

Credit Suisse Basis Points

US Interest Rate Strategy

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A Guide to the Front-End and Basis Swap Markets



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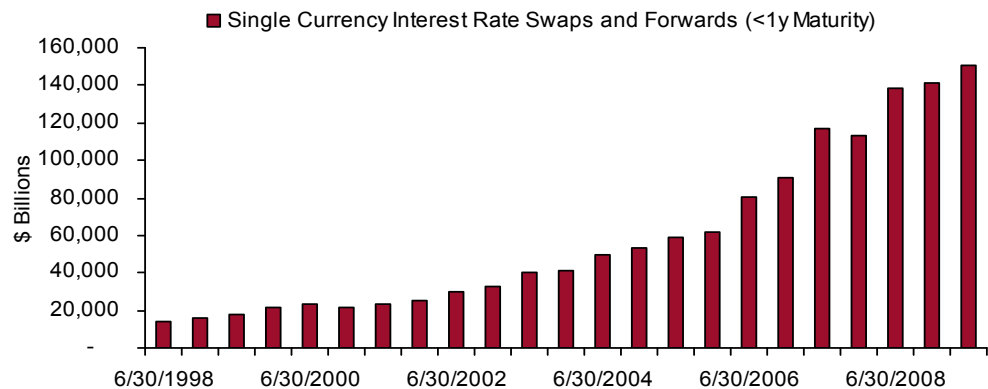
Introduction

The demand for short-term interest rate instruments and derivatives has increased significantly in recent years in response to unprecedented volatility. Policy rates were slashed markedly during 2008 and 2009 in response to the global financial crisis. Meanwhile, the spreads between various short-term benchmark rates became much more volatile as credit concerns caused historically stable relationships to unravel. For example, LIBOR rates rose even as central banks cut policy rates.

Derivatives trading in the front end of the USD rates market increased 33% from the beginning of 2008 to mid-2009. Hedgers increased their usage of short-term instruments in order to protect their cash flows better from unexpected moves in spreads and/or policy rates. Meanwhile, speculators increased their trading of more tailored products such as OIS to express views on policy rates while becoming far more active in the basis markets to take advantage of spread movements.

Recent events provide a useful context for discussing the breadth of products available to market participants in the short-term rates and basis markets. This primer starts with the building blocks of the LIBOR and the fed funds market and moves on to cover the most common instruments in the front-end and basis markets. Sections are devoted to products and are intended to be self-contained. Each section consists of an overview outlining the salient features of the product followed by examples of usage. Sample term sheets for the instruments and derivatives are provided in the Appendix.

Exhibit 1: Growth of short-term interest rate derivatives trading



Source: Credit Suisse, Bank of International Settlements (BIS)

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The Basics

London Interbank Offered Rate (LIBOR)

“[LIBOR is] The rate at which an individual Contributor Panel bank could borrow funds, were it to do so by asking for and then accepting interbank offers in reasonable market size, just prior to 11:00[am] London time.” – British Banker’s Association

In the early 1980s, in order to ensure continued growth in the trading of numerous new instruments such as interest rate swaps and currency options, there arose the pressing need to establish a uniform benchmark index against which these instruments could be referenced. That search for a uniform benchmark culminated in the LIBOR indices. Today, LIBOR serves as the foundation for the bulk of front-end trading and is quoted for a number of tenors and currencies. LIBOR is not a traded

Exhibit 2: LIBOR Panels

Currency	LIBOR Tenors	Number of Contributing Banks
AUD	S/N (spot/next), 1W, 2W, 1M - 12M	8
CAD	O/N (overnight), 1W, 2W, 1M - 12M	12
CHF	S/N, 1W, 2W, 1M - 12M	12
EUR	O/N, 1W, 2W, 1M - 12M	16
GBP	O/N, 1W, 2W, 1M - 12M	16
JPY	S/N, 1W, 2W, 1M - 12M	16
USD	O/N, 1W, 2W, 1M - 12M	16
DKK	S/N, 1W, 2W, 1M - 12M	8
NZD	S/N, 1W, 2W, 1M - 12M	8
SEK	S/N, 1W, 2W, 1M - 12M	8

Source: British Banker’s Association

rate, but rather the outcome of a poll of bank rates submitted to the British Banker’s Association (BBA) at 11am GMT each London business day. The official fixings are calculated by the BBA in conjunction with Reuters and are released to the Telerate/Reuters page 3750 and on Bloomberg to BBAL <GO>.

The term “funds” in the LIBOR definition refers to unsecured deposit rates, which tend to trade at or above secured (repo) rates. LIBORs reflect “offshore” deposit rates, which allow banks to avoid regulation or registration applicable to onshore deposit markets and thus require an added spread to equivalent onshore rates. Note that the terms “Eurodollar”, “Euroyen”, etc., refer to USD or JPY deposits trading outside of their respective domestic deposit markets and are not related to the euro currency.

The fixed LIBOR rate is not precisely linked to the rate a contributing bank would bid for funding, nor is it directly tied to the rate at which a given contributor would offer funding. Instead, it reflects where a given bank deems it could borrow funds in reasonable size should it seek to do so. In essence, the banks are being asked to disclose the rate at which they **believe** the market would be willing to offer cash to them should they desire funding. It is the contributing bank’s perception of where others would offer them funding. Sentiment is, therefore, critical for the direction of LIBOR.

To compute the USD LIBORs, the BBA queries 16 banks each morning, ranks the rates from highest to lowest, removes the top and bottom quartiles and then arithmetically averages the remaining rates. This average is the LIBOR fixing for the day, for a particular tenor. The process is repeated for each tenor to compute the corresponding LIBOR fixings (Exhibit 2). The day-count convention used in the submissions and fixings is actual/360.

LIBOR rates reference accrual periods, with lengths that correspond to the specific LIBOR tenors. The start of the accrual period and the LIBOR fixing date need not, and most often do not, coincide. In the case of USD, the LIBOR fixing date precedes the accrual start date (also known as the LIBOR Spot date or LIBOR Value date) by two London business days. The procedure for calculating the LIBOR spot date from the fixing date is outlined below.

Steps to calculate the LIBOR Spot date:

1. Start with today's date.
2. Go forward two good London business days from (1).
3. If the date from (2) is a good New York business day, (2) is the USD LIBOR Spot.
4. If (2) is not a good New York business day, advance forward until both a good London and New York day is reached. This date is then the USD LIBOR Spot.

LIBOR fixings are generally slower to adjust to small changes in rates than the real-time derivative markets since LIBORs represent deposit rates with wider bid-offer spreads than derivatives. These wider margins allow the fixing panels to adjust rates incrementally, as the bid/offer prices will likely remain valid after a small rate change.

Generally, timing can significantly impact LIBOR fixings. Around quarter-end and year-end turns, LIBOR rates can spike as banks' willingness to lend diminishes near balance sheet reporting periods. In addition, LIBOR fixings after central bank meetings jump noticeably, even when policy changes are fully expected, since cash participants generally want to see the changes before they adjust rates. Notably, the volatility of changes in Wednesday/Thursday fixings is not significantly greater than that of other days even though the value date for Thursday's fixing is three calendar days ahead of Wednesday's value date.

Federal Funds Market

“Federal funds, or fed funds, are unsecured loans of reserve balances at Federal Reserve Banks that depository institutions make to one another. The rate at which these transactions occur is called the fed funds rate.” – (Federal Reserve Bank of New York)

Banks maintain reserve balances at the Federal Reserve Banks to serve two primary purposes – to meet their reserve requirements and to clear financial transactions. The **reserve requirement** is a central-bank-mandated minimum level of reserves that must be held against demand deposits. Currently, the reserve requirement in the US stands at 10%, measured over a period of two weeks (the reserve maintenance period). Any reserves in excess of the reserve requirement are considered **excess reserves**. In the US, banks and other eligible institutions trade these reserves in the fed funds market, a free trading market, to redistribute total reserves in the banking system. Institutions that have excess reserves lend reserves to institutions that have reserve deficiencies with loan terms that are typically overnight, although longer terms can also be arranged.

The eligible entities that can participate in the federal funds market include commercial banks, thrift institutions, agencies and branches of foreign banks in the United States, federal agencies and government securities dealers.¹

Although fed funds are unsecured loans, they are considered safer than unsecured deposits because they occur in the Federal Reserve system under the oversight of the Federal Reserve. The Federal Reserve uses the fed funds market as a tool to implement monetary policy. It does so by setting the target level for the fed funds rate at every Federal Open Market Committee (FOMC) meeting and changing the reserve balances in the system to effect the desired fed funds rate. The Federal Reserve Bank of New York is charged by the FOMC to “create conditions in reserve markets” that encourage the fed funds rate to trade close to a certain level and from time to time **may or may not** intervene in the fed funds market.

While the fed funds target rate is set at the FOMC meetings, the fed funds rate itself is a traded rate that is determined by the trading counterparts in a free market environment. Thus the Fed does not dictate the fed funds rate. During the course of the day, the fed funds rate can vary from transaction to transaction. The **federal funds effective rate**, commonly referred to as the fed effective, is the weighted average of all brokered trades in the federal funds market on a given day and is used as a benchmark in many short-term interest rate instruments. The official fixing is calculated by the Federal Reserve and published between 7:30am and 8:00am EST to the H.15 series of Federal Reserve Statistical Releases. It can also be found on Bloomberg under FEDL <Index> and on Reuters page FEDFUNDS1. The fixing is released with a one-day lag, and thus to avoid confusion, the fixing has an attached correct reference date. For example, brokered trades in the federal funds market for value date 2-Mar-09, are averaged and published on 3-Mar-09, but carry an associated date label of 2-Mar-09.

Excess reserve balances rose sharply from late 2008 into 2010 as the Federal Reserve created reserves in order to fund its credit facilities and asset purchases in the wake of the financial crisis. These large excess balances depressed the funds rate, and absent the Fed’s payment of interest on excess reserves (IOER), the effective rate would tend to trade near zero, as banks would seek to dispose of unwanted reserves at any positive interest rate. For the foreseeable future, IOER will likely be the primary tool to manage the effective rate. Liquidity-draining techniques (reverse repos, time deposits) may be used to mitigate the impact of excess reserves on the effective rate at some point. Still it is likely that a persistent reserve overhang will dampen the impact of various seasonal factors that historically caused predictable sources of volatility in the effective rate.

¹ <http://www.newyorkfed.org/aboutthefed/fedpoint/fed15.html>

Prior to 2008, the funds market exhibited discernable trading patterns. At some point, these factors may again become important considerations if the supply of excess reserves is reduced substantially.

Historically, demand to borrow funds has generally been high on the market open because of offshore entities' needs to cover short balances. This demand often (but not always) tapers off throughout the day. Peak volume occurs in the afternoon after banks have reconciled overnight balances (3pm - 6pm).

Timing can have a significant impact on the fed funds market. Some of the salient date effects are listed below:

- Daily Adjustments
 - Weekends – Effective is generally lower than the target as funds get lent out at a cheaper rate because of the longer time period.
 - Thursdays – Effective is generally higher than the target as Treasury bill auction settlement increases the demand for funds.
- Monthly Adjustments
 - Month-end / Quarter-ends – Effective is generally higher than the target as Treasury note auction settlement increases the demand for funds as does increased corporate borrowing for quarter-end balance sheets.
 - Tax Days / Quarterly Refunding – Effective is generally higher than the target as corporations (15th of each fiscal quarter) and individuals (15 April) borrow to meet tax obligations. Another source of higher demand for funds is the quarterly Treasury refunding settlement on the 15th of February, May, August and November.
 - Mortgage Settlement dates – Effective is generally higher than the target as mortgage bond payments (25th of each month) drain balances of the Government Sponsored Entities (GSE) out of the system.
- Year-end Adjustments
 - Year-end – Effective is generally lower than the target as the Fed injects excess liquidity to the fed funds market.

Forward Rate Agreements (FRAs)

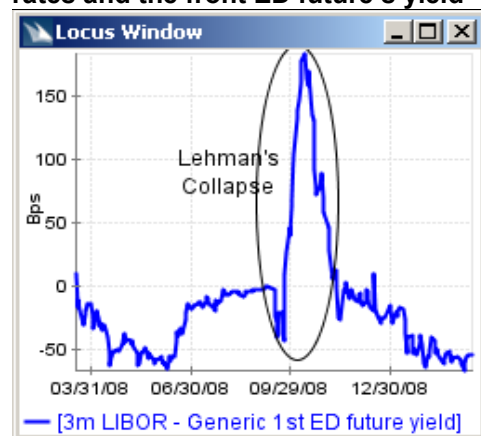
Overview

A forward rate agreement (FRA) is an obligation to exchange a pre-specified fixed rate for a floating reference rate, usually LIBOR in the case of USD, at a pre-specified time in the future for a pre-determined period of time and notional amount. In other words, a FRA is a way of locking in an interest rate today for borrowing/lending that is to take place at some time in the future. The buyer of the FRA pays the fixed rate, while the seller receives the fixed rate.

The FRA level is a result of market supply and demand and thus is a reflection of market expectations of forward rates. In addition, FRAs are over-the-counter instruments with highly customizable start and end dates compared to Eurodollar futures, which are restricted to IMM dates. Because no principal is exchanged, FRAs are credit-efficient instruments with credit risk limited to the difference between the reference and FRA rates. Thus, FRAs can be used extensively to hedge against and express a view on future movements in interest rates.

Eurodollar (ED) futures are generally the cheapest way to express a view on the direction of rates or to hedge interest rate movements. However, ED futures cover limited dates (IMM dates²) and lack convexity, making FRAs an attractive alternative. The importance of hedging for a specific day can be illustrated by the divergence between 3-month LIBOR and the first ED future in the wake of Lehman's collapse. Had an investor used ED futures to hedge a liability based on 3-month LIBOR by shorting the first ED future, the investor would have amassed losses from both the change in the liability and the hedging position. If, instead, the same liability had been hedged with a FRA settling on the same date as the liability fixing, the hedge would have been effective.

Exhibit 3: Difference in 3m LIBOR rates and the front ED future's yield

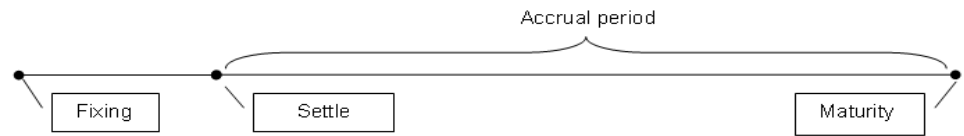


Source: Credit Suisse

ED futures have a constant exposure of \$25 per basis point move in interest rates and thus exhibit no "convexity". A FRA, on the other hand, shows a smaller change in value for a 1bp rise in the forward interest rate than for a 1bp decline in the forward rate (convexity). FRAs are therefore a better hedge for fixed-rate assets and liabilities that are also convex.

A FRA is referenced by three dates – the fixing, settle and maturity dates. On the **fixing date** the reference floating rate is observed. Once the fixing has been determined, accrual begins and cash settlement is made on the **settle date**. In contrast to an interest rate swap, the cash payment for a FRA is made at the beginning of the accrual period rather than at **maturity** (with appropriate discounting).

² International Money Market (IMM) dates are the third Wednesdays of March, June, September and December.

Exhibit 4: FRA Timeline

Source: Credit Suisse

FRA Shorthand Notation

Notation can be a potential source of confusion in FRAs given the three dates that must be referenced to define the timeline of a FRA. Preferred shorthand notation takes the “A*B over C” form (for example, 1*4 over 10th). “A” and “B” refer to the number of months to settle and maturity dates, respectively, and C references the specific day of the month for the maturity date. The step-by-step procedure for identifying the key dates based on the notation A*B over C is as follows:

1. Start with the current LIBOR **spot** date (not the current date).
2. Advance A months forward from (1).
3. Locate the Cth date of the month in (2) – this is the settle date.
4. Advance B months forward from (1).
5. Locate the Cth date of the month in (4) – this is the maturity date.
6. (B-A) month LIBOR is the reference rate (e.g., 1m, 3m, 6m, etc. LIBOR).
7. Two London business days prior to (3) is the fixing date.

Notes:

- A and B must be integers, where B is greater than A.
- C can take on any of the following forms:
 - Numbers: refers to the day of the month (e.g., “1st, 10th, 21st);
 - IMM: refers to the IMM date (3rd Wednesday of the month);
 - End: refers to the last good business day for both NY and London in any given month; and
 - Omitted/spot: refers to the same day of the month as spot.
- If the settle/maturity date falls on a holiday, the next good business day is used.

Exhibit 5 provides concrete examples of shorthand notation for FRAs followed by a list of the most common FRA contracts.

Exhibit 5: Shorthand notation given a sample calendar with US& UK holidays

- **Deal Date: 3-Mar-09**
- **LIBOR Spot: 5-Mar-09**
- **1*4 FRA**
 - 6-Apr-09 to 6-Jul-09, fixing 2-Apr-09
- **1*4 ov IMM FRA**
 - 15-Apr-09 to 15-Jul-09, fixing 9-Apr-09
- **1*4 ov end FRA**
 - 30-Apr-09 to 31-Jul-09, fixing 28-Apr-09
- **1*4 ov 10th FRA**
 - 14-Apr-09 to 10-Jul-09, fixing 8-Apr-09

April						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10 UK	11
12	13 UK	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4 US
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Source: Credit Suisse

Popular FRA runs

Some of the most common FRA runs include the following:

- **FOMC FRAs** (the first FRA fixing after an FOMC meeting) are often used to hedge unexpected changes in the FOMC and the ensuing market reaction to the changes. These FRAs can also be used to express a view on FOMC outcomes.
- **FOMC switch**, the one-day switch between two FRAs before and after FOMC, allows investors to take advantage of, or hedge against, events that cause anomalies in the market, such as a FOMC meeting.
- **Turn FRAs** (Oct 1 or Dec 31) are used in hedging/expressing directional views around specific fixings that are not covered by Eurodollar futures.
- **Turn switches** (Sep 30 vs. Oct 1, and Dec 31 vs. Jan 1), like FOMC switches, are commonly used to take advantage of or hedge against idiosyncratic month-end, quarter-end or year-end effects.
- **FRAs to hedge serial month exposures** (Jan, Feb, Apr, May, Jul, Aug, Oct, Nov) are common given that the IMM Eurodollar futures only cover the first four serial months, which are not very liquid, and do not cover forward serial months. Thus FRAs are generally used for hedging serial month exposures.
- **End-of-quarter FRAs** tend to be popular, as many corporations use them to hedge cash-flow volatility at quarter-end dates.

Exhibit 6: Advantages/Disadvantages of Forward Rate Agreements

Advantages	Disadvantages
<ul style="list-style-type: none"> • Tailorability: FRAs can cover any set of dates, while futures trade specific dates • Off Balance Sheet: FRAs are off-balance sheet derivatives • Quicker Settlement: P&L is exchanged earlier than that of a swap and thus FRAs are slightly less credit intensive 	<ul style="list-style-type: none"> • Wider Bid/Offer than Futures: Less liquidity (given OTC nature) requires compensation • Short-end product: Liquidity out to two years maximum • Subjective Valuation: No official daily settlement; thus valuation is more subjective • LIBOR is a polled rate: FRAs reference LIBOR, which is not a “pure” market rate

Source: Credit Suisse

FRAs used to hedge floating-rate notes

FRAs can be used to hedge against unfavorable movements in interest rates. In particular, FRAs can be used to “lock-in” borrowing or lending costs, to protect against changes in an asset’s value because of swings in discount rates, or to manage portfolio exposure to interest rates.

Consider, for example, an investor who is long \$10million XYZ floating-rate notes (FRNs) that pay 3-month LIBOR + 20bps every March 1, June 1, September 1 and December 1. Hypothetically, this investor decides in June 2009 that 3-month LIBOR is likely to decline prior to the September reset. The investor can protect himself against a decline in LIBOR with a FRA. Specifically, the investor can sell a 3-month FRA for the period September 1 to December 1 (a 3 months forward, 3-month FRA or 3x6 FRA) at the then prevailing rate of 0.766%.

On September 1, 3-month LIBOR had fallen to 0.334% and the coupon on the XYZ floating-rate note reset at 0.534% (0.334% + 20bps). Still, the company would effectively receive a coupon rate of 0.966% (the 0.766% rate “locked-in” + 20bps). The calculations are shown in Exhibit 7. On December 1, the company’s cash inflow comes from two sources – the FRN and the FRA. At a more conceptual level, Exhibit 8 shows the cash flows that would result from hedging the FRN with a FRA.

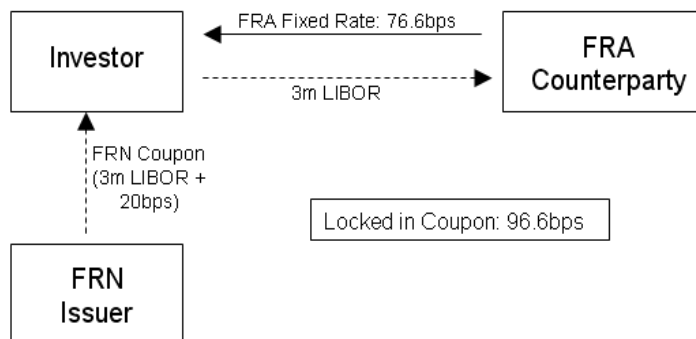
Exhibit 7: Hedging a FRN with a FRA

		Total P&L
Coupon from FRN (on Dec 1)	$0.534\% \times (92/360) \times 10\text{Mil}$	\$13,647
Net Cash from FRA (on Sept. 1)	$(0.766\% - 0.334\%) \times (92/360) \times 10\text{Mil}$	\$11,040
Int. on FRA P&L (if re-invested at 3mL 2.85%)	$0.334\% \times (92/360) \times 11,040$	\$ 9.42
Total Return on Dec. 1		\$24,696.09

Equivalent to coupon of 0.966% (or 3mL of 0.766%)

Source: Credit Suisse

Exhibit 8: Locking in a coupon rate for a floating-rate note



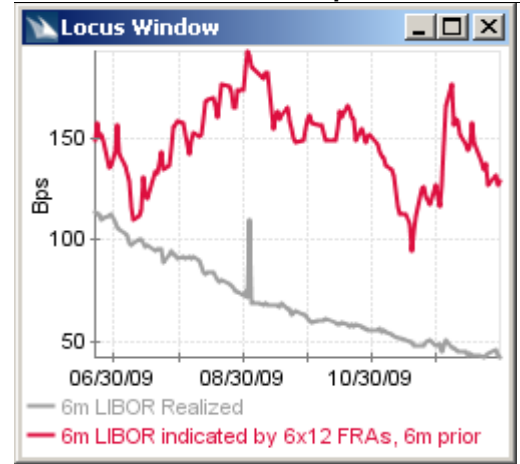
Source: Credit Suisse

FRA's used to express a view on falling LIBOR Rates

As of June 2009, the 6x12 (6 months forward, 6-month FRA) and 6x9 (6 months forward, 3 month FRA) rates indicated that LIBOR rates would remain elevated at or above the then current levels even six month down the road as markets remained nervous. Suppose an investor believed that interbank lending rates would normalize and that the 6-month tenor had more room to fall than 3-month LIBOR. Because there is no futures contract referencing 6-month LIBOR, the investor decides to utilize a FRA.

In particular, had the investor sold the 6x12 FRA on 10 June 2009 at 161bps, he would have realized a profit of 115 bps, as 6-month LIBOR fell to 46 bps as of settlement. The hypothetical cash flows are shown in Exhibit 10.

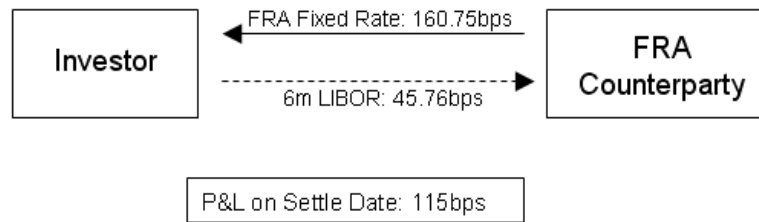
Exhibit 9: Realized vs. implied 6mL



Source: Credit Suisse

Exhibit 10: Hypothetical trade cash flows based on a long 6x12 FRA

Based on Trade date: 6/10/2009



Source: Credit Suisse

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Overnight Index Swaps

Overview

An Overnight Indexed Swap (OIS) is a fixed/floating interest rate swap with the floating leg tied to a published overnight rate index. The start and end dates are highly customizable, providing exposure to virtually any time period a counterparty wishes (the bulk of OIS trades mature within two years, however). The parties agree to exchange at the repayment date the difference between the agreed fixed rate and interest accrued from the geometric average of the floating overnight index rate, on the agreed notional amount. OIS counterparties do not exchange notional principal; settlement is made on a net basis.

Since their introduction in the 1990s, OIS have become widely used, very credit-efficient and liquid derivatives in all major currencies. They are used to hedge against, or express a view on, moves in overnight interest rates. The popularity of OIS has increased in the wake of the 2007/2008 financial crisis, as LIBOR-based instruments often did not capture movements in policy rates as a result of credit-induced widening in LIBOR rates.

In the U.S. market, the reference rate is the overnight fed funds effective rate as set forth in the Fed's H.15 release. Interest payments on bank reserves and open-market operations aim to equilibrate

Exhibit 11: Market Convention (USD OIS)

Reference Rate	Value Date	Payment Date	Rate Basis
Fed Funds Effective	Spot (t+2)	Maturity+2	A/360

Source: Credit Suisse

the maintenance period average level of the effective rate and the Fed's stated policy rate. The effective rate data are published on Reuters page FEDM, Bloomberg page FEDL and Telerate 118. A potential source of confusion in OIS is that the fixing is released with a one-day lag – the fed funds effective rate for a given business day is not released until the morning of the following business day, generally around 7:30am. In addition to the sources cited above, investors can subscribe to email alerts from the NYFRB at the web address: <http://service.govdelivery.com/service/user.html?code=USFRBNEWYORK>.

The accrual of the floating leg of the swap is identical to that of a strategy in which one borrows cash in the amount of the swap's notional principal, invests in the overnight index rate and repeats the transaction, investing principal plus interest on an overnight basis. The fixed leg accrual is a straightforward interest calculation using the contract's agreed fixed rate based on local currency money market conventions.

Exhibit 12: Example of a hypothetical one-week USD OIS trade (spot starting)

	Trade Date	Value Date	End Date	Payment Date	
	Mon 04-Jan-10	Wed 06-Jan-10	Tue 12-Jan-10	Thu 14-Jan-10	
		Wed 06-Jan-10	Thu 07-Jan-10	Fri 08-Jan-10	Mon 11-Jan-10
Fed Funds Effective Rate		0.12%	0.13%	0.14%	0.13%
Day Count Fraction (Act/360)		1/360	1/360	3/360	1/360
1 + Fed Effective x DCF		1.0000033	1.0000036	1.0000117	1.0000036
Cumulative Product		1.0000033	1.0000069	1.0000186	1.0000250

$$\text{Breakeven Fixed Rate} = (1.00002500 - 1) \times (360/7) = 0.1286\%$$

Source: Credit Suisse

Exhibit 13: Advantages/Disadvantages of Overnight Index Swaps

Advantages	Disadvantages
<ul style="list-style-type: none"> • Tailorability: An OIS can cover any set of dates, while futures trade specific dates • More precise for taking Fed views: OIS, because they are so customizable, can trade from one FOMC meeting to another, while fund futures cover calendar months • Credit Efficient: Fixed and floating cash flows occur on matched days. Thus there is no credit exposure from mismatched payment dates • More reflective of market conditions: Unlike LIBOR-based products, the underlying index for OIS is based on traded rates rather than a poll • Less volatile: OIS tend to exhibit lower volatility than like-maturity LIBOR-based products 	<ul style="list-style-type: none"> • Computationally Intensive: Multiple fixing dates and daily compounding require robust systems to handle all cash flows • Wider Bid/Offer for non-standard dates: Liquidity can be sparse for non-standard runs and requires compensation • Short-end product: Liquidity out to three-year maximum • Sensitive to anomalies in fed funds market: The impact of seasonality, tax dates, Treasury settlement dates, etc. on the overnight cash rate can make OIS difficult to model

Source: Credit Suisse

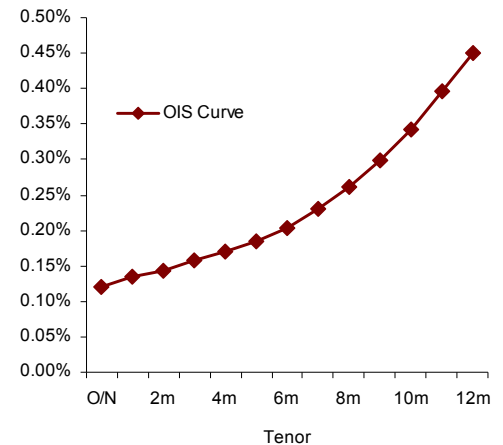
Using OIS to restructure bank liabilities

A bank receiving a one-year term deposit might wish to keep the liquidity of the one-year point but not the one-year term or rate. The bank could receive fixed in a 1-year OIS to achieve a shorter net liability term and (in an upwardly sloping curve) a lower funding rate. Exhibit 15 illustrates how this synthetic liability is structured.

Currently money-center banks are paying about 1.00% on 12-month certificates of deposit. By receiving fixed in a 1-year OIS at 0.45%, they can create a floating-rate 1-year liability that floats daily at effective funds plus 0.55%. With overnight rates hovering around 0.12%, the bank would begin accruing the liability at a rate of 0.67% for a savings of 0.33%. For the hedge to deliver a net savings to the bank over the life of the deposit, overnight rates would need to come in below the 0.45% compounded average implied by the OIS rate.

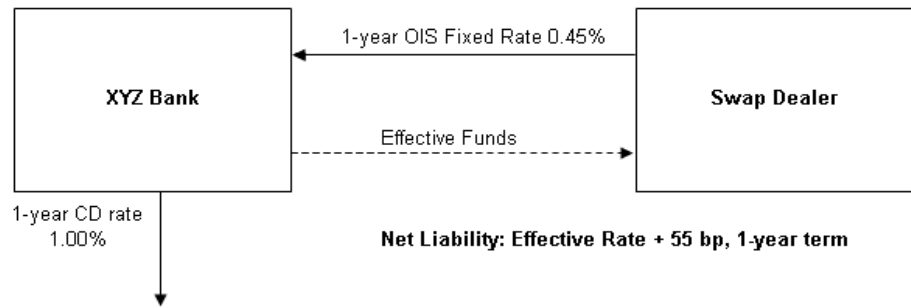
The bank might choose to employ such a strategy to express a view that short rates will be lower than implied by the OIS market or simply to reduce the duration of its liabilities to match their book of assets better.

Exhibit 14: An upward-sloping money market curve allows positive carry for swapping term liabilities to overnight



Source: Credit Suisse

Exhibit 15: Synthetic Deposit Liability



Source: Credit Suisse

Using OIS to hedge repo funding rates

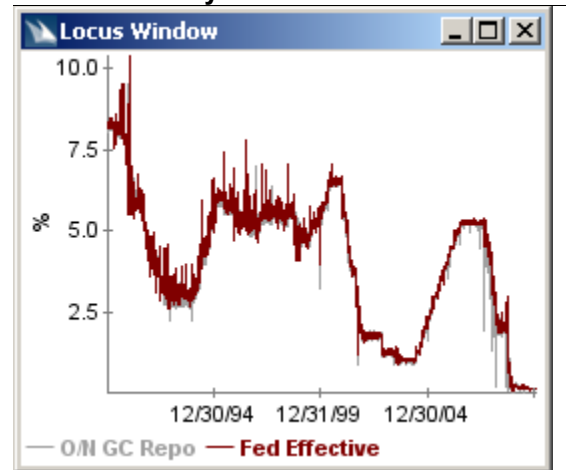
Liquidity in overnight repo markets is very good but tends to fall off substantially at longer terms. Purchasers of Treasury bonds, for example, can use the OIS market to create term repo financing synthetically in order to avoid “paying up” to lock in an actual term repo. Overnight general collateral repo rates tend to track the effective funds rate very closely, making OIS an ideal instrument for terming out a repo.

The diagram in Exhibit 17 shows the mechanics of a synthetic term repo. Specifically, the investor finances his bond with a repo on an overnight basis. Simultaneously, he pays fixed in 1-year OIS, against which he

receives the compounded average of the daily effective funds rate for the year. His net funding cost will be approximately the 1-year OIS rate (0.45%) less the average spread between the overnight GC rate and the fed funds effective (over the past ten years, GC has averaged 8 bps below the effective rate). This would suggest an expected 1-year funding cost of approximately 0.37%. Note that the actual funding rate will vary based on the realized spread between GC and the effective rate and the spread between the repo rate on the bond and GC (the investor will lose the benefit of any episodes in which the bond trades special in repo). Additionally, the repo rate is computed using simple interest, where the effective rate leg of the OIS trade is based on compounded interest, which will reduce the precision of the hedge somewhat; however, the difference will typically be quite small, especially at low levels of interest rates.

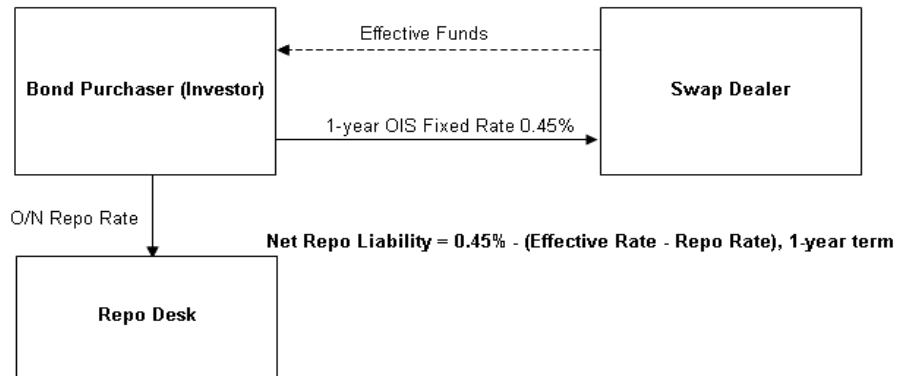
More generally, OIS can be used to create term funding while raising funds in the overnight market.

Exhibit 16: Overnight GC tracks the fed effective closely



Source: Credit Suisse

Exhibit 17: Synthetic 1-year term repo



Source: Credit Suisse

Using OIS to take directional views on T-Bill/OIS spreads

OIS can be used along with Treasury bill purchases or sales to express views on T-Bill/OIS spreads. OIS and T-bill yields are essentially risk free – the T-bill because it is government-backed debt and the OIS rate because it is based on lending among depository institutions under the oversight of the Federal Reserve. Thus the difference in the two rates (the spread) is mostly dependent on supply and demand. In times of crisis, the demand for government debt can soar. Treasuries become the collateral of choice for funding, using repurchases agreements (repos) in times of high uncertainty. T-Bill/OIS spreads therefore tend to widen (on an absolute basis) during a crisis, as illustrated in Exhibit 18.

Exhibit 18: T-Bill (OIS Equivalent)/OIS spread volatility over time

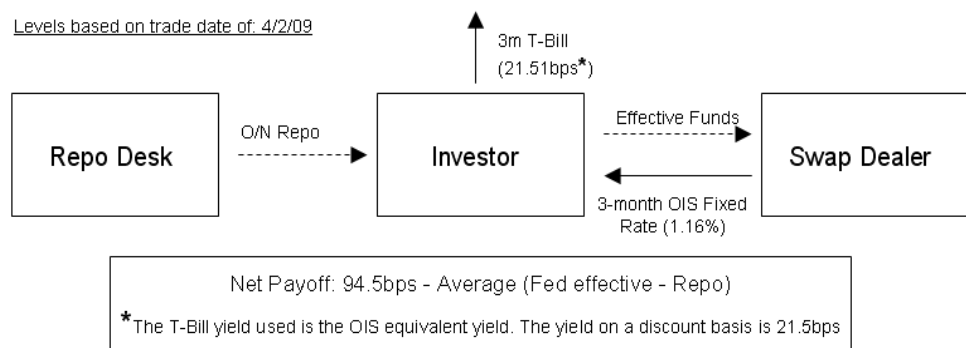


Source: Credit Suisse

Distortions in the market allow for opportunities to exploit the dislocation of the spread between the OIS and the T-bill (OIS equivalent) yields. For instance, should the spread be highly negative, an investor expecting risk aversion to fade could short a T-Bill while receiving fixed in a matched-maturity OIS (Exhibit 19).

Exhibit 19: T-Bill/OIS spread exposure

Levels based on trade date of: 4/2/09

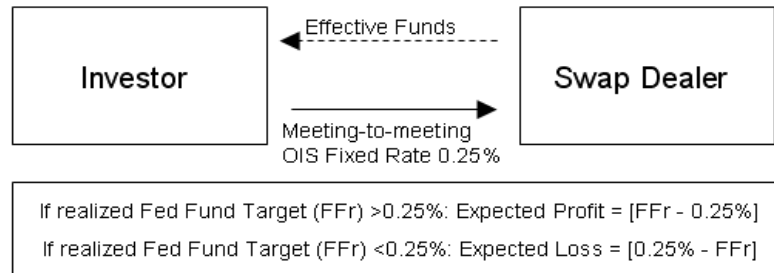


Source: Credit Suisse

Using OIS to anticipate the outcome of FOMC meetings

Meeting-to-meeting OIS, which cover the period from a given FOMC meeting to the next, are an ideal vehicle for anticipating the rate outcome of an FOMC meeting. The OIS fixed rate for a meeting-to-meeting OIS is the expectation of the daily fed funds effective rate compounded over the life of the swap. This expectation should be close to target rate expectations, assuming the fed funds target and effective rates trade close to each other and no inter-meeting rate moves are anticipated. Should an investor have reason to believe the rate change the market has priced in is not accurate, he can use the meeting-to-meeting OIS to express his view. For example, if an investor believes that the rate priced in is too low, he can pay fixed in meeting-to-meeting OIS.

Exhibit 20: Positioning for a higher-than-expected rate hike

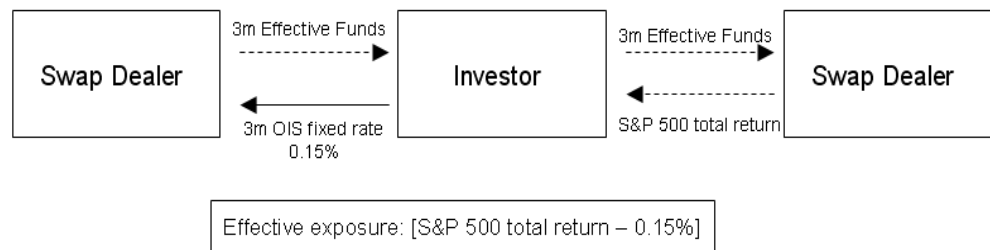


Source: Credit Suisse

Using OIS to hedge one leg of total return swaps

A total return swap (TRS) consists of exchanging the total return on a reference asset, such as the S&P 500 Index, with a floating reference rate plus or minus a spread. Often the fed funds effective rate is used as the floating reference. If an investor believes the market is underpricing the risk of a Fed hike before the next TRS fixing, he can pay fixed in an OIS spanning the period between TRS fixings to lock in a funding rate. Exhibit 21 presents the mechanics of this hedge.

Exhibit 21: Hedging one leg of a total return swap with OIS



Source: Credit Suisse

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FRA-OIS Spread

Overview

The spread between current 3-month LIBOR and spot 3-month OIS (often called the LIBOR/OIS spread) is now frequently cited by the financial press, market commentators and policymakers. The spread is seen as a bellwether for overall credit and liquidity conditions in the interbank market since it represents the premium paid to borrow funds in the LIBOR market versus the more secure fed funds market. It also embodies a term premium, as 3-month LIBOR is compared with expectations for compounded overnight rates. Market participants can hedge against, or express a view on, future moves in LIBOR/OIS by combining an FRA trade with a forward-starting OIS position.

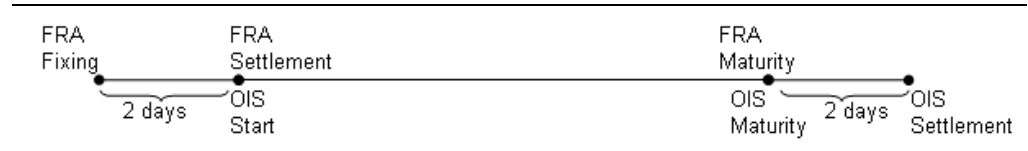
Exhibit 22: LIBOR/OIS spread widened in 2008 with deterioration in bank credit



Source: Credit Suisse

FRA/OIS is quoted as a spread, where the USD FRA uses actual/360 with payment occurring on the settlement date and the USD OIS uses actual/360 (on fixed and floating legs), with payment occurring two New York business days after the maturity date. The timeline of a FRA/OIS is shown in Exhibit 23.

Exhibit 23: FRA/OIS Timeline



Source: Credit Suisse

In a FRA/OIS trade, both legs of the trade cover the same notional principal amount (NPA). IMM FRA/OIS is quoted from one quarterly IMM date reference to the next (they cover the same period as the quarterly ED futures contracts).

Generally FRA/OIS is fairly liquid in the so-called “whites” (which cover the first four quarterly IMM contracts), primarily because of the liquidity in the underlying products themselves. OIS is generally most liquid through one year. Beyond one year, the fed funds futures contracts used as a hedge by market makers become far less liquid and hedges are moved to FF/LIBOR basis swaps.

Using FRA/OIS as a hedge for general bank credit quality

The FRA/OIS spread provides a hedge against general bank credit quality. With the FRA leg tied to LIBOR (interbank lending rate) and the OIS tied to the overnight fed funds effective rate (minimal credit risk), FRA/OIS is a direct measure of the credit quality of financial institutions. Exhibit 24 shows the correlation of the 3x6 FRA/OIS with the 5-year bank CDS. The 3x6 FRA/OIS moves in much the same direction as the bank CDS, indicating that as bank credit quality deteriorates the FRA/OIS spread (in this case the 3x6 FRA/OIS) widens.

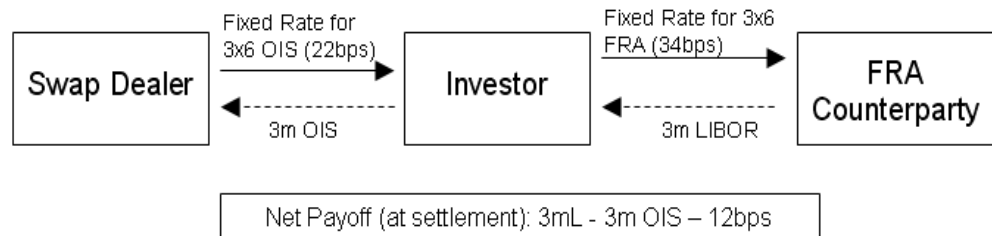
A long FRA/OIS spread position provides a hedge against deterioration of bank credit quality. Synthetically, this would allow an investor to gain exposure to 3-month LIBOR/OIS, which increases with worsening bank credit quality. Exhibit 25 illustrates the net exposure based on current levels of 3-month FRA and OIS rates, three months forward. With the fixed rates already determined, the variable pay-off is then [3mL - 3mOIS], which will result in higher pay-offs with worsening bank credit quality.

Exhibit 24: FRA/OIS vs. Bank CDS



Source: Credit Suisse

Exhibit 25: Constructing a hedge against deteriorating bank credit



Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

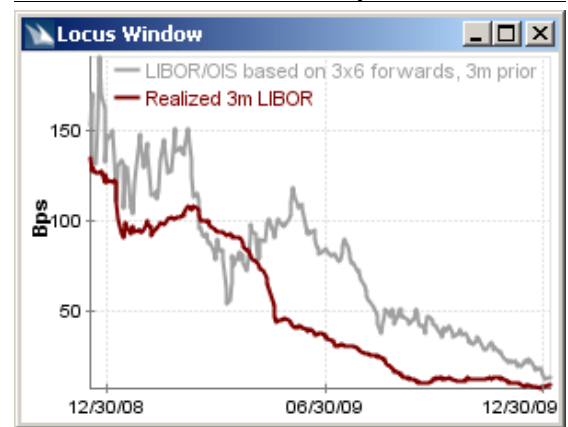
Using FRA/OIS to express directional view on credit spreads

FRA/OIS can be used to express a directional view on credit spreads. During 2007 and 2008, as the banking crisis unfolded, LIBOR/OIS widened significantly and remained at elevated levels until exogenous measures by the government helped credit conditions to thaw.

At the end of April 2009, the 3-month LIBOR/OIS spread started to decline after being elevated for many months. The FRA/OIS market indicated that the LIBOR/OIS spread was expected to remain at or above the then-current levels over the next three months. If an investor had believed that the banking crisis would not last much longer, the FRA/OIS structure could have been used as a credit-efficient way of expressing this view.

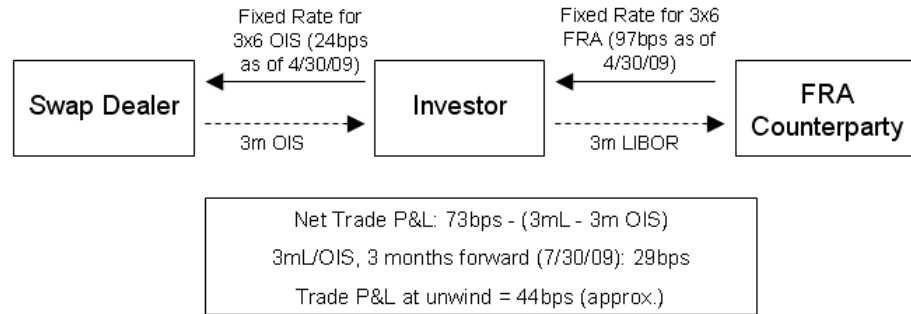
If an investor had anticipated that LIBOR/OIS would come in more quickly than the forwards indicated at the end of April 2009 and accordingly sold the spread (by selling the 3x6 FRA and buying the 3x6 OIS with the same start and end dates), the trade would have resulted in a positive P&L. As shown in Exhibit 26, the realized 3-month LIBOR/OIS was consistently lower than anticipated by the forwards during the period in question. A hypothetical trade based on these premises is presented in Exhibit 27. Three months from the trade date, the 3-month LIBOR/OIS spread was 29bps, resulting in a P&L of 44bps at settlement.

Exhibit 26: FRA/OIS to express a directional view on credit spreads



Source: Credit Suisse

Exhibit 27: Hypothetical FRA/OIS trade to anticipate decreasing credit spreads



Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

Using FRA/OIS to hedge swap spreads generically

Historically, swap spreads and the LIBOR/OIS spread have moved closely together. Exhibit 28 illustrates how the 2-year swap spread has generally moved in tandem with the 3-month LIBOR/OIS spread. The same relationship also holds true for the 5-year and 10-year swap spreads. Thus being short the FRA/OIS spread can be an approximate hedge for a long position in the 2-year swap spread, for example.

Exhibit 28: FRA/OIS as a hedge for swap spreads



Source: Credit Suisse

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LIBOR/LIBOR Basis Swaps

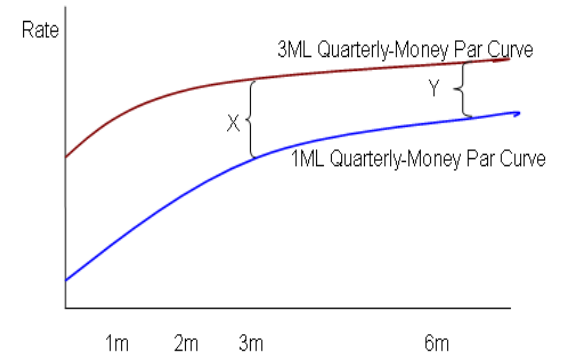
Overview

A LIBOR/LIBOR basis swap is a floating-for-floating exchange of (netted) cash flows, where the floating legs each reference a distinct LIBOR index. Recall that LIBOR is meant to mirror an unsecured deposit rate. As such, credit premium exists for term lending versus rolling funding in shorter intervals and the basis is the value of this optionality. A bank or investor that rolls one-month loans for three months has the option to cancel each month, whereas a bank or investor who lends for a three-month term does not.

The LIBOR/LIBOR basis answers the question: What is the compounded short-tenor rate relative to the long-tenor rate? As shown in Exhibit 29, the 3-month 1mL/3mL basis (3s1s basis) is "X", the difference between the 1-month LIBOR compounded over three months and the 3-month LIBOR also over the same period. A positive 3s1s basis is a result of the compounded 1-month rate being less than the 3-month rate and represents banks' preference to lend for one month rather than three months.

Exhibit 29: 3s1s LIBOR Basis

X: 3 month 3s1s basis; Y: 6-month 3s1s basis



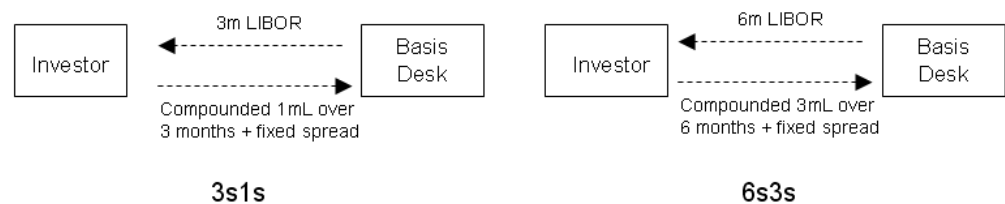
Source: Credit Suisse

LIBOR/LIBOR basis swaps can be an indication of lending preference, basis

curve shape and credit/liquidity perceptions. Typically, the term structure of the LIBOR/LIBOR basis is downward sloping, i.e., the spread between the tenors decreases with time.

In the basis swap market, spreads (basis) are quoted against the shorter underlying tenor, while the payment is determined by the longer tenor. For example, the 3s1s basis is quoted as the 1mL +/- spread and the payment frequency is quarterly. Both legs of a LIBOR/LIBOR basis swap use an actual/360 basis for accrual. Exhibit 30 shows the basic structure of the 3s1s and 6s3s basis swaps, the most commonly traded LIBOR/LIBOR basis swaps. The structures show the cash flows at each payment period (governed by the longer tenor).

Exhibit 30: 3s1s and 6s3s Basis Swap Structures (for buying/paying the spread)

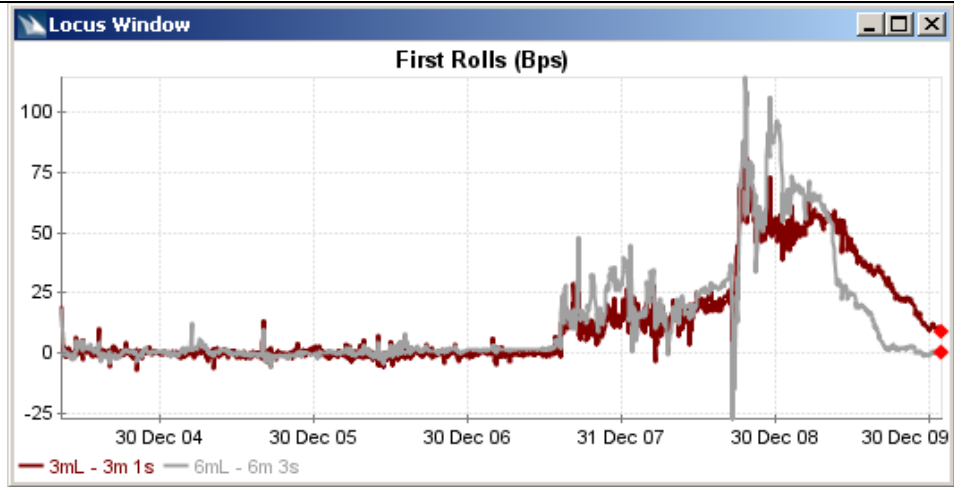


Source: Credit Suisse

The Stub

An important characteristic of the spot starting LIBOR/LIBOR basis swap is the "stub", the first piece of the basis swap, which is responsible for exposure to outright market direction. This exposure results from the first fixing being known at trade inception. For example, at the start of the spot starting 3s1s basis swap, the first compounding rate for the 1-month tenor is already fixed, as is the first payment for the 3-month tenor. This exposes the basis swap to changes in market direction. The payer of the basis has long market exposure, i.e., the payer of the basis benefits from lower rates, and conversely the seller has short market exposure. The stub can be measured as the difference between the longer-tenor LIBOR fixing and the shorter-tenor interest rate swap (IRS) that lasts for the term of the longer tenor. Thus the 3s1s stub is: [3mL – 3m 1s IRS].

Exhibit 31: History of the Stub



Source: Credit Suisse

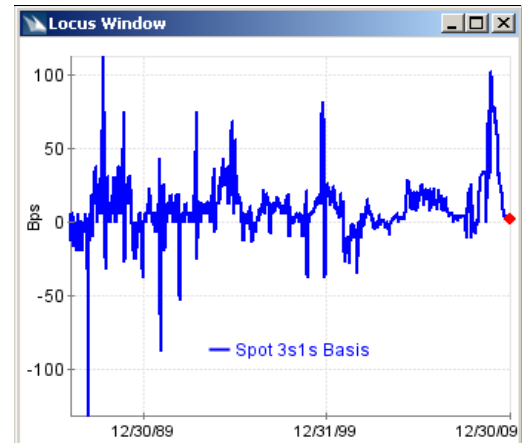
LIBOR/LIBOR basis as a hedge for interest rate uncertainty

Bank balance sheets typically have assets tied to 1-month LIBOR, while their funding is achieved in 3-month LIBOR. The mismatch in assets and liabilities can be a source of additional risk since the basis between the 1-month LIBOR and 3-month LIBOR is not constant (Exhibit 32). Thus, in order to reduce this additional basis risk, financial institutions can use a 3s1s LIBOR/LIBOR basis swap.

Consider a financial institution that makes a student loan with monthly repayments at 8% over the 1-month LIBOR rate. The funding is typically achieved through the issuance of debt based on 3-month LIBOR (with quarterly payments). Assume this institution

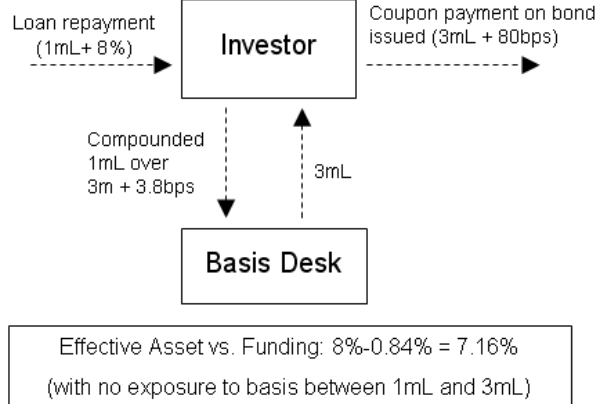
is able to raise debt at 3-month LIBOR + 80bps for a 10-year term. In-order to match the quarterly payment of debt based on the 3-month LIBOR to the asset that brings in loan repayments based on 1-month LIBOR, the financial institution could buy a 3s1s LIBOR/LIBOR basis swap for the term of ten years. The resulting difference between the asset and the funding is locked in, based on the spread above the 1-month LIBOR for the asset, the spread over 3-month LIBOR for the debt and the 3s1s basis for a 10-year term. Exhibit 33 shows how the asset and liability in question can be matched using the 3s1s basis swap.

Exhibit 32: Non-constant basis



Source: Credit Suisse

Exhibit 33: Asset Liability Management using a 3s1s LIBOR/LIBOR basis swap

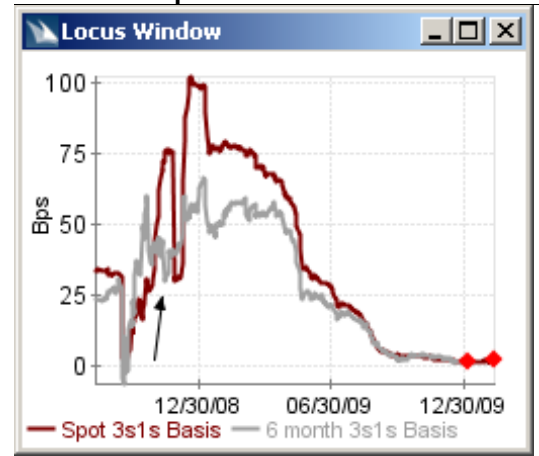


Source: Credit Suisse

Using LIBOR/LIBOR basis to express a view on bank credit

On 14 November 2008, the market expectation for 3s1s was extremely low, as illustrated by the 6-month 3s1s basis swap spread (at 30bps) versus the then-current spot 1-month/3-month LIBOR spread of 76bps. At the time, LIBOR rates were on a downward trend and 1-month LIBOR decreased at a much faster pace than 3-month LIBOR. If an investor had believed that LIBOR rates would continue to fall over the coming six months and that the preference for shorter-term lending would persist given the uncertainty in the financial markets, he/she would have found an opportunity in basis swaps.

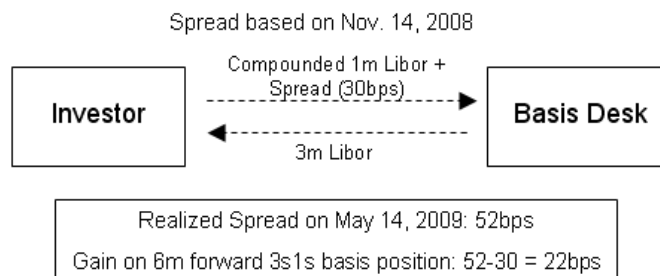
Exhibit 34: Spot vs. 6m 3s1s basis



Source: Credit Suisse

To take advantage of the low market expectations for the 3s1s basis spread, an investor could have established a long position in the 6-month 3s1s basis (by receiving in 3-month LIBOR vs. paying in 1-month LIBOR). As it turned out, the market had over-estimated the scope for narrowing in the 1-month/3-month LIBOR spread and a long 3s1s basis position would have been profitable (Exhibit 35).

Exhibit 35: Expressing a view on higher-than-expected term lending premium (6m 3s1s basis)



Source: Credit Suisse

Using 6s3s basis swaps to match bank assets and liabilities

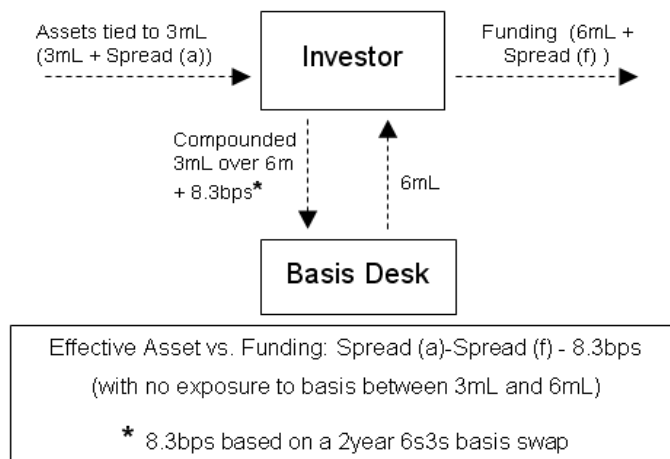
In the international markets, a significant amount of corporate funding is benchmarked to 6-month LIBOR, i.e., companies raise funding by issuing debt tied to the 6-month LIBOR rate. At the same time, international companies also generally hold assets linked to 3-month LIBOR. If left unhedged, the exposure to the 6s3s basis can be a source of risk (Exhibit 36). An investor who wants to minimize this basis risk can buy the 6s3s basis as inexpensive insurance. The mechanics of how this can be achieved are laid out in Exhibit 37 below.

Exhibit 36: Historical 3m/6m LIBOR spread



Source: Credit Suisse

Exhibit 37: Asset Liability Management using a 6s3s LIBOR/LIBOR basis swap

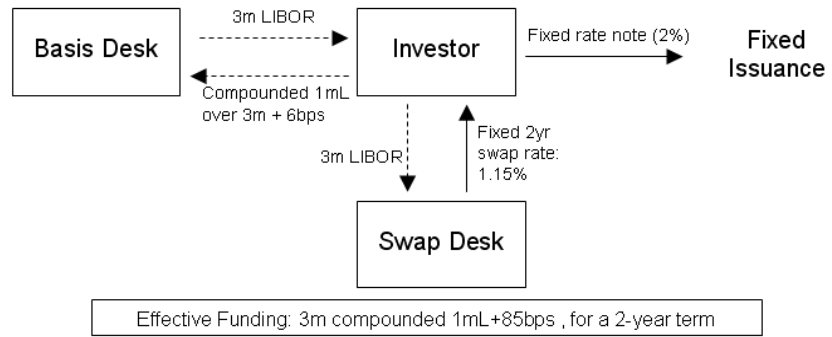


Source: Credit Suisse

Using 3s1s basis swaps to convert issuance exposure from fixed to 1-month LIBOR

Issuers of fixed-rate debt may want to have exposure to 1-month LIBOR instead of a fixed rate to match their liabilities to their assets better or if they are concerned about falling interest rates. In order to achieve funding based on 1-month LIBOR, the issuer can enter into a swap contract, receiving fixed and paying 3-month LIBOR, and use the 3s1s basis swap to swap the 3-month LIBOR exposure to 1-month LIBOR. The result is exposure to 1-month LIBOR instead of a fixed rate. Exhibit 38 shows how a synthetic exposure to 1m LIBOR can be created for fixed-rate issuance using the 3s1s basis swap.

Exhibit 38: 3s1s basis swap used to covert exposure from fixed to 1m LIBOR

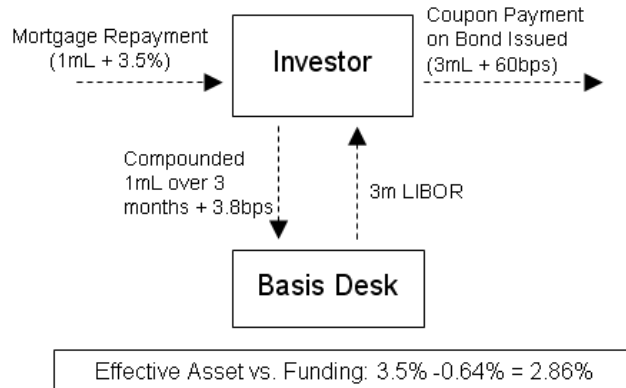


Source: Credit Suisse

Using 3s1s basis swaps to match assets and liabilities of mortgage portfolios

Issuers of mortgage loans that are based on the 1-month LIBOR rate with monthly repayments are often faced with an asset-liability mismatch since the funding for these loans is generally based on 3-month LIBOR rates. The 3s1s basis swap enables owners of mortgage portfolios to match their assets and liabilities better. The mechanics of this asset/liability matching using a 3s1s basis swap are shown in Exhibit 39.

Exhibit 39: 3s1s basis used to match asset/liability of a mortgage portfolio



Source: Credit Suisse

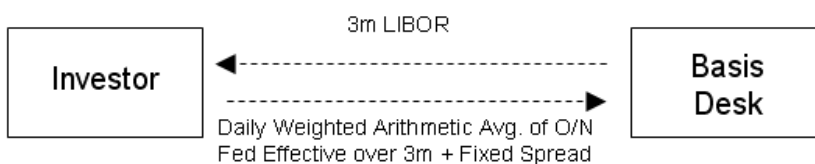
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Fed Funds/LIBOR Basis Swap

Overview

A fed funds/LIBOR basis swap is a floating-for-floating exchange of (netted) cash flows where the fed funds (FF) leg is tied to the fed effective rate and the LIBOR leg to 3-month LIBOR. Spreads are quoted against the FF leg and the payment is made quarterly. The basis swap is referred to simply as “Feds”, and thus “1yr Feds” refers to a one-year FF/LIBOR basis swap. With many institutions that fund based on the fed funds effective but have assets tied to LIBOR, FF/LIBOR basis swaps can match assets and liabilities. The FF/LIBOR basis swap captures bank credit and term premiums since it represents the spread between expected term bank funding rates (LIBOR) and a nearly risk-free daily rate (fed funds). FF/LIBOR basis swaps are used extensively in both hedging and speculation.

Exhibit 40: Cash flows at each payment date for a FF/LIBOR basis swap



Source: Credit Suisse

There is a two-day rate cut-off applied to the FF leg of the FF/LIBOR basis swap because of the one-day lag in the release of the fed funds effective rate. The final fed funds effective fixing is applied to the last two fixing days. Exhibit 41 shows a hypothetical calculation for the daily weighted arithmetic average of the fed effective rate. It is possible to trade absent the rate cut-off so long as the counterparty can make timely payment on the payment date. It is also possible to trade the basis swap versus 1-month LIBOR as long as the payment on the FF leg is clearly specified as monthly or quarterly. Monthly payment includes more rate cut-off periods over the year and thus additional bid/offer spreads will apply.

Exhibit 41: The final fed funds effective fixing is applied to the last two fixing days

Trade Date	Value Date	End Date	Payment Date				
Dec 15, 2008	Dec 17, 2008	Mar 16, 2009	Mar 18, 2009				
Daily Weighted Average							
Date	W, 17-Dec-08	Th, 18-Dec-08	F, 19-Dec-08	...	Th, 12-Mar-09	F, 13-Mar-09	M, 16-Mar-09
Rate	0.12%	0.11%	0.11%	...	0.18%	0.19%	0.20%
Weight	1	1	3	...	1	3	1
Average	0.17548%						
Daily Weighted Average with 2-day rate cut-off							
Date	W, 17-Dec-08	Th, 18-Dec-08	F, 19-Dec-08	...	Th, 12-Mar-09	F, 13-Mar-09	M, 16-Mar-09
Rate	0.12%	0.11%	0.11%	...	0.18%	0.19%	0.20%
Weight	1	1	3	...	1	4 = 3 + 1	0
Average	0.17537%						

Source: Credit Suisse

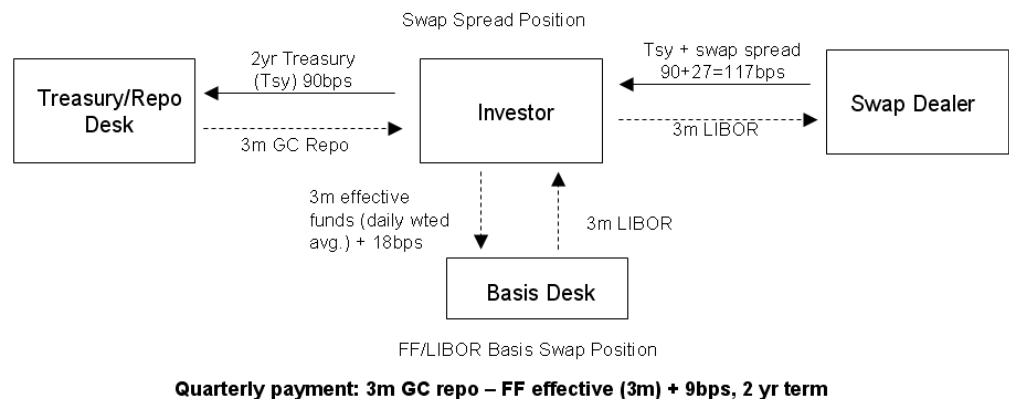
Note that the FF leg in a FF/LIBOR basis swap differs from the floating leg of an OIS (of the same maturity) in the way the daily weighted average is calculated. OIS uses geometric averaging, while the FF leg in a FF/LIBOR basis swap uses arithmetic averaging.

Using FF/LIBOR basis swaps to convert a swap spread trade to a repo/OIS trade

FF/LIBOR basis swaps can be used to convert a short swap spread trade synthetically into a repo/OIS trade. This isolated exposure to repo/OIS allows an investor to express a view on a cheapening of repo (for example, if the investor expects Fed reverse repo operations). Swap spreads embed a credit component in addition to repo/OIS expectations. Specifically, being short the swap spread alone exposes the investor to the difference between the 3-month LIBOR rate and the 3-month repo rate. The repo rate component would be expected to increase if liquidity conditions tighten. However, the LIBOR component, which depends on credit risk of financial institutions, can potentially increase by more than the increase in repo rates.

By constructing a repo/OIS trade, an investor can isolate the exposure to repo/OIS. Exhibit 42 shows how the repo/OIS trade can be created synthetically with the help of a swap spread and the FF/LIBOR basis swap (based on current market prices).

Exhibit 42: Synthetic repo/OIS (using swap spread and FF/LIBOR basis swap)



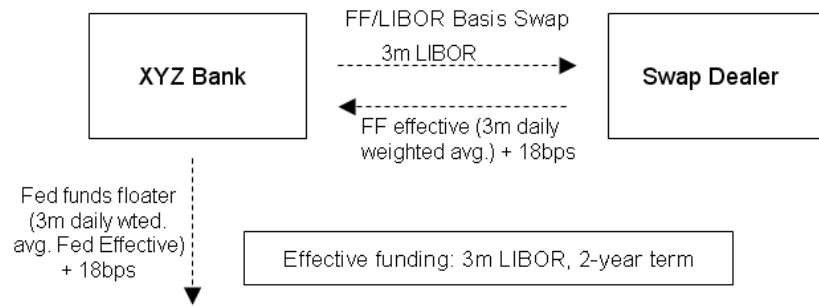
Source: Credit Suisse

Using FF/LIBOR basis swaps to hedge fed funds floaters

The demand, and thus the supply, for fed funds floaters has grown as investors seek to avoid LIBOR/FF spread risk in uncertain market environments. Fed funds floaters are also an attractive alternative for investors who use the repo market for overnight liquidity. These investors can invest core liquidity daily in a fed funds floater instead of investing cash in the repo market, which can sometimes be prone to limitations based on dealer balance sheets.

The banks that issue the fed funds floaters to meet investor demand may seek to fund in 3-month LIBOR (for example, to match asset exposures better). FF/LIBOR basis swaps can be used to achieve 3-month LIBOR funding while still issuing floaters linked to the fed funds effective rate. To illustrate this, assume a bank is issuing a 2-year floating-rate note at fed funds effective + 18 basis points, paying quarterly. The bank can go long a FF/LIBOR basis swap and synthetically achieve funding in 3-month LIBOR (Exhibit 43).

Exhibit 43: Synthetic 3m LIBOR funding (2yr FF floater + 2yr FF/LIBOR basis swap)

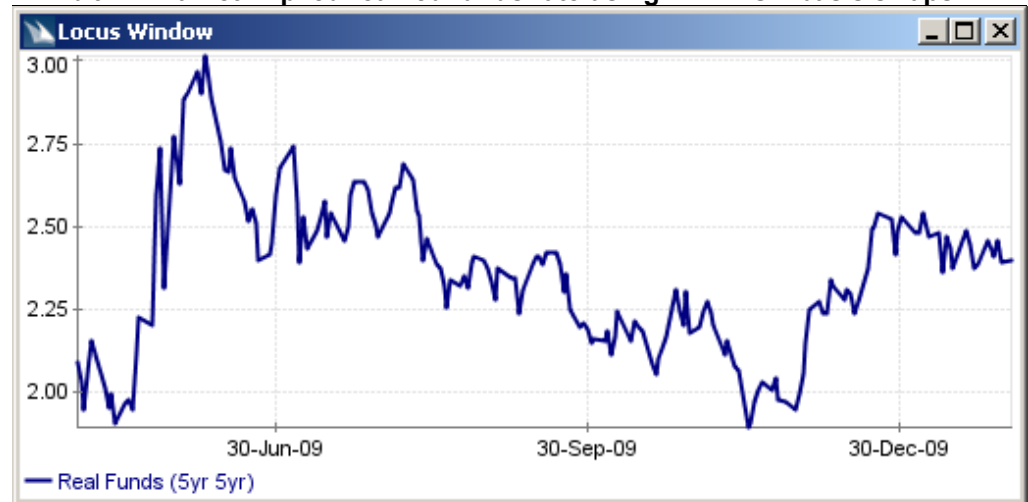


Source: Credit Suisse

Using FF/LIBOR basis swaps to extract 5yr 5yr real fed funds

FF/LIBOR basis swaps allow investors to determine the market-implied 5yr 5yr real fed funds rate. Specifically, 5-year and 10-year FF/LIBOR basis swaps can be used along with 5yr 5yr swaps to extract the market-implied 5yr 5yr fed funds rate, which can then be used in conjunction with the 5yr 5yr TIPS breakeven to construct the market-implied 5yr 5yr real fed funds rate. Standard interest rate rules specify that the long-run equilibrium for the real fed funds rate is somewhere between 2% and 3%. The market-implied 5yr 5yr real fed funds rate is presented in Exhibit 44. Dislocations from the long-run equilibrium may provide trading opportunities. For instance, when the market-implied real fed funds rate is higher than 3%, it is likely the implied rate will revert toward the long-run equilibrium range. An investor can express this view by receiving fixed in a 5yr 5yr OIS while being long the 5yr 5yr TIPS breakevens.

Exhibit 44: Market-implied real fed funds rate using FF/LIBOR basis swaps



Source: Credit Suisse

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Prime/LIBOR Basis Swap

Overview

The prime rate originated as the overnight domestic interest rate that commercial banks charged their most creditworthy customers. In the US, the prime rate has generally been 300 basis points above the fed funds target rate and is used extensively as a reference for loans like home equity lines of credit (HELOC), credit cards, and car and student loans. The official prime fixing is published as part of the Federal Reserve's H.15 release and is the rate posted by a majority of the top 25 insured U.S.-chartered commercial banks (by assets in domestic offices).

A prime/LIBOR basis swap is a floating-for-floating exchange of (netted) cash flows, where the prime leg is tied to the prime rate (H.15) and the LIBOR leg is tied to 3-month LIBOR. The prime/LIBOR swap is similar to the fed funds/LIBOR basis swap, where the first leg is 3-month LIBOR flat and the second non-LIBOR leg (prime) is computed as the weighted average of a daily rate. Payments are made quarterly and accruals are on an Act/360 basis for both legs. These basis swaps have a rate cut-off period of two days before the quarterly settlement on the prime leg because of the one-day lag in the release of prime rates. The final prime rate fixing is therefore applied to the last two fixing days.

Prime rates are based on riskier lending and generally are higher than LIBOR, so the spread on this basis swap is typically negative and quoted as "prime minus spread."

A variant on the prime/LIBOR basis swap is called the Discrete Prime basis swap, where the prime leg depends on a single day per quarter instead of the three-month daily weighted average in the standard prime/LIBOR basis swap case. However, this structure is heavily exposed to inter-meeting FOMC rate changes, as the FOMC meeting is extremely difficult to hedge without slippage.

Exhibit 45: Historical Prime/LIBOR Spread



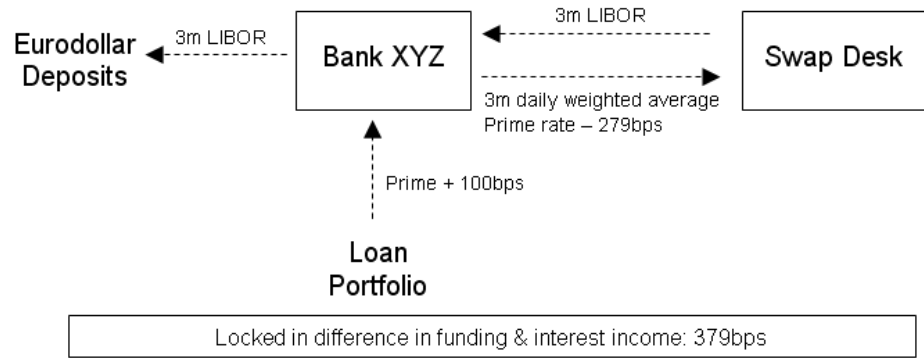
Source: Credit Suisse

Using prime/LIBOR basis swaps for asset liability matching

Banks often issue loans that are based on the prime rate with monthly repayments, like credit card, HELOC and car loans. However, these loans tend to be funded by LIBOR-based liabilities. In order to match their assets and liabilities, banks that hold such loans can use prime/LIBOR basis swaps.

Assume a bank has a student loan portfolio with a maturity of ten years based on prime + 100bps. Further, assume the portfolio is funded by Eurodollar deposits that pay 3-month LIBOR. As seen in Exhibit 45, the spread between the funding rate and the interest income from the loan is volatile and can be a source of risk. To hedge against the volatility in the prime/LIBOR spread, the bank can pay prime versus LIBOR in a swap to lock in the difference between the funding rate and the interest income (Exhibit 46).

Exhibit 46: Matching bank assets and liabilities with a 10-year prime/LIBOR basis swap

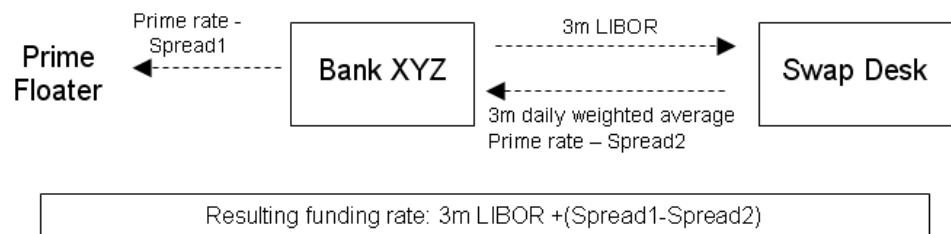


Source: Credit Suisse

Using prime/LIBOR basis swaps to hedge prime floaters

Issuers of floating-rate notes based on the prime rate may seek to fund in 3-month LIBOR in order to avoid exposure to unexpected hikes in the fed funds target rate. Prime/LIBOR basis swaps can be used to convert the funding based on the prime rate to funding based on 3-month LIBOR. Exhibit 47 outlines how the hedge can be constructed using a prime/LIBOR basis swap.

Exhibit 47: Using a prime/LIBOR basis swap to hedge a prime floater

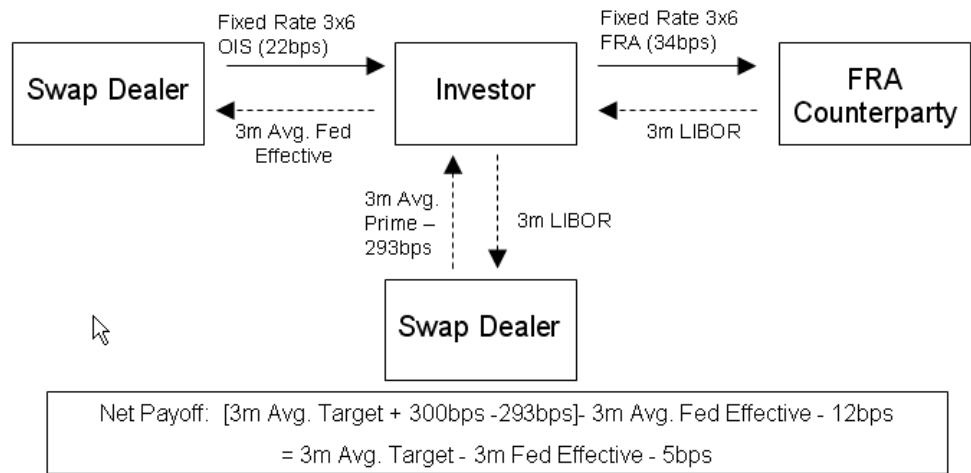


Source: Credit Suisse

Using prime/LIBOR basis swaps to express a view on fed funds effective diverging from target

The prime rate is the only rate that directly references the fed funds target. The prime/LIBOR basis swap can be used together with the FRA/OIS spread to express a view on the divergence of the fed funds effective from the target. If an investor expects the difference between the fed funds target rate and the fed funds effective rate to widen, the hypothetical trade illustrated in Exhibit 48 could be used to express this view. If, on average, over the three-month period starting three months from trade date, the fed funds target is higher than the effective by more than 5bps, the trade would result in a profit. Currently, the relevant target for prime is the upper end of the Fed's range for the effective (0% - 0.25%); the effective has been trading 11-14bps below this upper band.

Exhibit 48: Anticipating divergence of fed effective and target using a prime/LIBOR basis swap

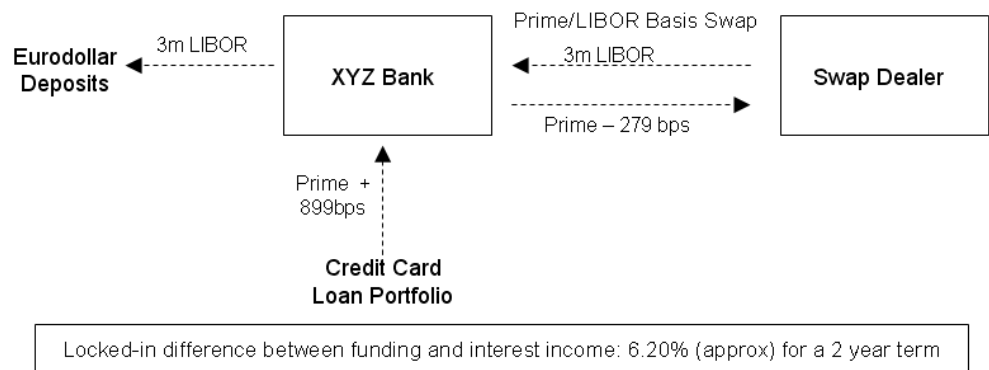


Source: Credit Suisse

Using prime/LIBOR basis swaps to hedge a credit card portfolio

Banks that issue credit cards often have credit card rates tied to the prime rate. The funding for these credit card loan portfolios tends to be based on the 3-month LIBOR rate. To hedge the mismatch between the credit card loan payments (monthly based on the prime rate) and the funding rate (3-month LIBOR), the prime/LIBOR basis swap can be used. Exhibit 49 shows how the prime/LIBOR basis swap can hedge a credit card portfolio by removing the exposure to the prime rate and instead locking in the interest income and funding rate differential.

Exhibit 49: Hedging mismatch between assets & liabilities of a credit card portfolio



Source: Credit Suisse

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Prime/Fed Funds Basis Swap

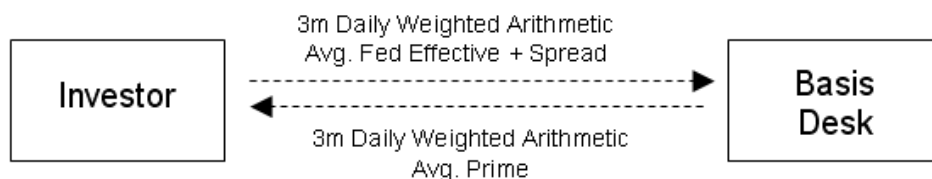
Overview

A prime/fed funds basis swap is a floating-for-floating exchange of (netted) cash flows, where the prime leg is tied to the prime rate (H.15) and the fed funds leg is tied to the overnight fed funds effective rate (H.15). Both legs are computed as the weighted arithmetic average of the daily rate and payments are made quarterly (accruals on an act/360 basis for both legs). The spread is quoted against the FF leg. These basis swaps have a rate cut-off period of two days before the quarterly settlement on both the prime and FF legs because of the one-day lag in the release of the prime and fed funds effective rates.

Using prime/fed funds basis swaps to express a view on consumer credit quality

The prime/fed funds basis can be viewed as a proxy for consumer credit quality, with the prime leg tied to lending rate for banks' most creditworthy customers and the FF leg tied to a near risk-free interest rate. In practice, the prime rate is 300bps over the fed funds target rate and changes only with the fed funds target. However, if consumer credit deteriorates significantly, it is not unthinkable for banks to increase the spread over the fed funds target from current levels. If an investor believed this event was imminent, he/she could express this view by receiving the prime leg and paying the FF leg, as shown in Exhibit 50.

Exhibit 50: Short prime/FF basis to anticipate declining consumer credit quality



Source: Credit Suisse

Using prime/fed funds basis swaps to express a view on divergence of fed effective from target

The prime/fed funds basis is directly linked to the difference between fed funds effective and the target rate (with prime at target + 300bps). Note that the fed target is currently in a range between 0% and 0.25% and the prime rate is 300bps higher than the upper bound on the range. If an investor expects the fed effective to diverge further from the target rate, a prime/fed funds basis swap can be used to express this view. The mechanics of the trade would be the same as shown previously in Exhibit 49.

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Summary & Comparison

Basic Instruments

	Forward Rate Agreement (FRA)	Overnight Index Swap (OIS)	FRA/OIS Spread
Leg 1	Fixed FRA rate	Fixed OIS rate	Fixed FRA rate
Leg 2	LIBOR Index (any tenor) – a polled rate	Overnight fed funds effective rate – a traded rate	Fixed OIS rate
Settlement	Beginning of accrual period (two days after fixing date)	Two days after maturity	FRA leg: two days after fixing date OIS leg: two days after maturity
Floating-Rate Calculation	NA	Compounded daily using simple interest (daily weighted geometric average)	NA
Day Count	Act/360 for both legs	Act/360 for both legs	Act/360 for both legs
Liquidity	Most liquid: 3m FRAs within 2 yrs Reasonably liquid: 1m FRAs within 1 yr Somewhat Liquid: 6m FRAs within 18m Much less liquid: 2m & 12m FRAs Illiquid: All other odd runs	Most liquid: Benchmark runs within 3 yrs Reasonably liquid: IMM-to-IMM, FOMC meeting-to-meeting and odd dated runs all under 1 yr Very Illiquid: USD OIS past 3 yrs	Most liquid: Front white (first 4) IMM runs Reasonably liquid: Non IMM 3m runs within 1 yr Somewhat liquid: Red (5 th -8 th) 3m IMM runs Much less liquid: Green (9 th -12 th), Blue (13 th -16 th) 3m IMM runs Illiquid: 6m and 12m FRA/OIS spreads
Uses	Hedging: <ul style="list-style-type: none"> ▪ Insure borrowing/lending costs ▪ Protect changes in cash flow present value ▪ Manage portfolio reset/fixings exposure Expressing directional views: <ul style="list-style-type: none"> ▪ Express directional views on the term structure of interest rates (less balance sheet intensive than cash products) 	Hedging: <ul style="list-style-type: none"> ▪ Insure borrowing/lending costs ▪ Protect changes in cash flow present value ▪ Manage portfolio reset/fixings exposure Expressing directional views: <ul style="list-style-type: none"> ▪ Express views on FOMC meetings (off balance sheet like the FRAs) 	Hedging: <ul style="list-style-type: none"> ▪ Generically hedge swap spreads ▪ Being a proxy for general bank credit, FRA/OIS can be used to hedge against bank credit quality ▪ One component can be used to hedge a difficult run in either OIS or FRA Expressing directional views: <ul style="list-style-type: none"> ▪ Express directional views on credit spreads

Source: Credit Suisse

Basic Swaps

	LIBOR/LIBOR	Fed Funds/LIBOR	Prime/LIBOR	Prime/Fed Funds
Leg 1	3m LIBOR Index	3m LIBOR Index	3m LIBOR Index	Overnight fed funds effective rate (H.15) Index
Leg 2	LIBOR Index (1m, 6m, 12m) – based on polled rates	Overnight fed funds effective rate (H.15) Index– based on traded rates	Prime rate Index (H.15) – based on quoted rates (fed funds target + 3%)	Prime rate Index (H.15)
Rate Cut-off	None	Two days on FF leg - final fixing applied to last two fixing days	Two days on prime leg – final fixing applied to last two fixing days	Two days on both legs – final fixing applied to last two fixing days
Look-back / Fixing Lag	2 days	0 days	0 days	0 days
Leg 2 Calculation	Flat compounding, e.g., for 3s1s basis swap- 1m LIBOR compounded for 3m	3m daily weighted arithmetic average	3m daily weighted arithmetic average	3m daily weighted arithmetic average on both legs
Spread / Payment	Periodicity determined by longer tenor	Quarterly	Quarterly	Quarterly
Day Count	Act/360 for both legs	Act/360 for both legs	Act/360 for both legs	Act/360 for both legs
Liquidity	<p>Most liquid: Par points to 30yr, 1yr 1yr forward</p> <p>Reasonably liquid: 1 period basis swaps over IMM dates</p> <p>Somewhat Liquid: Runs out of particular dates for standard tenors, forwards further than 1yr 1yr forward</p> <p>Much less liquid: Anything customized</p> <p>Illiquid: Basis swaps greater than 30yrs or against 12mL</p>	<p>Most liquid: Quarterly runs out to 1yr, 18m and 2yr basis swaps</p> <p>Reasonably liquid: 3, 4 and 5yr basis swaps</p> <p>Somewhat Illiquid: Off benchmark runs to 5yrs</p> <p>Much less liquid: 7yr and 10yr points</p> <p>Illiquid: Basis swaps greater than 10yrs</p>	<p>Reasonably liquid: Quarterly runs out to 1yr, 18m and 2yr basis swaps</p> <p>Somewhat liquid: 3, 4 and 5yr basis swaps</p> <p>Much less liquid: Off benchmark runs to 5yrs</p> <p>Illiquid: Basis swaps greater than 7yrs</p>	<p>Reasonably liquid: Quarterly runs out to 1yr, 18m and 2yr basis swaps</p> <p>Somewhat liquid: 3, 4 and 5yr basis swaps</p> <p>Much less liquid: Off benchmark runs to 5yrs</p> <p>Illiquid: Basis swaps greater than 7yrs</p>
Uses	<p>Hedging:</p> <ul style="list-style-type: none"> Asset liability matching by entities that have assets and liabilities tied to different LIBOR indices Protect changes in cash flow present value <p>Expressing directional views:</p> <ul style="list-style-type: none"> Express views on credit and direction of LIBOR-based spreads 	<p>Hedging:</p> <ul style="list-style-type: none"> Asset liability matching by entities that have assets and liabilities tied to fed funds and the 3m LIBOR Protect changes in cash flow present value <p>Expressing directional views:</p> <ul style="list-style-type: none"> Express views on repo/OIS, credit spreads and spread direction 	<p>Hedging:</p> <ul style="list-style-type: none"> Asset liability matching by entities that have assets and liabilities tied to fed funds and the 3m LIBOR Protect changes in cash flow present value <p>Expressing directional views:</p> <ul style="list-style-type: none"> Express views on consumer credit quality, divergence of fed effective and target and general direction of spreads 	<p>Hedging:</p> <ul style="list-style-type: none"> Asset liability matching by entities that have assets and liabilities tied to fed funds and the prime rate Protect changes in cash flow present value <p>Expressing directional views:</p> <ul style="list-style-type: none"> Express views on consumer credit quality, divergence of fed effective and target and general direction of spreads

Source: Credit Suisse

Appendix: Sample Term Sheets

OIS:

3m USD OIS (Trade Date 01-Feb-10)

Payer of Fixed:	XYZ Bank
Receiver of Fixed:	Credit Suisse Int'l – London Branch
Notional:	\$500.0mm
Fixed Rate:	0.50%
Start Date:	03-Feb-10
Maturity Date:	03-May-10
Index:	Fed funds eff. (per H-15), Annual, A/360
Compounding:	3m daily weighted geometric average fed funds eff.

FRA:

1*4 ov 3rd USD FRA (Trade Date 01-Feb-10)

Payer of Fixed:	XYZ Bank
Receiver of Fixed:	Credit Suisse Int'l – London Branch
Notional:	\$500.0mm
Rate:	0.50%
Fixing Date:	01-Mar-10
Start Date:	03-Mar-10
Maturity Date:	03-Jun-10
Index:	3m USD LIBOR, A/360

1*4 ov IMM USD FRA (Trade Date 01-Feb-10)

Payer of Fixed:	XYZ Bank
Receiver of Fixed:	Credit Suisse Int'l – London Branch
Notional:	\$500.0mm
Rate:	0.50%
Fixing Date:	15-Mar-10
Start Date:	17-Mar-10
Maturity Date:	16-Jun-10
Index:	3m USD LIBOR, A/360

FRA/OIS:**1*4 ov 3rd USD FRA/OIS (Trade Date 01-Feb-10)**

XYZ Bank pays on 1.0bln 1*4 ov 3rd FRA from 03-Mar-10 to 03-Jun-10 at 0.30%
 XYZ Bank recs on 1.0bln 1*4 ov 3rd OIS from 03-Mar-10 to 03-Jun-10 at 0.18%
 ***XYZ Bank buys 25k of 1*4 ov 3rd FRA/OIS at 12.0bps

1*4 ov 3rd USD FRA:

Payer of Fixed: XYZ Bank
 Receiver of Fixed: Credit Suisse Int'l – London Branch
 Notional: \$1.0bn
 Rate: 0.30%
 Fixing Date: 01-Mar-10
 Start Date: 03-Mar-10
 Maturity Date: 03-Jun-10
 Index: 3m USD LIBOR, A/360

1*4 ov 3rd USD OIS:

Receiver of Fixed: XYZ Bank
 Payer of Fixed: Credit Suisse Int'l – London Branch
 Notional: \$1.0bn
 Fixed Rate: 0.18%
 Start Date: 03-Mar-10
 Maturity Date: 03-Jun-10
 Index: Fed funds eff. (per H-15), Annual, A/360
 Compounding: 3m daily weighted geometric average fed funds eff.

Mar FRA/OIS (Trade Date 01-Feb-10)

XYZ Bank pays on 1.0bln 1*4 ov IMM FRA from 17-Mar-10 to 16-Jun-10 at 0.30%
 XYZ Bank recs on 1.0bln 1*4 ov IMM OIS from 17-Mar-10 to 16-Jun-10 at 0.18%
 ***XYZ Bank buys 25k of Mar FRA/OIS at 12.0bps

1*4 FRA ov IMM USD FRA:

Payer of Fixed: XYZ Bank
 Receiver of Fixed: Credit Suisse Int'l – London Branch
 Notional: \$1.0bln
 Rate: 0.30%
 Fixing Date: 15-Mar-10
 Start Date: 17-Mar-10
 Maturity Date: 16-Jun-10
 Index: 3m USD LIBOR, A/360

1*4 OIS ov IMM USD FRA:

Receiver of Fixed: XYZ Bank
 Payer of Fixed: Credit Suisse Int'l – London Branch
 Notional: \$1.0bn
 Fixed Rate: 0.18%
 Start Date: 17-Mar-10
 Maturity Date: 16-Jun-10
 Index: Fed funds eff. (per H-15), Annual, A/360
 Compounding: 3m daily weighted geometric average fed funds eff.

LIBOR/LIBOR basis swap:**5y 6s3s LIBOR Basis Swap (Trade Date 01-Feb-10)**

Payer of 6m L:	XYZ Bank
Payer of 3m L:	Credit Suisse Int'l – London Branch
Notional:	\$1.0bn
Start Date:	03-Feb-10
Maturity Date:	03-Feb-15
6m L Pmts:	6m L flat, S/A, A/360
6m L Rolls/Coup:	1st coupon = 0.38375%, 3 rd rolls
3m L Pmts:	3m L + 7.75bps, Qtrly, A/360
3m L Rolls/Coup:	1st coupon = 0.24906%, 3 rd rolls
Compounding:	3m L compounded flat QTRLY, w/net settlement S/A

FF/LIBOR basis swap:**2y Fed Funds/LIBOR Basis Swap (Trade Date 01-Feb-10)**

Payer of FF:	XYZ Bank
Payer of 3m L:	Credit Suisse Int'l – London Branch
Notional:	\$1.0bn
Start Date:	03-Feb-10
Maturity Date:	03-Feb-12
FF Pmts:	Daily weighted average fed funds (H.15) + 20.75bps, QTRLY, A/360
3m LIBOR Pmts:	3m L flat, QTRLY, A/360
Rate Cut-Off:	two-day rate cut off for fed funds

Prime/LIBOR basis swap:**2y Prime/LIBOR Basis Swap (Trade Date 01-Feb-10)**

Payer of Prime:	XYZ Bank
Payer of 3m L:	Credit Suisse Int'l – London Branch
Notional:	\$1.0bn
Start Date:	03-Feb-10
Maturity Date:	03-Feb-12
Prime Pmts:	Daily weighted average prime (H.15) - 275.0bps, QTRLY, A/360
3m LIBOR Pmts:	3m L flat, QTRLY, A/360
Rate Cut-Off:	two-day rate cut off for prime

Prime/FF basis swap:**2y Prime/Fed Funds Basis Swap (Trade Date 01-Feb-10)**

Payer of Prime:	XYZ Bank
Payer of FF:	Credit Suisse Int'l – London Branch
Notional:	\$1.0bn
Start Date:	03-Feb-10
Maturity Date:	03-Feb-12
Prime Pmts:	Daily weighted average prime (H.15), QTRLY, A/360
FF Pmts:	Daily weighted average fed funds (H.15) + 299.75bps, QTRLY, A/360
Rate Cut-Off:	two-day rate cut off for both prime and fed funds

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