ILBs pay higher Z-spreads than nominal bonds: We discuss the main drivers

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- In the current environment of low rates, finding yield enhancement opportunities is as appealing as ever. ILBs tend to trade with a pickup relative to nominal bonds. In this note, we examine the key drivers behind this differential.
- With some easy calculations, we show that this pickup depends on a liquidity premium, on a credit risk premium and on the inflation risk premium of swap inflation relative to sovereign bonds (the latter factor should be relatively small).
- We estimate a model for the Z-spread pickup offered by ILBs over nominal BTPs and find that the current pickup is not particularly sizable.

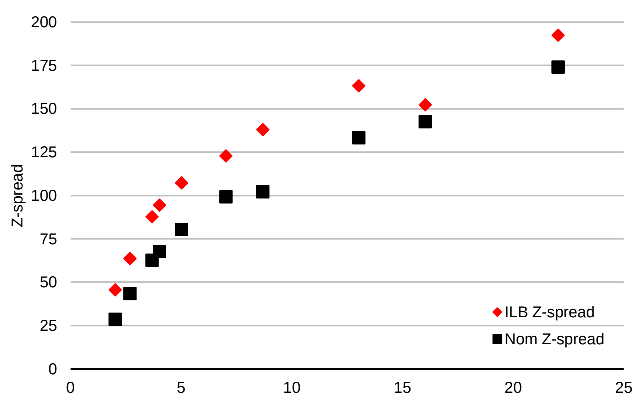
1. Linkers can be attractive, regardless of your expectations on inflation

Unless you have shining expectations on the future path of inflation (in stark contrast with consensus views), inflation linked bonds do not look like the most appealing investment at the moment. True, BEs are cheap but inflation has remained low in recent years, deceiving the ECB's long-run objective. Against this backdrop, it is difficult to have a strong conviction call for inflation.

Despite this, ILBs offer investors a higher Z-spread compared to nominal bonds. Such a pickup does not depend on realized inflation, which is actually swapped away, but rather on ILBs' lower liquidity and investors' risk aversion. In this respect, exploiting the pickup offered by ILBs is attractive for investors with a relatively long investment horizon and with a buy-and-hold approach.

In a period of very abundant liquidity and very low yields, finding investment opportunities that offer a pickup is highly attractive. In this note, we examine the economic reasons behind the higher return offered by ILBs relative to nominal bonds and shed light on a number of financial variables that can help to assess whether the Z-spread of ILBs relative to nominal bonds is cheap.

CHART 1: BTPEI ARE CHEAPER IN Z-SPREAD



Source: Bloomberg, UniCredit Research

2. Exploring the differential in Z-spread: some basic formulas

As a first step of our analysis, we explore the main components of the Z-spread of nominal bonds and ILBs. This will help analyze the key drivers of Z-spread difference:

$$\Delta Zspread = Zspread_{real} - Zspread_{nom}$$

These calculations can be applied to all bonds with negligible credit risk. Later in this section, we will discuss which adjustments are needed to take credit risk into account.

We first deal with the nominal Z-spread by stating that it is roughly equal to the difference between the yield of the bond and the corresponding swap rate:

$$Zspread_{nom} = y_{nom} - swap_{nom} \quad (1)$$

Similarly, the Z-spread for an ILB can be approximated as the real yield minus the nominal swap rate plus the inflation swap rate:

$$Zspread_{real} = y_{real} - swap_{nom} + swap_{infl} \quad (2)$$

Therefore, the difference in Z-spread is given by the following:

$$\Delta Zspread = swap_{infl} + y_{real} - y_{nom} \quad (3)$$

Given that $BE_{govt} = y_{nom} - y_{real}$, equation 3 can be further simplified:

$$\Delta Zspread = swap_{infl} - BE_{govt} \quad (4)$$

Equation 4 shows that the difference in Z-spread reflects the difference between swap inflation and the BE quoted by sovereign bonds. In particular, the spread will be positive as long as the inflation level quoted by ZC inflation swap contracts exceeds that of sovereign bonds.

To gain a better insight into equation 4, one must consider that nominal and real yields can be decomposed as follows:

$$y_{nom} = r^* + \tau + \pi^e + Infl\ RP + Liq\ RP_{nom} + \eta_{nom} \qquad (5)$$

$$y_{real} = r^* + \tau + Liq\ RP_{real} + \eta_{real} \qquad (6)$$

Where r^* is the real short-term yield, τ is the term premium, π^e is the inflation expectation, $Infl\ RP$ is the inflation risk premium, $Liq\ RP_{nom}$ and $Liq\ RP_{real}$ are the liquidity premiums for nominal and for inflation linked bonds respectively, and η_{nom} and η_{real} are the model residuals for nominal and inflation linked bonds respectively. Assuming that the residuals of the model have an average that is equal to zero, we can rewrite the BE as follows:

$$BE = \pi^e + Infl\ RP + Liq\ RP_{nom} - Liq\ RP_{real} \qquad (7)$$

This can be rewritten as follows:

$$BE = \pi^e + Infl\ RP - \Delta L \qquad (8)$$

where $\Delta L = Liq\ RP_{real} - Liq\ RP_{nom}$ (9)

BE is hence a measure of inflation expectations and is influenced by inflation risk premium (to the upside) and by ILBs' liquidity premium (to the downside). Given that these two effects have an opposite sign, at least during quiet markets, BE should be a good indication of inflation expectations.

By substituting equation 8 into equation 4 we obtain:

$$\Delta Zspread = \left[swap_{infl} - \pi^e\right] - Infl\ RP + \Delta L \qquad (10)$$

$$\Delta Zspread = swap_{infl}RP - Infl\ RP + \Delta L \qquad (11)$$

The spread between swap inflation and inflation expectations is likely to be higher when inflation uncertainty is high. Hence, the first two items in equation 11 tend to offset each other, leaving the liquidity premium of ILBs as the main driver of the premium offered by ILBs versus nominal bonds.

Lastly, the effect of credit risk should be taken into account. As the credit risk component mainly depends on the issuer's creditworthiness, it affects both nominal and real bonds. Therefore, its impact on the Z-spread difference is broadly nil. However, the difference in the cash flow structure of ILBs relative to nominal bonds affects pricing. Indeed, ILBs accrue inflation over time, and this inflates their gross price. As a result, when purchasing an ILB, an investor has to face a more significant outflow compared to a nominal bond with equal notional amount. Although at maturity the investor in ILB will be entitled to receive inflation compensation, he/she will be exposed to a larger potential loss during the investment period. This difference becomes relevant during times of widening credit spreads, when investors are generally unwilling to pay large cash amounts upfront. When this factor is taken into consideration, equation 11 becomes the following:

$$\Delta Zspread = \Delta L + f(accr.infl) + \left[swap_{infl}RP - Infl\ RP\right] \qquad (12)$$

Equation 12 shows that the higher Z-spread offered by ILBs relative to nominal bonds depends on a liquidity premium, on a credit risk premium and on the relative inflation risk premium of swap inflation relative to sovereign bonds (the latter factor should be relatively small).

3. BTPeis vs. BTPs: estimating a model for the Z-spread difference

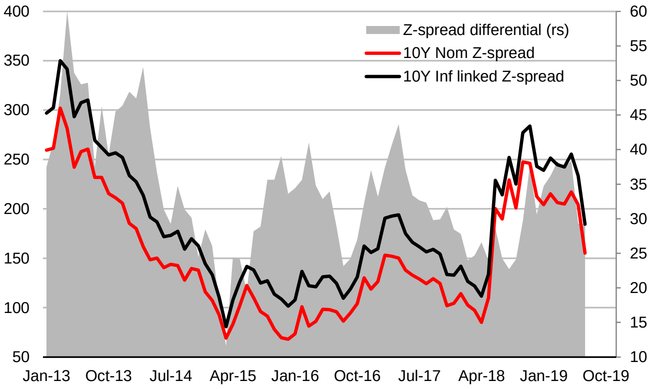
In the previous section, we showed that the Z-spread pickup offered by ILBs depends mainly on two risk premiums: liquidity and credit risk.

Hence, an investor should always expect to obtain an extra-compensation when he or she purchases an ILB rather than a nominal bond. Therefore, the question is: "what is a fair value for this compensation?"

We focus on Italian BTPeis and use monthly data from January 2013 to July 2019. Since we are interested in capturing a stable and structural relationship, we prefer avoiding the period 2011-12, which was likely dominated by transitory, one-off factors.

In the first step, we create a constant maturity series of BTPs' and BTPeis' Z-spreads by linearly interpolating the nominal and real curves. We choose the 10Y tenor.

CHART 2: Z-SPREAD DIFFERENTIAL (10Y TENOR)



Source: Bloomberg, UniCredit Research

Chart 2 illustrates the dynamics of the Z-spread difference at the 10Y tenor. The Z-spread difference has been positive on average (35bp), ranging from a minimum of 10bp to a maximum of 60bp.

The difference appears reasonably stationary, which is important given that we showed, in the previous paragraph, that this spread is the sum of various risk premiums.

A key issue is how much of the change in the Z-spread difference we are able to explain. Moreover, it is important to assess, from an historical point of view, if the Z-spread pickup offered by ILBs is either sizeable or subdued.

Following equation 12, we focus on liquidity risk premium and on credit risk premium by using the following:

$$\Delta Zspread = \alpha + \beta_1 Mkt\ Liq\ factor + \beta_2 ILB\ Liq\ factor + \beta_3 Credit\ premium + \epsilon$$

Since risk premiums are unobservable, one needs to find variables that can be used as a proxy.

Following Pflueger and Viceira in *Return Predictability in the Treasury Market: Real Rates, Inflation, and Liquidity*, we select a number of observable variables that can measure liquidity differentials between two asset classes:

TABLE 1: FINANCIAL VARIABLES THAT TRACK THE LIQUIDTY PREMIUM

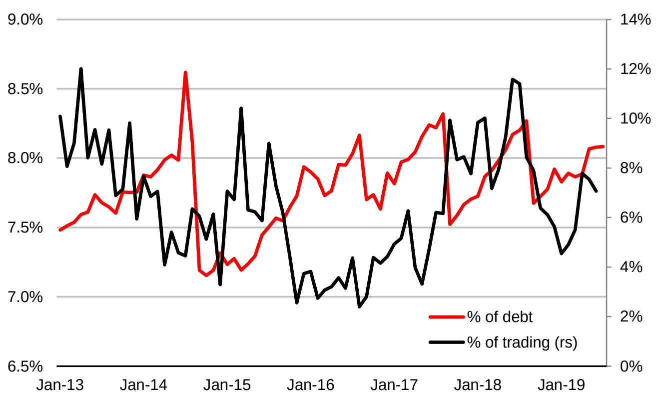
Market liquidity factor	Correlation with Z-sp diff.
6M Euribor-OIS spread	41%
2Y swap-OIS spread	49%
2Y swap-Schatz spread	0%
OIS-repo spread (difference 1-week OIS and the 1-week GC repo rate on German Bunds)	-25%
ECB financial market stress indicator	-8%
UCG risk appetite indicator	-7%
ILB liquidity factor	**Correlation with Z-sp diff.**
BTPeis outstanding (% of total debt)	12%
BTPei trading volume relative to BTPs	5%

Source: Bloomberg, UniCredit Research

The first six variables serve as good proxies of a general preference for liquidity in the eurozone. During periods of flight-to-liquidity, these spreads widen significantly but ease during more quiet periods. Hence, their correlation with the Z-spread pickup offered by ILBs should be positive. Over the period analyzed, the first two variables have a positive and strong correlation with the Z-spread differential, while the other factors have a negligible or slightly negative correlation.

The last two factors relate more specifically to BTPei relative to BTPs. HICP-linked Italian government bonds represent a relatively small share of Italy’s debt (around 7/8%). Thus, this asset class is likely to be relatively less liquid. Furthermore, as data from Euro-MTS show, the trading of BTPei is much lower than that associated with BTPs. When BTPeis’ amount outstanding or trading volume increases, the Z-spread pickup offered by ILBs should reduce. Counter-intuitively, table 1 shows that in both cases correlation is positive but poor in absolute terms. Possibly, it has to do with investors not expecting a change in BTPeis’ issuance that could have a significant impact on pricing.

CHART 3: LIQUIDITY MEASURES FOR BTPEI VS. BTPS



Source: Bloomberg, UniCredit Research

The 10Y BTP-Bund spread and the bid-ask yield spread on 5Y on-the-run BTPs were selected to serve as a proxy for the last component. We did not explicitly take into account the accrued inflation given that, at this stage, we were working with an interpolated series rather than with specific bonds.

Clearly, we could not use all the variables together. Therefore, we needed to select a subset. The figures shown in the Table 1 suggests that the 6M EUR-OIS spread and the 2Y swap-OIS spread show the strongest correlation. In addition to these variables, which should track general liquidity preference, we also used variables that are more specific to the asset class.

The table below shows the coefficient estimates for a select number of model specifications:

TABLE 2: MODEL ESTIMATE (10Y MATURITY)

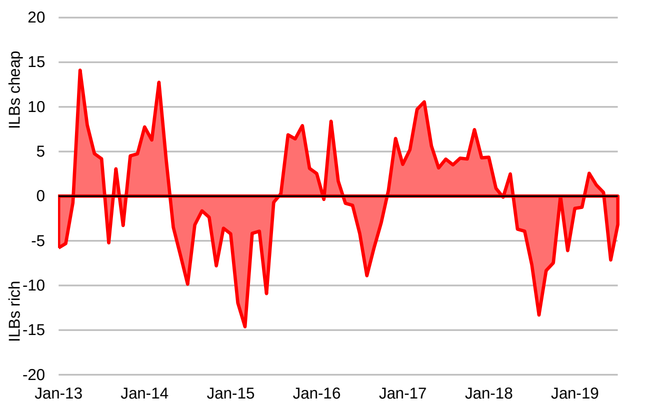
	A	B	C	D	E	F	G	H
Intercept	-32.0	**-43.4**	**11.4**	**11.2**	-31.3	-47.5	**22.3**	**20.5**
6M EUR-OIS	**0.68**		**0.59**		**0.59**		**0.54**	
2Y Swap-OIS		**0.69**		**0.58**		**0.69**		**0.58**
BTPeis outstanding	**5.24**	**6.57**			**7.27**	**8.79**		
BTPei trading volume			-44.91	-59.26			63.58	45.33
BTP Bund spread	**0.07**	**0.06**	**0.08**	**0.08**				
On-the-run bid ask					-0.74	-0.70	-0.88	-0.81
Adjusted R^2	49.2%	52.8%	47.3%	50.3%	25.0%	34.4%	22.0%	27.7%

*Coefficients in bold denote a 95% significance.

Source: UniCredit Research

The first four model specifications are those with the best R^2. The coefficients of the market liquidity factors have the expected sign and are statistically significant. At 95%, the coefficient of the share of BTPei of total debt is positive (although we would expect a negative sign) and significant, while the trading intensity associated with them is somewhat less significant, but has the expected sign. Table 2 also shows that the BTP-Bund spread is a much better explanatory variable than the bid-ask spread of BTPs. Based on the residuals of the first four models, we were able to build a rich/cheap indicator for the Z-spread difference. The indicator is shown below.

CHART 4: RICH/CHEAP INDICATOR



Source: Bloomberg, UniCredit Research

The indicator is negative (i.e. ILBs are rich) if the models' results exceed the Z-spread differential on average. Otherwise, ILBs are cheap if the indicator turns positive. By construction, the indicator has an average that is equal to zero. Over the last few months, the indicator has been negative, implying that the four models' results have, on average, exceeded the actual Z-spread. Nevertheless, as highlighted in Chart 2, the Z-spread differential has been significant.

4. BTPeis vs. BTPs: looking at each bond in detail

In this final section, we estimate a model similar to the one cited in the previous section but which uses individual bonds rather than a constant maturity series. In this way, we are able to analyze relative value in greater detail and can also use bond-specific information, such as an index ratio or price.

Given that our analysis involves both a cross section dimension (different bonds) and a time series dimension, it was carried out by using panel:

$$\Delta Zspread(BTPei^i) = c_0^i + c_1 * [6M\ EUR - OIS] + c_2 * [BTP - BUND] + c_3 * \log(maturity^i) + c_4 * [gross\ price^i] + \epsilon^i$$

In line with the analysis cited in the previous section, we assume, in the model specification, that the Z-spread difference of each BTPei relative to the corresponding nominal BTP depends on liquidity preference (we employed 6M EUR-OIS, as its weekly correlation with the Z-spread differential tends to be higher than other market liquidity factors) and on the credit risk component (BTP-Bund spread).

In addition, we let the difference in Z-spread also depend on the maturity of the bond as well as on its gross price. The latter was computed as the product of the clean price and the index ratio, hence overlooking coupon accruals.

In this estimation, we used weekly data from January 2013 to July 2019. The results of the estimation are shown in the following table:

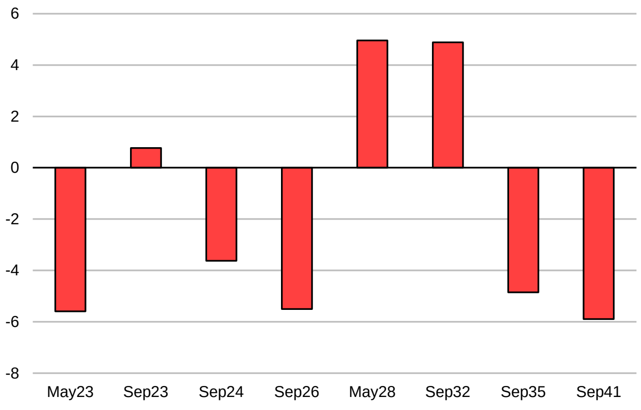
Variable		Coefficient	StErr	T-stat
6M EUR – OIS	c_1	0.47	0.03	14.05
BTP-Bund spread	c_2	0.06	0.00	17.58
Log (maturity)	c_3	3.38	0.84	4.00
Gross price	c_4	-0.35	0.02	-15.25
BTPEI Sep19	c_0^i	49.03	3.81	12.87
BTPEI Sep21	c_0^i	47.32	3.85	12.30
BTPei May22	c_0^i	43.01	3.49	12.33
BTPei May23	c_0^i	45.97	3.62	12.70
BTPei Sep23	c_0^i	52.23	4.22	12.38
BTPei Sep24	c_0^i	45.22	3.91	11.58
BTPei Sep26	c_0^i	54.97	4.31	12.76
BTPei May28	c_0^i	41.08	3.93	10.46
BTPei Sep32	c_0^i	33.08	4.04	8.19
BTPei Sep35	c_0^i	37.18	4.84	7.68
BTPei Sep41	c_0^i	45.73	4.75	9.62
Adjusted R^2	62%			

Source: Bloomberg, UniCredit Research

The coefficient for the 6M EUR-OIS and the BTP-Bund is roughly in line with the estimate presented in the previous section, which suggests a good stability of the model. The coefficient related to time to maturity has a positive sign, which indicates that the pickup offered by ILBs tends to grow the farther we move along the curve. Finally, gross price has a negative effect on the Z-spread pickup. This can seem counterintuitive given what was discussed in section 2. However, the reason for this negative coefficient is that the standard practice when calculating ASW and Z-spread is to use a par-par convention. Calculating the Z-spread by using the par-par method results in a comparatively lower figure when bonds are trading at cash prices that are significantly higher than par. In a way, adding the model component for the gross price can be seen as a way of approximating calculations under the proceed methodology.

As shown in the previous paragraph, we can build a rich/cheap indicator based on model residual. In such a case, analysis is cross-sectional and based on the latest available model error. Chart 5 shows the residuals for all BTPeis. May28 and Sep32 look modestly cheap compared to other ILBs.

CHART 5: RICH/CHEAP INDICATOR



Source: Bloomberg, UniCredit Research

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