Swap Markets

P. Sercu,
*International Finance: Theory into Practice*

Overview

Chapter 7

Swap Markets
Overview

How the Modern Swap Came About

The IBM-WB Swap

Subsequent Evolution

Why Currency Swaps?

Spreads—have your cake and eat it

Other reasons for swapping
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Early antecedents

Spot-Forward Swap

Parallel/Bk2Bk loans

Often a bit shady—occasionally very shady
The IBM-WB Swap

**Early antecedents**

- **Spot-Forward Swap**

  - $100 \rightarrow 1.03 \rightarrow $103
  - £40 \rightarrow 1/1.05 \rightarrow £42
  - $100 \times 1/2.5 = £40

  - $103 \times 1.03/1.05 = £42

  - Parallel/Bk2Bk loans

  - UKco's US subs
  - UKco
  - USco
  - USco's UK subs

  - UKco's US subs
  - UKco

  - USco
  - USco's UK subs

  Arrows show direction of loans (initial principals). Black = actual; green = original purpose.

- **Often a bit shady—occasionally very shady**
The 1983 IBM/WB Swap

◊ **The intentions**

▷ **IBM**’s plans
  - IBM had DEM-CHF (henceforth “DEM”) debt outstanding
  - latent capital gain: interest rates had gone up (so $v_{\text{DEM} \text{bonds}} < 100\%$) and the DEM down
  - So IBM wanted to lock in the gain: retire the DEM debt, replace it by USD debt
  - Costs: issue costs & spread USD debt, conversion costs, call premium(!) on DEM bonds, capgains tax on gain

▷ **WB**’s plans
  - WB wanted to issue DEM (and CHF) debt to finance its own DEM etc lending
  - costs: issue costs & spread new debt

◊ **The deal**

▷ IBM leaves DEM debt outstanding, let WB service it
▷ WB issues USD debt not DEM, and lets IBM service it
The 1983 IBM/WB Swap

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IBM & WB—the Movie

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Why Currency Swaps?

3.3 The 1983 IBM-WB Swap

- **Purpose**: IBM wanted to borrow USD and retire DEM debt, to realise a capital gain.
- WB wanted to issue DEM debt.

- **Deal**: WB will borrow USD, but IBM will service these USD bonds. WB will service IBM's existing DEM debt. Thus, both ended up with the (net) liability they wanted.

- **Gains**: Costs of (IBM) retiring and (WB) issuing DEM bonds avoided. WB can borrow at lower risk spread than IBM. IBM's capital gain is postponed for tax advantage.

*arrows show direction of service flows*
IBM-WB: further discussion

◊ **Initial Equivalence**
  ▶ Fairness: at $t_0$, $PV(\text{DEM flows}) = PV(\text{USD flows})$

◊ **Gains**
  ▶ Costs of IBM retiring DEM bonds avoided
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(These gains were split equally via a side payment)

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Standardization

- Idea was soon applied to **interest swaps**, (the “loans” differ not in currency of denomination but in type of interest paid—typically fixed v floating)

- The interest-rate swap market grew very fast:
  - banks could easily take one side of the swap,
  - hedge it in the bond/loan market ...
  - until a customer arrives with opposite wants

  This way, swaps became commoditized—as standard & boring as forwards.

- **LIBOR** is the key rate: swap dealers define the swap rates as the rates they accept if the other side is LIBOR.

- Secondary market has emerged
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The Standard Swap, nowadays

- Swap dealer and customer agree to “lend” each other initially equivalent amounts, with a right of offset.
  But words like “loan”, “security”, “interest” are studiously avoided, and there is just one contract.

- The interest paid to/received from the dealer is (close to) the riskfree rate ...
  (riskfree? :
  ▶ the customer has, initially, a good record; or security is posted
  ▶ right of offset limits the risk
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  ... plus or minus a small commission (e.g. 5 bp p.a.).

- Early termination? Let life = $n - f$, swap rates $s_t$ and $s_t^*$, coupons $c$ and $c^*$; then, for bullet loans:

\[
\text{Value} = V_t - V_t^* S_t, \\
\text{where } V_t = V_{\text{nom}}[1 + (c - s_t) a(n, s_t)] \times (1 + s_t)^f, \\
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If the legs are not of the bullet type—e.g. constant annuities, instead—then the leg is constructed out of bullet loans (each with its own swap rate).

\[ V_3 + C_3 = 1000 \]
\[ V_3 (1 + s_3) = 1000 \Rightarrow V_3 \]

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\[ V_1 + C_1 + C_2 + C_3 = 1000 \]
\[ V_1 (1 + s_1) + V_2 s_2 + V_3 s_3 = 1000 \Rightarrow V_1 \]

\[ V_3 = 934.58 \quad V_2 = 881.68, \quad V_1 = 839.69 \]

**Corollary:**

\[ PV = 934.58 + 881.68 + 839.69 = 2,655.95; \]
\[ \Rightarrow IRR = 6.347\%, \]

= swap rate for 3-year constant-annuity loan.

This way one can generate a term structure for any type of loans, fully consistent with that of bullet loans.
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Other reasons for swapping
**Spreads—have your cake and eat it**

- **Rule:** if the risk spread favors currency A (e.g. asymmetric info; subsidies), but you otherwise prefer currency B, then cheaply borrow A and swap.

### Example

A French Cy can borrow
- EUR at 6% = EUR swap rate: 5%, plus spread: 1%
- USD at 6% = USD swap rate: 4%, plus spread: 2%

... but prefers USD borrowing. One possible solution:

(spot rate 1.25 USD/EUR; 125m USD needed; outflows red)

<table>
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<tr>
<th>Total</th>
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<td>r: principals</td>
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Cosmetic improvements to the solution

One blemish remains: interest is party in EUR. So you can replace the spread, EUR 1, by some equivalent:

– an upfront payment of EUR 1m \times a(7y, 5\%) = EUR 5,786,373.4, or

– a USD annuity, \( A \) s.t. \( A \times a(7y, 4\%) \equiv 5,786,373.40 \times 1.25:\)

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A = \frac{5,786,373.40 \times 1.25}{6.002,055} = \text{USD}1,205,081.8.
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i.e. 0.964\% of USD 125m. (Why is this below the 1\% EUR spread?)

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- an upfront payment of \( \text{EUR } 1m \times a(7y, 5\%) = \text{EUR } 5,786,373.4 \), or
- a USD annuity, \( A \) s.t. \( A \times a(7y, 4\%) \equiv 5,786,373.4 \times 1.25: \)

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i.e. 0.964% of USD 125m. (Why is this below the 1% EUR spread?)

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<td>“lend” €100</td>
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<tr>
<td>( i ): interest p.a.</td>
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<td>“borrow” $125</td>
<td>$125</td>
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<td>( T ): principal</td>
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<td>$5+1.205</td>
<td>$6.205</td>
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◊ **When is swapping useful?**

▷ If the French Cy had been able to borrow USD at 4+0.964%, there would be neither gain nor loss from swapping

▷ You can check that 0.964% = 1% $\times \frac{5.786,373}{6.002,054} = 1\% \times \frac{a(n,s)}{a(n,s^*)}$

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$$\rho^* > \rho \frac{a(n,s)}{a(n,s^*)} \iff \rho^* \times a(n,s^*) > \rho \times a(n,s)$$

PV of FC spread \quad PV of HC spread

◊ **Bank’s translation rule for risk spreads:**

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Other reasons for swapping

◊ Getting access to a closed market: use local strawman

▷ E.g. Renault wanted to replace USD FRNs by JPY fixed-rate bonds but found the JPY bond market closed (early 80s!).
▷ So Yamaichi issued JPY bonds which Renault promised to service;
▷ In return, Yamaichi promised to service the USD FRNs, and in fact used the JPY it had borrowed to buy such assets.

arrows show direction of service flows
Other reasons for swapping—cont’d

◇ **Avoiding transaction costs.**

– IBM/WB example: avoid costs of withdrawing (IBM) / reissuing (WB) CHF & DEM debt.
– General: synthetic alternative involves three transactions: borrow currency 1, convert, reinvest currency 2.

◇ **Possible advantages of off-balance-sheet reporting:**

– Ratios
– Reduce Basel-1 capital requirement (relative to synthetic swap)

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 милосердие

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Parallel or back-to-back loans are similar in spirit. They are used e.g. to avoid exchange controls. Other motivations, e.g. in the IBM/WB swap, were avoidance of transaction costs, risk spreads, and postponement of capital gains taxes.

Modern currency swaps use a near risk-free rate. The main purpose is to save on risk spreads, and the gain from swapping is seen by comparing PVs, at the swap rate, of any interest paid over and above the swap rate.

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