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Chapter 7

Swaps

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Definition 7.1

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

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Definition 7.2

In a **"plain vanilla" interest rate swap**, a company agrees to pay cash flows equal to interest at a predetermined **fixed rate** on a **notional principal** for a number of years, while it receives interest at a **floating rate** on the same notional principal for the same period of time.

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Example 7.3

Consider a 3-year swap between Microsoft and Intel initiated on Mar 5, 2024. MS agrees to pay INT 5% (sa) on \$100 million, while INT agrees to pay MS the 6-month LIBOR on the same principal (payments every 6 months). MS is the **fixed-rate payer**, while INT is the **floating-rate payer**.

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Example 7.4

(a) Interest rate swaps can be used to transform a liability

- from fixed rate to floating rate
- from floating rate to fixed rate.

Suppose MS has arranged to borrow \$100 million at LIBOR+10 basis points, INT at 5.2%.

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Example 7.4 (continued)

(b) Interest rate swaps can be used to convert an investment

- from fixed rate to floating rate
- from floating rate to fixed rate.

Suppose MS owns \$100 million in bonds providing 4.7% interest, INT has an investment of \$100 million yielding LIBOR minus 20 basis points.

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Example 7.5

- Here we discuss **comparative advantage**.
- Credit ratings
AAA, AA, A, BBB, BB, B, CCC
- Design an equally attractive swap

	Fixed	Floating
AAA Corp	4.0%	LIBOR +0.3%
BBB Corp	5.2%	LIBOR +1.0%

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Remark 7.6

Often swaps have to be administered by a **financial intermediary** that will keep about 3-4 basis points.

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Example 7.7

For Example 7.5, design a swap that is equally attractive and nets an FI 4 basis points.

	Fixed	Floating
AAA Corp	4.0%	LIBOR +0.3%
BBB Corp	5.2%	LIBOR +1.0%

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Remark 7.7

Interest rate swaps can be valued by regarding them as a difference of two bonds or as a portfolio of FRAs.

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Example 7.8

X pays 6-month LIBOR and receives 8% (sa) on \$100 million. The remaining life of the swap is 1.25 years, 3/9/15-month LIBOR are 10%, 10.5%, 11% (cc), and 6-month LIBOR at last payment date was 10.2% (sa).

(a) Value the swap as a difference of bonds.
(b) Value the swap as a portfolio of FRAs.

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Definition 7.9

A **currency swap** (in its simplest form) involves exchanging principal and interest payments in one currency for principal and interest payments in another.

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Example 7.10

Consider a 5-year currency swap between IBM and BP entered into on Feb 1, 2024. IBM pays a fixed rate of 7% in GBP and receives a fixed rate of 4% in USD from BP. Interest rate payments are made once a year and the principal amounts are \$15 and £10 million. This is a **fixed-for-fixed** currency swap.

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Example 7.11

- Here we discuss comparative advantage.

	USD	AUD
GM	5.0%	12.6%
Qantas	7.0%	13.0%

- Suppose GM wants to borrow 20 million AUD and Qantas wants to borrow 12 million USD, and the current rate is 0.6 USD per AUD. Design an equally attractive swap that nets an FI 0.2% such that all foreign exchange risk is assumed by the FI.

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Remark 7.12

Currency swaps can be valued by regarding them as a difference of two bonds or as a portfolio of forward contracts.

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Example 7.13

Suppose that LIBOR in Japan and US (both flat) are 4% and 9%, respectively (cc). An FI has entered into a currency swap in which it receives 5% in yen and pays 8% in USD once a year. The principals are \$10 million and 1200 million yen, and the current exchange rate is 110 yen for \$1. The swap will last for another 3 years.

- Value the swap as a difference of bonds.
- Value the swap as a portfolio of forward contracts.

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