Amity School of Business

BBA, Semester V

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Swaps

Nature of Swaps

A swap is an agreement to exchange cash flows at specified future times according to certain specified rules

Forwards is a Swaps

- If investor A gets in a contract with B for trading 1 kg of gold at Rs 15000 for 10gms of gold after a year. Here A and B swaps there cash flow for 100 units of gold.
- A when receive the gold on the maturity date will sell gold in the market at 100 * S. S is the spot rate on maturity. Here the cash flow is 100S. Where as B will get Rs 15000 *100 as his cash flow. So they have actually swapped their cash flows.

Example

- An agreement by Microsoft to receive 6-month LIBOR & pay a fixed rate of 5% per annum every 6 months for 3 years on a notional principal of $100 million
- Next slide illustrates cash flows that could occur

Cash flows of Microsoft

		---------Millions of Dollars---------		
	LIBOR	*FLOATING*	*FIXED*	Net
Date	Rate	Cash Flow	Cash Flow	Cash Flow
Mar.5, 2004	4.2%			
Sept. 5, 2004	4.8%	+2.10	–2.50	–0.40
Mar.5, 2005	5.3%	+2.40	–2.50	–0.10
Sept. 5, 2005	5.5%	+2.65	–2.50	+0.15
Mar.5, 2006	5.6%	+2.75	–2.50	+0.25
Sept. 5, 2006	5.9%	+2.80	–2.50	+0.30
Mar.5, 2007	6.4%	+2.95	–2.50	+0.45

Typical use of an interest rate swaps

- Converting a liability from
  - fixed rate to floating rate
  - floating rate to fixed rate

Example.

If microsoft arranges floating loan at LIBOR + 10 basis point. The cash flows will be :-

1. Pay LIBOR + 10 basis to the lender
2. Receive LIBOR through swap
3. Pay 5%

Effect – Microsoft pays 5.1% interest

Typical use of an interest rate swaps

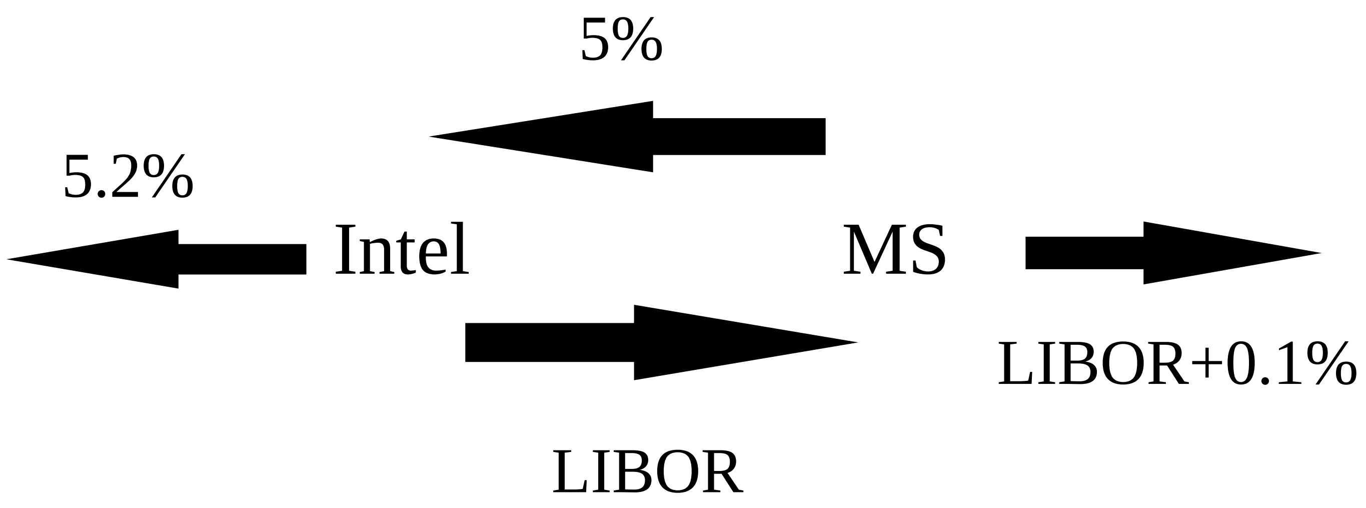
- Converting an investment from
  - fixed rate to floating rate
  - floating rate to fixed rate

Example

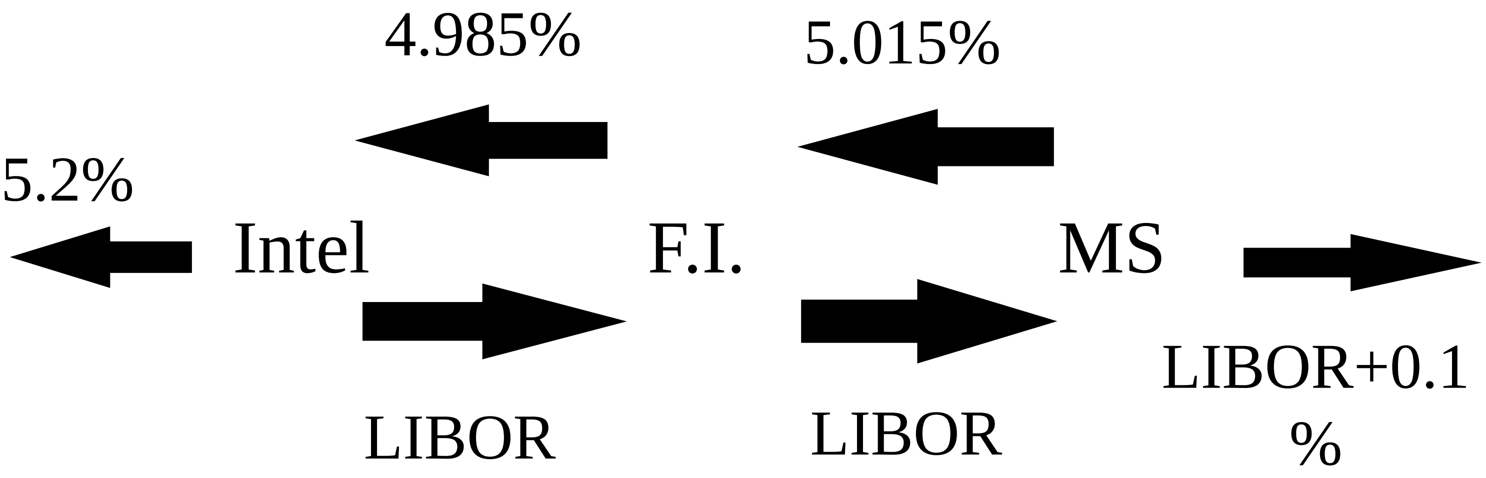
- Microsoft have bonds paying 4.7% p.a. The cash flows are:-
  - Recieves LIBOR under swap
  - Recieves 4.7% on bond
  - Pays 5% under swap

Effect – Inflow of LIBOR minus 30 Basis

Intel and Microsoft(MS) transforms a liability

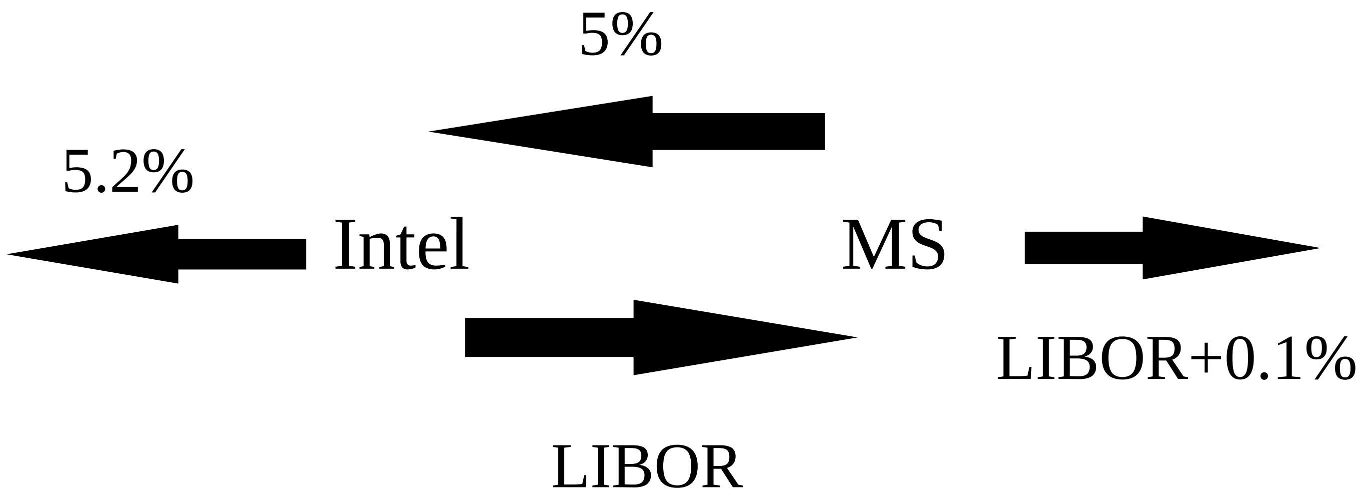


Financial institution is involved

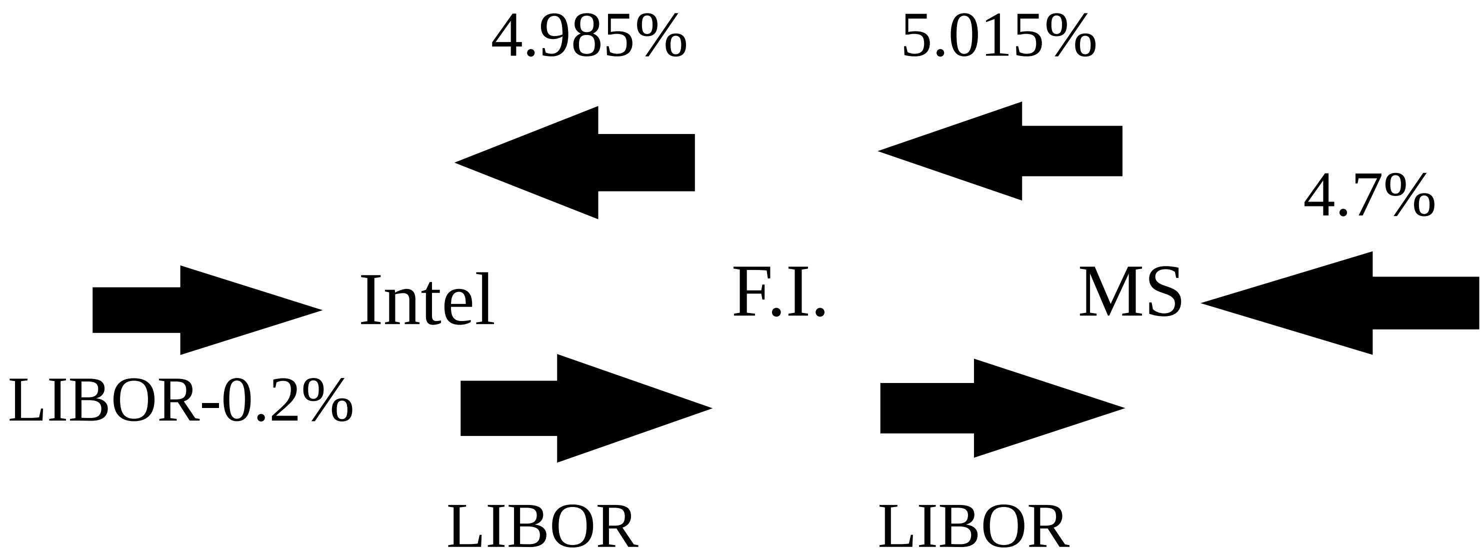


Financial Institution has two offsetting swaps

Intel and Microsoft(MS) transforms an asset



Financial institution is involved



Quotes by a swap market maker

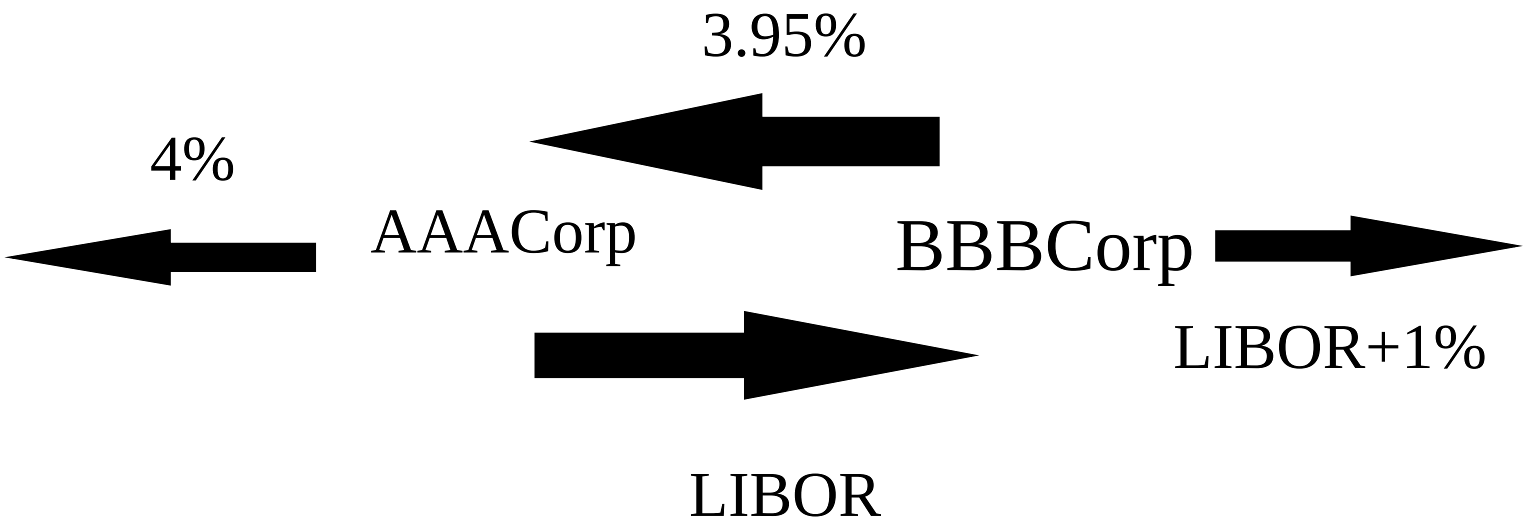
Maturity	Bid (%)	Offer (%)	Swap Rate (%)
2 years	6.03	6.06	6.045
3 years	6.21	6.24	6.225
4 years	6.35	6.39	6.370
5 years	6.47	6.51	6.490
7 years	6.65	6.68	6.665
10 years	6.83	6.87	6.850

Comparitive advantage argument

- AAACorp wants to borrow floating
- BBBCorp wants to borrow fixed

	Fixed	*Floating*
AAACorp	4.0%	6-month LIBOR + 0.3%
BBBCorp	5.2%	6-month LIBOR + 1%

The swap



Uses of an interest rate swap

AAA ltd cash flow.

1. Pay LIBOR to BBB
2. Receive 3.95% through swap
3. Pays 4%

Effect – AAA pays LIBOR + .05% interest

BBB ltd cash flow

1. Pay LIBOR + 1% to lender
2. Receive LIBOR through swap
3. Pays 3.95% to AAA

Effect – BBB pays 4.95% interest

Criricism of comparitive advantage

- The 4.0% and 5.2% rates available to AAACorp and BBBCorp in fixed rate markets are 5-year rates
- The LIBOR+0.3% and LIBOR+1% rates available in the floating rate market are six-month rates
- BBBCorp's fixed rate depends on the spread above LIBOR it borrows at in the future

Nature of swap rates

- Six-month LIBOR is a short-term AAA borrowing rate
- The 5-year swap rate has a risk corresponding to the situation where 10 six-month loans are made to AAA borrowers at LIBOR
- This is because the lender can enter into a swap where income from the LIBOR loans is exchanged for the 5-year swap rate

Using Swap Rates to Bootstrap the LIBOR/Swap Zero Curve

- Consider a new swap where the fixed rate is the swap rate
- When principals are added to both sides on the final payment date the swap is the exchange of a fixed rate bond for a floating rate bond
- The floating-rate rate bond is worth par. The swap is worth zero. The fixed-rate bond must therefore also be worth par
- This shows that swap rates define par yield bonds that can be used to bootstrap the LIBOR (or LIBOR/swap) zero curve

Problem

Suppose 6 month, 12 month and 1 month LIBOR/zero rates have been determined as 4%, 4.5%, 4.8% with continuous compounding and that the 2-year swap rate (semiannually) is 5%. Calculate the zero coupon/LIBOR rates. Notional amount is Rs 100

Solution

$$2.5e^{-0.04X0.5} + 2.5e^{-0.045X1.0} + 2.5e^{-0.048X1.5} + 102.5e^{-RX0.5} = 100$$

Valuation of Interest rate swap that is not new

- Interest rate swaps can be valued as the difference between the value of a fixed-rate bond and the value of a floating-rate bond
- Alternatively, they can be valued as a portfolio of forward rate agreements (FRAs)

Valuation in terms of FRA's

- Each exchange of payments in an interest rate swap is an FRA
- The FRAs can be valued on the assumption that today's forward rates are realized

Valuation of FRA's Example

Time	Fixed cash flow	Floating cash flow	Net Cash Flow	Disc factor	PV B_{fl}
0.25	4.0	-5.100	-1.100	0.9753	-1.073
0.75	4.0	-5.522	-1.522	0.9243	-1.407
1.25	4.0	-6.051	-2.051	0.8715	-1.787
Total					-4.267

Exchange of Principle

- In an interest rate swap the principal is not exchanged
- In a currency swap the principal is usually exchanged at the beginning and the end of the swap’s life

Typical use of currency swap

- Conversion from a liability in one currency to a liability in another currency

- Conversion from an investment in one currency to an investment in another currency

Comparitive advantage argument for currency swaps

General Electric wants to borrow AUD

Qantas wants to borrow USD

	USD	AUD
General Motors	5.0%	7.6%
Qantas	7.0%	8.0%

Swaps and forwards

- A swap can be regarded as a convenient way of packaging forward contracts
- Although the swap contract is usually worth zero at the outset, each of the underlying forward contracts are not worth zero

Credit risk

- A swap is worth zero to a company initially
- At a future time its value is liable to be either positive or negative
- The company has credit risk exposure only when its value is positive
- Some swaps are more likely to lead to credit risk exposure than others
- What is the situation if early forward rates have a positive value?
- What is the situation when the early forward rates have a negative value?

Other types of swaps

Floating-for-floating interest rate swaps, amortizing swaps, step up swaps, forward swaps, constant maturity swaps, compounding swaps, LIBOR-in-arrears swaps, accrual swaps, diff swaps, cross currency interest rate swaps, equity swaps, extendable swaps, puttable swaps, swaptions, commodity swaps, volatility swaps……..