# LEVEL II SCHWESER'S QuickSheet

## CRITICAL CONCEPTS FOR THE 2013 CFA® EXAM

## ETHICAL AND PROFESSIONAL STANDARDS

- **I Professionalism**
  - I (A) Knowledge of the Law
  - I (B) Independence and Objectivity
  - I (C) Misrepresentation
  - I (D) Misconduct
- **II Integrity of Capital Markets**
  - II (A) Material Nonpublic Information
  - II (B) Market Manipulation
- **III Duties to Clients**
  - III (A) Loyalty, Prudence, and Care
  - III (B) Fair Dealing
  - III (C) Suitability
  - III (D) Performance Presentation
  - III (E) Preservation of Confidentiality
- **IV Duties to Employers**
  - IV (A) Loyalty
  - IV (B) Additional Compensation Arrangements
  - IV (C) Responsibilities of Supervisors
- **V Investment Analysis, Recommendations, and Action**
  - V (A) Diligence and Reasonable Basis
  - V (B) Communication with Clients and Prospective Clients
  - V (C) Record Retention
- **VI Conflicts of Interest**
  - VI (A) Disclosure of Conflicts
  - VI (B) Priority of Transactions
  - VI (C) Referral Fees
- **VII Responsibilities as a CFA Institute Member or CFA Candidate**
  - VII (A) Conduct in the CFA Program
  - VII (B) Reference to CFA Institute, CFA Designation, and CFA Program

## QUANTITATIVE METHODS

### Simple Linear Regression

Correlation:

$$r_{XY} = \frac{cov_{XY}}{(s_X)(s_Y)}$$

t-test for r (n – 2 df): $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$

Estimated slope coefficient: $\frac{cov_{xy}}{\sigma_x^2}$

Estimated intercept: $\hat{b}_0 = \bar{Y} - \hat{b}_1\bar{X}$

Confidence interval for predicted Y-value:

$$\hat{Y} \pm t_c \times SE \text{ of forecast}$$

### Multiple Regression

$$Y_i = b_0 + (b_1 \times X_{1i}) + (b_2 \times X_{2i}) + (b_3 \times X_{3i}) + \varepsilon_i$$

- Test statistical significance of b; $H_0$: b = 0.

$$t = \hat{b} / s_{\hat{b}}, \quad n-k-1 \text{ df}$$

- Reject if |t| > critical t or p-value < α.
- Confidence Interval: $\hat{b}_j \pm \left(t_c \times s_{\hat{b}_j}\right)$.
- SST = RSS + SSE.
- MSR = RSS / k.
- MSE = SSE / (n – k – 1).
- Test statistical significance of regression: F = MSR / MSE with k and n – k – 1 df (1-tail).
- Standard error of estimate (SEE = √MSE). Smaller SEE means better fit.
- Coefficient of determination ($R^2$ = RSS / SST). % of variability of Y explained by X's; higher $R^2$ means better fit.

### Regression Analysis—Problems

- Heteroskedasticity. Non-constant error variance. Detect with Breusch-Pagan test. Correct with White-corrected standard errors.
- Autocorrelation. Correlation among error terms. Detect with Durbin-Watson test; positive autocorrelation if DW < $d_l$. Correct by adjusting standard errors using Hansen method.
- Multicollinearity. High correlation among Xs. Detect if F-test significant, t-tests insignificant. Correct by dropping X variables.

### Model Misspecification

- Omitting a variable.
- Variable should be transformed.
- Incorrectly pooling data.
- Using lagged dependent vbl. as independent vbl.
- Forecasting the past.
- Measuring independent variables with error.

### Effects of Misspecification

Regression coefficients are biased and inconsistent, lack of confidence in hypothesis tests of the coefficients or in the model predictions.

**Linear trend model:** $y_t = b_0 + b_1 t + \varepsilon_t$

**Log-linear trend model:** $\ln(y_t) = b_0 + b_1 t + \varepsilon_t$

**Covariance stationary:** mean and var. don't change over time. To determine if a time series is covariance stationary, (1) plot data, (2) run an AR model and test correlations, and/or (3) perform Dickey Fuller test.

**Unit root:** coefficient on lagged dep. vbl. = 1. Series with unit root is not covariance stationary. First differencing will often eliminate the unit root.

**Autoregressive (AR) model:** specified correctly if autocorrelation of residuals not significant.

**Mean reverting level for AR(1):**

$$\frac{b_0}{(1-b_1)}$$

**RMSE:** square root of avg. squared error.

**Random Walk Time Series:**

$$x_t = x_{t-1} + \varepsilon_t$$

**Seasonality:** indicated by statistically significant lagged err. term. Correct by adding lagged term.

**ARCH:** detected by estimating:

$$\hat{\varepsilon}_t^2 = a_0 + a_1\hat{\varepsilon}_{t-1}^2 + \mu_t$$

Variance of ARCH series:

$$\hat{\sigma}_{t+1}^2 = \hat{a}_0 + \hat{a}_1\hat{\varepsilon}_t^2$$

## ECONOMICS

**bid-ask spread** = ask quote – bid quote

**Cross rates with bid-ask spreads:**

$$\left(\frac{A}{C}\right)_{bid} = \left(\frac{A}{B}\right)_{bid} \times \left(\frac{B}{C}\right)_{bid}$$

$$\left(\frac{A}{C}\right)_{offer} = \left(\frac{A}{B}\right)_{offer} \times \left(\frac{B}{C}\right)_{offer}$$

**Currency arbitrage:** "Up the bid and down the ask."

**Forward premium** = (forward price) – (spot price) = $F - S_0$

**Value of fwd currency contract prior to expiration:**

$$V_t = \frac{(FP_t - FP)(\text{contract size})}{\left[1 + R\left(\frac{days}{360}\right)\right]}$$

**Covered interest rate parity:**

$$F = \frac{\left[1 + R_A\left(\frac{days}{360}\right)\right]}{\left[1 + R_B\left(\frac{days}{360}\right)\right]} S_0$$

**Uncovered interest rate parity:**

$E(S_t)$ = expected spot rate at time *t*

$$= \left(\frac{1+R_A}{1+R_B}\right)^t (S_0)$$

**Fisher relation:**

$(1 + R_{nominal}) = (1 + R_{real})[1 + E(\text{inflation})]$

$R_{nominal} \cong R_{real} + E(\text{inflation})$

**International Fisher Relation:**

$$\frac{(1+R_{nominal\ A})}{(1+R_{nominal\ B})} = \frac{[1+E(\text{inflation}_A)]}{[1+E(\text{inflation}_B)]}$$

$R_{nominal\ A} - R_{nominal\ B} \cong E(\text{inflation}_A) - E(\text{inflation}_B)$

**Relative Purchasing Power Parity:** High inflation rates leads to currency depreciation.

$$S_t = S_0\left[\frac{1+\text{inflation}_A}{1+\text{inflation}_B}\right]^t$$

$$\textbf{real exchange rate} = S_t\left[\frac{CPI_B}{CPI_A}\right]$$

**Profit on FX Carry Trade** = interest differential – change in the spot rate of investment currency.

**Mundell-Fleming model:** Impact of monetary and fiscal policies on interest rates & exchange rates. Under high capital mobility, expansionary monetary policy/restrictive fiscal policy → low interest rates → currency depreciation. Under low capital mobility, expansionary monetary policy/expansionary fiscal policy → current account deficits → currency depreciation.

**Dornbusch overshooting model:** Restrictive monetary policy → short-term appreciation of currency, then slow depreciation to PPP value.

**Labor Productivity:**

output per worker $Y/L = T(K/L)^{\alpha}$

**Growth Accounting:**

growth rate in potential GDP
= long-term growth rate of technology
+ α (long-term growth rate of capital)
+ (1 – α) (long-term growth rate of labor)

growth rate in potential GDP
= long-term growth rate of labor force
+ long-term growth rate in labor productivity

### Classical Growth Theory

- Real GDP/person reverts to subsistence level.

### Neoclassical Growth Theory

- Sustainable growth rate is a function of population growth, labor's share of income, and the rate of technological advancement.

continued on next page...