November 2010

Eurex Short-Term Euro-BTP Futures – increasing alpha opportunities in European fixed income markets for the buy side

On October 18, 2010, Eurex Exchange expanded its suite of fixed income derivatives contracts by launching a Short-Term Euro-BTP Futures contract with a remaining lifetime of the deliverable bonds between 2 and 3.25 years[1].

The buy side now has two exchange-traded Euro-BTP Futures at its disposal, covering non-triple A-rated government debt to complement the existing portfolio of Eurex European benchmark fixed income futures: Euro-Schatz, Euro-Bobl, Euro-Bund and Euro-Buxl®[2].

Short-Term Euro-BTP Futures – increasing alpha opportunities

The new Short-Term Euro-BTP Futures contract increases the opportunities to generate alpha for traditional fixed income fund managers and hedge funds alike. This paper provides an insight into the following fund management, credit and relative value strategies:

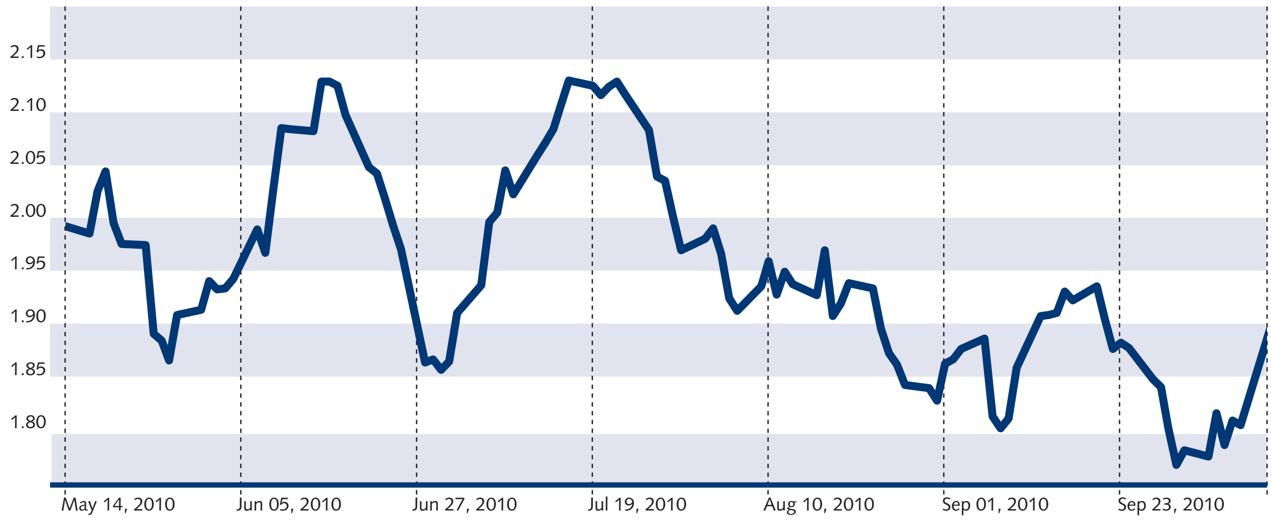
1. Trading the Italian yield curve – the Short-Term/Long-Term Euro-BTP Futures spread
2. The European short maturity "credit spread" strategy – the Euro-Schatz Futures/Short-Term Euro-BTP Futures spread
3. Portfolio overlay using Short-Term Euro-BTP Futures.
4. European fixed income yield curve "box" – Short-Term Euro-BTP Futures/Long-Term Euro-BTP Futures spread versus Euro-Schatz Futures/Euro-Bund Futures yield curve spread
5. Capturing alpha in a short maturity Italian corporate bond
6. EURIBOR strip versus Short-Term Euro-BTP Futures
7. Duration targeting
8. Eurex's wholesale offering

1. Trading the Italian yield curve – Short-Term/Long-Term Euro-BTP Futures spread

Short-Term Euro-BTP Futures offer asset managers an extremely inexpensive means of generating alpha from structuring strategies to benefit from anticipated changes in the BTP yield curve – with the added benefit of mitigation of counterparty risk with central clearing through Eurex Clearing.

[1] See Appendix 1 and 2 for the Short-Term Euro-BTP Futures' contract specifications and delivery basket (for December 2010, March 2011 and June 2011 delivery months) information respectively.
[2] See **http://www.eurexchange.com/trading/products/INT/FIX/products_en.html** for contract specifications of all Eurex fixed income derivatives products.

Diagram 1: BTP yield spread – BTPS 2% Dec 2012 vs. BTPS 4.25% Mar 2010



Source: Bloomberg

Construction of a Short-Term/Long-Term Euro-BTP Futures spread: Firstly, the structure of the short-term/ten year Euro-BTP Futures yield curve needs to be determined by identifying the cheapest to deliver bond for each of the contracts:

Table 1: BTP Futures' CTD & interest rate sensitivities

Delivery month	CTD*	Conversion factor	BPV**
Dec 10 – Ten Year	4.25% 03/2020	0.882893	0.0802
Dec 10 – Short Term	2.00% 12/2012	0.926446	0.0215

* Cheapest to deliver bond. This will change due to changes in yield levels and relative yields of deliverable bonds in the basket.
** Basis Point Value i.e. change in price due to an .01 change in yield, will change as yields change.

Secondly, in structuring a Short-Term/Long-Term Euro-BTP Futures yield curve strategy the relative price sensitivities of the two Euro-BTP Futures contracts needs to be calculated:

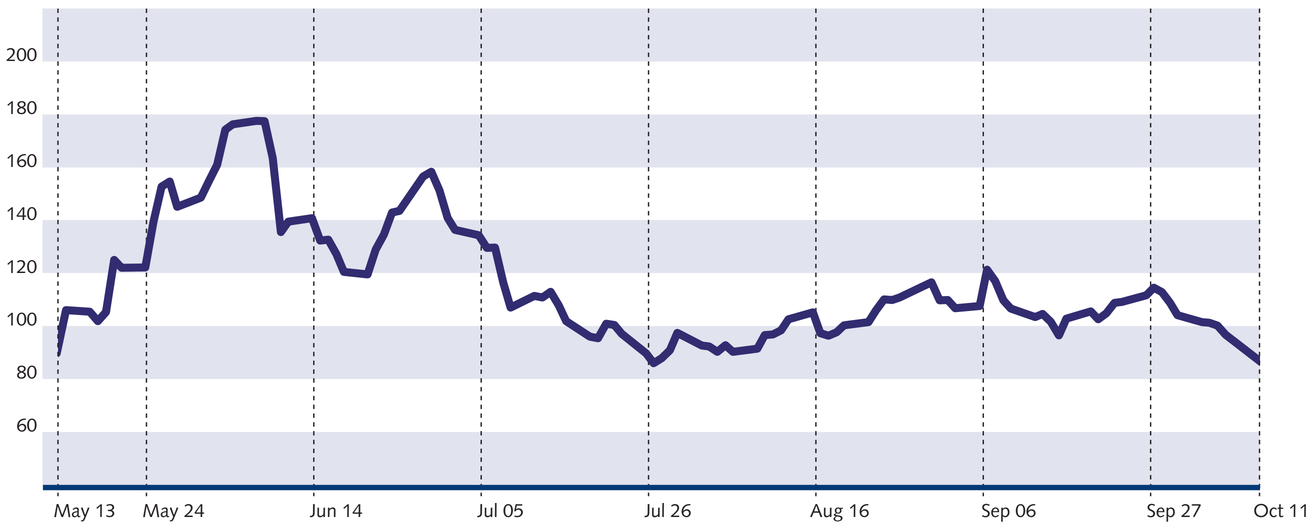
The basis point value of the ten year Euro-BTP Futures[3] can be expressed as: (0.0802/0.882893) = 0.0908 = EUR 90.80. Using the same approach, the BPV of the Short-Term Euro-BTP Futures would be (0.0215/0.926446) = 0.0232 = EUR 23.20. Therefore, a ratio of 3.91:1.0 Short-Term to Long-Term Euro-BTP Futures needs to be established to construct a Euro-BTP Futures yield curve strategy.

2. The European short maturity "credit" spread strategy – the Euro-Schatz/Short-Term Euro-BTP Futures spread

The Greek sovereign debt crisis, contagion fears, country rating downgrades, burgeoning government budget deficits and recently Ireland's fiscal crisis and bank problems have all added to the increased volatility in the spreads between the various European countries' bond markets. Trading the Short-Term Euro-BTP Futures enables alpha generation opportunities against the Euro-Schatz Futures as a "credit trade" strategy:

[3] The BPV of bond futures can be expressed as the BPV of its cheapest to deliver bond divided by its conversion factor. Obviously as yields and the CTD changes this figure will change.

Diagram 2: Two year[4] European government bond yield curve spread – Germany vs. Italy (May 13 – October 11, 2010)



Source: Bloomberg

Similar to that of structuring the Short-Term/Long-Term Euro-BTP Futures yield curve as outlined above, the relative price sensitivities of the two contracts needs to be calculated. Based on the BKO 0.75% September 2012 as the cheapest to deliver for the December 2012 delivery for the Euro-Schatz Future, gives a BPV for the contract as: (0.0194/0.91457) = 0.0212 = EUR 21.20 compared to that of a BPV of EUR 23.20 for the Short-Term Euro-BTP Futures (see section 1 above) generating a BPV weighted ratio of 1.09:1.0 Euro-Schatz Futures to Short-Term Euro-BTP Futures.

3. Portfolio overlay using Short-Term Euro-BTP Futures

Short-Term Euro-BTP Futures allow bond fund managers to generate alpha through portfolio overlay – effecting changes in portfolio asset allocation whilst leaving the existing portfolio intact. For example, a fixed income fund manager, managing a short term European government bond portfolio in short maturity European government bonds feels that short maturity Euro-BTPs will outperform similar maturity short term AAA rated bonds in the near term. The fund is EUR 100 million of 2.5 years duration exclusively invested in short term AAA rated bonds; the fund manager decides to synthetically switch twenty per cent of his portfolio to short-term Euro-BTPs via portfolio overlay.

To synthetically switch twenty percent i.e. EUR 20 million of the short maturity AAA rated bonds to short maturity Euro-BTPs in the portfolio overlay strategy, the steps are as follows:

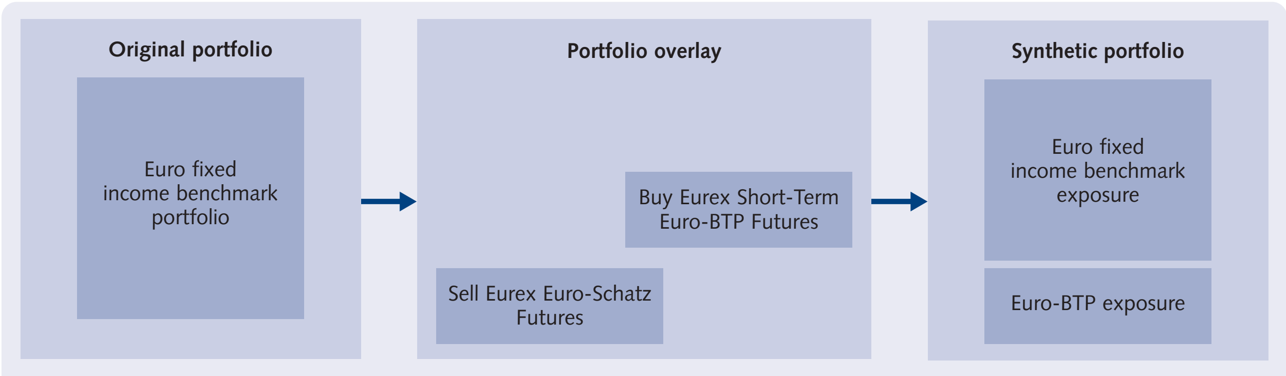
1. Calculate the number of Euro-Schatz Futures to be sold to reduce the portfolio of AAA bond holding by twenty per cent:
   = (duration × investment × 0.0001)/BPV Euro-Schatz Futures[5]
   = (2.5 × EUR 20 million × 0.0001)/EUR 21.20[6]
   = 235.85 ~ 236 Euro-Schatz Futures

2. Calculate the BPV weighted ratio of Euro-Schatz Futures to Short-Term Euro-BTP Futures:
   = 1.09 Euro-Schatz Futures: 1.0 Short-Term Euro-BTP Futures[7]

Therefore, the fund manager sells 236 Euro-Schatz Futures and buys 217 (i.e. 236 x 1.0 / 1.09) Short-Term Euro-BTP Futures to synthetically switch 20 percent of the portfolio from short maturity European AAA rated bonds to similar duration short term maturity Euro-BTPs whilst leaving the original portfolio intact. When the fund manager believes the outperformance of short-term Euro-BTPs has been completed the fund manager unwinds the short Euro-Schatz Futures/long Short-Term Euro-BTP Futures position with the portfolio returning to a fully exposed position in European short maturity AAA rated bonds. Diagram three outlines the portfolio overlay strategy using Euro-Schatz Futures and Short-Term Euro-BTP Futures:

[4] The Euro-Schatz Futures contract has a delivery basket of 1.75 to 2.25 years to maturity and the Short-Term Euro-BTP Futures has a delivery basket of 2 to 3.25 years. With yields being currently so low the CTD will be the lowest duration bond in the basket.
[5] The price sensitivity of a bond futures i.e. BPV, value of an .01 change in yield, can be expressed as BPV CTD / CF CTD where BPV CTD is the interest rate sensitivity of the CTD bond and CF CTD is the conversion factor of the CTD bond.
[6] See section 2 above for determination of BPV of Euro-Schatz Futures.
[7] See section 2 above for the determination of the Euro-Schatz: Short-Term Euro-BTP duration weighted ratio.

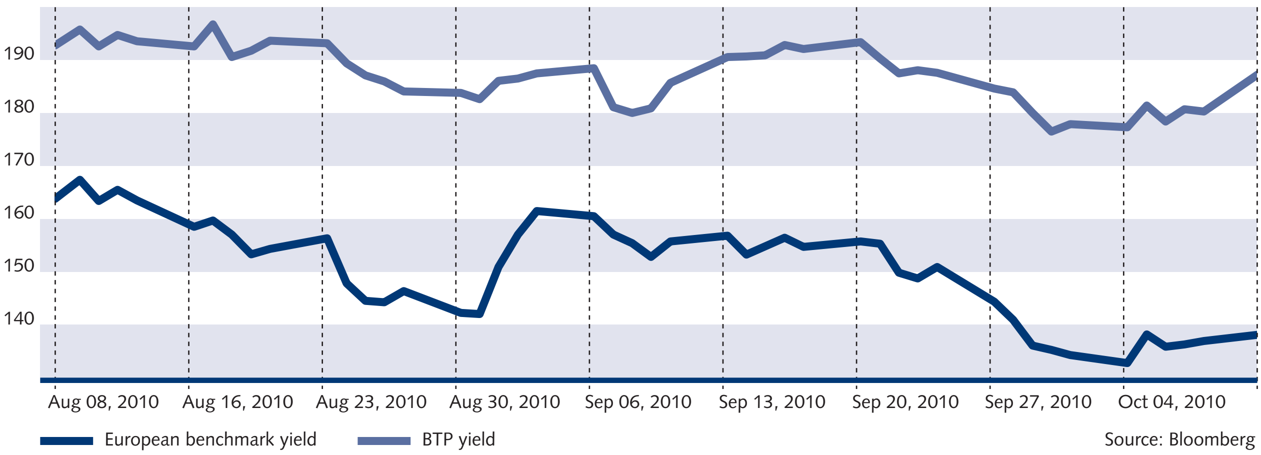
Diagram 3: Portfolio overlay using Short-Term Euro-BTP Futures



4. European fixed income yield curve "box" strategy – Short-Term Euro-BTP/Long-Term Euro-BTP Futures yield curve spread vs. Euro-Schatz/Euro-Bund Futures yield curve spread

Another potential alpha generating strategy is to trade the relative yield curve movements of a triple A-rated European government yield curve represented by the Euro-Schatz/Euro-Bund spread versus a non-triple A-rated European government bond yield curve represented by the Short-Term Euro-BTP/Long-Term Euro-BTP Futures spread. Using the various CTD bonds as the proxy for the futures contracts, diagram 4 below looks at the history of the two yield curves over the same period:

Diagram 4: European benchmark yield curve – BKO 0.75% Sep 12/DBR 3.5% July 19 spread vs. BTPS 2% Dec 12/BTPS 4.25% Mar 20 spread



Source: Bloomberg

For example, a hedge fund manager has the view that the BTP yield curve will flatten and the German government yield curve steepen over the same period:

Table 2: Construction[8] of European yield curve "box" strategy

Short-Term Euro-BTP Futures BPV:	(0.0215/0.926446) = 0.0232 = EUR 23.20	**3.91:1.0** Short-Term Euro-BTP Futures to Long-Term Euro-BTP Futures
Long-Term Euro-BTP Futures BPV:	(0.0802/0.882893) = 0.0908 = EUR 90.80	
Euro-Schatz Futures BPV:	(0.0194/0.91457) = 0.0212 = EUR 21.20	**4.75:1.0** Euro-Schatz Futures to Euro-Bund Futures
Euro-Bund Futures BPV:	(0.0842/0.836047) = 0.1007 = EUR 100.70	

Therefore, the hedge fund manager sells **391** Short-Term Euro-BTP Futures/buys **100** Long-Term Euro-BTP Futures and buys **475** Euro-Schatz Futures/sells **100** Euro-Bund Futures as a European yield curve "box" strategy anticipating the Euro-BTP yield curve to flatten and the German government yield curve to steepen over the same period.

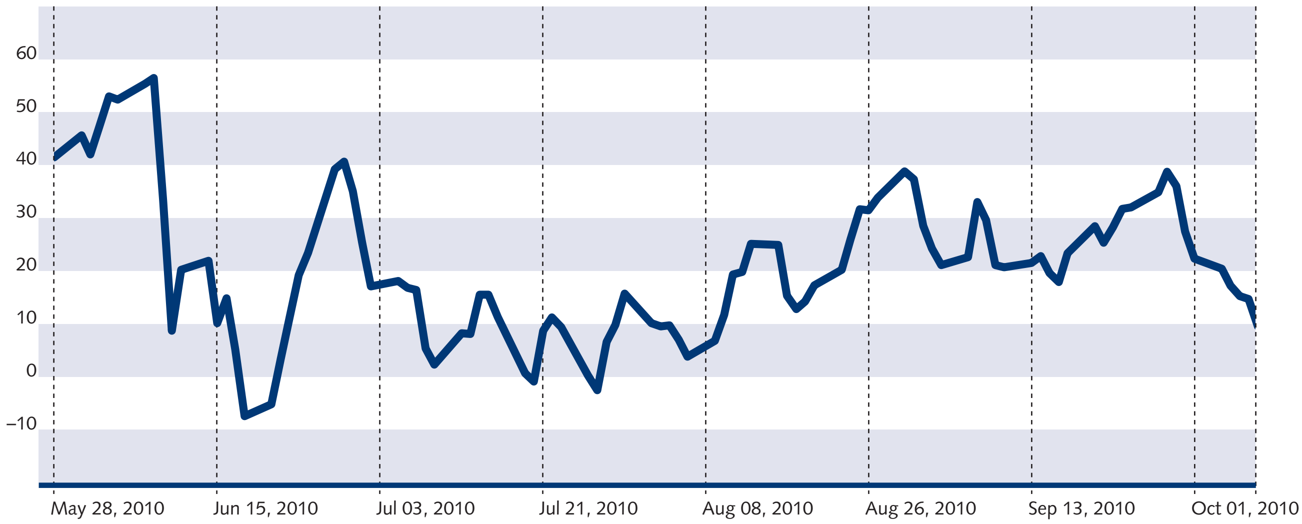
5. Capturing alpha in a short maturity Italian corporate bond

Short-Term Euro-BTP Futures allow asset managers to capture alpha of Short-Term Italian corporate bonds without exposure to the "beta" market risk. For example, a fixed income fund manager has the view that a particular corporate bond will outperform relative to the market. The fund manager buys the corporate bond and sells the required amount of contracts in Short-Term Euro-BTP Futures to create a synthetic short position in a similar maturity BTP government bond. (Please see diagram 5 below.)

Alpha capture strategy using Short-Term Euro-BTP Futures:

A fund manager buys EUR 10 million of the ENI 4.625% April 2013 corporate bond and sells 112 short term Euro-BTP Futures contracts to create a synthetic EUR 10.2[9] million short position in the BTPS 2% June 2013 to capture the expectation of the outperformance of the ENI 4.625% April 2013 corporate bond relative to the market. Table 3 below outlines the derivation[10] of the required number of Short-Term Euro-BTP Futures contracts to go short.

Diagram 5: ENI 4.625% April 2013 vs. BTPS 2% June 2013 yield spread



Source: Bloomberg

[8] The BPV of each of the contracts has been calculated based on the formula: BPV Bond Future = BPV CTD/CF ctd where BPV CTD is the BPV of the cheapest to deliver bond and CF ctd is the conversion factor of the cheapest to deliver bond.
[9] Duration weighted amounts to manage the "beta"/interest rate risk. The ENI 4.625% April 2013 bond has a BPV of 0.0261 and the BTPS 2% June 2013 has a BPV of 0.0255 – modified duration of 2.40 years and 2.53 years respectively.
[10] See appendix 3 for derivation of formula used in table 2. Position requires dynamic management due to changes in interest rates and possible CTD changes.

Table 3: Derivation of BTP Futures contracts

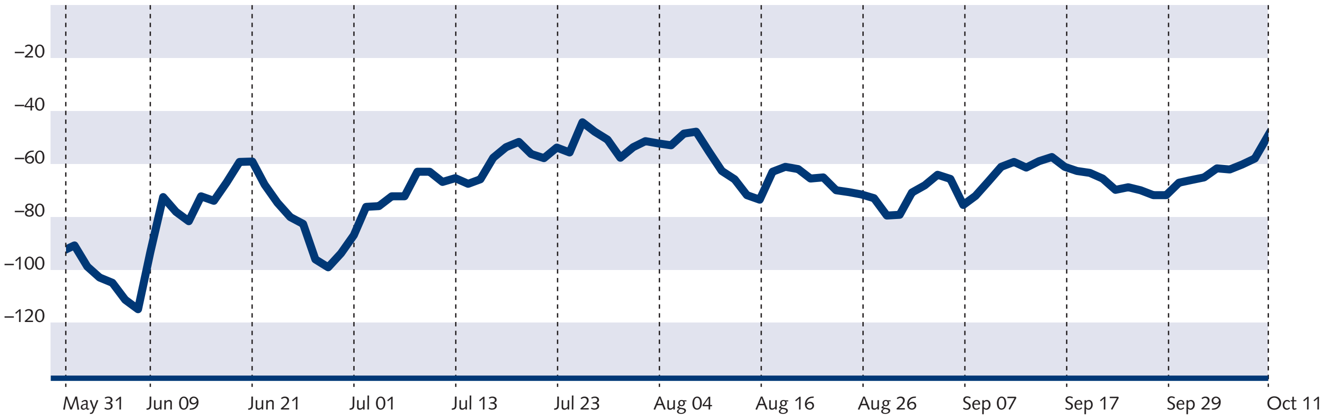
BPV of CTD (BTPS 2% December 2012):	0.0215
BPV of BTPS 2% June 2013:	0.0255
CF of the CTD:	0.926446
Nominal:	EUR 10.2 million
Number of Short-Term Euro-BTP Futures:	(0.0255/0.0215) × 0.926446 × (10.2 million/100,000) = 112.08 ~ 112.

6. EURIBOR strip versus Short-Term Euro-BTP Futures

Another relative value strategy is to trade the EURIBOR strip as a synthetic bond against the Short-Term Euro-BTP Futures (often referred to as a "Term TED[11]" strategy) using the future as a proxy for the cheapest to deliver bond. Diagram 6 below looks at the implied yield differential history between the EURIBOR strip and the BTPS 2% December 2012 (bond is the CTD – shortest duration bond in the December 2012 delivery basket):

For example, a hedge fund manager has the view that the EURIBOR strip/BTPS 2% December 2012 term TED relationship will become less negative i.e. yield of the BTPS will fall relative to the implied yield of the EURIBOR strip and constructs a term TED structure using the Short-Term Euro-BTP Futures as the proxy for buying EUR 10 million of the BTPS 2% December 2012, the cheapest to deliver bond for December 2010 delivery:

Diagram 6: EURIBOR strip vs. BTPS 2% December 2012 implied yield term TED (May 31 – October 11, 2010)



Source: Bloomberg

Table 4: EURIBOR strip/Short-Term Euro-BTP Future term TED structure

Sells EURIBOR strip	Buys Short-Term Euro-BTP Futures
Stub: –7 (in Dec 10 EURIBOR)	Buys 93[12] Dec Short-Term Euro-BTP Futures to create a synthetic long EUR 10 million position in the BTPS 2% December 2012 CTD bond.
Dec 10 EURIBOR: –10	
Mar 11 EURIBOR: –10	
Jun 11 EURIBOR: –11	
Sep 11 EURIBOR: –10	
Dec 11 EURIBOR: –10	
Mar 12 EURIBOR: –10	
Jun 12 EURIBOR: –10	
Sep 12 EURIBOR: –9	
Yield: 1.31%	Yield: 1.93%
Implied Yield TED: –0.62%	

[11] TED refers to the TBill/Eurodollar Futures Spread, a popular short maturity credit spread trade. A Term TED uses longer maturity instruments – hence the reference, "Term TED".

[12] The derivation of the formula to generate the appropriate number of contracts is outlined in appendix 3. For a 10 million short position in BTPS 2% Dec 2012 the calculation is: EUR 10 million/EUR 100,000 × 0.926446 = 92.64 ~ 93 contracts.

7. Duration targeting using Short-Term Euro-BTP Futures

Short-Term Euro-BTP Futures allows fund managers to create a synthetic short maturity BTP duration targeted investment. For example, a fund manager wants to create a synthetic EUR 20 million investment in a short-term maturity BTP with a duration of 2.5 years:

= (duration × investment × 0.0001)/ (BPV CTD/CF CTD)
= (2.5 × EUR 20 million × 0.0001)/(EUR 21.20[13])
= 235.85 ~ 236 Short-Term Euro-BTP Futures.

By buying 236 short term Euro-BTP Futures the fund manager has created, very quickly, a synthetic short maturity BTP EUR 20 million 2.5 years duration cash investment[14].

8. Eurex's wholesale offering

With its Wholesale offering Eurex supports the marketplace to enter bilaterally agreed transactions to be entered into the Eurex® system and to be cleared by Eurex Clearing.

Block trading

The new Short-Term Euro-BTP Futures is eligible for trading via Eurex's block trade facility[15]. This gives asset managers the opportunity to bilaterally agree transactions in short term Euro-BTP Futures off-exchange and novate the trade to Eurex Clearing. Eurex short term Euro-BTP Futures are subject to a minimum block trade threshold limit of 250 contracts[16].

Basis trading

To facilitate basis trading, the Exchange for Physical[17] (EFP) and Exchange for Swaps[18] (EFS) functionalities allow for the simultaneous purchase (sale) of futures along with a sale (purchase) of the underlying bond, swap or another futures contract. Such transactions are not subject to a minimum number of contracts.

For example, an asset manager wishing to trade the Euro-Schatz/Short-Term Euro-BTP Futures spread can agree the trade bilaterally and use the EFP trade entry facility to novate the trade to Eurex Clearing. Prerequisite is that one side of the spread transaction ("underlying security") has either been traded through the Block Trade facility or traded through the regular order book. In this example, a minimum trade of 250 Short-Term Euro-BTP Futures could be entered into Eurex's Block Trade facility to allow for a qualifying transaction in the Euro-Schatz Futures leg via Eurex's EFP facility.

[13] See derivation of BPV of the Short-Term Euro-BTP Future in section 1.
[14] The position will require dynamic management – the fund manager will need to adjust the number of contracts because of yield/duration changes and thus changes in BPV values and any change in CTD.
[15] See **www.eurexchange.com/trading/wholesale_en.html** for an outline of Eurex OTC Clear services including the Block Trade facility.
[16] For block trade limits for each contract see **www.eurexchange.com/trading/wholesale/block_trades_en.html**.
[17] See link **www.eurexchange.com/trading/wholesale/efp_en.html** for outline of EFP Facility.
[18] See link **www.eurexchange.com/trading/wholesale/efs_en.html** for outline of EFS facility.

Appendix 1: Short- and Long-Term Euro-BTP Futures – contract specifications

Short- and Long-Term Euro-BTP Futures	
Underlyings	Notional short- and long-term debt instruments issued by the Republic of Italy with a remaining term of 2 to 3.25 years (short-term) respectively 8.5 to 11 years and an original maturity of no longer than 16 years (long-term) and a coupon of 6 percent.
Product IDs	Short-Term Euro-BTP Futures: FBTS Long-Term Euro-BTP Futures: FBTP
Product ISINs	**FBTS:** DE000A1EZJ09 **FBTP:** DE000A0ZW3V8
Contract Value	EUR 100,000
Settlement	A delivery obligation arising out of a short position may only be fulfilled by the delivery of certain debt securities issued by the Republic of Italy with a remaining term of 2 to 3.25 years (short-term) respectively 8.5 to 11 years and an original maturity of no longer than 16 years (long-term). Such debt securities must have a minimum issue amount of EUR 5 billion.
Price Quotation and Minimum Price Change	In percent of the par value, with two decimal places. The Minimum Price Change is 0.01 percent, equivalent to a value of EUR 10.
Contract Months	Up to 9 months: The three nearest quarterly months of the March, June, September and December cycle.
Delivery Day	The tenth calendar day of the respective quarterly month, if this day is an exchange day; otherwise, the exchange day immediately succeeding that day.
Last Trading Day	Two exchange days prior to the Delivery Day of the relevant maturity month. Close of trading in the maturing futures on the Last Trading Day is at 12:30 CET.
Daily Settlement Price	The Daily Settlement Price for the current maturity month is derived from the volume-weighted average of the prices of all transactions during the minute before 17:15 CET (reference point), provided that more than five trades transacted within this period. For the remaining maturity months the Daily Settlement Price for a contract is determined based on the average bid/ask spread of the combination order book.
Final Settlement Price	The Final Settlement Price is established by Eurex on the Final Settlement Day at 12:30 CET; based on the volume-weighted average price of all trades during the final minute of trading provided that more than ten trades occurred during this minute; otherwise the volume-weighted average price of the last ten trades of the day, provided that these are not older than 30 minutes. If such a price cannot be determined, or does not reasonably reflect the prevailing market conditions, Eurex will establish the Final Settlement Price.
Trading Hours	08:00–19:00 CET, on the Last Trading Day 08:00–12:30 CET.
Vendor Codes	**FBTS:** Bloomberg: BTSA comdty ThomsonReuters: <0#FBTS:>CQG: FBTS **FBTP:** Bloomberg: IKA cmdty ThomsonReuters: <0#FBTP:>CQG: FBTP

Appendix 2: Short-Term Euro BTP Futures – delivery basket

Maturity window: 10.09.2018–10.03.2021						
Mar 2010	**ISIN**	**Amt issued**	**Coupon**	**Conversion factor***	**Issue Dt**	**Maturity**
	IT0003493258	23,318,000,000	4.25	0.886171	25.06.2003	01.02.2019
	IT0004423957	22,644,728,000	4.50	0.902663	03.11.2008	01.03.2019
	IT0004489610	22,275,000,000	4.25	0.880565	04.05.2009	01.09.2019
	IT0003644769	21,090,500,000	4.50	0.895037	24.03.2004	01.02.2020
	IT0004536949	11,770,386,000	4.25	0.875919	22.09.2009	01.03.2020
Total		**101,098,614,000**				

* plus new issues & tappings during this time

Maturity window: 10.12.2018–10.06.2021						
Jun 2010	**ISIN**	**Amt issued**	**Coupon**	**Conversion factor***	**Issue Dt**	**Maturity**
	IT0003493258	23,318,000,000	4.25	0.888655	25.06.2003	01.02.2019
	IT0004423957	22,644,728,000	4.50	0.904675	03.11.2008	01.03.2019
	IT0004489610	22,275,000,000	4.25	0.882877	04.05.2009	01.09.2019
	IT0003644769	21,090,500,000	4.50	0.897022	24.03.2004	01.02.2020
	IT0004536949	11,770,386,000	4.25	0.878162	22.09.2009	01.03.2020
Total		**101,098,614,000**				

Maturity window: 12.03.2019–10.09.2021						
Sep 2010	**ISIN**	**Amt issued**	**Coupon**	**Conversion factor***	**Issue Dt**	**Maturity**
	IT0004489610	22,275,000,000	4.25	0.885352	04.05.2009	01.09.2019
	IT0003644769	21,090,500,000	4.50	0.899052	24.03.2004	01.02.2020
	IT0004536949	11,770,386,000	4.25	0.880567	24.03.2005	01.03.2020
	IT0004009673	24,726,830,000	3.75	0.827991	26.01.2006	01.08.2021
Total		**79,862,716,000**				

* plus new issues & tappings during this time

Appendix 3: Derivation of a fixed income futures hedge ratio

When hedging a bond exposure with fixed income futures the fund manager is trying to equate a movement in fixed income futures to a movement in the underlying bond holdings.

Therefore, the hedge ratio = dC / dF
Where dC = change in bond and dF = change in fixed income futures.

It is assumed, because of cash and carry arbitrage, fixed income futures will track the cheapest-to-deliver bond that is, dF = dCTD / CFctd

Where dCTD = change in the cheapest-to-deliver bond; and CFctd = conversion factor of the cheapest-to-deliver bond.

Substituting, hedge ratio = dC / dCTD × CFctd.

Therefore, for small changes in yield:
hedge ratio = BPV bond to be hedged / BPV CTD × CFctd. (Where BPV = Price change of an .01 change in yield)

The number of bond futures to hedge a bond holding is therefore: (BPV bond to be hedged / BPV CTD bond) × CF ctd × (nominal exposure / nominal size of future).

When hedging the CTD bond the expression, (BV bond to be hedged / BPV CTD bond), cancels out and the hedge ratio becomes the CFctd and the number of bond futures to hedge the CTD bond becomes: (nominal bond exposure / nominal size of bond future) × CFctd.

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