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Chapter 7

Swaps

Math 5737/Econ 5337, Fall 2022

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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, 2022. 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**.

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

- Credit ratings AAA, AA, A, BBB, BB, B, CCC

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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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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, 2022. 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.

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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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