

## Derivative Instruments

### Valuation and Strategies

**T**his study session introduces key valuation concepts and models for forward commitments (forwards, futures, swaps) and contingent claims (options). Option coverage includes the “Greeks,” which measure the effects on value of small changes in underlying asset value, time, volatility, and the risk-free rate. Coverage of common derivatives strategies and their investment objectives follows. Strategies include synthetic position exposure, covered calls and protective puts, bull and bear spreads, and collars and straddles.

#### READING ASSIGNMENTS

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| <b>Reading 40</b> | Pricing and Valuation of Forward Commitments<br>by Robert E. Brooks, PhD, CFA, and Barbara Valbuzzi, CFA    |
| <b>Reading 41</b> | Valuation of Contingent Claims<br>by Robert E. Brooks, PhD, CFA, and David Maurice Gentle,<br>MEc, BSc, CFA |
| <b>Reading 42</b> | Derivatives Strategies<br>by Robert A. Strong, PhD, CFA, and Russell A. Rhoads, CFA                         |

**LEARNING OUTCOMES****READING 40. PRICING AND VALUATION OF FORWARD COMMITMENTS**

The candidate should be able to:

- a** describe and compare how equity, interest rate, fixed-income, and currency forward and futures contracts are priced and valued;
- b** calculate and interpret the no-arbitrage value of equity, interest rate, fixed-income, and currency forward and futures contracts;
- c** describe and compare how interest rate, currency, and equity swaps are priced and valued;
- d** calculate and interpret the no-arbitrage value of interest rate, currency, and equity swaps.

**READING 41. VALUATION OF CONTINGENT CLAIMS**

The candidate should be able to

- a** describe and interpret the binomial option valuation model and its component terms;
- b** calculate the no-arbitrage values of European and American options using a two-period binomial model;
- c** identify an arbitrage opportunity involving options and describe the related arbitrage;
- d** calculate and interpret the value of an interest rate option using a two-period binomial model;
- e** describe how the value of a European option can be analyzed as the present value of the option's expected payoff at expiration;
- f** identify assumptions of the Black–Scholes–Merton option valuation model;
- g** interpret the components of the Black–Scholes–Merton model as applied to call options in terms of a leveraged position in the underlying;
- h** describe how the Black–Scholes–Merton model is used to value European options on equities and currencies;
- i** describe how the Black model is used to value European options on futures;
- j** describe how the Black model is used to value European interest rate options and European swaptions;
- k** interpret each of the option Greeks;
- l** describe how a delta hedge is executed;
- m** describe the role of gamma risk in options trading;
- n** define implied volatility and explain how it is used in options trading.

**READING 42. DERIVATIVES STRATEGIES**

The candidate should be able to:

- a** describe how interest rate, currency, and equity swaps, futures, and forwards can be used to modify portfolio risk and return;

- b** describe how to replicate an asset by using options and by using cash plus forwards or futures;
- c** describe the investment objectives, structure, payoff, and risk(s) of a covered call position;
- d** describe the investment objectives, structure, payoff, and risks(s) of a protective put position;
- e** calculate and interpret the value at expiration, profit, maximum profit, maximum loss, and breakeven underlying price at expiration for covered calls and protective puts;
- f** contrast protective put and covered call positions to being long an asset and short a forward on the asset;
- g** describe the investment objective(s), structure, payoffs, and risks of the following option strategies: bull spread, bear spread, collar, and straddle;
- h** calculate and interpret the value at expiration, profit, maximum profit, maximum loss, and breakeven underlying price at expiration of the following option strategies: bull spread, bear spread, collar, and straddle;
- i** describe uses of calendar spreads;
- j** identify and evaluate appropriate derivatives strategies consistent with given investment objectives.