

KELLOGG GRADUATE SCHOOL OF MANAGEMENT
NORTHWESTERN UNIVERSITY

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Finance 465
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Outline of Important Ideas

Here is a brief outline of the course. This is intended to summarize a) the flow of the material and b) which concepts are most important. It may not be totally comprehensive.

1 Introduction

- What are puts, calls, and forwards?
 - Options are insurance
 - * Buyer perspective
 - * Seller perspective
 - Which positions entail buying, which selling
- Constructing profit and loss diagrams
 - Accounting for interest (i.e., thinking about the financing of the position)
 - Given a position, draw the diagram
 - Given a diagram, what position generates the diagram?

2 Basic Strategies

- Basic option strategies (spreads, straddles, etc...)
- What are collars and zero-cost collars and why are they used
- Put-call parity (put and call premia are equal when the strike price equals the forward price)
- Paylater and similar strategies
- Uses of forwards and options in basic hedging
 - Reasons to hedge
 - Producer perspective
 - Buyer perspective

3 Financial Forwards and Futures

- Forward pricing formulas
 - Stocks (dividend-paying and non-dividend-paying)
 - Currencies
 - Arbitrage strategies if there is a mispricing
 - Tailing to offset income on the underlying asset
- Strategies with forwards (e.g. asset allocation)
- How forwards are different from futures; implications for pricing
- Eurodollar futures

4 Commodity Forwards and Futures

- Interpreting the forward curve
 - Commodity short sales
 - Storage costs
 - Seasonality
 - The convenience yield
- Arbitrage with storage costs and leasing
- Using forward prices in NPV calculations

5 Swaps

- What is a swap?
- Pricing interest rate swaps
- Pricing commodity swaps
- Swap customization (e.g. seasonal and quantity variation)

6 Parity and Other Option Characteristics

- Various incarnations of parity (e.g. parity for stocks, currencies, futures, pre-paid forwards)
- Calls are puts and vice versa (e.g., executive options (MSFT/GOOG options) and currency options)

- Early-exercise: the role of dividends, interest, and insurance
- When are options definitely *not* early-exercised?
- What should you expect to see when you compare prices of
 - otherwise identical American and European options,
 - otherwise identical options with different times to maturity, and
 - otherwise identical options with different strikes?

7 Option Pricing

- Binomial Option Pricing
 - How is the binomial tree constructed?
 - Using the binomial model to price European and American calls and puts on
 - * dividend-paying stocks (continuous dividend)
 - * currencies
 - * futures
 - Intuition for early exercise
 - Risk-neutral pricing
 - * Interpretation
 - * Same price as using standard DCF, just simpler
- Black-Scholes
 - What are the inputs?
 - * How is volatility measured?
 - How are the inputs modified to price:
 - * Options on dividend-paying stocks
 - * Options on futures
 - * Options on currencies
 - Perpetual American options
 - Greeks
 - * Delta, gamma, vega, theta, rho, psi, elasticity
 - * Intuition for values
 - Market making and delta hedging
 - * What is delta-hedging

- * The cash flows and portfolio transactions generated by delta hedging
- * Risks of delta-hedging: when does a delta-hedged portfolio make or lose money
- * The Black-Scholes equation and the link to delta-hedging
- Non-standard (“exotic”) options
 - * Asian options
 - * Barrier options
 - * Exchange options

8 Corporate Applications

- Debt and equity as options on the assets of the firm
- Equity-linked notes: Pricing and why they are used
- Compensation options

9 Real Options

- Investment timing (the perpetual widget machine)
- Reconciling option pricing and DCF in the context of real options
- Peak-load electricity generation
- Oil Extraction: timing, shutting down, and the effect of multiple options