

## **Portfolio Analysis**

#### 22 September 2010

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#### Metropolitano de Lisboa

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Section 1

# Introduction

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INTRODUCTION

## **Executive Summary**

- As mentioned during the previous conference calls, the aim of the document is to analyse the markto-market and the projected cash-flows sensitivities across different interest rate scenarios and interest rate curves of the derivative portfolio (the "Portfolio") of Metropolitano de Lisboa
- The first section will focus on the Portfolio sensitivities
- The second one will analyse 5 transactions (the "Selected Trades") that are more relevant in the current valuation of the Portfolio
- With this analysis we aim to provide you with a good understanding of the main risk exposure in the Portfolio and concentrate on the positions that stand out from a risk exposure point of view
- The outcome will highlight an overall "short" position with respect to the outright level of interest rates and a potentially significant negative convexity
- We feel that the overall Portfolio risk is material and hope that this analysis could be used in order to facilitate a discussion about a risk reducing process

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### Portfolio Description<sup>1</sup>

- The Portfolio is composed of 72 over-the-counter positions characterised by different maturities, notional, leverage and a variety of risk factors including multicurrency interest rates (EUR, USD, GBP and JPY) and EUR Inflation
- For clarification purposes we have grouped the transactions into 6 different categories:
  - <u>Vanilla</u>: vanilla fix/float swaps and unleveraged caps/floors
  - Steepener: linked to outright Constant Maturity Swaps ("CMS") or CMS Steepeners
  - Leveraged Steepener: as above but with an explicit leverage on the payoff
  - Path Dependent: trades with a "memory" feature with coupons linked to the previous ones
  - <u>Implied Volatility</u>: trades with a payoff linked to the implied interest rate volatility
  - Index Linked: trades linked to a proprietary algorithmic strategy
- As mentioned during our various communications, it was not possible to model the trades in the last category given the proprietary nature of the algorithmic strategy. These trades represent a significant proportion of the portfolio ([22.3]<sup>1</sup>% of current notional)

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INTRODUCTION

## Portfolio Description<sup>1</sup>

• The table below summarises the number of trades per category and the indicative performance attribution to the negative mark-to-market of the Portfolio

#### Portfolio Performance Allocation

Category	Percentage of Losses	Number of Trades
Vanilla	[11]%	24
Steepener	[11]%	9
Lev Steepener	[5]%	4
Path Dependent	[62]%	18
Implied Volatility	[11]%	3
Index Linked	[NA]%	14

 Additionally, some transactions include rating or government-ownership mandatory break clauses. Indicatively the mark-to-market of these positions corresponds to [35.7]% of the mark-to-market of the Portfolio. These features add additional liquidity risks as Metropolitano de Lisboa could be forced to unwind the trades at market

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Section 2

# Portfolio Scenario Analysis

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PORTFOLIO SCENARIO ANALYSIS

**EUR Millions** 

200

150

100

50

0

-50

-100

ŝ

---- EUR

Source Morgan Stanley

25

0

USD

25

GBP

## Mark-to-Market Sensitivities<sup>1</sup>

#### Portfolio Mark-to-Market Variation under Parallel Shifts

- We have split the sensitivities of the Portfolio across different swap curves (EUR, USD, GBP and JPY). The chart shows the estimated changes of the markto-market of the Portfolio for different parallel shift scenarios:
  - A sell off in EUR, USD and GBP swap market rates will improve the current negative mark-to-market whereas a further market rally (or a prolonged low rate scenario) will hamper the value of the Portfolio
- The JPY sensitivity is significantly lower and opposite with respect to the 3 other analysed market rates
- The Portfolio is furthermore characterised by a negative convexity due to the amount of optionality sold

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Notes 1. 50

75

JPY

8

125

150

175

200

225

250

275

30



PORTFOLIO SCENARIO ANALYSIS

## Cash-Flow Projections<sup>1</sup>

- Portfolio Discounted Cash-Flow Projections under Interest Rate Scenarios EUR Millions 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -100 -105 -110 -115 The averages across scenarios are: -120 - Base Scenario: [-40.3]MM -125 - Rally Scenario: [-48.2]MM -130 - Sell-Off Scenario: [-33.5]MM -135 -140 - Japanese Scenario: [-70.2]MM -145 -150 31-Dec-16 31-Dec-10 31-Dec-17 31-Dec-18 31-Dec-19 31-Dec-12 31-Dec-20 31-Dec-11 31-Dec-13 31-Dec-15 31-Dec-21 31-Dec-14 31-Dec-23 31-Dec-24 31-Dec-29 31-Dec-30 31-Dec-22 31-Dec-25 31-Dec-26 31-Dec-28 31-Dec-27 **Base Scenario Rally Scenario** Sell-off Scenario Japanese Scenario Source Morgan Stanley
- We have then analysed the Portfolio in 4 different interest rate scenarios:
  - Base Scenario (current EUR, USD,GBP and JPY interest rate environment<sup>2</sup>)
  - Rally Scenario (equal to Base Scenario minus [50]bps<sup>2</sup>)
- Sell-Off Scenario (equal to Base Scenario plus [50]bps)
- Japanese Scenario (all curves to mirror the current JPY swap rates)
- For each of these we have calculated the discounted expected annual net cash-flow (please refer to the box in the bottom right corner)

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As of 15 September 2010. Please note sensitivities are dynamic and subject to market changes Please refer to Appendix A for details on the underlying curves used



## Conclusions<sup>1</sup>

- The Sell-Off Scenario (plus [50]bps parallel shift) implies an annual discounted expected net negative cash-flow equal to EUR [33.5]MM. Even an extraordinary +[175]bps instantaneous sell-off across all curves would improve the annual expected net negative cash-flow only to minus [26.5]MM
- The Portfolio is furthermore characterised by a significant negative convexity: across all analysed scenarios for a given rally in the interest market and an equivalent sell-off, the change in the mark-tomarket will be greater in the negative scenario
- The considered worst-case scenario (Japanese Scenario), exhibits a total expected discounted negative net annual cash-flow of EUR [70.7]MM
- The current state of the Portfolio, including the potential for further downside, suggests it may be prudent to consider a strategic de-risking

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Section 3

# **Selected Trades Scenario Analysis**

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## Introduction<sup>1</sup>

• We have then repeated the same analysis on a selection of 5 different transactions (the "Selected Trades"):

Selected Trades <sup>1</sup> C'party	Current Notional	Description	Indicative mid MtM
Santander	EUR 25MM	Path Dependent ("PD") on Euribor 2% Floors / 6% Caps	EUR -[190]MM
Santander	EUR 92MM	PD on USD Libor 1.50% Floors and 8% Caps	EUR -[56]MM
Santander	EUR 100MM	PD on USD Libor 1.50% Floors and 8% Caps	EUR -[153]MM
Barclays	EUR 15MM	PD on 10y EUR and 10y GBP Differential	EUR -[10]MM
J.P. Morgan	EUR 170MM	PD on 10y GBP and 3m JPY Libor Differential	EUR -[70]MM

- We have considered these positions due to (i) the very leveraged nature caused by the pathdependency feature and (ii) the fact that the bulk of the risk lies in these 5 transactions
- For each of these we looked at:
  - (i) the sensitivities across swap curves
  - (ii) the expected annual cash-flows

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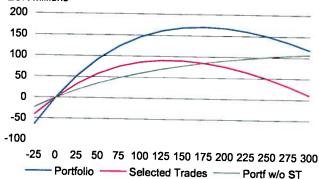


## Mark-to-Market Analysis<sup>1</sup>

- The charts show the change in mark-to-market of (i) the Portfolio (blue line) and (ii) the Selected Trades (red line) under different interest rate scenarios (parallel shifts) and across the 4 main interest rate curves (EUR, USD, GBP and JPY)
- The Selected Trades represent a relevant proportion of the total risk of the Portfolio
  - Without these trades the Portfolio sensitivity to USD, GBP, and JPY curves would be significantly reduced (green lines)

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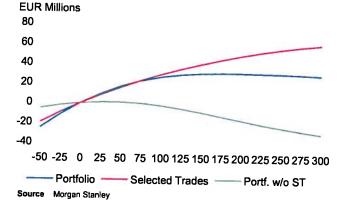


Source Morgan Stanley

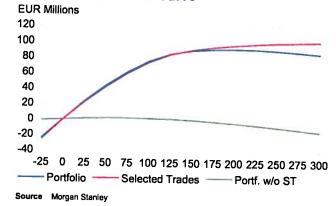


Parallel Shifts of EUR Curve

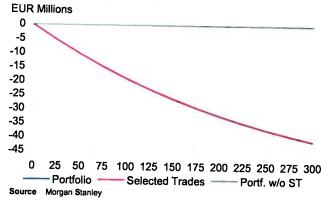
EUR Millions



#### Parallel Shifts of USD Curve



#### Parallel Shifts of JPY Curve





## Conclusion<sup>1</sup>

- In the Base Scenario the sum of the annual expected net cash-flow of the Selected Trades is equal to EUR [-36.7]MM (i.e. [52]% of the Portfolio). In the worst case the sum is equal to [72.8]MM (i.e. [59]% of the Portfolio)
- The risk of the Portfolio is very concentrated on these 5 trades. It is very important that these are constantly monitored due to the high sensitivity to interest rate dynamics aggravated by the pathdependency feature

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- The chart shows the average of the discounted net cash-flows of the transaction with maturity in June 2022 (blue bars – Base Scenario)
- We have then calculated the indicative outflows in 3 additional interest rate scenarios (Rally, Sell-Off and Japanese – Please refer to the Appendix A for details of the relevant swap curves)
- The average of the annual discounted net cash-flows are:
  - Base Scenario: [-14.6]MM
  - Rally Scenario: [-20.1]MM
- Sell-Off Scenario: [-10.9]MM
- Japanese Scenario: [-35.3]MM

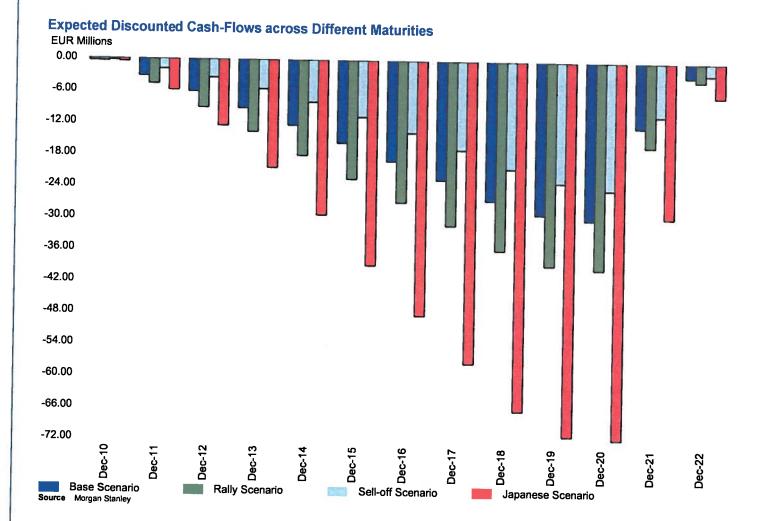
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#### SELECTED TRADES SCENARIO ANALYSIS

## Example: Trade1 Projected Coupons<sup>1</sup>

Santander - June 2022 - Euribor Linked Transaction



Section 4

# Strategic De-Risking Plan Outline

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## **Executive Summary**

- We group the existing Portfolio in three categories according to characteristics such as leverage, negative mark-to-market impact, etc.:
- the first contains the most levered/structured transactions with significant negative mark-to-market impact;
- the second contains less levered/structured transactions, but still carries significant market risk;
- the third contains positions which are low/non-levered
- We suggest a preliminary de-risking strategy for each one of the categories above, trying to minimise the associated transaction costs as well as the impact that unwinding some of the trades may have in a market of limited liquidity and depth. Please note that transactions in Category 3 are generally straightforward interest rate hedges (in most cases) and as such Metro may decide to keep in place rather than unwind
- An oversight of the whole unwind process, which Morgan Stanley can provide, is essential in order to minimise the Credit and Funding costs that the various counterparties will incur and therefore charge
- Metro and the State of Portugal may also want to appoint IGCP as an independent third party to work together with Morgan Stanley during the pricing and unwind process given the Agency's extensive derivatives expertise
- We note that the 14 Index linked transactions currently in the Portfolio will have to be unwound directly with the original counterparties as they are based on proprietary models which are not publicly available

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## Portfolio Description – Cont'd<sup>1</sup>

The table below summarises the number of trades per category and the indicative performance attribution to the negative mark-to-market of the Portfolio (excluding the Index linked transactions)

#### **Portfolio Performance Allocation**

Category	Indicative Percentage of Losses	Number of Trades
Highly Levered/Structured	[77]%	39
Less Levered/Structured	[12]%	9
Low/Non Levered	[11]%	24

 Additionally, some transactions include rating or government-ownership mandatory break clauses. Indicatively the mark-to-market of these positions corresponds to [35.7]% of the mark-to-market of the Portfolio. These features add additional liquidity risks as Metro could be forced to unwind the trades at market if any of these clauses are breached

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## Category 1: Highly Levered/Structured Transactions

- The transactions included in this category make up a very significant proportion of the overall risk of the Portfolio
- The general characteristics are high leverage, high structural complexity, high notional exposure aggravated by the path-dependency (memory) feature and high negative valuation
- They are significant in size compared to the current liquidity and depth available in the market and therefore quite sensitive to even small market moves
- The outline of the de-risking process for these transactions will look as follows:
  - 1. Morgan Stanley will indicate where the specific transactions can be unwound
  - 2. Metro will subsequently come back with target unwind levels
  - 3. Morgan Stanley will, subject to market conditions, take indications of interest to execute the unwind of each of these transactions at the provided target levels
  - 4. Whenever market conditions permit Morgan Stanley will execute 'overlay' swaps for all or part of the notional of the transactions, i.e. swaps whereby Morgan Stanley pay Metro the structured coupon of the transaction being unwound and receive a fixed or Euribor plus [Spread] coupon until the Termination Date of the underlying trade
- The process described effectively unwinds the transaction, i.e. removes the structured coupon that Metro is currently paying under the original transaction, but in a discreet and controlled way as required by the highly levered/structured nature of these trades
- Metro should consider prioritising these transactions in the context of the overall de-risking effort since they represent the bulk of the total risk of the Portfolio

 It will be relevant to have a good understanding of the market implications of unwinding trades in this Category

- As an example, the indicative notional amount of floors required to unwind the first trade in page 12 is equivalent to EUR [3]bn, while our rough estimate of the weekly average market liquidity for such floors (based in part on discussions with other brokers) is only EUR [1]bn
- Conducting large transactions in relatively illiquid markets can be expected to have a larger impact on pricing. The lack of market depth means that unwinding transactions in this Category could move the market, resulting in higher cost for the unwinds
- For that reason, unwinds should be made in stages over a period of several weeks

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## Category 2: Less Levered/Structured Transactions

- The transactions included in this category are still levered and structured in nature, but do not
  possess the high exposures and potential for negative mark-to-market of the previous category
- They are not 'market moving' transactions, which effectively means that there are more options with respect to their unwind
- They could be potentially unwound directly with the original counterparty or through overlay swaps as explained in the previous category
- Morgan Stanley can help in either executing overlay swaps or provide Metro with additional market quotations
- Some of these transactions have valuations which are close to zero, making them good candidates for immediate unwinds
- Similar transactions with potentially offsetting risks may exist in this category of trades, which could
  make the unwind process more efficient

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## Category 3: Low/Non-Levered Transactions

- The transactions contained in this category are ones that can be unwound in the open market even through a competitive process, BUT are not key to de-risking/de-leveraging the Portfolio
- These are positions that can be characterised as 'hedges' since they are either fixed-to-floating swaps or simple interest rate caps and floors
- They may even be excluded from the unwinding process as most reduce the interest rate risk of the underlying fixed rate liabilities
- A few transactions have positive valuations and may be unwound to offset the losses in some of the positions in the previous two categories

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## The Next Steps

- Metro and the State need to jointly agree the need for a de-risking/unwind plan for the Portfolio
- Morgan Stanley can work with Metro in all stages from designing to executing this plan. Morgan
  Stanley has already done substantial analysis on the Portfolio and possesses a wealth of experience
  of similar situations
- IGCP can be included in the process given their derivatives expertise and as a technical advisor to the State
- We anticipate that a final plan can be put in place within the space of a month after the joint decision between Metro and the State. Transactions can subsequently begin to be unwound according to the action plan outlined in the previous pages under the appropriate market conditions
- The following slide summarises the timeline for each of the 3 Categories

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STRATEGIC DE-RISKING PLAN OUTLINE

## Overview of the Strategic De-Risking Plan

**CATEGORY 1** 

**CATEGORY 2** 

MS indicates unwind levels co with

Metro comes back with target levels MS takes indications of interest to unwind according to market conditions MS executes overlay swaps on partial/full size as market permits

All of Category1 trades unwound

MS indicates unwind levels Metro comes back with target levels original counterparty (OC) takes indications of interest to unwind according to market conditions

timeline

MS or

MS executes overlay swaps on partial/full size A as market permits OC executes full/partial unwinds

All of Category2 trades unwound

CATEGORY 3

trades to unwind

1 month

Metro decides

which (if any)

1 month + few weeks

Expected conclusion within 6-9 months

Metro unwinds

trades (if any)

in the open market

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STRATEGIC DE-RISKING PLAN OUTLINE

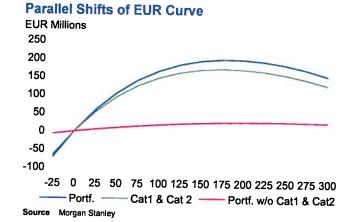
## Mark-to-Market Analysis<sup>1</sup>

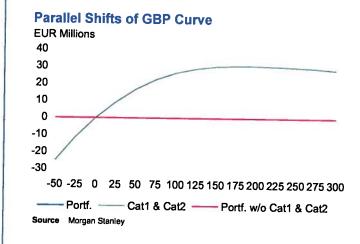
Indicative Sensitivities after Implementation of the De-risking Plan

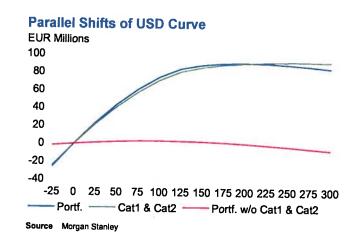
- The charts show the change in mark-to-market of (i) the Portfolio (blue line) and (ii) Category 1 and Category 2 trades (green line) under different interest rate scenarios (parallel shifts) and across the 4 main interest rate curves (EUR, USD, GBP and JPY)
- The red line shows the change in mark-to-market of the remaining Portfolio after all the Category 1 and Category 2 trades have been unwound.
- Moves in the GBP and JPY curves do not impact the valuations of Category 3 trades

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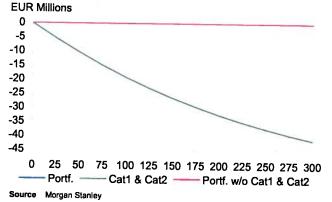
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#### Parallel Shifts of JPY Curve



Appendix A

# Scenario Yield Curves and Assumptions

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SCENARIO YIELD CURVES AND ASSUMPTIONS

**EUR Curve Scenarios** 

₹ 3

**GBP Curve Scenarios** 

Base Scen.

Sell-Off Scen.

57

Base Scen.

Sell-Off Scen.

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Source Morgan Stanley

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2

Source Morgan Stanley

5 2 2 2

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12Y

20Y 25Y

Japanese Scen.

Rally Scen.

<sup>30</sup>

30Y

(%)

4.0

3.0

2.0

1.0

0.0

(%)

4.4

3.3

2.2

1.1

0.0

## Interest Rates Curve Scenarios<sup>1</sup>

- The charts show the interest rates curves used to compute the mark-to-market variations and projected coupons of the Portfolio and the Selected Trades
  - The Base Scenarios are shown in blue and represents the curves as of the 15<sup>th</sup> September 2010
- The JPY Base Scenario is assumed to be the Japanese Scenarios for EUR, USD and GBP

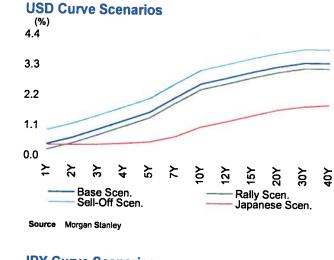
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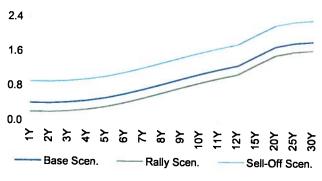
157 157 207 257

Rally Scen.

Japanese Scen.



#### JPY Curve Scenarios



Source Morgan Stanley



## Historical Perspective<sup>1</sup>

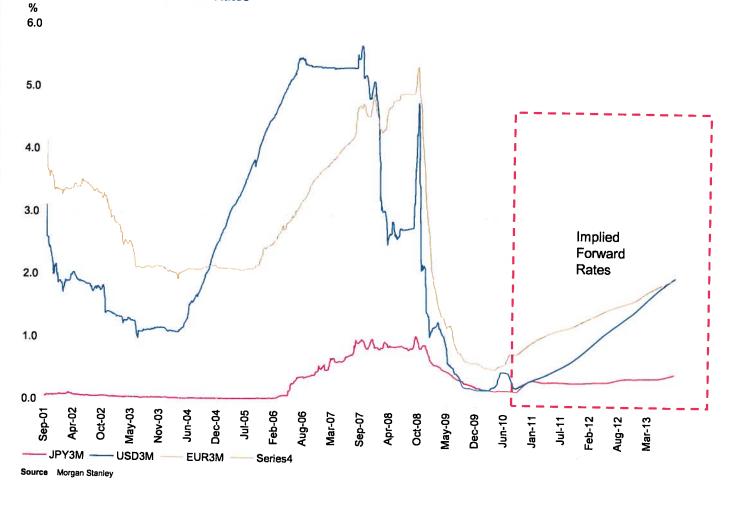
#### **Historical and Forward Libor Rates**



- Yen money market rates have been steadily below 1% for more than a decade
- Euribor and USD Libor forwards, on the other hand, are currently implying a quick recovery with rates reaching 2% in 3 years

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1. As of September, 15, 2010

Notes



SCENARIO YIELD CURVES AND ASSUMPTIONS

## **Assumptions Page**

Clarifications Related to Confirmations

#### Summary of Assumptions

C'party	Maturity Date	Notional (EUR MM)	Description	Cathegory	Assumptions
Credit Suisse	22-Jul-24	100	Constant Mat Cap Spread	Implied Volatility	Cap Spread Removed
Credit Suisse	22-Jul-24	100	Flippable Steepener	Steepener	Flip option cancels all CFs
Deutsche Bank	18-Aug-16	22.5	Range Accrual Flippable	Vanilla	Not yet flipped
Deutsche Bank	18-Aug-16	22.5	Range Accrual Flippable	Vanilla	Not yet flipped
Barclays	15-Jun-22	15	GBP10y-EUR10y Path Dependent	Path Dependent	Timing mismatch on fixings
J.P. Morgan	15-Jun-22	40	2s/10s Path Dependent	Path Dependent	Mistake in the PD feature
UBS	15-Sep-21	91	Implied Straddle Volatility	Implied Volatility	Not unwound yet
UBS	22-Jul-24	100	2s/10s CMS Steepener	Steepener	Not unwound yet

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Appendix B

Important Information



IMPORTANT INFORMATION

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**IMPORTANT INFORMATION** 

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