

January-February 2007

# Financial Markets and Instruments

## Lecture notes

### **Subject of this course: financial institutions**

- Basic questions
  - What?
  - Why?
  - How?
  - Whereto?
- Financial markets
  - Transaction costs
  - Investors vs. savers
  - Primary vs. secondary
  - Organized vs. over-the-counter
  - Local assets vs. depository receipts
- Financial instruments
  - Cash flow rights vs. control rights
  - First vs. second level
  - Indices
- Financial intermediaries
  - Private vs. institutional investors
  - Asset transformation
  - Agency problem and conflicts of interest

## Introduction to financial markets

### **Financial markets**

- *What:* Transfer funds from savers to borrowers
- *Why:* Promoting allocation efficiency and risk sharing
- *How:* Via the use of securities and financial intermediaries
- *Whereto:* That become more advanced to satisfy different demands

### **Major financial innovations:** managing different types of risks

- Money
  - Evolution: skins (“bucks”) → coins → paper → electronic money
  - Lower costs of trade → enormous expansion of commerce, specialization of production
  - Functions: medium of exchange / unit of account / storage of value
- Stock market
  - Separation of ownership and control
  - Investors can diversify across many risky projects, with limited liability
- Futures markets
  - Hedging future risks, e.g., grain / exchange rates / weather
  - Even without owning the underlying asset!
- Insurance for a car / house / health / life

## Functions of financial markets

- Channeling funds from agents without investment opportunities: “Lender-Savers”...
- to those who have them: “Borrower-Spenders”
  - Households
  - Business firms
  - Government
  - Foreigners

## Segments of financial markets

- Direct Finance: the “arm’s-length system”
  - Borrowers borrow directly from lenders in financial markets by selling financial instruments
    - Claims on the borrower’s future income or assets
    - Stocks, bonds, derivatives
- Indirect Finance: the “relationship-based system”
  - Borrowers borrow indirectly from lenders via financial intermediaries
    - Matching available funds and loan opportunities
    - Banks, investment companies (e.g., mutual funds)

### Discussion topic What explains the tremendous growth of the financial industry?

Source: [Rajan&Zingales \(2001\)](#)

## Financial development vs. economic growth

- Empirically: positive relation
  - Large economy needs a larger financial sector
  - Financial intermediaries help the real sector to allocate the funds more efficiently
  - Both driven by a third factor: e.g., saving rate, culture, legal and regulatory environment

How to measure financial development?

- Stock market size and liquidity
  - Market equity cap to GDP
  - # instruments (actively) traded locally, # IPOs
  - Trading volume / turnover rate
  - Transaction costs / bid-ask spread
- Banking system
  - Bank credits to GDP

What explains the level of financial development?

- Protection of property rights
  - Laws and enforcement
- Openness of capital account
  - Liberalization leads to higher competition and diversification, lower cost of capital
  - But only after ensuring property rights
- Legal origin
  - Common law countries: prevalent role of financial markets
    - Require transparency and protection of (small) investors
  - Continental Europe and Asia: led by financial intermediaries (banks)
    - FIs establish deep relations with the clients and have enough power to protect their interests
- Synergy between banks and financial markets

How does financial development contribute to economic growth?

- Increases allocation efficiency
  - Channeling resources to their most productive uses
- Allows risk sharing
  - Placing risks where they are best borne
- Makes the cost of capital lower
- Stimulates innovations
- Allows longer-term investment projects
- Having a large number of financial instruments helps to achieve macro stability
- Makes the economy less sensitive to external shocks and systemic crises

### Mini-case 1 Micro-loans

- 2006 Nobel peace prize: for the first time to the financier
  - Grameen bank and its founder Muhammad Yunus (Bangladesh, PhD Vanderbilt 1969)
  - “for the efforts to initiate economic and social development from below”
- Typical example
  - A woman earns only 2 cents on the borrowed 9 cents
  - The whole village needed only \$27 to buy the necessary materials!
- How to help the poor?
  - Financial aid? Bad incentives
  - Subsidies? Large costs
  - Loans? Too many defaults
- Banking for the poor
  - Loans granted to people with less than 2 sq.km, preferably women
  - Small loan (\$ tens to hundreds) to the group
  - No collateral, (mutual) guarantees from the partners
  - Small fixed weekly payments
  - Flexible restructuring in case of temporary difficulties (after the 1998 flood)
- Results
  - 6.61 mln clients (97% women)
  - Loans totaling \$5.72 bln with 11% default rate
  - Net profit over \$15.2 mln in 2005
  - Helped 70 mln people to improve their living (out of 130 mln)

### Overview of the financial system

- Security (financial instrument)
  - A claim on future income or assets
- Debt: fixed income instruments (bills, bonds, notes, etc.)
  - Periodic pre-specified payments for a specified period of time
  - Control rights only in case of bankruptcy
- Equity: (common) stocks
  - Share in residual value of the project (firm)
  - Control rights until bankruptcy
- Foreign exchange: relative prices of national currencies

### Classification of financial markets

- Primary Market
  - New security issues sold to initial buyers
- Secondary Market

- Securities previously issued are bought and sold
- Exchanges
  - Trades conducted in central locations (e.g., New York Stock Exchange)
- Over-the-Counter (OTC) Markets
  - Dealers at different locations buy and sell
- International Bond Market
  - Foreign bonds
  - Eurobonds (now larger than U.S. corporate bond market)
- World Stock Markets
  - U.S. stock markets are no longer always the largest—at one point, Japan's was larger

### **Functions of Financial Intermediaries (FIs)**

- Engage in process of indirect finance
- Reduce transactions costs
  - Developing expertise
  - Taking advantage of economies of scale
- Provide liquidity
  - E.g., depositors can earn interest on the accounts and yet still convert them into goods whenever necessary
- Reduce the exposure of investors to risk
  - Risk sharing: create and sell assets with lesser risk to one party in order to buy assets with greater risk from another party
- Mitigate asymmetric information problems
  - Adverse Selection (before transaction occurs): potential borrowers most likely to produce adverse outcome are ones most likely to seek loan and be selected
  - Moral Hazard (after transaction occurs): the borrower has incentives to engage in undesirable activities making it more likely that he won't pay the loan back

### **Types of Financial Intermediaries**

- Depository Institutions
  - Commercial banks
- Contractual Savings Institutions
  - Insurance companies
  - Pension funds
- Investment Intermediaries
  - Mutual funds

### **Regulation of Financial Markets**

- Increase Information to Investors: SEC
- Ensure the Soundness of Financial Intermediaries
  - Disclosure
  - Deposit Insurance: FDIC
- Improve Monetary Control
  - Reserve requirements: FRS

## Interest rates

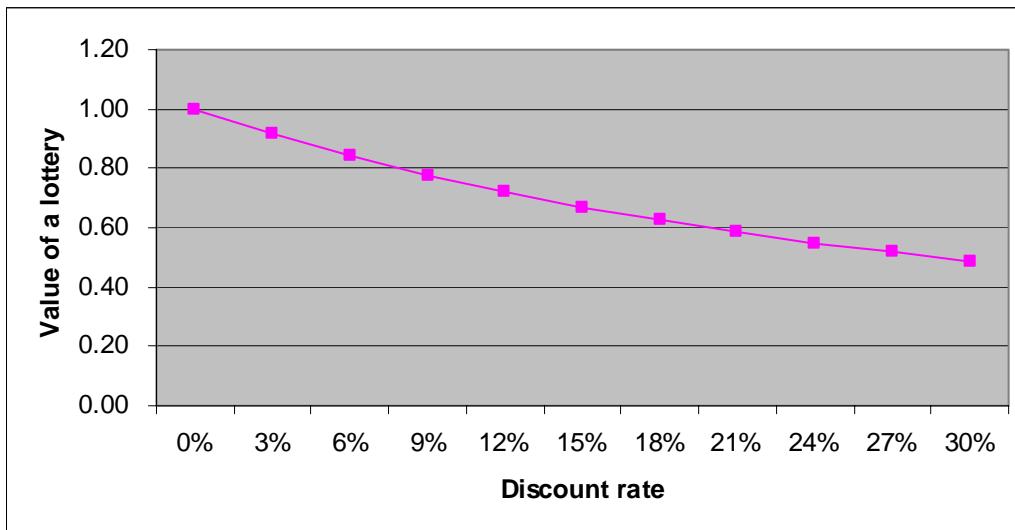
### Time value of money

- Example
  - Suppose you have won \$1 mln in a lottery
  - But this amount is spread equally over the next 10 years
  - This is worth much less than a million!
- We need to discount future cash flows to the present
  - We prefer money now
  - We fear inflation
  - We avoid uncertainty

### Asset valuation

- Discounted cash flow approach:  $P_0 = \sum_t CF_t / (1+r)^t$ 
  - CF: cash flows
  - r: discount rate
  - $P_0$ : current price (value)
- Bonds:  $P_0 = \sum_{t=1:T} C / (1+r_t)^t + F / (1+r_T)^T$ 
  - Assuming same discount rate:  $P_0 = \sum_{t=1:T} C / (1+r)^t + F / (1+r)^T$
- Stocks:
  - Constant dividends:  $P_0 = Div_1 / r$
  - Dividends growing at rate g:  $P_0 = Div_1 / (r-g)$

*How does the discount rate affect the value of the nominal \$1 mln payoff?*



### Definitions of rates

- Treatment of inflation  $\pi$ : Fisher equation
  - Real vs. nominal rates: nominal rate  $\approx$  real rate +  $\pi$
- Reinvestment:
  - Simple vs compound interest for T periods:  $P_T = P_0(1+r_S T) = P_0(1+r_C)^T$
- Frequency of compounding:
  - Nominal (coupon) rate (payments  $m$  times a year)...
  - vs effective (annual) rate:  $r_E = (1+r_N(m)/m)^m - 1$
- Continuous compounding:

- Log-return:  $r_C = \log(1+r_E) = m \log(1+r_N(m)/m)$
  - Yield to maturity / internal yield / bond yield
    - Rate that equates cash flows on the bond with its market value
    - Internal rate of return earned from holding a bond to maturity
      - Assuming reinvestment at same rate
      - Different from the actual return over a specific holding period!
  - Par yield
    - Coupon rate that causes the bond price to equal its face value
  - Current yield
    - Annual coupon payment divided by the bond's price
    - Often quoted but useless
  - Zero rate (at  $t$  for payment at  $T$ ):  $y(t, T) = [1 / P(t, T)]^{1/(T-t)}$ 
    - YTM of a zero-coupon bond maturing at  $T$ , with current price  $P(t, T)$  and face value of 1
    - How to get zero rates from coupon bond prices?
      - Bootstrapping method: coupon bond as a ptf of zero-coupon bonds
  - Spot rate:  $r(t) \equiv y(t, t+1)$ 
    - One-period zero rate
  - Forward rate:  $f(t, T) = P(t, T) / P(t, T+1)$ 
    - Rate on a one-period credit from  $T$  to  $T+1$
- Are yields additive?**
- What is YTM of a coupon bond traded at par?**
- What is the relation between YTM and price?**
- How to write the discount rate for  $CF_t$  via zero rates, forward rates, and zero bond prices?**

### Risk structure of interest rates

- Default Risk
  - When the issuer is unable or unwilling to make promised interest payments
  - *Risk-free* bonds: U.S. Treasury bonds
  - *Risk premium*: spread between the interest rates on bonds with default risk and default-free bonds
- Liquidity
  - A liquid asset can be quickly and cheaply converted into cash
  - U.S. Treasury bonds are the most liquid of all long-term bonds
  - Corporate bonds are not as liquid
- Income Tax, e.g. in the US
  - Interest payments on municipal bonds are exempt from federal income taxes
  - Treasury bonds are exempt from state and local income taxes
  - Interest payments from corporate bonds are fully taxable

### Term structure of interest rates

- Relationship between yields and maturities
  - For bonds of a uniform quality (risks and taxes)
  - E.g., Treasury or same credit rating
- Equivalent ways to present TSIR:
  - Discount curve:  $P(t, T)$ , with  $P(T, T) = 1$
  - Zero curve:  $y(t, T) = [1 / P(t, T)]^{1/(T-t)}$
  - Forward curve:  $f(t, T) = P(t, T) / P(t, T+1)$
- Upward sloping yield curve: Fwd Rate > Zero Rate > Par yield

### Term Structure Facts to Be Explained

1. Interest rates for different maturities move together
2. Yield curves tend to have steep upward slope when short rates are low and downward slope when short rates are high
3. Yield curve is typically upward sloping

### Theories of the term structure: why different yield curves?

- Market segmentation:
  - Short, medium and long rates are determined independently of each other
    - SR%: D – corporations financing their sr obligations (e.g., trade credit), S – banks
    - LR%: D – corporations financing lr inv projects, S – insurance co-s, pension funds
  - Investors don't react to yield differentials between the maturities
  - Explains 3, but not 1 and 2
- Expectations Theory:
  - Unbiased expectations hypothesis:  $f(t, T) = E_t[r(T)]$
  - Term structure is explained by expected spot rates
    - Upward sloping yield curve: signal that spot rate will increase
  - Explains 1 and 2, but not 3
- Liquidity preference theory:
  - Investors demand a premium for bonds with higher risk
    - Long-term bonds require a liquidity premium
  - Upward sloping yield curve: forward rates higher than expected future zero rates
  - Combined with Expectations Theory explains all facts

### Discussion topic How to measure a risk-free rate in Russia?

#### Why do we need to measure a risk-free rate?

- Benchmark for risky rates
  - Risky rate = Risk-free rate + Risk premium
  - Risk premium determined from some model
- Corporate finance:
  - Used to evaluate projects
- Financial markets:
  - Used to value securities

#### Measuring a risk-free rate abroad

- Treasury rates: interest rates on government bills and bonds
  - Default-free, usually liquid
  - Usually, dollars and US: the largest financial market in the world
- LIBOR: London Interbank Offered Rate
  - Traded in the Eurocurrency market
  - Short-term opportunity cost of capital for AA-rated fin institutions
  - There is a small chance of default

#### Measuring a risk-free rate in Russia

- Rate on government bonds (GKO, OFZ, ...)?
  - Small volumes, low liquidity
- Deposit rate in Sberbank?
  - Illiquid, below inflation
- Refinancing rate of the Bank of Russia?
  - Rarely changed
  - Not used as an instrument of the monetary policy
- Interbank rate (e.g., MIBOR)?
  - High chance of default and volatility, low liquidity
- Rate on close substitutes of the government bonds

- E.g., Moscow government or Gazprom
- High liquidity
- But still a small chance of default (e.g., due to political risk)
- Implied rate from the currency forward
  - Forward settlement price for T years:  $F = S e^{(r-q)T}$ 
    - where S and F are the current and forward exchange rates,
    - r and q are local and foreign rates
  - The local risk-free rate:  $r = q + (1/T)\ln(F/S)$

## The money markets

### What are money markets (MM)?

- Money (currency) is not actually traded in MM
- The MM securities are short term with high liquidity
  - Thus, close to being money
- Example: Microsoft invests heavily in MMs
  - \$6 bln in cash and equivalents
  - \$42 bln in short-term instruments
  - Being ready to acquisitions / court settlements

### Typical characteristics of MM instruments

- Usually liquid
  - Active secondary markets
  - Very flexible to fill short-term financial needs
- Usually sold in large denominations (over \$1 mln)
  - Wholesale markets
- Have low default risk
  - Mature in one year or less from their issue date
  - If more than a year: *capital markets* (stocks and bonds)

### Why do we need Money Markets?

- Couldn't banks mediate between savers and borrowers?
  - They have an information advantage on the credit-worthiness of participants.
- Cost Advantages of MMs
  - Banks are heavily regulated.
    - Reserve requirements
    - Ceiling on deposit rates
  - In 1970s, short-term rates rose and this led to a significant growth in MMs
    - Depositors moved their money from banks to MMs to earn a higher interest rate.
  - Even today, the banks are only competitive where their informational advantage outweighs the regulatory costs.

### The purpose of Money Markets

- Investors:
  - MM provides a place for warehousing surplus funds for short periods of time
- Borrowers:
  - MM provides a low-cost source of temporary funds
- Cash inflows and outflows to corporations or government are not well synchronized.

- MM provides a way to solve these cash-timing problems.

### Who participates in Money Markets?

- U.S. Treasury
- Commercial banks
- Businesses
- Individuals (through mutual funds)

### Money Market instruments

- Treasury Bills
  - 91-day, 182-day or 12 month maturities
  - Sold via auction to the dealers every Thursday
  - Computing annualized yield:  $i_{yt} = [(F-P)/P]*[365/n]$
- Federal Funds
  - Short-term funds transferred (loaned or borrowed) between financial institutions, usually for a period of one day.
    - Nothing to do with the federal government
  - Used by banks to meet reserve requirements for a short period.
  - Rates closely tracking those of T-bills
- Repurchase Agreements
  - These work similar to the market for fed funds, but nonbanks can participate.
  - A short-term collateralized loans: a firm sells Treasury securities, but agrees to buy them back at a certain date (usually 3–14 days later) for a certain price.
  - The Fed purchases/sells Treasury securities in the repo market to conduct its monetary policy.
- Negotiable Certificates of Deposit
  - A bank-issued security that documents a deposit and specifies the interest rate and the maturity date
  - Denominations range from \$100,000 to \$10 million
  - Rates closely tracking those of T-bills
- Commercial Paper
  - Unsecured promissory notes, issued by corporations, maturing in no more than 270 days.
    - To avoid the registration with SEC
    - No strong secondary markets
  - Their use increased significantly in the early 1980s because of the rising cost of bank loans.
  - The outstanding volume is well over \$1 trillion.
  - The commercial paper rates exceeded the prime rates by roughly 2% in the 1990s.
- Banker's Acceptance
  - An order to pay a specified amount to the bearer on a given date if specified conditions have been met, usually delivery of promised goods.
  - Often used when buyers / sellers of expensive goods live in different countries.
    - Exporter paid immediately
    - Exporter shielded from foreign exchange risk
    - Exporter does not have to assess the financial security of the importer
    - Importer's bank guarantees payment
    - Crucial to international trade
  - Thus, banker's acceptances avoid the need to establish the credit-worthiness of a customer living abroad.
  - There is also an active secondary market for banker's acceptances until they mature.
    - The terms of note indicate that the bearer, whoever that is, will be paid upon maturity.
- Eurodollars
  - Dollar denominated deposits held in foreign banks
    - Many foreign contracts call for payment in U.S. dollars

- Started when the Soviet government moved dollar accounts from the US to Europe
- The Eurodollar market has continued to grow rapidly because depositors receive a higher rate of return on a dollar deposit in the Eurodollar market than in the domestic market.
- Multinational banks are not subject to the regulations restricting U.S. banks
- Eurodollars rates
  - London interbank bid rate (LIBID): rate paid by banks buying funds
  - London interbank offer rate (LIBOR): rate offered for sale of the funds
  - Time deposits with fixed maturities (largest short term security in the world)
- Money (currency) is not actually traded in MM

### The Russian money market

- Government bills: GKO
  - Copied after T-bills
  - Small volumes, low liquidity
- Commercial paper
  - Actively used by companies to finance short-term needs
  - Used to serve as a means to pay taxes
- Interbank market
  - Divided into several circles: first-class banks and the others
  - Periodically: liquidity crises

## The bond markets

### Capital markets

- Instruments with maturity over 1 year
  - For long-term financing or investments
  - Bonds and stocks
- Participants:
  - Federal and local governments: debt issuers
  - Corporations: equity and debt issuers
- Trading:
  - Primary and secondary markets exist for most securities

### Bonds

- Represent debt owed by the issuer to the investor
- Typically have specified payments on specified dates
- Types of bonds
  - Long-term government bonds (T-bonds)
  - Municipal bonds
  - Corporate bonds

### T-bonds

- Issued and backed by the full faith and credit of the U.S. Federal government
- No default risk since the Treasury can print money to payoff the debt
- Very low interest rates, often considered the risk-free rate
  - Although inflation risk is still present
  - Short-term rates are more volatile
- Treasury STRIPS, since 1985

- The coupon and principal payments are “stripped” from a T-bond and sold as individual zero-coupon bonds.
- Easy way to get zero rates
- Treasury Inflation-Indexed Securities, since 1987
  - The principal amount is adjusted for the inflation
- Agency bonds
  - Issued by government-sponsored entities
    - E.g., GNMA (Ginnie Mae)
  - Having “implicit” guarantee from the U.S. government
    - Usually, offer higher yield to compensate for lower liquidity

### Municipal bonds

- Issued by state and local governments
  - Used to finance public interest projects
- Tax-exempt
  - Tax-free municipal interest rate = taxable interest rate  $\times$  (1 – marginal tax rate)
- Defaultable
  - E.g., Orange County California defaulted in 1990 for \$1.4 billion
- Two types
  - General obligation bonds
    - Backed by “full faith and credit” of the issuer
  - Revenue bonds
    - Backed by a cash flow of a specific project

### Corporate bonds

- Issued by corporations and have a wide range of features and risk
- Typically have a face value of \$1,000
- Pay interest semi-annually
- The degree of risk ranges from low-risk (AAA) to higher risk (BBB).
  - Bonds rated below BBB are *sub-investment grade*

### Characteristics of corporate bonds

- Registered Bonds: payments are made to the registered owner
  - Replaced “bearer” bonds with attached coupons
  - IRS can track interest income this way
- Restrictive Covenants
  - May limit dividends, new debt, ratios, etc.
  - Mitigate conflict with shareholder interests
- Call Provisions: the possibility of early redemption by the issuer
  - The issuer profits from this → has to pay a higher yield
  - Sinking fund: paying off the portion of the bond issue each year
  - Gives flexibility wrt capital structure or new projects forbidden by restrictive covenants
- Convertibility to stocks at a pre-specified rate in the future
  - Allows the bondholders to share in the firm’s good fortunes
  - Implies a lower yield
    - Does it make debt cheaper for the corporation?
- Financial Guarantees (for timely payment of interest and principal)
  - Usually purchased by the issuer from large insurance companies.
  - The credit rating of the insurer replaces the issuer’s rating

## Types of corporate bonds

- Secured Bonds: with collateral
  - Mortgage bonds: real estate
  - Equipment trust certificates: smth else
- Unsecured Bonds
  - Debentures
    - Indenture: contract stating the borrower's obligations
    - Lower priority than secured bonds
  - Subordinated debentures
    - Even lower priority
  - Variable-rate bonds
    - Rate tied to some market rate (e.g., LIBOR + 1%)

## Mini-case 2 Junk Bonds

- Debt rated below investment grade (BBB)
  - Higher risk of default → higher yields
    - Some of the largest corporations, e.g. IBM and General Motors, were at times below BBB
  - Often, trusts and insurance companies are not permitted to invest in such bonds
- High-yield debt has become one of the largest segments of the bond market
  - Annual issuance volume: \$150 bln in the US, Euro30 bln in Europe
- *Is it an example of successful financial innovation or yet another mousetrap for unsophisticated investors?*

## The story of Mike Milken

- Drexel Burnham Lambert: one of the investment banks in the US
- Mike Milken: head of the non-investment-grade bond department since 1973
- Until late 1970s:
  - All new bonds sold publicly to large groups of investors were investment-grade
    - There were a few companies that got into trouble, and their bonds became junk
  - Companies with low ratings raised new money by borrowing from banks or through private placements (not registered with SEC)
- Milken's idea, based on the research at Wharton
  - The interest-rate premium on low-rated debt was higher than justified by the added risk of default
    - A diversified portfolio of risky bonds did better than investment-grade bonds, even after deducting losses on defaults
  - Main obstacle: lack of liquidity
    - Coordination problem
- By 1977, Drexel controlled 25% of the market of high-yield bonds
  - The only market-maker, offering liquidity to its clients
  - Started from the secondary placements
  - Then focused on underwriting primary offerings
- By 1983 over a third of all corporate bond issues were non-investment grade
  - Usually publicly issued bonds carry lower interest rates than private placements
    - Because they are more easily resold
    - Usually they had fewer restrictive covenants
- Milken promoted
  - New high-interest bonds for companies not previously thought creditworthy
    - Indeed, round 50 companies that originally issued high-yield debt were subsequently upgraded to investment grade by the credit-rating agencies

- Bonds issued to finance the hostile takeovers of corporations whose value could be increased
  - LBO (leveraged buy-out): a small company buys a larger and older company using high leverage from the junk bonds
  - MBO (management buy-out): when managers buy its own company
- 1980s: the peak
  - Many long-term investors included high-yield bonds to their portfolios
    - Insurance companies, saving&loan (S&L) banks
  - Boom of LBOs
    - Many large companies were bought out and became private
    - Later restructured and often sold in parts
  - Drexel became the most profitable investment firm on Wall Street
    - E.g., in 1986 earning over \$4 bln in fees
    - Over \$1 bln for Milken
- 1988: virtual frenzy of new bond issues
- 1989: politicians blamed junk bonds for the economic troubles
  - Many defaults by junk bond issuers, esp LBO companies
  - Huge losses by banks
    - Drexel too went bankrupt
    - The S&L crisis (driven by losses on junk bonds, real estate and oil) – saved from the bankruptcy by the government bailout
  - Corporate raiders made assaults on the largest corporations
  - New legislation to discourage hostile takeovers
  - The market for newly issued junk bonds disappeared for a year
  - Milken charged for racketeering and fraud, use of inside information, and market manipulation
    - Pleaded guilty for 6 minor charges
    - Paid \$900 mln in fines and settlements
    - Banned for life from the securities industry
    - Served about 22 months in jail
    - Upon release, still had net worth of over \$1 bln
    - Later, advised investment transactions and had to settle with SEC
- Junk bonds in perspective
  - Made it possible to issue public debt for most (small) companies
  - Gave high average returns to investors
  - Companies that were taken over via LBO did increase efficiency
  - However, huge damage to the reputation of financial markets
    - Insider trading
    - Market manipulation due to monopoly position

### **Investment risks**

- Return from holding a bond = Change in price + Accrued Interest
- Interest rate risk
  - Prices and returns are more volatile for long-term bonds, which have a higher duration
    - Weighted maturity of the payments
    - Elasticity of the price wrt the interest rate
  - No interest-rate risk for any bond whose maturity equals holding period
- Reinvestment risk
  - Occurs if hold series of short bonds over long holding period
  - The rate at which you reinvest is uncertain
- Risk of default
  - Usually measured by credit rating
  - Lately, also by internal bank models

## The local Russian bond market

- Rapidly growing
  - December 2006: the record issuance volume of RUB70 bln
- Mostly medium-term bonds
  - A few companies issued long-term bonds
  - E.g., the first issue of 30y OFZ bonds in 15/2/2006 at 6.99%
- Often, premature redemption option for the investors (оферта)
- Rates slightly above inflation
  - Excessive money liquidity
- Declining term structure of interest rates
  - Inflation goes down
- No defaults yet
  - The closest case: Московский хлебокомбинат
  - Bad for the statistics
- Liquidity concentrated in blue chips
  - Moscow government, Gazprom, Lukoil

## The Russian Eurobond market

- Issued by the government, state and private ‘blue chip’ companies, and banks
  - June 2005: record 6.25% rate for 30y bonds by VTB
  - November 2006: record issuance volume of \$750 mln by Evraz (10y, \$8.5%)
  - Gazprom, Sberbank, Alrosa, Sistema, etc.
- Rapidly growing, as many companies
  - Become transparent
  - Have sound position
  - Need foreign currency denominated debt for their intl operations
- Several banks sold ruble-denominated bonds outside Russia
  - E.g., ING securitized loans to RZhD and RBR

### Discussion topic What hinders the development of the bond market in Russia?

- Risks
  - Political
  - Corporate governance
  - Liquidity
- Legislation
  - What happens in case of bankruptcy?

## The stock market

### Evolution of the forms of business organization

- Sole proprietorship
- Partnership
- Corporation
- Evaluate by
  - The life of the entity
  - The ability to raise capital
  - The owners' liability

## Modern Corporation

- Advantages
  - Limited liability
    - 1811: general act of incorporation in NY
  - Easy transfer of ownership
  - Unlimited life
  - Ability to raise large amounts of money
- Disadvantages
  - Start-up can be costly
  - Earnings subject to double taxation
  - The agency problem
    - Separation of control and ownership
    - The leverage effect of debt

## Equity vs Debt

- Shareholders (common stocks)
  - Control rights (e.g., elect directors)
  - Limited liability
  - Residual claim on assets (after paying up liabilities)
  - Dividends (fully taxable)
- Debtholders
  - Fixed contractual claim against the corporation
  - No voting power unless the debt is not paid
  - Interest on debt is tax-deductible
- How do companies finance their long-term investment?
  - The issued volumes of new debt are much larger.
  - Even in the late 1990s, the boom years for new equity offerings, new debt issuances still outpaced equity by over 5:1.

## Preferred stocks: a hybrid instrument

- Preference over common stock in cash rights:
  - in the payments of dividends
  - in the assets in case of bankruptcy
- No voting rights, unless no dividends 6 quarters in a row
- Is it really debt in disguise?
  - Fixed dividend: usually, **cumulative** (carried forward if not paid)
  - Stated liquidating value
- Call provision: can be converted to common shares
- US: Corporations get 80% tax exemption on dividends
  - But not on debt interest
  - Most preferred stock in the U.S. is held by corporate investors
- Control premium:
  - Difference between the prices of voting and non-voting stocks
  - Especially large in countries with low level of corporate governance

## Indices

- Aggregate picture of a particular market segment
  - Should be replicable by investors
  - Benchmark to evaluate portfolio performance
- Computation

- Index return = equal or market-cap weighted sum of individual stock returns
  - The latter is the same as growth in total market capitalization
  - Dow Jones: wrong way to compute the index (average price of several stocks)
- Free-float adjustment: exclude strategic stakes

### Most popular indices

- US:
  - Dow Jones Industrial Average, the S&P 500, and the NASDAQ composite
- International:
  - MSCI: only investable stocks (available to foreign investors), dollar-denominated
  - E.g., MSCI Developed / Emerging / Country indices
- Russia
  - Equity: RTSI (in \$), MICEX10 (in rubles)
    - Recently introduced free-float-adjusted weights
    - Industry indices, RenCap IPO
  - Bonds: Cbonds (local corporate bonds), EMBI+ Russia (Eurobonds), RCBI (by MICEX)

### Indices of particular segments

- Equity indices:
  - Large-cap vs Mid-cap vs. Small-cap
    - Small companies are characterized by higher risk and return
    - E.g., S&P500 vs. S&P MidCap 400 vs. S&P SmallCap 600
  - Value vs growth
    - Value stocks (low P/E, high B/M) are less risky
    - E.g., S&P500 Citigroup Value, S&P MidCap 400 Citigroup Growth
- Fixed income indices
  - Short-term vs long-term
  - High vs low credit rating

### Buying foreign stocks

- Useful for diversification
  - However, the purchase may be complicated if the shares are not traded in your country
- American depository receipts (ADRs):
  - U.S. banks buy foreign shares and issue receipts against the shares in U.S. markets.
  - Allow foreign firms to trade on U.S. exchanges
- Global depository receipts (GDRs):
  - In London, Frankfurt, Warsaw, etc.
- Russian depository receipts (RDRs):
  - New legislation in October 2006

### How to value stocks?

- The DCF approach
  - The One-Period Valuation Model
  - The Generalized Dividend Valuation Model
    - The Gordon growth model
- The relative valuation approach
  - Comparing the multipliers (e.g., P/E)
- Errors in Valuations
  - Problems with Estimating Growth
  - Problems with Estimating Risk
  - Problems with Forecasting Dividends

**Stocks: Investment Risks**

- Return from holding a stock = Change in price + Dividend
- No default risk
- Market risk
  - If the stock is less sensitive to the overall market movements, it is considered less risky and has a lower expected return in equilibrium
- Macroeconomic risks
  - E.g., change in the industrial growth, oil price, inflation, etc.
- Risks from the company characteristics (micro level)
  - E.g., size: small stocks earn a premium
- Specifics of trading
  - E.g., liquidity: illiquid stocks should compensate this by a higher return
- Individual risk
  - Not valued according to the asset pricing models (e.g. CAPM)
  - Because can be reduced by diversification

**Discussion topic What explains high volatility of Russian stocks?**

Source: [Goriaev&Zabotkin \(2006\)](#)

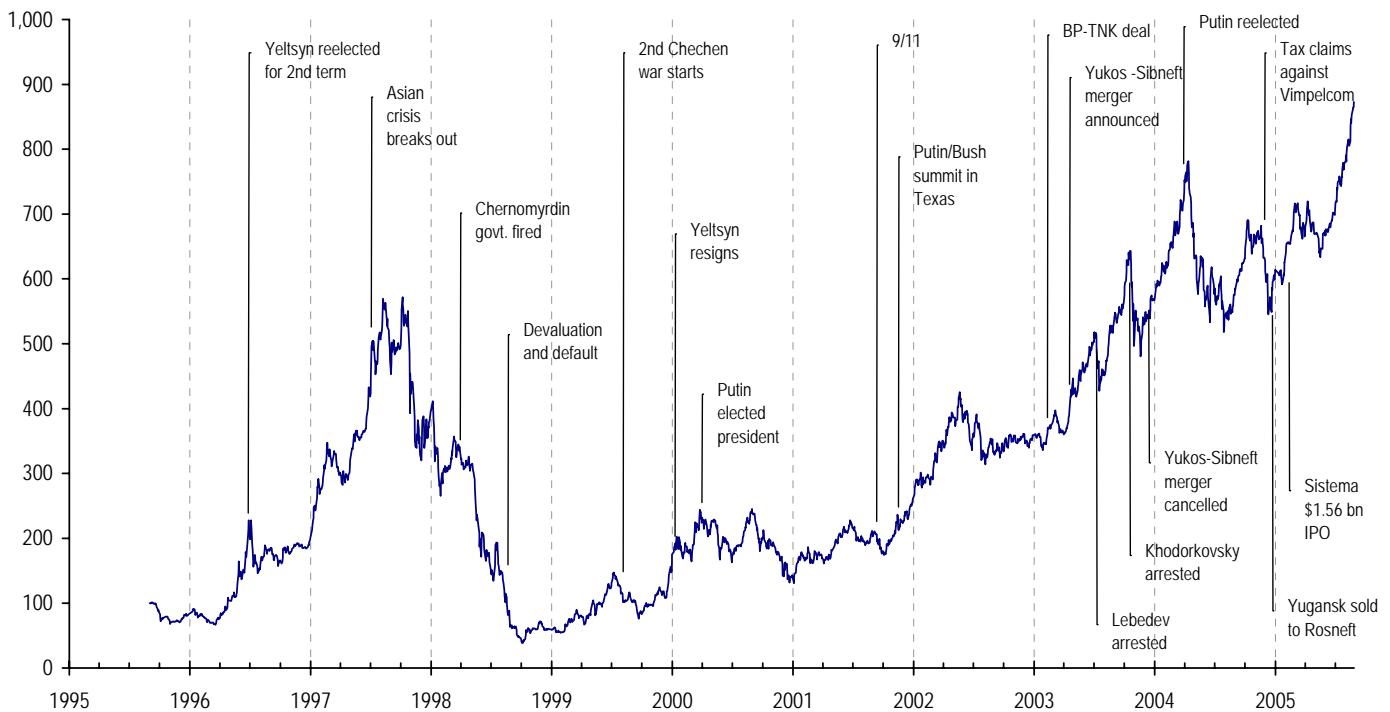
**Specifics of the Russian stock market**

- Leading country in the Soviet block
  - Longest history of the planned economy
- Had to create the market from the scratch, in the midst of the painful transition
- Is it a success story?
  - Now one of the largest emerging markets,...
  - Due to both extensive and intensive growth
  - Yet highly concentrated and volatile

**Evolution of the market: time line**

- 1994: mass privatization
- 1995: creation of the RTS, a dealership market
- 1/9/1995: launch of the RTS index
- 1997: start of the MICEX, an order-driven market
- 1998: financial crisis
- 2000: Putin coming to power
- 2003: (beginning of) the Yukos affair
- 2005-6: rapid market growth, boom of IPOs

## RTS index as a mirror of Russia's major events



Current position (as of end 2005)

- One of the largest emerging markets
  - Total market capitalization: over \$600 billion
  - Avg monthly turnover: \$12 bln
  - # listed stocks: 234 in RTS, 134 in MICEX
  - 75 stocks have depositary receipt programs
- Yet concentrated and not very liquid
  - # traded stocks: ~40 in RTS, ~80 in MICEX
  - 6 of the 10 largest companies are from the oil&gas sector

Major risk factors

- Political risk
  - Yeltsin's era: binary perception that Russia would relapse into Soviet times or move to a market system
- Macroeconomic factors
  - August 1998: ruble devaluation and default
- Corporate governance
  - Poor disclosure, asset stripping, abuses of minority shareholders
  - but also accumulation of (super-)majority stakes
- Political risk vs. corporate governance
  - 2000: pact between Putin and oligarchs
    - Incentives to improve corporate governance
  - 1/2002: new Law on Joint Stock Companies
- Macroeconomic stability
- Structural reforms
- Political risk: Yukos case
  - Eventually, did not lead to expropriation of the companies by the state
  - Though signaled the tougher government policy
- Impact of the oil price

- Esp visible after improvement in corporate governance
- Global equity markets

### Conclusions

- Interaction between financial infrastructure and economic / political / legal / regulatory environment in the country
- Time-varying impact of risk factors
  - Corporate governance
  - Political risk
  - Macroeconomic factors: global equity markets performance, oil prices, and exchange rates

## Derivatives

### Securities

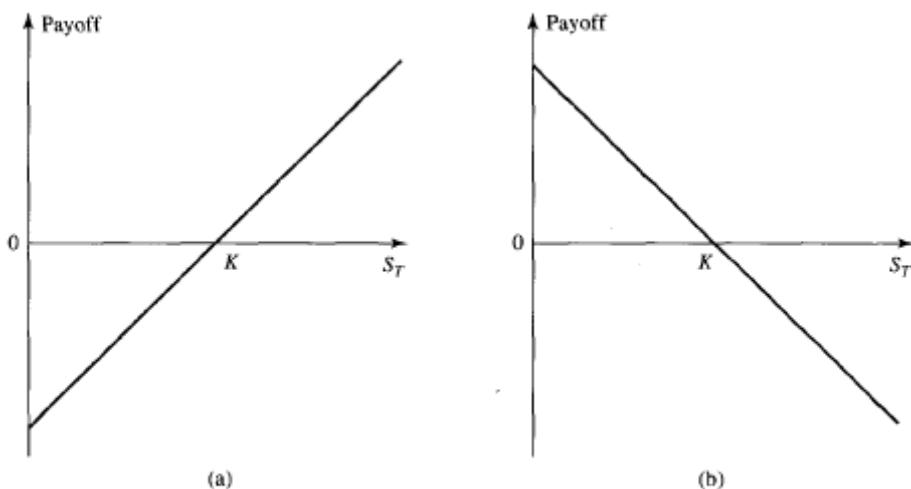
- Characteristics
  - Contingent contractual claim
    - The contract specifies cash flow and ownership rights
  - Marketability
    - Can be sold at the market
- Necessary conditions:
  - Record-keeping technology
  - Legal infrastructure: contracting and enforcement

### Derivatives

- Second level securities
  - Payoff depends on the value of other (underlying) securities
- Many instruments are like derivatives!
  - Bonuses tied to performance
  - Prices of stocks and bonds depend on the company's value
  - Value of the investment project depends on future cash flows
- Some derivatives are combinations of others
  - Forward as a portfolio of options
  - Swap as a portfolio of forwards

### Forward/futures

- *Obligation* to buy (sell) the underlying asset at the future date T at the settlement price K
  - Long (short) position
  - May be offset by the counter deal
- There is no exchange of payments when the contract is signed
  - The settlement price is chosen to make the contract worth exactly zero
- Payoff at T:  $S_T - F$ 
  - Symmetric payoff, with unit sensitivity to the price of the underlying asset



**Figure 1.1** Payoffs from forward contracts: (a) long position, (b) short position.  
Delivery price =  $K$ ; price of asset at maturity =  $S_T$

Why do we need forward/futures?

- Hedging: reduce undesirable risks
  - E.g., we'll have grain to sell in September
  - *Short hedge*: sell September forward in spring
    - We now fix the future selling price
- Speculating: get higher profit from a bullish or bearish market
  - E.g., expect the market to go up
  - Buy futures on the stock market index
    - Receive a high profit (or loss) on small investment
    - High leverage increases expected return and risk
- Arbitrage: find riskless profit opportunity (“free lunch”)
  - Buy undervalued asset and sell overvalued asset with the same risk characteristics
  - E.g., buy oil and sell oil futures
    - Pure arbitrage is very rare: there always some risks
  - Metallgesellschaft: sold 5-10y oil forwards and bought oil futures
    - 1990-1993: large profits
    - 1993: the decline in oil price led to losses over \$1bln

### Example: Hedging with Oil Forward

- An oil company extracts 1 mln. barrels each month
- The current oil price is \$50
- Two strategies:
  - 1: wait till the end of the month and sell at the market price
  - 2: sell now at one-month forward price \$49
- Suppose the manager chose strategy 1 and the market price fell to \$45
  - Strategy 1 does not protect from the oil price risk
- Suppose the manager chose strategy 2 and the market price rose to \$55
  - Strategy 2 does protect from the downside risk, but also eliminates an upside potential
  - In both cases, the manager was fired
- What is the optimal solution?
  - Partial hedging: e.g., 50% *hedge ratio* = hedged volume / total volume
  - The strategy must be understood and approved by the top management!

### Forward

- Specific terms

- Very flexible for the initiating side
- Low liquidity
  - Hard to find the counterparty
  - Spot settlement
- Credit risk
  - The possibility of the default by the counterparty

## Futures

- Standardized exchange-traded contract
  - Amount, quality, delivery date, place, and conditions of the settlement
- Credit risk taken by the exchange
  - The exchange clearing-house is a counterparty
  - Collateral: the initial / maintenance margin
    - The margin account guarantees the settlement for the exchange
  - Marking to market daily
    - E.g., long position: receive  $A(F_t - F_{t-1})$  into account
    - where  $A$  is the position size,  $F_t$  is the settlement price at day  $t$
- High liquidity → popular among speculators
  - Can be offset by taking an opposite position
  - Usually, cash settlement

## Options

- European call (put):
  - Right to buy (sell) the underlying asset at the expiration/maturity date  $T$  at the strike/exercise price  $K$
- American call (put):
  - Can be exercised at any time before  $T$
  - Always more expensive than European one
- Right for the buyer, which is only exercised when profitable
  - An obligation for the option writer to fulfil his promise, if necessary
- Asymmetric payoff function
  - Call:  $c_T = \max(S_T - K, 0)$
  - Put:  $p_T = \max(K - S_T, 0)$

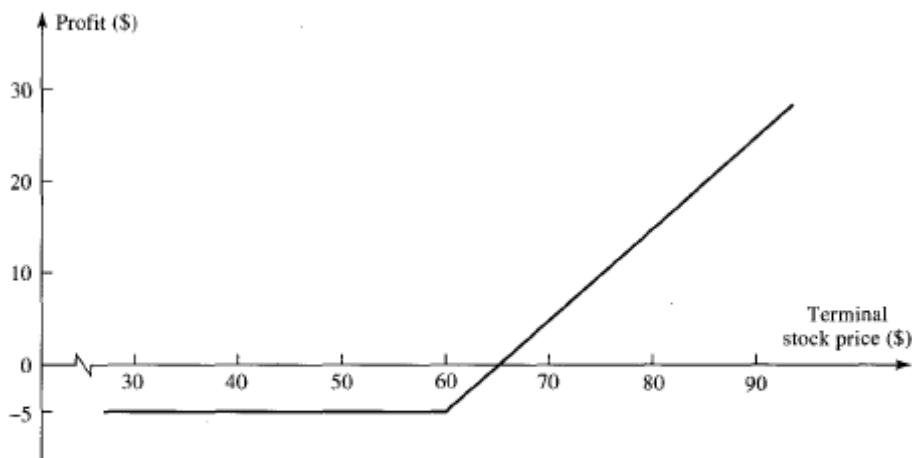
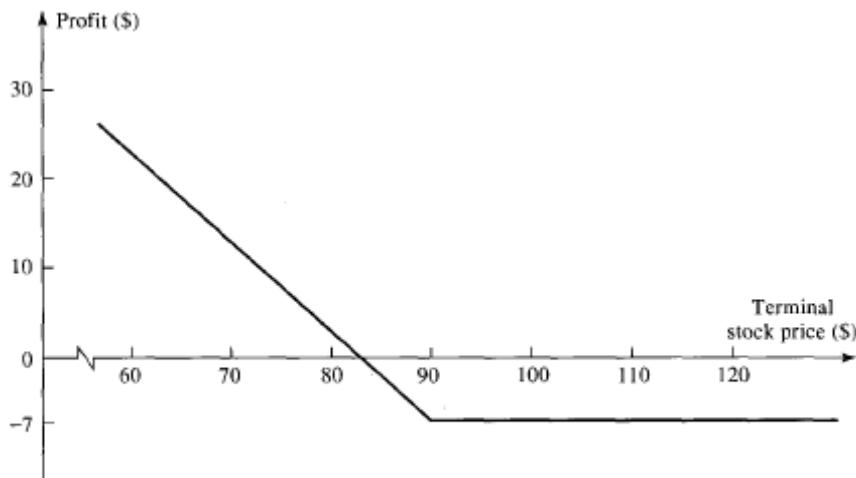


Figure 1.2 Profit from buying a European call option on one Microsoft share.  
Option price = \$5; strike price = \$60



**Figure 1.3** Profit from buying a European put option on one IBM share.  
Option price = \$7; strike price = \$90

### Example continued: Hedging with Oil Option

- Another strategy:
  - 3: buy one-month put option with strike \$49
- This protects from the downside risk and keeps an upside potential
- But at a fixed price
  - The option's price (premium)

### Option terminology

- How much is the option worth?
  - Option *premium*, paid by the buyer to the writer of the option
- Moneyness
  - What would the option bring if it currently expired? Profit / nothing / loss
  - IN / AT / OFF-the-money options
- *Intrinsic value* = profit from the option if it is exercised now
- *Time value* = option's premium - intrinsic value
  - Positive, since the market expects positive developments before maturity
  - If the underlying price goes up, the option will give higher profit
  - If the underlying price falls, the option cannot lose more than 0
  - The higher the volatility of the underlying asset, the better!

### Option pricing

- No-arbitrage approach
  - If two portfolios yield the same payoff in the future, they must have the same price now
- Synthetic forward: long call, short put
- European call-put parity:  $c_0 + Ke^{-rT} = p_0 + S_0$ 
  - Call with cash = covered put
- Black-Scholes model (1973)
  - Prices of European call and put options

### Equity as a call option on the firm with strike equal to the face value of debt

- The company's capital structure includes
  - Equity, with value E
  - Pure-discount debt, with face value F and maturity T
- Default occurs at maturity if the company's value  $V_T < F$ 
  - Stockholders receive at T:  $\max(V_T - F, 0)$

- Creditors receive at T:  $\min(V_T, F)$
- Stockholders: call option on the company
  - Price of the underlying asset: V
  - Exercise price: F
  - Exercise date: T
- Creditors: basic asset (the company) and short call
  - Or bond and short put

### Other uses of options

- Convertible bonds: embedded call option on a stock
  - Bondholders may receive a share in the company's profits
- Redeemable bonds: embedded short call option on the bond
  - The company can buy out the bond for the face value if the interest rates fall
- Executive stock options
  - Call on the company's stock given to the managers for proper incentives
- Real options
  - Evaluate projects with dynamic strategy in response to the changes in the environment
  - E.g., the oil company may change extraction in response to the oil price

### Exotic options

- Bermudan option
  - Can be exercised at *several* exercise dates
- Exchange option:  $\max(S_A - S_B, 0)$ 
  - Gives right to exchange one asset for another
- Binary option:  $I\{S_T - X > 0\}$ 
  - Fixed payoff
- Asian option:  $\max(S_{avg} - X, 0)$ 
  - Payoff depends on the *average* rather than final price
- Barrier option:
  - Knock-in (-out)
  - The call or put becomes worthy (worthless) only after the stock price hits the barrier

### Swaps

- Interest rate swap
  - Exchange of fixed-rate and floating-rate interest payments for a fixed par value
  - Like a portfolio of forwards on interest rates...
  - or long fixed-rate bond vs. short floating-rate bond
- Purpose
  - Hedge interest rate risk
- Currency swap
  - Exchange of interest payments in different currencies
  - Like a portfolio of currency forwards
- Purpose
  - Issue bonds in the cheapest way in one currency
  - Hedge currency risk via swaps

### Mini-case 3 Weather derivatives

What are weather derivatives?

- Instruments with payoff depending on the nature

- Temperature, rainfall, hurricanes, etc.
- Futures on temperature in a large city on a certain date
  - The underlying: # days with  $t$  below  $18^{\circ}$  during November to March period
  - Traded at CME since 1999
- Catastrophe (*cat*) bonds that lose principal in case of an extreme natural disaster
  - Trigger types: actual losses / windspeed / ground acceleration
  - The current issuance volume: \$5 bln per year

Who is interested in futures on temperature?

- Hedging weather risks
  - Gas and power companies, recreational centers, farmers, etc.
- Speculating / investing
  - Instl investors: the payoff is uncorrelated with stocks and bonds
  - Hedge funds: the market “cannot be predicted, but can be forecast”
    - The underlying cannot be manipulated
- Getting more precise information
  - Energy companies

Who is interested in cat bonds?

- Hedging risks
  - Insurance companies: issuing bonds is cheaper than reinsurance
    - The rate is LIBOR + 3-5%, paid only if there is no catastrophe
    - The maturity is 3-5 years
- Sharing risks
  - Investors: willing to put a small fraction of the portfolio to the instrument, which on average gives a high return
- Getting more precise information
  - The government

Are derivatives “financial weapons of mass destruction”?

- Major concerns
  - Derivatives allow financial institutions to increase their leverage
    - This could lead to excessive risks and ultimately to the bankruptcy
  - Derivatives are too complicated
    - Risks are not properly understood
- Many cases of big losses for banks and corporations
  - Orange County, 1994: \$1.7 bln on interest rate derivatives
  - Barings bank, 1995: \$1.4 bln on stock index futures
  - Sumitomo corporation, 1996: \$2.6 bln on copper options
  - Amaranth hedge fund, 2006: \$6.2 bln on energy futures and options
- Who is guilty?
  - Advisors: investment banks did not describe risks properly
  - Decision-makers: had an incentive to show good results, at a cost of higher risks
  - Company management: all cases resulted from a failure in risk management
    - The strategy was not clearly specified
    - The risks were not properly understood
    - Traders could hide losses for a long time

**Role of derivatives:** efficient risk sharing

- To hedge risks
  - Make risk-offsetting bets

- To speculate
  - Take a view on the future direction of the market
- To lock in arbitrage profit
  - Long-short (self-financed) portfolio
- To change the nature of liability/investment
  - Without a need to remove it
- ...at low cost!

**Discussion topic What are the most promising derivatives to develop in Russia?**

Most popular derivatives in Russia

- Currency derivatives
  - OTC forwards, swaps on USD/RUB
  - MICEX/RTS: futures on USD/RUB, EUR/RUB
- Interest rate derivatives
  - MICEX/RTS: futures on bonds, MosIBOR, and MosPrime
  - OTC options on bonds
- Stocks derivatives
  - RTS: futures and options on RTS index, Gazprom, Lukoil, RAO UES,...

Problems

- Lack of the netting principle in the legislation on bankruptcy and taxation
- Low liquidity
- Fragmentation
  - Large banks vs. others
- Lack of the generally acknowledged interest rates

## Organization of primary markets

How can the firm attract external financing?

- Debt vs. equity
- Private placement
  - For start-up, small, and financially troubled firms the public market is often not available
  - The biggest drawback: securities cannot be easily resold
- vs. public offering
  - IPO (initial public offering): the first public equity issue
  - The firm is assisted by the underwriter (an investment bank)

Public offering

- The rights offer
  - Each shareholder receives an offer to buy a proportional number of new stocks at a fixed price
    - This allows shareholders to maintain their % ownership
    - Shareholders can either exercise their rights or sell their rights
- vs. the general cash offer (90%)
  - Everybody can participate

The IPO procedure

- Management gets the approval of the board of directors
- The firm prepares and files a *registration statement* with SEC

- Info about the firm, purpose of the funding, and assessment of the security's risks
- Required for amounts over \$1.5 mln in a year and maturity over 270 days
- SEC studies the registration statement during the *waiting period*
  - If the SEC does not object during the 20 days, it is fine to continue
- The underwriter sets the IPO price and selling effort gets underway
- The underwriter supports the stock price at the secondary market

<b>Steps in Public Offering</b>	<b>Time</b>
1 Pre-underwriting conferences	Several months
2 Registration statements	20-day waiting period
3 Pricing the issue	Usually on the 20th day
4 Public offering and sale	After the 20th day
5 Market stabilization	30 days after offering

### The Underwriting Methods

- Firm Commitment:
  - The investment bank buys the securities outright from the issuing firm
    - The bank guarantees that the issuer receives a fixed amount of money whether the securities are sold or not
  - The bank buys at “wholesale”, tries to resell at “retail” price
  - The investment banks often form a syndicate to share risks
- Best Efforts:
  - The underwriter acts as an agent, receiving a commission for each share sold and using its “best efforts” to sell the entire issue
  - This is more common for smaller and riskier issues (e.g., IPOs than for seasoned issues)

### Main Reasons for Going Public

- (Access to) new finance
  - Improved prospects for growth (esp. by acquisition)
  - Strengthening the equity base and reducing leverage
  - Liquidity and diversification for the previous owners
  - Liquidity for new investors
  - Competition among suppliers of finance
- Enhanced company image and public exposure
- Motivating management and employees
- Cashing in
- Exploiting mispricing

### Disadvantages of IPOs

- Direct costs:
  - Underwriter fees, legal/filing expenses
  - Negative market reaction upon announcement
  - Underpricing at the IPO
    - The next-day secondary market price is usually higher
  - *Green shoe* provision: option for the underwriters to buy additional shares at the offering price
- Greater transparency
  - For competitors / tax authorities / employee unions
- A danger of losing control

### Why are IPOs underpriced?

- Asymmetry of information between investors

- Some investors are better informed
  - They only go for the underpriced issues
- The uninformed investors are subject to the winner's curse
  - When they buy more at the IPO, they discover they have overpaid
- The price at *each* IPO should be lower to attract the uninformed investors
- Reputational issues of the underwriters
  - The underwriters face a trade-off between underpricing too much (to please investors) and too little (to please the issuers) to sustain long-run reputation
  - Potential legal liabilities because of *due-diligence* obligations

### Empirical evidence on IPOs

- Underpricing of IPOs
  - Offering price is on average about 15% below the last trading price
  - This can be partly explained by underwriter price stabilization in the aftermarket
  - Winner's curse: only about 60% of IPOs are underpriced (and oversubscribed)
- High year-to-year variability in number and volume of IPOs
  - Firms issue equity when stocks are overvalued
    - E.g., in the end of 1990s: boom of dot-com IPOs
- Long-run (3 year) underperformance of new issues
  - IPO firms earn less than their peers
  - Do they window-dress their reports before the IPO?

### Discussion topic Why are Russian companies interested in IPOs abroad?

#### Specifics of Russian IPOs

- Are these really initial offerings?
  - Privatization created many non-traded public companies
  - Listing in a good exchange = 'real' IPO
- Pros
  - Money for expansion / cashing in
  - Reputation and hedge against political risk
  - Commitment to keep high corporate governance standards
  - Liquidity and higher demand by foreign investors
- Cons
  - High costs, esp if abroad
    - Underwriting: 3% of the issue amount
    - Audit, legal, etc.: ~\$1 mln in Russia, ~\$2 mln abroad
  - Higher transparency
    - Intl accounting and audit
    - Ownership structure
- Where to do an IPO?
  - LSE (AIM)
  - Frankfurt
  - Warsaw
  - Moscow
- Boom of IPOs in Russia
  - 2004: 5 companies, \$620 mln
  - 2005: 13 companies, \$4.5 bln
  - 2006: 22 companies, \$17.7 bln
    - Rosneft: record \$10.bln
    - Cf: China \$59 bln

## Organization of secondary markets

### **Why do people trade?**

- Is it a zero-sum game?
  - Winner's gain = loss
  - Profit is not the only motive!
- Investing or borrowing
  - To solve the intertemporal cash flow timing problems
- Hedging and distributing risks
  - To mitigate individual risks
- Speculating and gambling
  - To make a bet on future market movements
  - For profit or entertainment

### **Trader types**

- Profit-motivated traders
  - Speculators
  - Dealers / market-makers
- Utilitarian traders
  - Investors and borrowers
  - Hedgers
  - Gamblers

### **Trade intermediaries**

- Brokers
  - Trading on behalf of a client
- Dealers
  - Trading for their own account
- Market-makers
  - Providing bid-ask quotes

### **Placing an order**

- Market
  - Buying/selling at the prevailing market price
- Limit
  - Buying (selling) at a market price not higher (lower) than X
- Short sale: '*selling a cow, which you don't own*'  
  - Sell a stock borrowed from (another client of) your broker
- Stop loss
  - Conditional market order: sell if the market fell below certain level

### **Margin trading**

- Initial / maintenance margin
  - % of MV(assets) kept in the account as a collateral
  - The rest is borrowed from the broker
- Margin call
  - If the amount in the account drops below maintenance margin

- Leverage effect:  $r = (\Delta P - \text{interest}) / (P_0 \text{margin})$

### What do we want from the markets?

- Efficient markets: informative prices
  - Help to make production and allocation decisions
  - E.g., determine the required rate of return
  - E.g., evaluate the company managers
- Liquid markets: low transaction costs
  - Ability to open or close large positions without strong effect on prices
  - Allow the market participants to more efficiently share risks

### Important factors

- Low transparency
  - Little information leads to high volatility
- Insider trading
  - Hurts average investors who leave the markets
- Gamblers
  - Create liquidity

### Traditional division of secondary markets

<i>Stock exchange</i>	<i>OTC</i>
Auction	Dealer market
One center	Different locations
Access only for members	Much wider membership
Listing with strong requirements for companies	No or weaker requirements
Quoting: a single price	Bid/ask quotes

### Typology of modern markets

- Degree of continuity
  - Periodic vs continuous systems
- Reliance on market makers
  - Dealer / quote-driven market: agents trade at the quotes provided by the market-makers
    - Dealers provide liquidity in exchange for the preferential position
  - Auction / order-driven market: many agents trade with each other
- Degree of automation
  - Floor vs screen-based electronic systems
- Transparency: providing info before (quotes, depths) and after (actual prices, volumes) the trades
  - Extent of dissemination: brokers, customers, or public
  - Speed of dissemination: real time / with delay
  - Degree of anonymity: hidden orders, counterparty disclosure

### Three basic trading systems

- Dealership market: NASDAQ, RTS
  - Market-makers provide bid and ask prices at which other agents may trade
- Batch auction / call market: NYSE open
  - Agents submit demands to the auctioneer who sets common market clearing price
- Continuous auction: NYSE intraday, Euronext, MICEX

	Nasdaq-NMS	NYSE Open	NYSE Intraday
<b>Market Type</b>			
Continuous	×		×
Floor-based		×	×
Dealer Presence	×	×	×
Multilateral		×	
<b>Transparency</b>			
Pre-trade Quotes	×		×
Post-trade Reports	×	×	×

- Floor: brokers trade with each other on behalf of their clients
- Electronic: the system displays the best limit orders and automatically executes incoming market orders

**▶ КТО БОЛЬШЕ**

**Объемы торгов на российских биржах на порядки меньше, чем на крупнейших мировых площадках**

Биржа	Оборот в январе–августе 2006 г. (\$ млрд)	Число эмитентов
NYSE	11 712,6	2242
NASDAQ	7889,6	3139
LSE	4846,2	3205
Euronext	2274	1218
Deutsche Börse	1822,7	756
OMX Group	860	750
ММВБ	322,6	192
SGX	116,4	693
WSE	34,4	270
<b>РТС</b>	<b>24,2</b>	<b>283</b>

ИСТОЧНИК: ММВБ, РТС, OMX GROUP

Discussion topic Why did the MICEX overturn RTS as the main trading place for Russian stocks?

<i>RTS</i>	<i>MICEX</i>
Created in 1995 as a stock market	Started in 1992 as FX market Stocks since 1997
<b>Dealership</b> system	<b>Order-driven</b> system
Quotes in dollars	Quotes in rubles
230 listed stocks	130 listed stocks
40 traded stocks	80 traded stocks
250 brokers/dealers	530 brokers/dealers