

Finance and Financial Management

Lecture One

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General Information

- Two sections: Tuesdays and Fridays from 12:00pm to 2:00pm.
- Class Policies:
 - Please be punctual!
 - If you use a laptop please sit towards the back.
- Materials
 - Lecture Notes
 - *Investments, 10th edition* by Bodie, Kane, and Marcus
 - Newspapers
- Connections to practice and theory.

Contact

- Email: s.sundaresan@imperial.ac.uk
- Office: 5.01a, 53 Princes Gate
- Office Hours: Mondays from 12:00pm to 2:00pm or by appointment (I'm less reliable by appointment)
- TA TBA

Course Requirements

- Two homework assignments (15% each, 30% total).
- Can be submitted by a group of up to six people.
 - Submitted via the Hub in week 5
 - Submitted via the Hub in week 10
- Final Exam (70%)

Suggestions

- Skim the lecture notes or textbook in advance.
- Lecture notes are *roughly* complete.
- Keep up with current financial events (FT, WSJ, blogs)
- Talk to non-finance friends.
- Ask questions.

Lecture 1: Basics

- What is Finance? How does it differ from and fit in with Economics?
- What is the purpose of Academic Finance and how does it differ from Practical Application of Finance?
- Types of Securities
- Types of Markets
- Types of Transactions

Lecture 2: Time Value of Money

- Discounting and Present Value
- Zero-Coupon Bonds
- Different Discount Rates as a reason to trade.
- Diamond-Dybvig

Lecture 3: CAPM Setup

- Generalized Portfolio Theory
- Asset allocation
- Return vs. Variance vs. Covariance
- Optimal portfolio choice with 1 risky asset and 1 risk-free.
- Optimal portfolio choice with 2 risky assets.
- Optimal portfolio choice with 2 risky assets and 1 risk-free.

Lecture 4: CAPM Payoff

- Efficiency of the Market Portfolio
- Systemic vs Idiosyncratic Risk
- Testing the model.

Lecture 5: Arbitrage

- Examples: multiple securities or multiple markets.
- FX trades: What is and isn't arbitrage.
- Arbitrage should solve itself.
- Limits to Arbitrage: transaction costs and market microstructure

Lecture 6: Equity Valuation

- Market Value vs.
- Intrinsic Value vs.
- Book Value
- Discounted Cash Flow Models
- Valuation Ratios
- Dividend Growth and Multiples.

Lecture 7: Fixed Income Valuation

- Bond Prices
- Term Structure
- Duration
- Convexity
- Fixed Income Portfolio Management

Lecture 8: Options

- Option types, contracts, and strategies.
- Black-Scholes and Options Valuation
- Implied probabilities and volatilities
- How to hedge.

Lecture 9: Market Microstructure

- How are prices actually set?
- The mechanics of trade.
- What matters for market makers? What changes spreads?
- What are the different types of market participants?

Lecture 10: Clean up

- Review
- Catchup
- Trading Games?

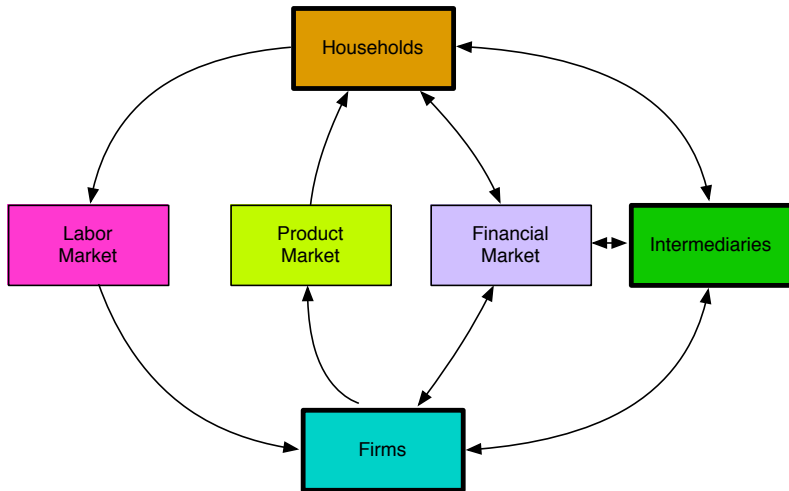
What is Economics?

- Finance is born out of Economics.
- Economics: studies production, distribution, and consumption of goods and services.
- Focused on analyzing behavior and maximizing welfare. (positive vs normative analysis)
- Natural question:

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- Economics: studies production, distribution, and consumption of goods and services.
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- Natural question:
 - What if there were money?
 - Standard reasons for money: store of value, medium of exchange, unit of account.
 - Store of value

Why Economics Paid Attention



What is Finance?

- Finance is the study of investments.
- Modern finance born in 1952 with 'Portfolio Selection' (*Journal of Finance*).
- First paper to define and rigorously analyze **risk** (variance) and **return** (mean).
- The mean-variance approach (micro-level)
- Birthed the CAPM (macro-level)
- Two basic functions: Valuation and Management
 - Valuation is objective-independent: How are assets valued? How *should* they be valued?
 - How should I save/spend? What/When should I buy/sell?

What is the Purpose of Academic Finance

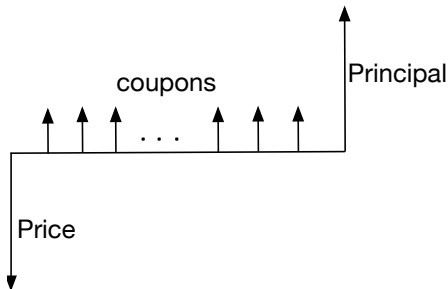
- **Asset Pricing:** How to value assets. Allocation across time (debt and equity) and states (risk and portfolio management).
- **Corporate Finance:** How firms fund themselves. Capital structure and management.
- **Market Microstructure:** Understanding how people trade. Types of traders, motivations from trade, and effects of trading processes on the market.
- **Financial Economics:** Embedding a financial market in a real one - trying to understand feedback between the two.
- **Mathematical Finance:** Modeling price movements and/or security fundamentals with mathematical formulae.
- **Behavioral Finance:** Understanding the 'non-rational'.

What are important assumptions?

- Agents are selfish
- Investors prefer more to less
- Investors don't like risk
- Investors prefer money now to later
- No such thing as a free lunch
- Financial Market Prices shift to set $S = D$
- Financial Markets are Adaptive and Competitive
- Risk Sharing and Frictions are central to Financial Innovation
- Don't say that a model is unrealistic!

Fixed Income

- Debt instruments: ways to borrow and lend money.
- They have a fixed cash flow (coupons, interest rates).
- The only cash flows are the purchase, the coupons, and the principal:



Implications of price as function of coupons and principal? Price and Yield move inversely.

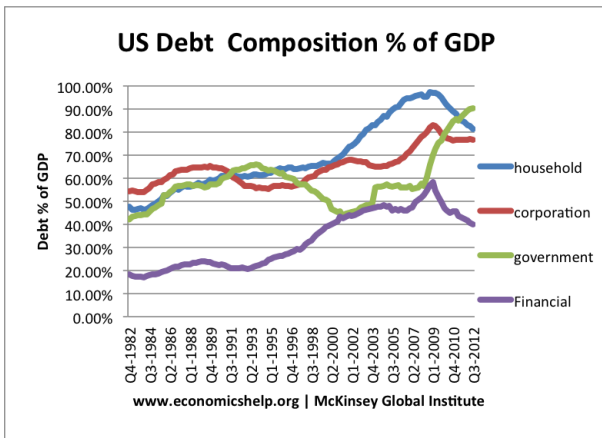
Types of Bonds

- Treasuries
 - Treasury Bills (< 1 year), Notes (1-10 years), Bonds (> 10 years).
 - Semi-Annual coupon payments.
 - How do interest rates vary with maturity?
 - Why are they considered safe? Are they really risk-free?

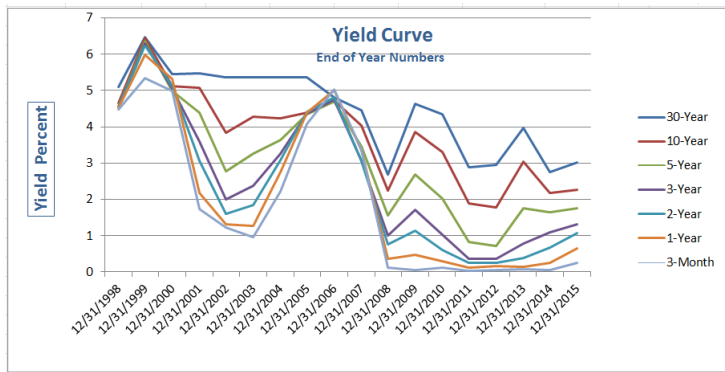
Types of Bonds

- Corporates
 - Corporate Paper (<1 year), Bonds (>1 year)
 - Different repayment priorities (senior, junior).
 - Higher yields. Why? What's the difference?
 - Different types of risk: credit, liquidity, counterparty, etc.

The Bond Market



The Yield Curve



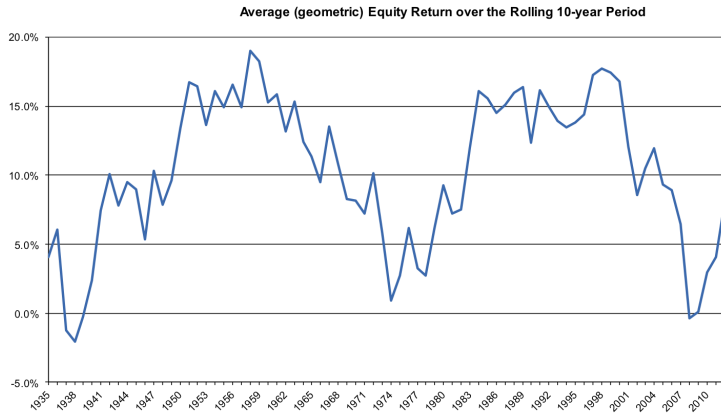
Equity

- Ownership of the future cash flows of a project.
- No maturity
- Cash flows are stochastic.
- Cash flows are subordinate to debt - senior, junior

Equity Indices

- Equity performance often reported in aggregate indices.
- Dow Jones Industrial Average
 - Price-weighted index
 - 30 firms
- Standard & Poors Composite 500 Index
 - Value weighted index
 - 500 firms
- FTSE 100 Index
 - Value weighted index
 - 100 firms

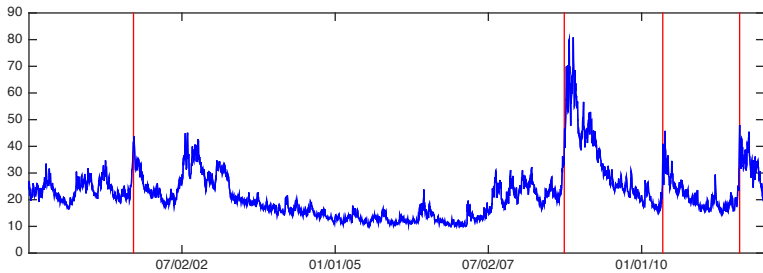
The Equity Market



Derivatives

- Securities whose cash flows depend on other securities
- **Futures:** Contracts signed today that agree to exchange a security for a given cash value at a specified future date.
- **Swaps:** Contracts that agree to exchange two sets of cash flows for a specified amount of time.
- **Convertibles:** Debt contracts that convert into equity when certain preconditions are met.
- **Options:** Contracts that give one party the *right* to buy or sell a certain security.
- **Asset Backed Securities:** Securitized products where cash flows are a function of underlying (mortgages, car loans, corporate bonds, credit card debt, life insurance policies).

The VIX



Money Market

- Short term borrowing instruments.
- No coupons - discount bonds only.
- Highly Liquid.
- T-Bills, Commercial Paper, Repos, Eurodollars, Fed Funds, LIBOR, etc.

Types of Markets

- Exchange Markets
- OTC Market

Cost of Trade

- Broker's Commission
- Bid-Ask spread (why does this exist?)
- Price impact (why does this exist?)
- Taxes

Types of Transactions

- Cash funded (rare - why?)
- Margin funded (bull)
- Going short (bear)

Buying on Margin

- Federal securities law mandates limitations on borrowing.
 - Initial margin must be at least 50%.
 - Maintenance margin must be at least 30%.
- Margin is defined as:

$$\text{Margin} = \frac{\text{Equity}}{\text{Value of Security}} = \frac{\text{Value of Security} - \text{Loan}}{\text{Value of Security}}$$

Buying on Margin

- Suppose you have \$10,000 and are bullish about MSFT.
- You can borrow \$10,000 from your broker at 10%.
- Can buy up to \$20,000 of MSFT.
- What are the returns of this trading strategy if Microsoft stock increases or falls by 25% during the next year?

Buying on Margin

	MSFT ↑ 25%	MSFT ↓ 25%
Value of Stock Position		

Buying on Margin

	MSFT ↑ 25%	MSFT ↓ 25%
Value of Stock Position	\$25,000	\$15,000
Loan Repayment		

Buying on Margin

	MSFT ↑ 25%	MSFT ↓ 25%
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Loan Repayment	\$11,000	\$11,000
Net Value of Account		

Buying on Margin

	MSFT ↑ 25%	MSFT ↓ 25%
Value of Stock Position	\$25,000	\$15,000
Loan Repayment	\$11,000	\$11,000
Net Value of Account	\$14,000	\$4,000
Net Return		

Buying on Margin

	MSFT ↑ 25%	MSFT ↓ 25%
Value of Stock Position	\$25,000	\$15,000
Loan Repayment	\$11,000	\$11,000
Net Value of Account	\$14,000	\$4,000
Net Return	40%	-60%

Selling Short

	Today	Tomorrow
Bank	Lend Stock	Receive Stock, Dividend, Fee
Investor	Borrow and Sell Stock	Buy back and return Stock

Investor gets $P_0 - P_1$ -Fee-Dividends. Floor on losses?

Bank gets Fee.