fundamentals but convergence to fair value is tricky - 19 April 2018
- » T-LTRO II early repayments: why we are not concerned - 5 April 2018
- » US 10Y fair value model part II: breakeven inflation - 22 March 2018
- » Upside risks to the US term premium - 8 March 2018
- » US real yields are in line with our fair-value model - 26 February 2018
- » Foreign ownership of EM local currency debt: trends, indices and effects on FX and yields - 8 February 2018
- » EUR-USD cross currency: no normalization in sight - 25 January 2018
- » Italy's 2018 funding: how to trade it - 11 January 2018
- » We prefer credit to duration risk, especially at the longer maturities - 7 December 2017

Legal Notices

Glossary

A comprehensive glossary for many of the terms used in the report is available on our website: [link](#)

Disclaimer

Our recommendations are based on information obtained from or are based upon public information sources that we consider to be reliable, but for the completeness and accuracy of which we assume no liability. All information, estimates, opinions, projections and forecasts included in this report represent the independent judgment of the analysts as of the date of the issue unless stated otherwise. We reserve the right to modify the views expressed herein at any time without notice. Moreover, we reserve the right not to update this information or to discontinue it altogether without notice. This report may contain links to websites of third parties, the content of which is not controlled by UniCredit Bank. No liability is assumed for the content of these third-party websites.

This report is for information purposes only and (i) does not constitute or form part of any offer for sale or subscription of or solicitation of any offer to buy or subscribe for any financial, money market or investment instrument or any security, (ii) is neither intended as such an offer for sale or subscription of or solicitation of an offer to buy or subscribe for any financial, money market or investment instrument or any security nor (iii) as marketing material within the meaning of applicable prospectus law. The investment possibilities discussed in this report may not be suitable for certain investors depending on their specific investment objectives and time horizon or in the context of their overall financial situation. The investments discussed may fluctuate in price or value. Investors may get back less than they invested. Fluctuations in exchange rates may have an adverse effect on the value of investments. Furthermore, past performance is not necessarily indicative of future results. In particular, the risks associated with an investment in the financial, money market or investment instrument or security under discussion are not explained in their entirety.

This information is given without any warranty on an "as is" basis and should not be regarded as a substitute for obtaining individual advice. Investors must make their own determination of the appropriateness of an investment in any instruments referred to herein based on the merits and risks involved, their own investment strategy and their legal, fiscal and financial position. As this document does not qualify as an investment recommendation or as a direct investment recommendation, neither this document nor any part of it shall form the basis of, or be relied on in connection with or act as an inducement to enter into, any contract or commitment whatsoever. Investors are urged to contact their bank's investment advisor for individual explanations and advice.

Neither UniCredit Bank AG, UniCredit Bank AG London Branch, UniCredit Bank AG Milan Branch, UniCredit Bank AG Vienna Branch, UniCredit Bank Austria AG, UniCredit Bulbank, Zagrebačka banka d.d., UniCredit Bank Czech Republic and Slovakia, ZAO UniCredit Bank Russia, UniCredit Bank Czech Republic and Slovakia Slovakia Branch, UniCredit Bank Romania, UniCredit Bank AG New York Branch nor any of their respective directors, officers or employees nor any other person accepts any liability whatsoever (in negligence or otherwise) for any loss howsoever arising from any use of this document or its contents or otherwise arising in connection therewith.

This report is being distributed by electronic and ordinary mail to professional investors, who are expected to make their own investment decisions without undue reliance on this publication, and may not be redistributed, reproduced or published in whole or in part for any purpose.

This report was completed and first published on 2 October 2019 at 09:28.

Responsibility for the content of this publication lies with:

UniCredit Group and its subsidiaries are subject to regulation by the European Central Bank

- a) UniCredit Bank AG (UniCredit Bank, Munich or Frankfurt), Arabellastraße 12, 81925 Munich, Germany, (also responsible for the distribution pursuant to §34b WpHG). Regulatory authority: "BaFin" – Bundesanstalt für Finanzdienstleistungsaufsicht, Marie-Curie-Str. 24-28, 60439 Frankfurt, Germany.
 - b) UniCredit Bank AG London Branch (UniCredit Bank, London), Moor House, 120 London Wall, London EC2Y 5ET, United Kingdom. Regulatory authority: "BaFin" – Bundesanstalt für Finanzdienstleistungsaufsicht, Marie-Curie-Str. 24-28, 60439 Frankfurt, Germany and subject to limited regulation by the Financial Conduct Authority, 12 Endeavour Square, London E20 1JN, United Kingdom and Prudential Regulation Authority 20 Moorgate, London, EC2R 6DA, United Kingdom. Further details regarding our regulatory status are available on request.
 - c) UniCredit Bank AG Milan Branch (UniCredit Bank, Milan), Piazza Gae Aulenti, 4 - Torre C, 20154 Milan, Italy, duly authorized by the Bank of Italy to provide investment services. Regulatory authority: "Bank of Italy", Via Nazionale 91, 00184 Roma, Italy and Bundesanstalt für Finanzdienstleistungsaufsicht, Marie-Curie-Str. 24-28, 60439 Frankfurt, Germany.
 - d) UniCredit Bank AG Vienna Branch (UniCredit Bank, Vienna), Rothschildplatz 1, 1020 Vienna, Austria. Regulatory authority: Finanzmarktaufsichtsbehörde (FMA), Otto-Wagner-Platz 5, 1090 Vienna, Austria and subject to limited regulation by the "BaFin" – Bundesanstalt für Finanzdienstleistungsaufsicht, Marie-Curie-Str. 24-28, 60439 Frankfurt, Germany. Details about the extent of our regulation by the Bundesanstalt für Finanzdienstleistungsaufsicht are available from us on request.
 - e) UniCredit Bank Austria AG (Bank Austria), Rothschildplatz 1, 1020 Vienna, Austria. Regulatory authority: Finanzmarktaufsichtsbehörde (FMA), Otto-Wagner-Platz 5, 1090 Vienna, Austria
 - f) UniCredit Bulbank, Sveta Nedelya Sq. 7, BG-1000 Sofia, Bulgaria. Regulatory authority: Financial Supervision Commission (FSC), 16 Budapeshta str., 1000 Sofia, Bulgaria
 - g) Zagrebačka banka d.d., Trg bana Josipa Jelačića 10, HR-10000 Zagreb, Croatia. Regulatory authority: Croatian Agency for Supervision of Financial Services, Franje Račkoga 6, 10000 Zagreb, Croatia
 - h) UniCredit Bank Czech Republic and Slovakia, Želetavská 1525/1, 140 92 Praga 4, Czech Republic. Regulatory authority: CNB Czech National Bank, Na Příkopě 28, 115 03 Praga 1, Czech Republic
 - i) ZAO UniCredit Bank Russia (UniCredit Russia), Prechistsenskaya nab. 9, RF-119034 Moscow, Russia. Regulatory authority: Federal Service on Financial Markets, 9 Leninsky prospekt, Moscow 119991, Russia
 - j) UniCredit Bank Czech Republic and Slovakia, Slovakia Branch, Šancova 1/A, SK-813 33 Bratislava, Slovakia. Regulatory authority: CNB Czech National Bank, Na Příkopě 28, 115 03 Praha 1, Czech Republic and subject to limited regulation by the National Bank of Slovakia, Imricha Karvaša 1, 813 25 Bratislava, Slovakia. Regulatory authority: National Bank of Slovakia, Imricha Karvaša 1, 813 25 Bratislava, Slovakia
 - k) UniCredit Bank Romania, Bucharest 1F Expozitiei Boulevard, 012101 Bucharest 1, Romania. Regulatory authority: National Bank of Romania, 25 Lipscani Street, 030031, 3rd District, Bucharest, Romania
 - l) UniCredit Bank AG New York Branch (UniCredit Bank, New York), 150 East 42nd Street, New York, NY 10017. Regulatory authority: "BaFin" – Bundesanstalt für Finanzdienstleistungsaufsicht, Marie-Curie-Str. 24-28, 60439 Frankfurt, Germany and New York State Department of Financial Services, One State Street, New York, NY 10004-1511
- Further details regarding our regulatory status are available on request.

ANALYST DECLARATION

The analyst's remuneration has not been, and will not be, geared to the recommendations or views expressed in this report, neither directly nor indirectly. All of the views expressed accurately reflect the analyst's views, which have not been influenced by considerations of UniCredit Bank's business or client relationships.

POTENTIAL CONFLICTS OF INTERESTS

You will find a list of keys for company specific regulatory disclosures on our website <https://www.unicreditresearch.eu/index.php?id=disclaimer>.

RECOMMENDATIONS, RATINGS AND EVALUATION METHODOLOGY

You will find the history of rating regarding recommendation changes as well as an overview of the breakdown in absolute and relative terms of our investment ratings, and a note on the evaluation basis for interest-bearing securities on our website <https://www.unicreditresearch.eu/index.php?id=disclaimer> and <https://www.unicreditresearch.eu/index.php?id=legalnotices>.

ADDITIONAL REQUIRED DISCLOSURES UNDER THE LAWS AND REGULATIONS OF JURISDICTIONS INDICATED

You will find a list of further additional required disclosures under the laws and regulations of the jurisdictions indicated on our website <https://www.unicreditresearch.eu/index.php?id=disclaimer>.

UniCredit Research*

Strategy Research



Erik F. Nielsen
Group Chief Economist
Global Head of CIB Research
+44 207 826-1765
erik.nielsen@unicredit.eu



Dr. Ingo Heimig
Head of Research Operations
& Regulatory Controls
+49 89 378-13952
ingo.heimig@unicredit.de

FI Strategy Research



Michael Rottmann
Head
+49 89 378-15121
michael.rottman1@unicredit.eu



Dr. Luca Cazzulani
Deputy Head
+39 02 8862-0640
luca.cazzulani@unicredit.eu



Francesco Maria Di Bella
FI Strategist
+39 02 8862-0850
francescomaria.dibella@unicredit.eu



Chiara Cremonesi
FI Strategist
+44 207 826-1771
chiara.cremonesi@unicredit.eu



Kornelius Purps
FI Strategist
+49 89 378-12753
kornelius.purps@unicredit.de

FX Strategy Research



Roberto Mialich
FX Strategist
+39 02 8862-0658
roberto.mialich@unicredit.eu

Credit Strategy Research



Holger Kapitza
Credit & High Yield Strategy
+49 89 378-28745
holger.kapitza@unicredit.de



Dr. Stefan Kolek
EEMEA Corporate Credits & Strategy
+49 89 378-12495
stefan.kolek@unicredit.de

Equity Strategy Research



Christian Stocker, CEFA
Lead Equity Sector Strategist
+49 89 378-18603
christian.stocker@unicredit.eu



Elia Lattuga
Deputy Head of Strategy Research
Cross Asset Strategist
+44 207 826-1642
elia.lattuga@unicredit.eu

Cross Asset Strategy Research

UniCredit Research, Corporate & Investment Banking, UniCredit Bank AG, Am Eisbach 4, D-80538 Munich, globalresearch@unicredit.de
Bloomberg: UCCR, Internet: www.unicreditresearch.eu

SR 19/5

*UniCredit Research is the joint research department of UniCredit Bank AG (UniCredit Bank, Munich or Frankfurt), UniCredit Bank AG London Branch (UniCredit Bank, London), UniCredit Bank AG Milan Branch (UniCredit Bank, Milan), UniCredit Bank AG Vienna Branch (UniCredit Bank, Vienna), UniCredit Bank Austria AG (Bank Austria), UniCredit Bulbank, Zagrebačka banka d.d., UniCredit Bank Czech Republic and Slovakia, ZAO UniCredit Bank Russia (UniCredit Russia), UniCredit Bank Romania.