Chapter 2

Structure of Derivatives Markets

Chapter 2: Structure of Derivatives Markets

The key to understanding derivatives is a deeper understanding of all that's underlying.

Morgan Stanley Dean Witter

Advertisement in Derivatives Strategy, October 1997, p. 15

Important Concepts in Chapter 2

- Types of derivatives
- Origins and development of derivatives markets
- Exchange-listed derivatives trading
- Over-the-counter derivatives trading
- Clearing and settlement
- Market participants
- Transaction costs
- Taxes
- Regulation of derivatives markets

Types of Derivatives

- Options
- Forward contracts
- Futures contracts
- Swaps
- Other types of derivatives

Options

- Premium – price paid to buy an option
- Call – right to buy
- Put – right to sell
- Exercise or strike price – fixed price to option buyer and buy (call) or sell (put)
- Expiration date – options have finite lives
- Moneyness – in-, at-, or out-of-the-money
- European – exercise only on expiration date
- American – exercise anytime before or on expiration date

Forward Contract

- Forward contract is an obligation to engage in some transaction in the future, not a right
- Forward price – analogous to exercise price
- Initial forward value is typically zero
- Forward price is the strike price where the call premium equals the put premium
- Customizable
- Counterparty default risk

Futures Contract

- Similar to forward contract
- Standardized
- Transacted on organized exchange
- Clearinghouse acts as intermediary
- Liquidity
- Futures price – price at which the underlying can be transacted at the expiration of the futures contract
- Margin accounts required

Swaps

- Swap is a commitment between two parties to do a series of transactions in the future
- Similar to forward contract, but involves multiple future transactions
- Swaps can involve a variety of underlyings
  - Interest rates
  - Equity
  - Currency
  - Commodities

CENGAGE

Chance/Brooks, An Introduction to Derivatives and Risk Management, 10th Edition. © 2016 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

Other Types of Derivatives

- Embedded derivatives – when derivative is embedded in other assets
  - Callable bonds
  - Convertible bonds
  - Other instruments
- Options on derivatives – option on swap, option on futures
- Credit derivatives
- Default option in bonds
- Real options – e.g., options embedded in projects

Origins and Development of Derivatives Markets

- As old as stocks and bonds
- Rice futures in Japan in 17th century
- Chicago Board of Trade (CBOT) opened in 1848
- Evolution of commodity derivatives
  - To arrive contracts became known as futures contracts
  - Commodity futures – wheat, corn, soybeans, gold
- Chicago Butter and Egg Board opened in 1898 (now the CME Group)

Evolution of Financial Derivatives

- 1970 – fixed currency exchange rates ended
- Foreign currency futures began trading at the CME
- Financial futures popularity rose
- 1973 – pivotal year
  - Fischer Black and Myron Scholes publish option model
  - Robert Merton publish rigorous foundations of model
  - CBOT spun off Chicago Board Options Exchange (CBOE)
- Many more derivatives markets were subsequently launched

Development of the OTC Market

- Allows for customization
- Over the counter (OTC) originated as investors purchased securities literally "over the counter" at broker's offices
- Regulations stemming from financial crisis of 2008-2009 are merging OTC and exchange traded products

Derivatives Exchanges

- Largest derivatives exchanges (see Table 2.1 on 27th slide)
- Derivatives exchanges span the globe
- More than 20 billion contracts traded on world derivatives exchanges. Figure 2.1 on 29th slide shows breakdown between options (9.4 billion) and futures (12.2 billion)
- Exchanges are often for-profit companies
- Exchange membership is often termed seats

Standardization of Contracts

- Standardization advantages
  - Reduces costs
  - Improves efficiency
- Derivatives standardization
  - Underlying
  - Expirations
  - Option exercise prices
  - Contract sizes
  - Unit of price quotation

CENGAGE

Chance/Brooks, An Introduction to Derivatives and Risk Management, 10th Edition. © 2016 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

Various Limits

- Position limits – maximum number of contracts held
- Exercise limits – number of options that can be exercised
- Price limits
  - Limit up – maximum up move in underlying price
  - Limit down – maximum down move in underlying price
- Limit move – price change that results in hitting limit
- Locked limit – market where trading has stopped due to a limit move
- Circuit breakers – automatic trading halts

Physical versus Electronic Trading

- Physical trading was face-to-face in octagonal-shaped pits
- Location in pit had specific meaning regarding contract maturity
- Pit trading termed open outcry
- Out-trade – discrepancy between traders caught by exchange process
- GLOBEX at CME pioneering electronic trading system
- Electronic trading reduced out-trade frequency

CENGAGE

Chance/Brooks, An Introduction to Derivatives and Risk Management, 10th Edition. © 2016 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

Mechanics of Trading

- Types of orders
  - Market order
  - Limit order
  - Good-till-canceled order
  - Stop order
  - All or none order
- Opening or closing orders
  - Opening order – order for derivative in which no position is currently held (increases open interest)
  - Closing order – order for derivatives that is opposite of a position previously taken (decreases open interest)

Expiration and Exercise Procedures

- Offsetting order simply passes the derivative to someone else
- With options, contracts can be exercised
- At expiration, physical delivery or cash settlement via assignment
- Exchange-for-physicals or against actuals – long and short agree on an alternative delivery procedure

OTC Derivatives Trading

- Dealers – makes a market, quotes bid and ask prices
- End-users – typically the one initiating the transaction
- Trading platform – electronic quotation system, such as swap execution facilities
- Bilateral contract – two parties agree, each promising to do something
- ISDA Master Agreement – standardized OTC contract
- Notional amounts and market values
  - Foreign Exchange/Interest Rate Forwards (Figure 2.2 on 30th slide)
  - Foreign Exchange/Interest Rate Swaps (Figure 2.3 on 31st slide)
  - Foreign Exchange/Interest Rate/Equity Options (Figure 2.4 on 32nd slide)

CENGAGE

Orders and Procedures

- OTC early termination
  - Offset with original party
  - Offset with another party
    - Both contracts remain
    - Financial risk offset
    - Default risk remains
- Cash settlement common in OTC market

CENGAGE

Chance/Brooks, An Introduction to Derivatives and Risk Management, 10th Edition. © 2016 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

Clearing and Settlement

- Role of clearinghouse
  - Futures transaction on derivatives exchange (see Figure 2.5 on 33rd slide)
  - Options transaction on derivatives exchange (see Figure 2.6 on 34th slide)

Daily Settlement

- Clearinghouse means of credit risk management is through margin deposit (or performance bond)
- Initial margin – amount deposited on day transaction opened
- Maintenance margin – amount that must be maintained every day thereafter
- Settlement price – average of last few trades of day
- Marked to market – gains/losses charged daily, process called daily settlement
- Margin call – additional funds required
- Variation margin – additional funds deposited

Market Participants

- Market maker – quotes bid and ask prices
- Scalpers – hold positions for very short period of time
- Floor broker (futures commission merchant) – execute orders for non-members of exchange
- Traders – execute trades for themselves or their company
  - Position traders – view driven
  - Arbitrageurs – seek profits for misalignment of prices

Transaction Costs

- Floor trading and clearing fees
- Commissions
- Bid-Ask Spreads
- Delivery Costs
- Other Transaction Costs
- Taxes

CENGAGE

Chance/Brooks, An Introduction to Derivatives and Risk Management, 10th Edition. © 2016 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

Regulation of Derivatives Markets

- Colorful history due to alignment with gambling
- SEC, created in 1934, regulates securities and options on stocks as well as currencies
- In U.S., regulations originated in Department of Agriculture
- Commodities Futures Trading Commission created in 1974
- Dodd-Frank Wall Street Reform and Consumer Protection Act passed in 2010
  - Transparency
  - More multilateral clearing
  - Disclosure
  - Reduce systemic risk

CENGAGE

Summary

- Types of derivatives
- Origins and development of derivatives markets
- Exchange-listed derivatives trading
- Over-the-counter derivatives trading
- Clearing and settlement
- Market participants
- Transaction costs
- Taxes
- Regulation of derivatives markets

CENGAGE

TABLE 2.1: THE LARGEST DERIVATIVES EXCHANGES (1 of 2)

RANK	EXCHANGE	2013 VOLUME	2013 YEAR-END OPEN INTEREST
1.	CME Group	3,161,476,638	83,904,116
2.	Intercontinental Exchange	2,807,970,132	135,377,377
3.	EUREX	2,190,548,148	77,090,544
4.	National Stock Exchange of India	2,135,637,457	7,786,961
5.	BM&F BOVESPA (Brazil)	1,603,600,651	56,666,689
6.	CBOE Holdings	1,187,642,669	351,428
7.	Nasdaq OMX	1,142,955,206	7,196,312
8.	Moscow Exchange	1,134,477,258	5,233,255
9.	Korea Exchange	820,664,621	2,683,821
10.	Multi Commodity Exchange of India	794,001,650	745,474

(To continued)

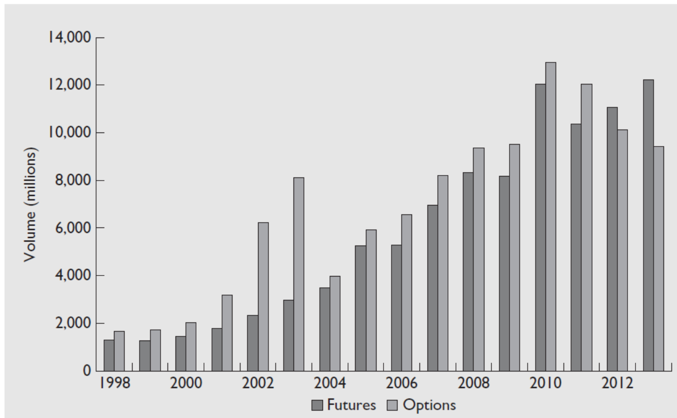
TABLE 2.1: THE LARGEST DERIVATIVES EXCHANGES (2 of 2)

RANK	EXCHANGE	2013 VOLUME	2013 YEAR-END OPEN INTEREST
11.	Dailan Commodity Exchange (China)	700,500,777	3,153,905
12.	Shanghai Futures Exchange (China)	642,473,980	2,093,921
13.	Zhengzhou Commodity Exchange (China)	525,299,980	1,998,727
14.	Japan Exchange Group	366,145,920	5,436,115
15.	Hong Kong Exchanges & Clearing	301,128,507	8,183,801
16.	ASX Group (Australia)	261,514,098	13,956,878
17.	BSE (India)	254,845,929	32,801
18.	JSE South Africa	254,514,098	17,857,396
19.	China Financial Futures Exchange	193,549,311	123,166
20.	TMX Group (Canada)	155,753,473	4,329,062

Source: http://www.futuresindustry.org/files/css/magazineArticles/article-1612.pdf.

(Return to previous slide) (Return to text slide)

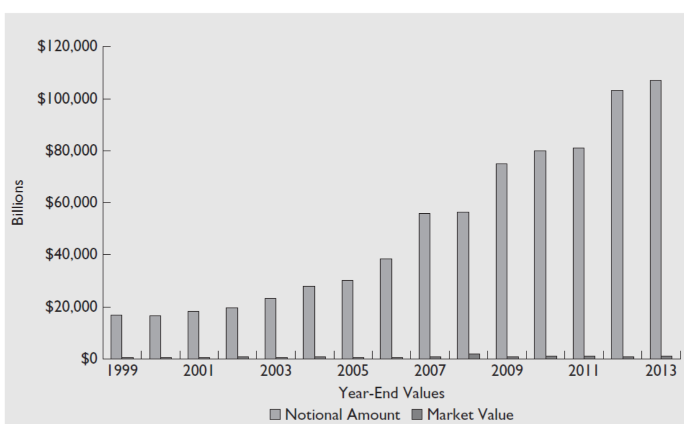
FIGURE 2.1: Historical Volume of Exchange-Listed Options and Futures around the World



Source: http://www.futuresindustry.org/bibliography.asp (various issues of their annual volume survey).

(Return to text slide)

FIGURE 2.2: Notional Amount and Market Value of OTC Foreign Exchange and Interest Rate Forward Contracts



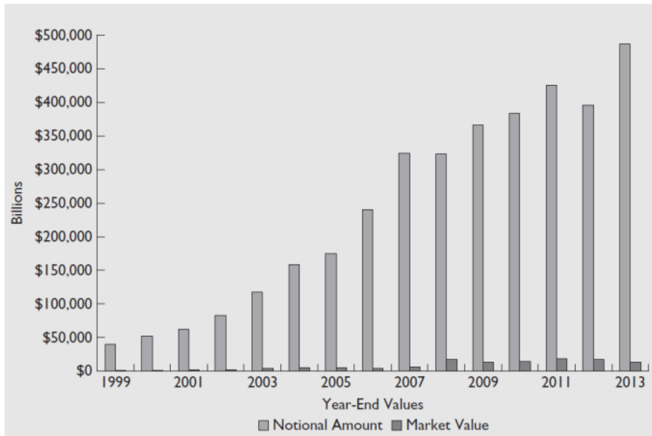
Source: http://www.bis.org/statistics/derstats.htm (various issues of their *Regular OTC Derivatives Market*).

(Return to text slide)

CENGAGE

Chance/Brooks, An Introduction to Derivatives and Risk Management, 10th Edition. © 2016 Cengage. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

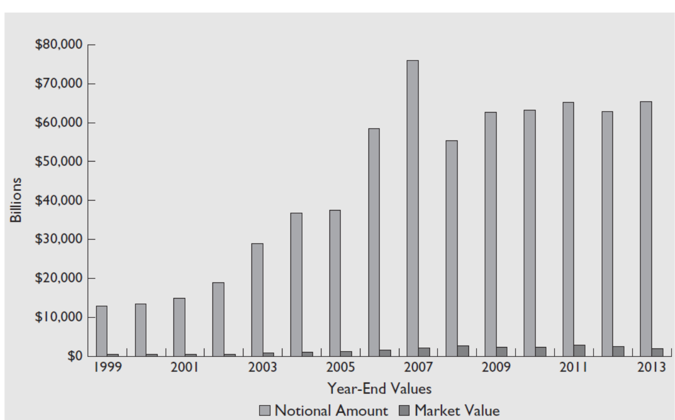
FIGURE 2.3: Notional Amount and Market Value of OTC Foreign Exchange and Interest Rate Swaps



Source: http://www.bis.org/statistics/derstats.htm (various issues of their *Regular OTC Derivatives Market*).

(Return to text slide)

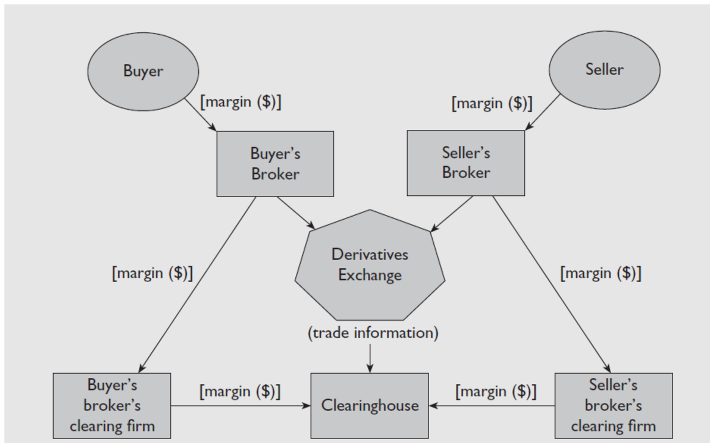
FIGURE 2.4: Notional Amount and Market Value of OTC Foreign Exchange, Interest Rate, and Equity Options



Source: http://www.bis.org/statistics/derstats.htm (various issues of their Regular OTC Derivatives Market).

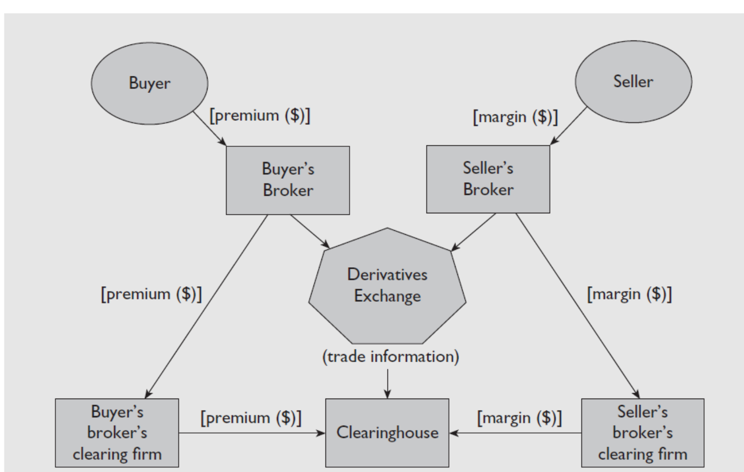
(Return to text slide)

FIGURE 2.5: A Futures Transaction on a Derivatives Exchange



(Return to text slide)

FIGURE 2.6: An Options Transaction on a Derivatives Exchange



(Return to text slide)