

Lecture 16: Futures, Swaps and Risk Management

ECON435: Financial Markets and the Macroeconomy

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Spring 2011

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Overview: Derivative Securities

Derivative Securities (or "derivatives"):

- price depends on (derives from) another security, e.g. stocks
→ also called "contingent" securities
- useful for both hedging and speculation

Main Categories:

- Options
- Forwards/Futures
- Swaps

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Review: Forwards & Futures

Forwards and Futures =

= deferred delivery contracts:

- obligation to buy or sell (i.e. long or short)
- at a specified price
- at a specified date

Forwards: traded informally, over-the-counter

Futures: traded in formal exchanges, with a clearinghouse that imposes margins

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Foreign Exchange (Forex) Futures

= obligation to buy/sell another currency at a specified exchange rate in the future

- hedge against exchange rate fluctuations
- useful e.g. for importers & exporters
- traded at
 - Chicago Mercantile Exchange (CME International Monetary Market)
 - London International Financial Futures Exchange (LIFFE)

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Interest Rate Parity

= arbitrage condition that holds in well-functioning markets

Two strategies with identical payoffs:

- earning interest r_{USD} on a USD balance and converting to a foreign currency using a forex future (at rate F_0)
- converting to a foreign currency now (at rate E_0) and earning foreign interest r_{FX} on that balance

$$(1+r_{USD})^T/F_0 = (1+r_{FX})^T/E_0$$

→ "covered" interest parity b/c the future covers all risk of exchange rate movements

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Example of Interest Rate Parity

Assume:

$$r_{USD} = 1\%$$

$$r_{EUR} = 1.5\%$$

$$E_0 = 1.48 \text{ \$/€}$$

→ What should be the price of a two-year \$/€ future?

$$F_0 = E_0 \cdot (1+r_{USD})^T / (1+r_{EUR})^T =$$

→ If the price was different, we could engage in arbitrage

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Example of Forex Hedging

- Suppose Boeing will earn €200m for the delivery of a new 777 to Italy in one year
- Workers and materials have to be paid in \$
- significant exchange rate risk
- sell €200m in futures market to hedge
- <http://www.cmegroup.com/trading/fx/g10/euro-fx.html>
- Which/how many contracts should Boeing sell?

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Stock Index Futures

- available for most major stock indices
- settled in cash → lower transaction costs
- faster to buy/sell than stock portfolios
- allow for “synthetic” trading
- can hedge systematic risk component of a portfolio

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Interest Rate Futures

- allow to hedge interest rate uncertainty

Examples:

- corporations planning to issue debt in the future
- fund managers expecting inflows that need to be invested in the future
- fund managers wishing to sell quickly

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Example of Interest Rate Hedging

Suppose Boeing needs to pay \$100m for components of its new 777 to suppliers in 6 months

- will require a loan in 6 months
- hedge against interest rate risk (sales price for plane is fixed now)
- Which/how many contracts should Boeing buy?

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Swaps

Swaps are multi-period forward contracts

- specify an exchange of payment flows at multiple future dates

Examples:

- interest rate swap: exchange income stream from a fixed rate and a variable rate security
- foreign exchange swap: exchange dollar vs. foreign currency at multiple future dates

Note: notional value (face value) much higher than actual stream of payments

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Example on Interest Rate Swaps

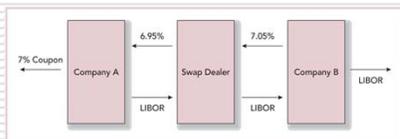
Suppose XYZ Realty wants to borrow \$50m at a fixed interest rate, but its bank only offers a short-term loan at a rate of LIBOR + 3%

- an interest rate swap allows XYZ to “swap” the variable rate obligation against a synthetic fixed rate obligation
- this is called “balance sheet restructuring”

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Swap Dealers

- mostly investment banks
- typically earn a spread
- seek to enter offsetting swap contracts



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Credit Default Swaps (CDSs)

- are insurance policies against defaults
- the seller of the swap makes the buyer whole in case of a "credit event" (e.g. default) of the reference company
- in return, the seller receives a periodic fee
- invented in 1997 by JPMorgan
- exempt from regulation by Commodity Futures Modernization Act of 2000
- rapid growth: \$45 trillion notional value by 2007

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Example on CDSs

- Suppose Boeing is expecting a \$250m payment from Alitalia in one year, but Alitalia is not doing well...
- Boeing can hedge against Alitalia's default risk by buying CDSs on Alitalia

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Pricing of CDSs

- Spread = annual amount paid for protection of notional value
- measured in basis points (bps) = 0.01% (e.g. 150bps = 1.5%)
 - reflects default probability
 - physical settlement or cash settlement based on auction (credit-fixing event)

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Role of CDSs in the Crisis

- CDSs used for speculation → role in 2008 bank runs, European debt crisis
 - Lehman default triggered \$400bn of CDSs (but: net settlement \$7bn)
 - AIG sold > \$100 billion in credit default swaps on risky mortgage securities to Goldman etc. → was bailed out by US Treasury
 - CDS important for creation of "synthetic" CDOs → Abacus transaction of Goldman
- Financial regulation bill → clearinghouse to centralize market and net out positions

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Examples of Credit-Fixing Auctions

Date	Name	Final price as % of par
10/11/2005	Northwest Airlines	28
10/11/2005	Delta Airlines	18
11/4/2005	Delphi Corporation	63.375
10/6/2008	Fannie Mae - Senior	91.51
10/6/2008	Freddie Mac - Senior	94
10/10/2008	Lehman Brothers	8.625
10/23/2008	Washington Mutual	57
1/14/2009	Republic of Ecuador	31.375
6/12/2009	General Motors	12.5
11/20/2009	CIT Group	68.125

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