LEVEL 2 SCHWESER'S QuickSheet™

CRITICAL CONCEPTS FOR THE 2011 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:

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

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.

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

- Reject if |t| > critical t or p-value < α.
- Confidence Interval: $\hat{b}_i \pm (t_c \times s_{\hat{b}_i})$.
- 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

One Third Rule

- At given technology level, 1% ↑ in capital/labor hour ⇒1/3% ↑ in real GDP per labor hour.

Classical Growth Theory

- Real GDP growth temporary (real GDP/person ↑ above subsistence level).
- Population explodes.
- Real GDP/person ↓ to subsistence level.

Neoclassical Growth Theory

- No technological change ⇒ no real GDP growth.
- Technology changes ⇒ increased saving and inv. ⇒ capital/labor hour ↑ and real return ↓.
- Economic growth stops when real return = target return.
- Pop. growth independent of economic growth.

New Growth Theory

- Economic growth continues indefinitely as technology advances.
- ↓ real rate ⇒ incentive to discover new products and methods.
- Discovery ⇒ real return > target return.

Nominal and Real Exchange Rate

- Nominal ex. rate (E): price of one currency in terms of another; observed in FX markets.
- Real exchange rate = E × (P/P*).

Balance of Payments: current acct + capital acct + official reserve account = 0.

Foreign Exchange

Direct quotes: if quote is £ per $ (or USD:GBP), this is a direct quote from the perspective of the pound.

Bid-ask spread stated as percent of asking price:

$$\%\text{ spread} = \frac{\text{ask price} - \text{bid price}}{\text{ask price}}(100)$$

Foreign currency is at forward *discount (premium)* if *F* is below (above) *S*, using *direct* quotes:

$$(\text{fwd prem/disc}) = \left(\frac{\text{fwd rate}}{\text{spot rate}} - 1\right)\left(\frac{360}{\text{term in days}}\right)$$

Currency **appreciates** due to:
- Lower relative income growth rate.
- Lower relative inflation rate.
- Higher domestic real interest rate.
- Improved investment climate.

Unanticipated shift to exp. monetary policy: higher income, accelerated infl., lower real interest rates; leads to currency depr. and financial acct. deficit.

Unanticipated shift to exp. fiscal policy: currency appr., current acct. deficit, and financial account surplus.

Purchasing Power Parity

Law of one price: a single, clearly comparable good should have same real price in all countries.

Relative PPP: countries with high inflation rates should see their currencies depreciate.

$$S_0\left[\frac{1+I_{\text{counter currency}}}{1+I_{\text{base currency}}}\right]^t = E(S_t)$$

International Fisher Relation

Assumes real interest rates are equal across borders, so interest differential equals expected inflation diff:

$$\frac{1+r_b}{1+r_a} = \frac{1+E(i_b)}{1+E(i_a)}$$

$$r_b - r_a \approx E(i_b) - E(i_a)$$

Uncovered Interest Rate Parity

Countries with high nominal interest rates should see their currencies depreciate:

$$S_0 \times \frac{\left[1+r_{\text{counter currency}}\left(\frac{n}{360}\right)\right]}{\left[1+r_{\text{base currency}}\left(\frac{n}{360}\right)\right]} = E[S_n]$$

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