

**Swaps**

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**Nature of Swaps**

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

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**An Example of a “Plain Vanilla” Interest Rate Swap**

- ✦ 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 (Day count conventions are not considered)

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### One Possible Outcome for Cash Flows to Microsoft

Date	LIBOR	Floating Cash Flow	Fixed Cash Flow	Net Cash Flow
Mar 5, 2012	4.20%			
Sep 5, 2012	4.80%	+2.10	-2.50	-0.40
Mar 5, 2013	5.30%	+2.40	-2.50	-0.10
Sep 5, 2013	5.50%	+2.65	-2.50	+0.15
Mar 5, 2014	5.60%	+2.75	-2.50	+0.25
Sep 5, 2014	5.90%	+2.80	-2.50	+0.30
Mar 5, 2015		+2.95	-2.50	+0.45

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### Typical Uses of an Interest Rate Swap

- ✦ Converting a liability from
  - ▣ fixed rate to floating rate
  - ▣ floating rate to fixed rate
  
- ✦ Converting an investment from
  - ▣ fixed rate to floating rate
  - ▣ floating rate to fixed rate

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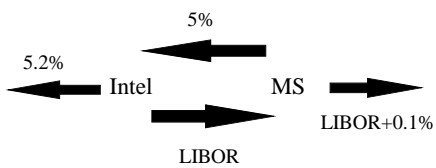
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### Intel and Microsoft (MS) Transform a Liability



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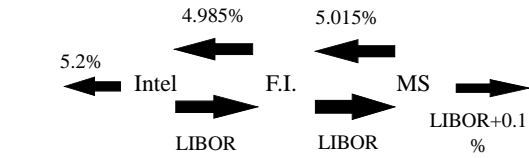
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**Financial Institution is Involved**



Financial Institution has two offsetting swaps

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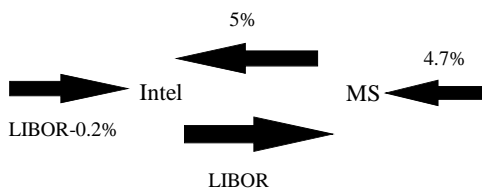
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**Intel and Microsoft (MS) Transform an Asset**



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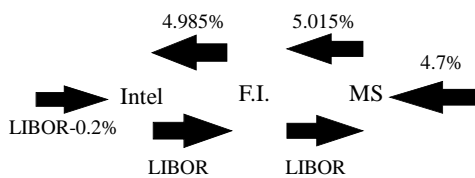
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**Financial Institution is Involved**



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## Day Count

- ✦ A day count convention is specified for fixed and floating payment
- ✦ For example, LIBOR is likely to be actual/360 in the US because LIBOR is a money market rate

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## Confirmations

- ✦ Confirmations specify the terms of a transaction
- ✦ The International Swaps and Derivatives has developed Master Agreements that can be used to cover all agreements between two counterparties
- ✦ Governments now require central clearing to be used for most standardized derivatives

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## The Comparative Advantage Argument

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

	Fixed	Floating
AAACorp	4.0%	6 month LIBOR - 0.1%
BBBCorp	5.2%	6 month LIBOR + 0.6%

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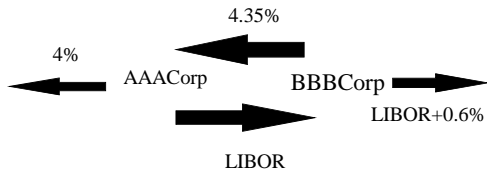
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### The Swap



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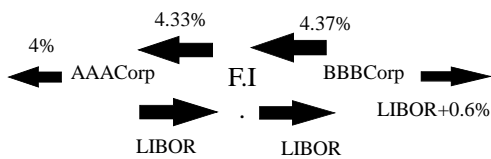
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### The Swap when a Financial Institution is Involved



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### Valuation of Currency Swaps

Like interest rate swaps, currency swaps can be valued either as the difference between 2 bonds or as a portfolio of forward contracts

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### Example

- ✦ All Japanese LIBOR/swap rates are 4%
- ✦ All USD LIBOR/swap rates are 9%
- ✦ 5% is received in yen; 8% is paid in dollars. Payments are made annually
- ✦ Principals are \$10 million and 1,200 million yen
- ✦ Swap will last for 3 more years
- ✦ Current exchange rate is 110 yen per dollar

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### Valuation in Terms of Bonds

Time	Cash Flows (\$)	PV (\$)	Cash flows (yen)	PV (yen)
1	0.8	0.7311	60	57.65
2	0.8	0.6682	60	55.39
3	0.8	0.6107	60	53.22
3	10.0	7.6338	1,200	1,064.30
Total		9.6439		1,230.55

Value of Swap =  $1230.55/110 - 9.6439 = 1.5430$

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### 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

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## 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.....

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## Credit Default Swaps

- ✦ Buyer of the instrument acquires protection from the seller against a default by a particular company or country (the reference entity)
- ✦ Example: Buyer pays a premium of 90 bps per year for \$100 million of 5-year protection against company X
- ✦ Premium is known as the *credit default spread*. It is paid for life of contract or until default
- ✦ If there is a default, the buyer has the right to sell bonds with a face value of \$100 million issued by company X for \$100 million (Several bonds are typically deliverable)

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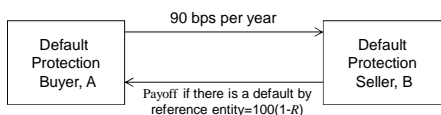
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## CDS Structure



Recovery rate,  $R$ , is the ratio of the value of the bond issued by reference entity immediately after default to the face value of the bond

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### Other Details

- ✦ Payments are usually made quarterly in arrears
- ✦ In the event of default there is a final accrual payment by the buyer
- ✦ Settlement can be specified as delivery of the bonds or (more usually) in cash
- ✦ An auction process usually determines the payoff

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### Attractions of the CDS Market

- ✦ Allows credit risks to be traded in the same way as market risks
- ✦ Can be used to transfer credit risks to a third party
- ✦ Can be used to diversify credit risks

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