Contents

1 Reading 9: Correlation and Regressions

1.1 Sample covar and sample correlation coefficients

Sample covariance: $cov_{x,y} = \sum_i \frac{(X_i - \bar{X})(Y_i - \bar{Y})}{n-1}$

Sample correlation coeff: $r_{x,y} = \frac{cov_{x,y}}{s_x s_y}$, where s_x is the sample dev of X.

1.2 Limtations to correlations analysis

Outliers: The results will be affected by extreme data points.(outliers)

Spurious correlation: There might be some non-zero corrlation coeff, but acutally they have no correlation at all.

Nonlinear relationships: Correlation only describe the linear relastions.

1.3 Hypothesis: determine if the population correlation coefficient is zero

Two-tailed hypothesis test:

$$H_0 : \rho = 0, H_a : \rho \neq 0$$

Assume that the two populations are **normally** distrubited, then we can use t-test:

$$t = \frac{r\sqrt{n-2}}{1-r^2}$$

: Reject H_0 if $t > +t_{critical}$ or $t < -t_{critical}$. Here,r is the sample correlation. Remember, you need to check t-table to find the t-value.

1.4 Determine dependent/indepedent variables in a linear regression

Simple linear regression: Explain the variation in a dependent variable in terms of the variabltion in a single indepedent variable. **Independent variables** are called explanatory variable, the exogenous variable, or the predicting variable. **Dependent variable** is also called the explained variable, the endogenous variable, or the predicted variable.

1.5 Assumptions in linear regression and interpret regression coeff.

1. Assumptions of linear regression:

   (a) Linear relationship must exist.

   (b) The indepedent variable is uncorrelated with residuals.

   (c) Expected Residual term is value. $E(\epsilon) = 0$

   (d) variance of the residual term is const. $E(\epsilon_i^2) = \sigma_\epsilon^2$. Otherwise, it will be "heteroskedastic"

   (e) The residual term is independently distributed. otherwise – "auto correlation"" $E(\epsilon_i \epsilon_j) = 1$

   (f) The residual term is normally distributed.

2. Simple Linear Regression Model

   (a) Model: $Y_i = b_0 + b_1 X_i + \epsilon_i$, where $i = 1...n$, and Y_i is the actual observed data.

   (b) The fitted line, the line of best fit : $\hat{Y} = \hat{b_0} + \hat{b1} X_i$. Where $\hat{b_0}$ is the estimated parameter of the model.

(c) How to choose the best fitted line? **Sum of squared errors** is minimum.

$$\hat{b}_1 = \frac{cov_{x,y}}{sigma_x^2}$$

where X is the indepdent variable. $\hat{b}_1$ is "regression coeffcient".

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

where $\bar{X}, \bar{Y}$ are the mean.

3. Interpreting a regression coefficient: Similar to basic ideas of "slope". Keep in mind: any conclusion regarding this parameter needs the statistical significance of the slope coefficient.

1.6 Standard error of estimate, the coeff. of determination and a confidence interval for a regression coefficient.

1. Standard error of estimate (SEE): Standard deviation between $Y_{estimate}$ and Y_{actual}. - Smaller: better

2. Coefficient of Determination (R^2) The percentage of the total variance in the dependent variable that is predictable from the indepedent variable. - One indepdent variable: $R^2 = r^2$, where r^2 is the square of correlation coefficient.

3. Regression Coefficient confidence interval

   (a) Hypothesis: $H_0 : b_1 = 0 \Leftrightarrow H_a : b_1 \neq 0$

   (b) Confidence interval: $\hat{b}_1 - (t_c s_{\hat{b}_1}) < b_1 < \hat{b}_1 + (t_c s_{\hat{b}_1})$ $s_{\hat{b}_1}$ is the standard error of the regression coeffi.

1.7 Hypothesis: Determine if $\hat{b}_1 = b_1$

1. t-test statistic: $t_{b_1} = \frac{\hat{b}_1 - b_1}{s_{\hat{b}_1}}$

2. Reject: if $t > +t_{critical}$ or $t < -t_{critical}$

1.8 Calculate the predicted value for the depedent variable

If an estimated regression model is known, $\hat{Y} = \hat{b}_0 + \hat{b}_1 X_p$

1.9 Calculate and interpret a confidence interval for the predicted value of the depedent variable

1. Eq: $\hat{Y} \pm (t_c s_f)$, where s_f is the std error of the forecast.

2. $s_f^2 = SEE^2 \left[1 + \frac{1}{n} + \frac{(X - \bar{X})^2}{(n-1)s_x^2} \right]$

   (a) $SEE^2 =$ variance of the residuals

   (b) $s_x^2 =$ variance of the indepdent variable

   (c) $X =$ value of the independent variable where the forecast was made.

1.10   ANOVA in regression. Interpret results, and calculate F-statistic

1. Analysis of variance (ANOVA) is used to analyze the total variability of the depedent variable.

    (a) Total sum of squares(SST): $SST = \sum_{i=1}^{n}(Y_i - \bar{Y})^2$
        SST is the total variation in the depedent variable. $Variance = SST/(n-1)$

    (b) Regression sum of squares(RSS): $RSS = \sum_{i=1}^{n}(\hat{Y}_i - \bar{Y})^2$
        RSS is the explained variation.

    (c) Sum of squared errors(SSE): $SSE = \sum_{i=1}^{n}(Y_i - \hat{Y}_i)^2$
        SSE is the unexplained variation.

    (d) $SST = RSS + SSE$ I cannot get this equation yet You need to know how to use these squares.

    (e) Degree of freedom: i) Regression(Explained): $k = 1$, since we only estimate one parameters. ii)
        Error(Unexplained) $df = n - k - 1 = n - 2$ iii) Total variation $df = n - 1$

2. Calculating R^2 and **SEE**

    (a) $R^2 = explained\,variation/total\,varn = RSS/SST$

    (b) $\textbf{SEE} = \sqrt{\frac{\textbf{SSE}}{\textbf{n-2}}}$ **SEE** is the std deviation of the regression error terms.

3. The F-Statistic: used to explain whether *at least one* indepdent parameter can significanly explain the dependent parameter.

    (a) F-statistic eq: $F = \frac{MSR}{MSE} = \frac{RSS/k}{SSE/n-k-1}$ where $MSR =$ mean regression sum of squares. $MSE =$
        mean squared errors. Note: One tailed test!

4. F-statistic with one independent variable.

    (a) Hypothesis: $H_0 : b1 = 0 \Leftrightarrow H_a : b1 \neq 0$

    (b) degree of freedom: $df_{rss} = k = 1, df_{sse} = n - k - 1$

    (c) Decision rule: reject H_0 if $F > F_c$

1.11   Limitations of regression analysis

1. Parameter instability: the estimation eq may not be useful for other times.

2. Limited usefulness: other participants may also use the same eq.

3. Assumptions does not hold: i) Heteroskedastic, i.e., non-const variance of the error terms. ii) autocorrelation, i.e., error terms are not independent.

2   Reading 10: Multiple Regression and Issues in Regression Analysis

Some basic ides

1. Model: $Y_i = b_0 + b_1 X_{1i} + b_2 X_{2i} + ... + b_k X_{ki} + \epsilon_i$

2. Multiple regression methodology estimates the intercept and slope coefficients so that $\sum_{i}^{n} \epsilon_i^2$ is minimized.

2.1   Interpret estimated regression coefficients and their p-values.

They are just simple linear functions with multiple parameters. Ignore.

2.2 Formulate a null/alternative hypothesis, do correspoding calculations

1. Hypothesis Testing of Regression coefficient. (Multi-parameters).
   Use t-statistics to determine if one parameter significantly contribute to the model.

$$t = \frac{\hat{b}_j - b_j}{s_{\hat{b}_j}}, df = n - k - 1$$

   where k is the number of regression coefficients, and 1 corresponds to the intercept term, and $s_{\hat{b}_j}$ is the coefficient standard error of b_j

2. Determining statistical significance.
   "testing statistical significance" $\Rightarrow H_0 : b_j = 0, H_a : b_j \neq 0$

3. Interpreting p-values.

   (a) Def: p-value is **the smallest level of significance for which the null hypothesis can be rejected.** If the p-value is less than significance level, the null

4. Other Tests of the Regression Coefficients: $H_0 : a =$some value

2.3 Calculate and Interpret a confidence interval for the population value of a regression coefficient or a predicted value for the depedent variable if an estimated regression model.

1. Confidence intervals for a regress. coeff.: $\hat{b}_j \pm (t_c \times s_{\hat{b}_j})$

2. predicting the depedent variable: $\hat{Y}_i = \hat{b}_0 + \hat{b}_1 \hat{X}_{1i} + ... + \hat{b}_k \hat{X}_{ki}$
   Even if you may conclude that some b_i are not statistally significantly, you cannot treat them as 0 and keep other parameters unchanged. You should use the original model, or you can throw $\hat{b}_k$ away and make a new regression model.

2.4 Assumptions of a multiple regresssion model

1. Linear relationships exist.

2. The independent variables are not random, and there is no exact linear relation between indepdent variables.

3. $E[\epsilon | X_1, ..., X_k] = 0$

4. Variance of $\epsilon = 0$, i.e. $E[\epsilon_i] = 0$

5. $E(\epsilon_i \epsilon_j) = 0$

6. ϵ is normally distributed.

2.5 Calculate and interpret F-statistic

F-test: whether at least **one** of the indepedent variables explains a significant portion of the variation of the depedent variable. F test is a one-tail test.

1. $H_0 : b1 = b2 = b3 = 0 vs H_a :$ at least one $b_j \neq 0$

2. $F = \frac{MSR}{MSE} = \frac{RSS/k}{SSE/n-k-1}$

3. Degree of freedom: $df_{numerator} = k, df_{denominator} = n - k - 1$

4. Rules: reject H_0 if $F(test - statistic) > F_c(criticalvalue)$

2.6   Distinguish between R^2 and adjusted R^2

1. coefficient of determination R^2: used to test if a group of indepedent variable can explain the depedent variable:
   $R^2 = \frac{total variation - unexplained variation}{total variation} = \frac{SST - SSE}{SST} = \frac{RSS}{SST}$
   Multiple R $= \sqrt{R^2}$

2. Adjusted R^2

   (a) Note: R^2: Overestimating: will increase as variables are added to the model. Even the marginal contribution of new variables are not statistically significant.

   (b) Introduce R_a^2: $R_a^2 = 1 - \left[\left(\frac{n-1}{n-k-1}\right)\right](1 - R^2)$

2.7   Evaluate the quality of a regression model by analyzing the ouput of the equation/ANOVA table

1. ANOVA Tables, some important quantities

   (a) $R^2 = \frac{RSS}{SST}$
   (b) $F = \frac{MSR}{MSE}$ with k and $n - k - 1$ df
   (c) Standard error of estimate:$SEE = \sqrt{MSE}$

2.8   Formulate a multiple regression with dummpy variables to represent qualitative factors

1. Def: Some value is quite qualitative. Using dummy values like 0 or 1 to describe their impacts.

2. Note: Pay attention to # of dummy variables. If n classes, we must use $n - 1$ dummy variables.

3. Interpreting the coefficients in a dummy variable regression. We can use F-statistics to test a group of parameters, or use t-test to test the individual slope coefficients.

4. Example of Regression application with dummy variables. See Notes directly.

2.9   Why multiple regression isn't as easy as it looks?

Pay attention to the assumptions that have been used. Violations like::

1. Heteroskedasticity

2. Serial correlation (auto-correlation)

3. Multicollinarity

Any violations on the assumptions will impact the estimation of SEE, and finaly change the t-statistic and F-statistic, and change the conclustion of the hypotesis test.

2.10   Types of Heteroskedasticity, how heteroskedasiticity and serial correlation affect inference

1. What is Heteroskedasticity?
   Corresponding assumptions: Variance of the residuals is constant across observations. –
   Homoskedasticity Heteroskedasity means the variance of the residuals is not equal.

   (a) Unconditional heter: Not related to the level of the indepedent variables. Will not systematiclly increase with changes in the value of the indepedent variables. Usually will not casue major problems.

(b) Conditional heter: Related to the level of the independent variables. Eg: Conditional heter exists if the variance of the residuals increase with the value of the independent variables increases. Will cause big problems.

2. Effect of Heteroskedasiticity on Regression Analysis

   (a) Unreliable standard errors.

   (b) The coefficient estimates aren't affected.

   (c) Will change the t-statistic, and will change the conclusion.

   (d) Unreliable F-test

3. Detect Heteroskedasicity

   (a) Scatter plot

   (b) Breusch-pagan test: $BPtest = n \times R^2_{resid}$ with $df = k$. where n =the number of observations, $R^2_{resid}=R^2$ from a second regression of the squared residuals from the first regression. k =the number of independent variables. If R^2 or BP-test are too large, something is wrong.

4. Correcting Heteroskedasticity

   (a) Calculate robust sndard errors(White corrected std errors.). Use them for t-test.

   (b) Generalized least squares.

5. What is serial correlations?

   (a) Def: auto-correlation, in which the residual terms are correlated. Common problem with time series data.

      i. Positive serial correlation: a postive error in one time period will increase the posibility to observe a positive one next time.

      ii. Negative serial correlation: Just opposite.

   (b) Effect: positive serial correlation will get small coefficient std errors. Thus, too large t-statistics. therefore, too many Type I errors: reject the null hypothesis H_0 while it's actually true.

   (c) Detection:

      i. Residual plots

      ii. Durbin-Watson statistics:
      $$DW = \frac{\sum_{t=2}^{T}(\hat{\varepsilon}_t - \hat{\epsilon}_{t-1})^2}{\sum_{t=1}^{T}\hat{\epsilon}^2}$$

      For large samples, $DW \approx 2(1 - r)$, where r is the correlation coefficient between residuals from one period and thoese from the previous period.
      Results:
      A. $DW = 2 \Rightarrow$ Homoskedasitic and not serially correlated.
      B. $DW < 2 \Rightarrow$ Postively serially correlated.
      C. $DW > 2 \Rightarrow$ Negatively serially correlated.
      Formulated hypothesis with DW-table, upper and lower critical values
      A. Hypothesis: H_0 : the regression has **no** positive serial correlation.
      B. $DW < d_l$: positive serially correlated. Reject null.
      C. $d_l < DW < d_u$: inconclusive results.
      D. $DW > d_u$: **There is no evidence that are positive correlated.**

   (d) Correcting serial correlation:

      i. Adjust the coefficient std errors. **recommended.** Using Hansen method.

  A. Serial correlation only: Hansen method.

  B. Heteroskedasticity only: White-corrected stand errors.

  C. Both: Hans methods.

 ii. Imporoe the specification of the model.

2.11 Multicolinearity and its cause and effects in regression analysis

Multicollinearity: Indepedent variables or linear combinations of independent variables are highly correlated.

1. Effect of Multicollinearity on Regression Analysis: Will increase the std errors of the slope coefficients.
   Type II Error: A variable is significant, while we conclude it's not.

2. Detecting: Common situation: $t - statistic$ is not significant while $F - test$ is significant. This tells us the indepedent variables are highly correlated.
   A simple rule works if there are 2 indepedent variables: when the absolute value of the sample correlation betewen any two indepedent variables in the regression is greater than 0.7.

3. Correcting: omit one or more of the correlated indepedent variables. THe problame is that it's hard to find the variables that result in the multicolinearity.

2.12 Model misspecification

1. Defination of **Regression model of specification**: decide which independent variables to be included in the model.

2. Types of misspecification

   (a) The functional form can be misspecified: important variables are ommited;variables should be transformed; data is improperly pooled.

   (b) Explanatory variables are correlated with error term in time series model: A lagged dependent variable is used as an independent variable; a function of the dependent variable is used as an independent variable(forecasting the past); independent variables are measured with error.

   (c) Other time-series misspecification.

2.13 Models with qualitive dependent variables

Include qualitative dependent variables, like default, bankcrupcy. Cannot use an ordinary regression model. Should use other models like **probit and logit models** or **discriminant models**.

1. Probit: normal distribution, give probability.

2. Logistic: logistic distribution.

3. Discriminant: result in an overall score or ranking.

3 Reading 11: Time-Series Analysis

3.1 Calculate/evaluate the predicted trend value for a time series given the estimated trend coefficients

1. Linear Trend Model and Log-linear Trend

   (a) Definition: $y_t = b_0 + b_1(t) + \epsilon_t$ Note: t is just time.

   (b) Coefficients is determined by OLS. Ordinary least squared regression.
   $\hat{y} = \hat{b}_0 + \hat{b}_1$

   (c) Log-linear Trend Models

   (d) Model: $y_t = \exp b_0 + b_1(t) \Rightarrow \ln y_t = b_0 + b_1(t)$

3.2 Factors that determine whether a linear or a log-linear model trend should be used

1. Factors that determine which model is best: plot data.

2. Limitaions of trend models:

   (a) residuals are uncorrelated with each other. Otherwise, it will cause auto correlation and we should not use the trend model.

   (b) For log-linear model, it is not suitable for cases with serial correlations (autocorrelation).

   (c) Detect auto correlation: Durbin Watson statistic. $DW = 2.0 \Rightarrow$ No auto correlation.

3.3 Autoregressive model, requirements for covariance statinoary

1. Autoregressive model:

   (a) Model: $x_t = b_0 + b_1 x_{t-1} + \varepsilon_t$

   (b) Statistical inferences bse on ordinary least squares estimates doesn't apply unless the time series is **covariance stationary**.

   (c) Conditions for covariance stationary

        i. Constant and finite expected value.
       ii. Constant and finite variance.
      iii. Constant and finite covariance between values at any given lag.

3.4 An autogressive model of order p

1. Model(order p): $x_t = b_0 + b_1 x_{t-1} + b_2 x_{t_2} + ... + b_p x_{t-p} + \varepsilon_t$

2. Forecasting with an autoregressive model:

   (a) One-period-ahead forecast for $AR(1)$: $\hat{x}_{t+1} = \hat{b}_0 + \hat{b}_1 x_t$

   (b) Two-period-ahead forecast for $AR(1)$: $\hat{x}_{t+2} = \hat{b}_0 + \hat{b}_1 \hat{x}_{t+1}$

3.5 How the residuals can be used to test the autogressive model

1. The residual should have no *serial correlation* if an AR model is correct.

2. Steps

   (a) Estimate: Start with AR(1)

   (b) Calculate: the autocorrelations of he model residuals

   (c) Test: whether the autoccorelations are signficantly different from 0.
       The standard error is $\frac{1}{\sqrt{T}}$ for T observations. The t-test for each observation is $t = \frac{\rho_{\epsilon_t, epsilon_{t-k}}}{1/sqrtT}$, with $T - 2$ df.

3.6 Mean reversion and a mean-reverting level

1. Mean reversion: The time series tends to move toward its mean.

2. Mean-reverting level: $\hat{x}_{t+1} = x_t$, where $\hat{x}_t$ is the predicted value.

3. All covariance stationary time series has finite mean-reverting level.

3.7 Contrast in-sample and out-of-sample forecasts and the forecasting accuracy of different time-series models based on the root mean squared error criterion.

1. in-sample, out-of-sample: determined by if the predicted data is in the range of the observations.

2. RMSE, root mean squared error: used to compare the accurancy. If the accurancy of out-of-sample is better, you should use it for future applications

3.8 Explain the instability of coefficients of time-series models

1. Instability or nonstationarity. Due to the dynamic econimic conditions, model coefficients will change a lot from period to period.

2. Shorter time series are more stable, but longer time series are more reliable.

3.9 Random walk processes and their comparisons between covariance stationary processes

1. Random walk: $x_t = x_{t-1} + \varepsilon_t$

   (a) $E(\varepsilon_t) = 0$: The expected value of each error is zero.
   (b) $E(\varepsilon_t^2) = 0$: The variance of the error terms is constant.
   (c) $E(\varepsilon_i, \varepsilon_j) = 0$: There is no serial correlation in the error terms.

2. Random walk with a Drift: $x_t = b_0 + b_1 x_{t-1} + \varepsilon_t$, where b_1=0

3. A random walk or a random walk with a drift have no finte mean-reverting level. Since $b_1 = 1, \frac{b_0}{1-b_1} = \frac{b_0}{0}$. Therefore, they are not covariance stationary.

4. $b_1 = 1$, they exhibit a unit root. Thus, **the least square regression that been used in AR(1) will not work unless we transfrom the data**.

3.10 Things about unit roots: when they will occur, how to test them, how to transform data to apply AR

1. Unit root testing for nonstationarity:

   (a) run an AR model and check autocorrelations
   (b) perform Dickey Fuller test.
      i. Transform: $x_t = b_0 + b_1 x_1 + \varepsilon \Rightarrow x_t - x_{t-1} = b_0 + (b_1 - 1)x_{t-1} + \varepsilon$
      ii. Direct test if $b_1 - 1 = 0$ using a modified t-test.

2. First differencing

   (a) For a random walk, transform the data $y_t = x_t - x_{t-1} \Rightarrow y_t = \varepsilon_t$ then start to use an AR model $y = b_0 + b_1 y_{t-1} + \varepsilon$, where $b_0 = b_1 = 0$
   (b) y is covariance stationary.

3.11 How to test and correct for seasonality in a time-series model, and calculate and interpret a forecasted value using an AR model with a sesonal lag.

1. Detect: special autocorrelation exists for some seasonal lags.

2. Correction: Add an additional seasonal lag term.

3.12 Explain autogressive conditional heteroskedasticity (ARCH) and describe how ARCH models can be applied to predict the variance of a time series

1. ARCH: the variance of the residuals in one period is dependent on the variance of the residuals in a previous period.

2. Using ARCH models:
   Example $ARCH(1)$: $\hat{\varepsilon}_t^2 = a_0 + a_1\hat{\varepsilon}_{t-1} + \mu_t$ if a_1 is significantly different from zero. $\hat{\varepsilon}_t^2$ is the squared residuals.
   Note: Things like generalized least squares should me used to correct heteroskedasticity. otherwise, the std errors of the coefficients will be wrong, leading to invalid conclusions.

3. Predicting the variance of a time series: using ARCH model to predict the variance of
   future periods: $\hat{\sigma}_{t+1}^2 = \hat{a}_0 + \hat{a}_1\hat{\varepsilon}_t^2$

3.13 Explain How time-series variables should be analyzed for nonstationarity and/or cointegration before use ain a linear regression

1. Cointegration:

   (a) Two time series are economically linked or follow the same trend and that relationship is not expected to change. – Error terms from regressing one on the other is covariance stationary and the t-test are reliable.

   (b) How to test conintegration: regress y_t on x_t $y_t = b_0 + b_1x_t + \varepsilon$, y_t, x_t are two different time series. Then do a unit root test using the Dickey Fuller test with critical t-values calculated by Engle and Granger.
   If "A unit root" is rejected $\Rightarrow$ covariance stationary, cointegrated.

4 Reading 12: Probabilistic Approaches: Scenario Analysis, Decision Trees, and Simulations

4.1 Describe steps in a simulatino, Explain three ways to define the probability distributions for a simulation's variable, and describe how to treat correlation accross variables in a simulation.

1. Steps in simulations:

   (a) Determine the probabilistic variables

   (b) Define probability distributions for these variables
      i. Option 1: Historical data
      ii. Option 2: Cross-sectional data: estimate the variable from similar companies.
      iii. Option 3: Pick a distribution and estimate the parameters.

   (c) Checkk for correlations among variables: Use historical data to deterine whether any ststematically related. Strong relations$\Rightarrow$ 1) Allow only one of the variables can be removed. Or 2) Build the rules of correlations into the simulation.

   (d) Run the simulation.

4.2 Describe advantages of using simulations in decision making

1. Advantages: 1) Better input quality 2) Provides a distribution of expected value rather than a point estimate.

4.3   Describe some common constraints introduced into simulations

1. Constraints: specific limits imposed by users of simulations.

2. Types of constraints

   (a) Book value constraints:

      i. Regulatory capital requirements: minimum capital requirements
      ii. Negative equity
   (b) Earnings and cash flow constraints: might be imposed to meet analyst expectations
   (c) Market value constraints

4.4   Describe issues in using simulations in risk assessment

1. Limitations of using simulations

   (a) Input quality: garbage in, garbage out
   (b) Inappropriate statistical distributions
   (c) Non-statinoary distributions: parameters will change
   (d) Dynamic correlations: correlations between input variables will change.

2. Risk-adjusted value: cash flows from simulations are not risk-adjusted. SHOULD NOT be discounted at risk-free rate.

4.5   Compare scenario analysis, decision trees, and simulations

1. Scenario analysis: computes the value of an investment under some specific cases. Total probability is less than 1.

2. Decision trees: good when risk is discrete and sequential. Sum of probability is 1

5   Reading 13: Currency Exchange Rates: Determination and Forecasting

5.1   Calculate and interpret the bid-ask spread

1. Exchange rates

   (a) Important things: exchange rate, spot exchange rate, forward exchange rate.
   (b) Bid/offer(ask) rates: //Bid: The price that bank will buy. Offer: The price that bank will sell.
   (c) Foregin Exchange Spread. Unit: "1 pip"= 1/10000 = 0.0001. Spread depend on:
      i. Spread in the interbank market. (Currencies, time, market volatility)
      ii. Size of transaction.
      iii. Relationship between the dealer and client.

5.2   Identify a triangular arbitrage opportunity and calculate its profit

1. Example: USD/AUD. USD is the price currency, and AUD is the base currency.

   (a) Buy the base currency at the ask $\Rightarrow$ Sell the price currency at the ask

   (b) Sell the base currency at the bid $\Rightarrow$ Buy the price currency at the bid

2. For investors,Rule: *up-the-bid-and-multiply, down-the-ask-and-divide*

   (a) Convert USD into AUD: going down the quote – from USD on top to AUD on bottom. Use the ask price for the quote.

   (b) Convert AUD into USD: similar. But from bottom to top.

3. Cross Rate: The exchange rate between two currencies with the help by a common third currency.

4. Cross Rate with bid-ask spreads.

   (a) Rule 1:
   $$\left(\frac{A}{C}\right)_{bid} = \left(\frac{A}{B}\right)_{bid} \times \left(\frac{B}{C}\right)_{bid}; \left(\frac{A}{C}\right)_{offer} = \left(\frac{A}{B}\right)_{offer} \times \left(\frac{B}{C}\right)_{offer}$$

   (b) Rule 2:
   $$\left(\frac{B}{C}\right)_{bid} = \frac{1}{(\frac{C}{B})_{offer}}; \left(\frac{B}{C}\right)_{offer} = \frac{1}{(\frac{C}{B})_{bid}}$$

5. Triangular Arbitrage: If the dealer's quote is different from the cross rate, arbitrage opportunities may exist. Check it with Notes.

5.3   Distinguish between spot and forward rates and calculate the forward premium/discont for a given currency

1. Forward premium relative to a second currency: Forward price > Spot price. Forward premium = $F - S_0$

2. Calculate the market-to-market value of a forward contract
   $$V_T = (FP_T - FP)(contractsize)$$

   where:

   (a) V_T = value of the forward contract at time T, denominated in price currency

   (b) T = maturity of the forward contract

   (c) FP = forward price locked in at inception to buy base currency

   (d) FP_T = forward price to **sell** the same currency at time T

3. Value prior to expiration.
   $$V_t = \frac{(FP_t - FP)contractsize}{1 + R(\frac{days}{360})}$$

   where

   (a) V_t is the value of the forward price

   (b) FP_t: forward price at time t

   (c) *days* number of days remaining

   (d) R interest rate

5.4 Explaining international parity relations (covered and uncovered interest rate parity, purchasing power parity, and the international Fisher effect)

1. Covered interest rate parity: "Covered" means bound by arbitrage. Investor should earn the same return using either currency.
$$F = \frac{1 + R_A(\frac{days}{360})}{1 + R_B(\frac{days}{360})} S_0$$

2. Uncovered interest rate parity: Forward currency contract is unavailable, which makes the interest rate not bound by arbitrage. For a quote A/B, the base currency is expected to appreciate
$$E(\%\Delta_S)_((A/B) = R_A - R_B$$

   Uncovered interest rate parity can only **forcast** the future spot exchange rate.

3. Comparing covered and uncovered interest parity:

   (a) Covered interest parity $\Leftrightarrow$ No-arbitrage forward rate

   (b) Uncovered interest parity $\Rightarrow$ **Expected** future spot rate

4. International Fisher Relation

   (a) $R_{nominal} = R_{real} + E(inflation)$

   (b) Under real interest rate parity, the real interest rate are assumed to converge across different markets.
   $$R_{nominalA} - RnominalB = E(inflation_A) - E(inflaction_B)$$

5. Purchasing Power Parity: Assumed by one price law.

   (a) Absolute purchasing power parity: The average price of a basket of consumption goods.
   $$S(A/B) = CPI(A)/CPI(B)$$

   May not hold due to different weights of consumptions.

   (b) Relative Purchasing Power Parity: Changes in exchange rates should exactly offset the price effects of any inflation differencital b between the two contries.
   $$\%\Delta S(A/B) = Inflation_A - Inflation_B = changeinspotprice(A/B)$$

   Not always held in short run.

   (c) Ex-Ante Version of Purchasing Power Parity: Similar to relative PPP, but Ex-Ante uses expected inflation instead of actuall inflation.

5.5 Describe the relations among the international parity conditions

See Notes Page 263, Vol. 2.

5.6 Evaluate the use of the current spot rate, the forward rate, purchasing parity and uncovered interest parity to forecast future spot exchange rates

1. Real Exchange Rate $= S_t \left[\frac{CPI_B}{CPI_A}\right]$, S_t is the spot rate at time t given as A/B

5.7 Explain how flows in the balance of payment accounts affect currency exchange rates

1. Balance of Payments: accounting method to track transactions between a country and its international trading partners.

   (a) Incluing government, consumer, and business transactions.

   (b) current account + financial account + offcial reserve account = 0

   (c) i. Current account: Exchanges of goods/services, exchanges of investment income and unilateral transfers like gifts.
        A. Surplus: we sell more to other countries, buy less from them
        B. Deficit: we buy more from the rest, sell less to them
       ii. Financial account/Capital account: Flows of funds for debt and equity investment into/out of a country. Surplus: Money is flowing into the country.
      iii. Offcial resreve: thoes made from the reserves held by the government. Normally doesn't change from year to year.

2. Influence of BOP on Exchange Rates

   (a) Current Account

        i. Flow mechanism
           A. Deficit: increase the supply of that currency in the market. Because exporters to our countries need to convert their revenue to their own currency. $\Rightarrow$ Down on the exchange value.
           B. Depreciation of the currency may rebalance the current account. Depending on **The initial deficit, the influence of exchange rates on import/export prices, price elasiticity of traded goods.** See Notes P265 for details.
       ii. Portfolio Composion mechanism. Countries with current account surpluses usually have capital account deficits, which typically take the form of investments in countries with current account deficits. As a result of these flows of capital, investor countries may find their portfolios' composition being dominated by few investee currencies. When investor countries decide to rebalance their investment portfolios, it can have a significant negative impact on the value of those investee country currencies.
      iii. Debt sustainability mechanism: Current account deficit may be balanced by borrowing money from other countries. If the debt too high, lenders may question the security, leading to the deprecitaion of the borrower's currency.

   (b) Capital Account Influences: Money flow in$\Rightarrow$Demand for my country's currency increases$\Rightarrow$Appreciation.

        i. Good: can help to overcome a shortage of internal savings
       ii. Bad: Too much money can be problematic for emerging markets.
           A. Excessive appreciation of the domestic currency
           B. Financial asset, real estate bubbles
           C. Increase in external debt
           D. Excessive consumption in the domestic market funded by credit

3. real exchange rate (A/B) = equilibrium real exchange rate (A/B) + (real interest rate$_B$ - real interest rate$_A$) -(risk premium$_B$ - risk premium$_A$)
   This eqution is not precise. We cannot use it to calculate the rate.

4. Taylor Rule
$$R = r_n + \pi + \alpha(\pi - \pi^*) + \beta(y - y^*)$$

   (a) R = Central bank policy rate implied by the Taylor Rule

(b) r_n = Neutral **real** policy interest rate

(c) π = Current inflation rate

(d) π^* = Central bank's target inflation rate

(e) y = log of current level of output

(f) y^* = log of central bank's target (sustainable) output

(g) α, β = policy response coefficients. (suggested value: 0.5 for both)

$$Real interest rate = r = R - \pi = r_n + \alpha(\pi - \pi^*) + \beta(y - y^*)$$

Substitute the real interest rate equation, we have

Real exchange rate (A/B) = equilibrium real exchange rate(A/B) + differenc in neutral real policy interest rate(B-A)+α[difference in inflation gap (B-A)]+ β[difference in output gap(B-A)]-(risk premium$_B$-risk premium$_A$) //Where: Inflation gap = current inflation - target inflation, Output gap = current output - target output

5.8   Explain approaches to assessing the long-run fair value of an exchange rate

1. The ex-ante version of relative PPP holds $\Rightarrow$ The real exchange rates constant. However, relative PPP does not necessarily hold over the short term. Over long term, PPP holds, and the real rate will be near its equilibrium level.

2. IMF asseses long-term equilibrium real exchanges rate based on

   (a) Macroeconomic balance approach: if the Ex rates need to be adjusted to equalize the expected current account imbalance and the sustainable current account imbalance.

   (b) External sustainability approach. How rates need to be adjust to force a country's external debt relative to GDP towards its sustainable level.

   (c) Reduced-form econometric model approach.

5.9   Describe the carry trade and its relation to uncovered interest rate parity and calculate the profit from a carry trade.

1. FX carry trade: Invest in a higher yielding funding with the funds borrowed in a lower yielding currency. This is due to the uncovered interest rate parity may not hold.

2. Risk of the Carry Trade

   (a) The exchange rate may change abruptly.

   (b) The return distribution is not normal. Negative skewness and excess kurtosis (fat tails). $\Rightarrow$ High probabilithy of large loss

3. Risk Management in Carry Trades

   (a) Volatility filter: if volatitlity > certain threshold, close the carry trade.

   (b) Valuation filter: valuation band for each currency based on PPP. If the value of a currency falls below the band, we will increase its ratio.

5.10 Describe the Mundell-Fleming model, the monetary approach and the asset market approach to exchange rate determination.

5.11 Forecast the direction of the expected change in an exchange rate based on balance of payment, Mundell-Fleming, monetary, and asset market approaches to exchange rate determination.

5.12 Explain the potential effects of monetary and fiscal policy on exchange rates.

1. Mundell-Fleming Model: evaluate the impact of monetary and fiscal policies on interest rates, and therefore on exchange rates.

2. Flexible Exchange Rate Regimes: rate are determined by markets.

   (a) High Capital Mobility: Expansionalry M and F are likely to have opposite effects. Expansionary M will reduce the interest rate, reduce the inflow of capital investment, reduce the demand for domestic money, depprecation.

   (b) Low Capital Mobility: Uncertain

   (c) Summary:

Monetary/Fiscal	High Capital Mobility	Low Capital Mobility
Expan/Expan	Uncertain	Depreciation
Expan/Restr	Depreciation	Uncertain
Restr/Expan	Appre	Uncertain
Restr/Restr	Uncertain	Appreciation

   (d) Fixed Ex rate regimes

      i. If monetary expansionary (depreciation), governments need to buy money in the FX market, therefore will reverse the effect from monetary expansionary.

      ii. Fiscal expansionary →Appreciation(More money needed) →Government need to sell money to keep Ex rate stable. →Fiscal effect on aggregate demand will be reinforced.

3. Monetary Approach to Exchange Rate determination
   Inflation play no role in exchange rate in Mundell-Fleming model.
   Assumptions: 1. Output is fixed.

   (a) Method 1: Pure Monetary model. Assume: PPP holds, output is constant.

   (b) Dornbusch overshooting model. Price are inflexible in short term. Expan Monetary →price increase, interest rate down →depreciatoin of currency. Therefore, in short term, price sticky, interest rate down too much. →depreciation is greater than PPP implies.

4. Portfolio Balance Approach to Exchange rate determination.

   (a) It focues on long-term implications of fiscal policy on currency values.

   (b) Fisical deficit→sell bonds→When investors thinks the country is safe, they will continue to buy bonds. If the investors refuse to fund the deficits →depreciation

5. In short term, with free capital flows, expan fiscal →appreciation
   Long term→government has to reverse expan fiscal. Otherwise, investor will refuse to fund it, then the country have to monetize its debt (print money).→depreation

5.13 Objectives of central bank intervention and capital controls and describe the effectiveness of intervention and capital controls.

See Notes P274. Old version.

5.14   Describe warning signs of currency crisis.

1. Terms of trade deteriorate

2. Foreign reserve down quickly

3. Real exchange rate is extremly higher than mean-reverting value.

4. INflation increases.

5. Equity markets have a boom-bust cycle.

6. Money supply relative to bank reserves increases.

7. Nominal private credit grows.

5.15   Technical analysis

See Notes P275 Old version.

6   Economic Growth and the Investment Decision

6.1   Compare factors favoring and limiting economic growth in developed and developing economies

Two important factors. 1: GDP per capita. 2: Growth of GDP

1. Preconditions for Growth

   (a) Saving and investment. Positively correlated with economic development.
   (b) Financial markets and intermediaries. Help resources reallocation. However, it may increase leverage, risks.
   (c) Political stability, rule of law and property rights.
   (d) Investment in human capital. Worker's skills.
   (e) Tax and regulatory systems. Lower tax burdens are good. Lower regulation levels are good.
   (f) Free trade and unrestriced capital flows.

6.2   Describe the relation between the long-run rate of stock market appreciation and the sustainable groth rate of economy.

The growth in the price is related to earnings and GDP: $\Delta_P = \Delta_G DP + \Delta(E/GDP) + \Delta(P/E)$. Over the long-term, $\Delta(E/GDP) = 0, \Delta(P/E) = 0$. Only GDP growth matters.

6.3   Explain why potential GDP and its growth rate matter for equity and fixed income investors.

Higer GDP growth→Higher interest rates →Higer real asset returns.
Higher GDP growth makes people think that future income is increasing, therefore increase consumptions and reduce savings. To encourage consumers save, higher interest rate is needed.
In short term, actual GDP in excess of potential GDP will result in rising prices →inflationary pressure.

6.4 Distinguish between capital deepening investment and technological progress and explain how each affects economic growth and labor productivity

1. Factor input and Economic growth

   (a) Model: 2-factor aggregate production: Y F(L,K) at a level of tech T. Output Y is a function of labor(L) and capital.

   (b) Cobb-Douglas Production: $Y = TK^\alpha L^{(1-\alpha)}$
       Dividing both sides by L, the output per worker is

   $$Y/L = T(K/L)^\alpha$$

6.5 Forecase potential GDP based on growth accounting relations

1. Growth Accounting Relations

   $$\Delta Y/Y = \Delta A/A + \alpha \times (\Delta K/K) + (1-\alpha)(\Delta L/L)$$

   i.e. growth rate in potential GDP = long-term growth of tech + α long-term growth rate of capital + $(1-\alpha)$*(long-term growth rate of labor)
   The growth of technology is not observable. Can be estimated from previous data: ex-growth rate - ex-growth rate from L and K

6.6 Explain how natural resources affect economic growth and evaluate the arument that limited availability of natural resources constrains economic growth

1. Access to natural resouces does not require ownership of resources.

2. Another theory: ownership of natural resources may actually inhibit growth. $\rightarrow$Dutch disease: global demand for natural resouces drives up the coutries currency, making all other exports more expensive and uncompetitive.

6.7 Explain how demographics, immigration, and labor force participation affect the rate and sustainability of economic growth

1. Labor Supply Factors

   (a) Demographics: A countries age distribution. Countries with younger age will have a higher potential growth.

   (b) Labor force participation.

   (c) Immigration: a potential source in developed countries $\Rightarrow$increase work force

   (d) Average hours worked

6.8 Explain how investment in physical capital, human capital, and technological development affects economic growth

1. Human capital: knowledge and skills that individuals possess. Can be enhanced via education.

2. Physical capital: infrastructure, computers, telecommunications(ICT) AND non-ICT capital(machineary, transportation and non-residential construction). More investment in physical capital $\Rightarrow$Good GDP growth.
   MOre investment may enhance the tech improvements.

3. Technological development. Investment in tech will increase the productivity.

4. Public infrastructure: like roads, bridges, and municipal facilities. This will enhance total productivity. Because the private investment will not invest these public things for their little returns.

6.9 Compare classical growth theory, neoclassical growth theory, and endogenous growth theory

1. Classical growth theory: In the long-term, population growth increases whenever there are increases in per capita income above subsistence level due to increase in capital or tech progress. ⇒Growth in real GDP per capita is not permanant. ⇒This is not supported by observed facts.

2. Neoclassical Growth theory:

    (a) Estimate steady state growth rate. Equilibrium economy is when the output-to-capital ratio is constant. When the output-capital ratio is constant, the labor-to-capital ratio and output per capita also grow at the equilibrium rate. Check textbooks here.

    (b) Based on Cobb-Douglas function,

        i. Sustainable growth of output per capita: $g^* = \frac{\theta}{1-\alpha}$, where θ is the growth rate in techonology, and $1 - \alpha$ is the labor's share of GDP.
        ii. Sustainable growth rate: $G^* = \frac{\theta}{1-\alpha} + \Delta_L$, which is the growth rate of output per capita plus the growth of labor.
        iii. Comments
            A. Caital deepening will not affet the growth rate in the long run.

3. Endogenous Growth Theory

    (a) Technological growth is a result of investment in physical and human capital. Returns to capital are constant.

    (b) Private investments in R&D also benefits all economy.

6.10 Explain and evaluate convergence hypoteses

1. Absolute convergence: Less developed countries will achieve equal living standards overtime.

2. Conditional convergence: Convergence in living standards will only occur for countries with the same savings rates, population growth rates and production functions.

3. Club convergence: Countries may be part of a club. Poorer countries that are part of the club will catch up their richer peers. Institutional changes can help a country to join the club. Those are not in the club will never catch up.

6.11 Describe the economic rationale for governments to provide incentives to private investments in technology and knowledge.

R&D are risky. Governments support may provide incentives to private R&D, and therefore boosts the growth of the overall economy.

6.12 Describe the expected impact of removing trade barriers on capital investment and profits, employment and wages, and growth in the economies involved.

1. Increased investment from foreign savins

2. Allows focus on industries where the country has advantage.

3. Increased markets

4. Increased sharing of tech

5. Increased competition removes bad firms and rellocating assets.

7 Reading 15:Economics of Regulation

7.1 Describe classifications of regulations and regulators

1. Regulations: i. Statues; ii. Administrative regulatinos; iii. judicial law

2. Regulators: government agencies/indepedent regulators/outside bodies. Independent regulators including self-regulating organizations that regulates and represents their members. Outside bodies will not regulate, but their products are referenced by regulators.

7.2 Describe uses of self-regulation in financial markets

1. US: FINRA is an SRO recognized by SEC.

2. In civil-law countries, independent SROs are rare, and government agencies fulfill the role of SROs.

3. In common=law countries, independent SROs are historically good.

7.3 Describe the economic rationale for regulatory intervention

1. Economic Rationale for Regulation. Regulations are needed when

   (a) Information frictions. When information is not equally availabel or distributed.
   (b) Externalities.

7.4 Describe regulatory interdependencies and their effects.

1. Regulatory Interdependencies.

   (a) Regulatory capture theory: Regulators will at some point in time be influenced or controlled byt the industiry that is being regulated. Because the regulators will be influenced by the industry, and the experience will sometimes lead to impartial conclusions.
   (b) Regulatory competition: Regulatory difference between jurisdictions will lead to it. Regulators compete to provide the most business-friendly environment.
   (c) Regulatory arbitrage: businesses find a coutry that best for itself.

7.5 Describe the tools of regulatory intervention in markets

1. Price mechanisms

2. Restricting/requiring certain activities. Ban certain activities or require to perform some activities.

3. Provision of public goods or financing private projects.

7.6 Explain purposes in regulating commerce and financial markets

1. Regulating commerce: Government regulations, including company laws, tax laws, contract laws, competition laws, banking laws, bankruptcy laws and dispute resolution systems.
   This laws may help or hinder commerce.

2. REgulating financial markets: regulation of securities markets and regulation of financial institutions.
   – protecting investors, creating confidence in the markets, and enhancing capital formation.

   (a) Regulation of security markets

   (b) Regulation of Financial Institutions: Prudential supervision, the monitoring and regulation of financial institutions to reduce system-wide risks and to protect investors. Cost-benefit analysis should include hidden costs.

7.7 Describe anticompetitive behaviors targeted by antitrust laws globally and evaluate the antitrust risk associated with a given business strategy.

Antitrust regulation works to promote domestic competition. Like blocking a merger that leads to excessive concentration of market share. International companies may be subject to antitrust laws in different countries.

7.8 Benefits and costs of regulation

Costs include the implementation cost and the cost of the regulation to the private sector. *Regulatory burden*: the cost of compliance for the regulated entity. Regulatory burden - benefits that private sector receives = Net regulotry burden.

7.9 Evaluate how a specific regulation affects and industry company, or security

1. Can help or hinder the industry or the company.

2. Not necessarily always costly for those that being regulated.

3. May introduce inefficiencies in the market. For example, government bailout of financial institutions may convey a message that companies will be helped. And the credit spreads will not fully reflect their risk.

4. Certain industries have more exposure to certain types of regulations.

8 Reading 16: Intercorporate Investments

8.1 Describe the classification, measurement, and disclosure under IFRS for 1) Investments in financial assets, 2) Investments in associates, 3) joint ventures, 4) bussiness combinations, and 5) special purpose and variable interest entities

8.2 Distinguish between IFRS and US GAAP in the classification, measurement, and disclosure of things above.

1. Classification: a. Investments in financial assests. b. Investments in associates (investing firm has a significant influence but not control). c. Bussiness combinations.

   (a) Financial assets. Ownership < 20%. Accouting treatment:
       i. IFRS: held-to-matruity, available-for-sale, fair value through profit/loss.

     ii. GAAP: similar to IFRS.

    iii. IFRS 9 start from 1/1/2018. Early adoption is allowed.

(b) Investments in associates. Ownership 20%∼50%. Most important thing is "significant influence." Equity method is used.

(c) Bussiness combinations. Ownership > 50%. "Controling" is important. The acquision method is used.

(d) Joint ventures. Equity method for it.

2. Reporting of Intercorporate investments

(a) Financial assets. Acquisition is recorded at cost, and dividend or interest income is in Income Statement.

     i. Held-to-maturity. Debt securities that cannot be sold prior to maturity excepte in unusual circumstances. Long-term: reported on the balance sheet at the amortized cost. Interest income(coupon cash flow adjusted for amortization) in the income statement but subsequent changes in fair value are ignored.

    ii. Fair value through profit or loss.
a. Held-for-trading: Debt/equity for the purpose of profiting in the near term. < 3 month Changes in fair value(realized or not) and dividend/interest are in Income State.
b. Designated at fair value: Report debt/equity that may be treated as held-to-maturity or available-for-sale at fair value. Gains/Loss are in Income State.

   iii. Available-for-sale: are neither held-to-m nor held-for-trading. Reported on the balance at the fair value. However, only the realized gains/losses and dividend or interest income are in the income statement. Unrealized gains/losses are in comprehensive income. When sold, these unrealized things will move to income statement.
NOTE: In IFRS, unrealized gains or losses on available-for-sale **sale** that from foreign exchange movements are in the income statement. In USGAAP, the entired unrealized gain/loss are recognized in equity.
Available-for-sale **Equity**, the treatments are similar in IFRS/USGAAP.

(b) Reclassification of Investments in Fiancial Assets.

     i. IFRS: a.does not allow reclassiication into/out of the designated at fair value. b.Out of the held-for-trading is severely restricted.
c.Debt securities in available-for-sale can be reclassified as held-to-maturity. The value will be remeasured to reflect its fair value at the time it is reclassified.
d. Held-to-maturity: can be reclassified as available-for-sale. Carrying value is remeasured t the fair value, and any difference is recoreded in comprehensive income.

    ii. USGAAP:

      A. Permit reclassification into/out of held-for-trading or designated at fair value. Unrealized gains on the income stmt is reclassified.

      B. Reclassificiation out of available-for-sale to held-for-trading, the cumulative g/l in comprehensive income will be recognized in income.

      C. Out-of-available for sale to held-to-maturity: G/L in comprehensive income stmt will be amortized over the remaining life of the security.

      D. Out of held-to-maturity to available-for-sale: Unrealized G/L goes into comprehensive income stmt.

      E. Summary

From	To	Unrealized G/L
Fair value w/ G/L*	Any	Income Statement
Held-to-maturity	Fair value*	Income statement
Held-to-mat	Available-for-sale	Other comprehensive income
Available-for-sale	Held-to-maturity	Amortize out of other comprehensive income
Available-for-sale	Fair value w/ G/L*	Transfer out of other comprehensive income

*: Restricted under IFRS

(c) Impairment of Fianancial Assets: Held-to-Maturity(HTM) and available-for-sale (AFS) evaluabed for impairment at each reporting period.

   i. US GAAP. If its decline in value is determined to be other than temporary. HTM/AFS, the write-down to fair value is treated as a realized loss.

   ii. US GAAP Reversals: NOT allowed.

   iii. IFRS: Impairments are in the income stmt. Impairment of a debt or equity seurity ⇐ at least one loss evet HAS occured, and its effect on the security's future cash flows can be estimated reliably.
   Debt: loss events – default on payments
   Equities: loss evets – fair value has experienced a decline, and it's unlikly to recover.
   HTM security: if it's impaired, its carrying value will be the PV of future cash flows, using the interest rate when the security was PURCHASED.

   iv. IFRS Reversals: Permited on HTM, available-for-sale. Not permitted for equity.

(d) Analysis of Investments in Financial Assets: Seperate a firm's operating results from its investment results.
   For comparison: market values for financial assets.
   Remove nonoperating assets when calculating the return on operating assets ratio.
   Investment classification will be misleading.

(e) IFRS 9 (New standards)

   i. Instead of HTM, availabel-for-sale, and held-for-trading, Using new terms: amortized cost, fair value through proft or loss (FVPL), and fair value through other comprehensive income (FVOCI)

   ii. Amortized cost (For debt securities only): If the securities are

      A. Business model test: being held to collect contractual cash flows

      B. Cash flow characteristic test: the contractual cash flows are eithe principal or interest on principal only.

   iii. Fair Value Through Profit or Loss (for debt and securities)

      A. Debt: can be FVTPL if held-for-trading, or Amortized cost results in an accounting mismatch.

      B. Equity: Must be FVTPL if it is held-for-trading. Other equity can be FVTPL or fair value trhough OCI, but once classified, the choice cannot be reversed.

   iv. Fair Value Through OCI (Equity Only) =Available-for-sal

(f) Reclassification under IFRS 9

   i. Reclassification of Equity is not allowed.

   ii. Reclassification of debt from amortized cost to FVPL or vice versa is OK only if the business model has changed. Unrecognized G/L on debt securities carried at amortized cost and reclassified as FVPL are in the income stmt.

   iii. Debt that out of FVPL: measured at amortized cost transfered at fair value on the transfer date, and the fair value becom the carrying amount.

(g) Investments in Associates

   i. Using equity method.

    ii. Initial investment is recorded at cost and reported on balance sheet as a noncurrent asset.

    iii. Subsequent: proportional share of earnings increases the investment account on the balance sheet, and is recognized in the income stmt. Dividends recevied are treated as a return of capital, and reduce the investment account, will no be in income stmt.

    iv. If the investee has a loss, investor will have a proportionate loss in balance, and income stmt.If the investment account on balance sht reduce to 0, we stop using equity method until the earnigs recovered.

(h) Fair Value Option

    i. USGAAP allows equtiy method investment to be recored at fair value.
IFRS: the fair value only good to venture capital firms, mutal funds and similar firms.
Decision to use FVO is irrevocable. If use FVO, any changes are in income stmt.

    ii. Excess of Purchase Price Over Book Value Acquired.

      A. At the acquisition date: the excess of the purchase price over the proportionate share of book value is allocated to the investee's identifiable assets and liabilities based on their fair values, and in investor's balance sheet. The remainder is good will.

      B. Investor need to recognize expense based on the excess amount assigned to the investee's asset and liabilities.

      C. Investor may need to include additional depreciation proportionate of the Excess of purchase price. See Notes-2 P11 examples and textbooks.

    iii. Impairments of Investments in Associates:

      A. Equity method investments need tests for impairment.a

      B. GAAP: Fair value of the investment < the carrying value(investment account on the balance sheet), and decline is permanent. Write-down to fair value, loss in income stmt.

      C. IFRS/GAAP: asset cannot write up

    iv. Transactions with the Investee Profit from these transactions deferred until the profit is confirmed through use/sale to a third party.

      A. Upstream(investee to investor): investee recognized all profit in its income stmt. Eliminate its proportionate share of the profit.

      B. Downstream(investor to investee). Investor recognize profit in its income stmt. Eliminate the proportionate share of unconfirmed profit.

    v. Analytical Issues for Investments in Associates.

      A. Equity method may have higher earnigs.

      B. Investor only report investee's proportionate share of equity. Investee's debt are ignored, and leverage is lower.

      C. Proportionate shaore of Investee's earnings may be reinvested, not available to investor via dividend.

(i) Bussiness Combinations

    i. Classification: Acquisition method is required for business combinations.

      A. IFRS: None

      B. GAAP:
-Merger. Acquiring firm survived.
-Acquisition. Acqing and Acqed continue to exist in a parent-subsidiary form. Not 100% of sub is owned by parent.
- Consolidation. A new entity absorbs both of companies.

    ii. Accounting methods

      A. Purchase method

      B. Pooling-of-interests method (eliminated)= uniting-of-interests method in IFRS
- Just combine assets and liabilities.

- Two companies combined using historical book vales
- Operating results are restated, as two have been always combined.
- Ownership interests continue, and former accounting bases maintained.

C. Acquisition method
- A, L, Revenue, Expense of sub are combined with the parent. Intercompany transactions are excluded. Stock holder's equity is ignored. Because this is not controlled by the company.
- noncontronling interest account may be needed for proportionate asset that are not owned by the parent. Check examples.

D. Good will in acquisition
- Goodwill. Fair value for identifiable assets/liabilities. Any remainder will be unidentifiable A/L ⇒Goodwill
–GAAP: full goodwill. Fair value of the sub(calculated by acquired ratio) - Fair value of net identifiable net assets of the subsidiary; IFRS can use full goodwill or partial goodwill, partical goodwill = purchase price - (%owned*FV of net identifiable asset)
Noncontrolling interest: For Full good will - nci based on the acquired company's fair value. For Partial goodwill - nci based on the fair value of the acquired company's identifiable net assets.

E. Annual test impariment of Goodwill
IFRS: carrying amount of cast genterting unit > the recoverable amount
GAAP: 2 steps. Carrying value of the reporting unit > the fair value; the loss = carrying value of the good will − the implied fair value of the goodwill.

(j) Bargain Purchase: If acquisition price < fair value of net asset aquired, gain should be in income stmt for GAAP and IFSR.

(k) Joint Ventures:

   i. One entitiy shared by multiple investors. Equity method in GAAP and IFRS.

  ii. Rare case: Proportionate consolidation method is OK for GAAP/IFRS. In Proportionate consolidation, investor only reports the proportionate share of assets, l, reve, expense. No minority owner's interest.

(l) Special Purpose and Variable Interest Entities

   i. SPE: Special purpose entity. Isolate certain A and L of the sponsor. SPE is often off-balanced-sheet. Thus enhance the ratios.

  ii. VIE is a special SPE in FASB. Consolidated by the primary beneficiary. VIE Characteristics:
       A. At-risk equity, insufficient to finance the entity's activities without additional support.
       B. Equity investors lack: decision making rights, obligation to absorb loss, or the right to recevie expected returns.

  iii. IFRS: Sponsoring entity must consolidate if it controls SPE.

3. Analyze how different methods used to account for intercorcortate investments affect financial statements and ratios.
Four important effects, Equity/Proportionate consolidation/Acquisition

(a) All 3 report the same Net Income.

(b) Equity: Equity method = Proportionate = Acquisition method - minority interest

(c) Assets and Liabilities: Acquision > Proportionate consolidation >Equity

(d) Revenues and expenses: Acquision > Proportinate consolidation > Equity

9   Reading 17: Employee Compensation: Post-Employment and Share-Based

9.1   Descreibe the types of post-employment benefit plans and implications for financial reports

Types: Defined-contribution plan and Defined-benefit plan. For defined-contribution plan, accounting is easy. Just the employer's contribution.
Defined-benefit:

1. Usually via a separate legal entity, like a trust.

2. funded status: difference between the pension obligation and the plan assets.

3. Other post-employment benefits: basically healthcare benefits.

9.2   Explain and calculate measures of a defined benefit pension obligation, i.e., PV of the defined benefit obligation and projcted benefit obligation, and net pension liability.

1. Things to know
   -Projected Benefit Obligation, or Present Value of Defined Benefit Obligation under IFRS. :The PV of all future obligation, based on expected future salary increases. PVB will change from one period to the next.

   (a) Current service cost: PV of benefits earned by during the current period.

   (b) Interest cost: Increases in the obligation due to the passage of time. Interest will accrue. The cost = the pension obilgation at the beginning of the period times the discount rate.

   (c) Past service costs: retroactive benefits awarded to employees when plan's changed. IFRS: expensed immediatedly. GAAP: ammortized over the average service life of employees.

   (d) Changes in actuarial assumptions: Gains/losses due to changes like mortality, employee turnover, retirement age, and the discount rate.

   (e) Benefits paid.

2. Balance Sheet Effects:
   Funded status = fair value of plan assets - PBO
   Balance sheet asset(liability) = funded status. This is good for IFRS/GAAP.

9.3   Describe the components of a company's defined benefit pension costs.

1. Total periodic pension cost = employer contributions - (ending funded status - beginning funded status)
   TPPC = current service cost + interest cost - actual return on plan assets +/- actuarial losses,gains due to changes in assumptions affecting PBO + prior service cost.

2. Periodic Pension Cost Reported in P&L, i.e. Income stmt

   (a) **Current service cost**. Immediately recognized in income stmt. CSC is the increase in PBO since the employee worke one more period.

   (b) **Interest cost**. Immediately recognized. Increase in PBO due to the passage of time.

   (c) **Expected return on plan assets**. The return on the plan assets has no effect on the PBO. Use expected return to compute the reported pension expense. Difference in expected return and actual return are in "actual gains and losses" IFRS: expected rate of return is assumed = the discount rate to compute PBO.

(d) **Actuarial gains and losses** Recognized in Other Comprehensive Income. has 2 components. G/L due to changes in actuarial assumptions; difference in actual/expected return. IFRS: not amortized. GAAP: amortized with corridor.

(e) **Corridor Approach.** If G/L>10% of max(begining PBO, plan assets), the excess amount should be amortized over the remaining service life of employees. Time can be shorter if wanted, but consistent.

(f) **Past(prior) service costs.** If pension plan is changed, the change reported in OCI. And amortized of the remainig life of affected employees. In IFRS: changes are reported in income stmt instantly.

(g) Summary

Component	GAAP	IFRS
Current service costs	Income stmt	Income stmt
Past service costs	OCI, amortized over life	Income
Interest costs	Income	Income
Expected return	Income	Income
Actuarial G/L	Amortized part in Income, Others in OCI	OCI

(h) **Presentation.** GAAP: income stmt aggreated and presented in one line. IFRS: components may be presented separately.

(i) **Capitalizing Pension Costs.**

9.4 Explain and calculate the effect of a defined benefit plan's assumptions on the defined benefit obligation and periodic pension cost.

3 Assumptions need disclosures.

1. **Discount rate:** Interest rate to compute the PV of BO and the current service cost.

2. **Rate of compensation growth:** average annual increase rate of employee's compensation.

3. **Expected return on plan assets:** long-term rate of return on the plan's investments. Only good in GAAP, b/c in IFRS, it's equal to the discount rate.

To improve reports, a company

1. Increase the discount rate to reduce PBO, pension costs, and interest cost.

2. Decrease the compensation growth rate to reduce futher benefit payments, PBO, and current service cost and interest cost.

3. Increase the expected return on plan assets.

Ultimate healthcare trend rate: constant rate of a health care inflation.

9.5 Explain and calculate how adjusting for items of pension and other post-employment benefits affect financial stmts and ratios.

One need to pay attention to different assumptions when compare companies:

1. Gross vs. net pension assets/liabilities. ROA will be lower with gross pension A/L; leverage ratios will be higher.

2. Differnces in assumptions used: like discount rates.

3. IFRS, GAAP.

4. Difference due to classification in the income stmt. GAAP: the entire periodic pension cost in P&L, including interest are operating expense. IFRS: can be in various line items.

9.6 Interpret pension plan note disclosures including cash flow related information.

If the difference between cash flow and total periodic pension cost is material, the difference can be reclassified from Operating activities to Financing activities.

9.7 Explain issues associated with accounting for share-based compensation

1. Forms: stock options and outright share grants.

2. Recording: issues for stocks – the value needs estimatings.

3. SHould be spread over the period for which they reward the employee.

9.8 Explain how accounting for stock grants and stock options affects financial stmts, and the importance of companies assumptions in valuing these grants and options.

IFRS and GAAP are similar.

1. **Stock options.** Expense is based on the fair value of options. Spread over the service time(grant date to the actual date that employees can act). Net income and retaining earnings will decrease, but total-equity will not change.

2. **Determining Fair Value.** If on-market, use market price. Otherwise, Using different models to find it.

3. **Stock grants.** Compensation expense is based on the fair value of the grant date. Allocated over the service period.

4. **Stock appreciation rights.** It's different from stock options. It gives the employee the right to receive compensation based on the increase in the price of the firm's stock over some threshold. No shares are issued. No dillustion, but the company needs to pay cash.

5. **Phantom stock.** Similar to stock appreciation rights. But is based on the performance of hypothetical stock

10 Reading 18: Multinational Operations

10.1 Distinguish among presentation currency, functional currency and local currency.

1. Definition:
   -Local currency: currency of the country being referred to.
   -Functional currency: determined by the management. The main currency the company uses.
   -Presentation (reporting) currency: The currency the parent company prepares stmts

10.2 Describe foreign currency transaction exposure, including accounting for and disclosures about foreign currency transaction gains and losses

1. Foreign currency denominated transactions are measured in the presentation currency at the spot rate on the transaction date. Currency risk arises when the transaction date and payment date differ, leads to differnt spot rate.

2. If balance sheet date occurs before the transaction is settled, recognize G/L in blance sheet, and unrealized G/L in income stmt. When the transaction settled, additional G/L may need to be recognized.

3. Analyst Issues: G/L due to currency in income stmt may be in operating or non-operating income. B/c accounting std do not provide any guides. Pay attention to this.

10.3   Analyze how changes in exchange rates affect the translated sales of the subsidiary and parent company

10.4   Compare the current rate method and the temporal method, evaluate how each affects the parent company's balance sheet and income stmt, and determine which method is appropriate in variuos scenarios.

1. Methods to translante financial stmts of sub to parent reporting currency
   - Remeasurement: converting the local to functional currency with temporal method.
   - Translantion: convert functional currency to paraent's reporting currency using the currenty rate method.
   - Define appropriate translation method. See P64 in notes, new version.
   - More definitions. a) Current rate: the exchange rate on the balance sheet rate. b) Average rate: the average exchange rate over the reporting period. c). historical rate: the actual when the transactions occurs.

2. Apply the current rate method process:

   (a) All income stms are translate at the average rate.

   (b) All balance sheet accounts are translated at the current rate *except for common stock, at historical rate*.

   (c) Dividends are at the rate that applied when they were declared.

   (d) Translation G/L is reported in shareholder's equity as a part of the cumulative translation adjustment.

3. Applying the Temporal Method

   (a) Monetary A/L(fixed in the amount of currency) remeasured using the current exchange rate.

   (b) All other A/L are nonmonetary assets, like inventory, fixed assets, intangible assets.for example, Unearned(deferred) revenue. They are remeasured in hisotyrical rate. (*Exception: non-money A/L on the balance sheet at fair value are remeasured at the current rate*).

   (c) Common stock, dividends paid are at historical rate.

   (d) Expense related to nonmonetariy assets are remeasured based on the historical rates at the time of purchase.

   (e) Revenues and all other expenses are at the average rate.

   (f) Remeasurement G/L is in income stmt.

4. Inventory and COGS under the Temporal Method.
   Numerous historical exchange rate needs to be remembered. Inventory are complicated. Inventory and COGS are remeasured at different rates in FIFO/LIFO.

5. Parents Company Exposure to Changing Exchange Rates

   (a) In Current rate method: Exposure in the net asset position of the subsidiary.

   (b) In Temporal method: net monetary A/L are exposed.

6. Calculating the Translation/Remeasurement G/L
   G/L is reported in CTA, and GTP is used to make A=L+E.

10.5   Calculate the translation effects and evaluate the translation of a subsidiary's balance sheet and income

1. -CR method: start with income stmt. As the net income here will be used for the retained earnings in balance stmt.
   -Temporal method: start with blance stmt.

2. Different results from CR and Temporal methods. Why?

   (a) Income before translation G/L is different, due to the different rate used for items. Example: COGS and depreciation, avearge rate in CR method and historical rate in Temporal.

   (b) Translation G/L are different. Since net assets' are exposed to the depreciation of Local Currenty in CR, but net MONETARY assets are in temporal method.

   (c) Net income is different. This is due to different exchange rate. Besides, in CR method, translation G/L are in CTA. In Temporal, remeasurement G/L are in income stmt.

   (d) Total assets are different b/c inventory and net fixed assets are different.

3.

10.6   Analyze how the current rate method and the temporal method affect financial statements and ratios.

1. Pure Balance Sheet and pure Income Stmt ratios. PURE balance sheet and pure income statement ratios

2. Mixed Balance Sheet/Income Statement ratios. CR result in small changes.
   Key points to remember
   –Pure balance sheet/pure income ratios will be the same.
   –If foreign currency is depreciating, translated mixed ratios (with income stmt in up and end-of-period balance sheet item down) will be larger.

3. Compare ratios from Temporal method and current rate method. Compare the rates is the key.

   (a) Determine whether the foreigen currency is appreciating/depre.

   (b) which rates is on numberator or denominator.

10.7   Analyze how alternative translation methods for subsidiaries operating in hyperinflationary economies affect financial stmts& ratios

1. Hyperinflation def. In FASB, cumulative infation >100% over 3-yr period. IASB: doesn't have definition. But 100-3-yr is a good indication. Nonmonetary A/L are not affected by hyperinflation.

2. GAAP: in hyperinflation, the parent's presentation currency is the functional currency. – Temporal method

3. IFRS: foreign currency stmts are restated for inflation, and then tranlated with CR method.
   –Nonmonetary A/L restated with price index.
   –Monetary A/L doesn't change.
   –Shareholder's equity are restated with price index.
   –Retained earnings, plug figure
   –Income stmt: times the change in the price index from the transaction date.
   –Net purchasing power G/L recognized in income stmt
   –Check the examples on P82, new notes, book2

4. Analyzing Foreign Currency Disclosure

(a) –Multiple foreign subs may exist. And disclosure information are limited. Can be found in footnotes (financial stmt) and management discussion/analysis of the annual report.
—Possiblie Solution:Add the change in CTA into netincome.
—Also, can add the unrealized G/L to net income.

(b) – Clean-surplas accounting: add G/L that are reported in shareholder's equity to net income stmt.
– Dirty-surplus accounting: report G/L in shareholder's equity.

10.8 Describe how multinational operations affect a company's effective tax rate

1. Tax Implications of Multinational Operations
–Effective tax rate: tax expense divided by pretax profit
–Statutory tax rate: Provided by the tax code of the home country.
Companies needs to reconcile these two rates.
Influence on the effective rate:
–Changes in the mix of profits from different countries
–Changes in tax rates

10.9 Explain how changes in the components of sales affect the sustainability of sales growth

1. Sales growth due to currency appreciation are not sustainable.

2. Organinc growth: growth in sales excluding the effects of acquisitions/ divestitures and currecy effects.

10.10 Analyze how currency fluctuations potentially affect financial results, given a company's countries of operation

Major Sources of Foreign Exchange Risk

1. Can affect value of A/L

2. Related disclosures in MD&A.
–Helpful for Earnings change from currency change
–Can do sensitivity analysis or inquire further information of hedgeing tools the company used.

11 Evaluating Quality of Financial Reports

11.1 Demonstrate the use of a conceptual framework for assesing the quality of a company's financial reports

1. Financial Report Quality=earnings quality+reporting quality
–reporting quality: decision useful information
–earnings quality:high-level earning + sustainable earning
–Cannot have low-quality reporting and high-quality earning

2. Questions to ask:
– Standard compliant AND decision useful?
– Are the earnings of high quality?

11.2   Explain potential problems that affect the quality of financial reports

Two problems: Measurement and timing issues and/or Classification issues

1. Problems
   ●Measurement and Timing Issues: aggressive/conservative recognition practices influence p,e,a; omission/postponement of expense will increase profits,equity,assets.
   ●Classfication Issue: How an individual financial stmt element within a particular financial stmt. Influence particular item.

2. Biased Accounting: Examples below.

   (a) Misstate profitability P102 NB2
       -Aggressive revenue recog
       -Lessor use of finance lease classification
       -Classifing non-operating reve/income as operating, and operating expense as non-operating
       -Channeling gains in net income and expense in OCI

   (b) Warnings signs of misstated profitability: high revenue growth than peers; receivable growth>revenue growth; higher rate of returns;high proportion of revenue is received in 4th quarter; unexplained bosst to opearting margin; operating cash flow lower than operating income; inconsistency in operating vs non-operating classificaiton;aggressive

   (c) Misstate A/L
       -Choose band inputs to change estimated value of stmt elements
       -Reclassificatoin from current to non-current
       -Over/understating allownances or reserves
       -Understating identifiable assets

   (d) Warning signs of A/L
       -Inconsistent inputs for estimating A/L
       -Typical current A is in non-current.
       -Allowances and reserves differ from peers, and flucturate
       -high goodwill
       -Use of special purpose entities
       -Large fluctuations in deferred tax A/L
       -Large off-balance-sheet liability

   (e) Overstate opearting cash flows
       -Managin activities to affect CFlow from operating
       -Misclassfying investing CFlow from operations.

3. Business Combinations – Acquisition method accounting

   (a) Give opportunities to change cf stmt:Purchase cash-generating entities to increase CFlow. Payment using stock can bypass the cash flow stmt.

   (b) Give motivations to impact stmt.

4. GAAP accounting but not Enconomic reality

11.3   Describe how to evaluate the quality of a company's financial reports

11.4   Evaluate the quality of a company's financial reports

1. Steps:
   - Understand the company, industry, and accouting principles
   - Understand management, evaluate insider trades and related party transactions
   - Identify material areas of accounting that are vulnerable to subjectivity

- Make cross-sectional and time series comparisons of stmts and ratios
- Check for warning signs
- multinational firms, check for shifting of profits/revenues to specific part of businees that the firm wants to highlight.
- Use quantitative tools to evaluate the likelihood of misreporting

2. Quantitative tools

   (a) The beneish model
       M-score>-1.78 indicates a higher-than-acceptable probability of earnings manipulation.
       Limitatings: relies on accounting data.

   (b) Altman model: Z-score to assess the probability that a firm will file for bankrupcy.
       Limitations: a single-period static model.

11.5   Describe indicators of earnings quality

1. High-quality earnings: sustainable, adequate

2. low-quality earnings may due to
   -below the firm's cost of capital
   -not sustainable
   -poor reporting quality

11.6   Describe the concept of sustainable earnings

1. Definiation: earnings that are expected to recur.

2. Possible gaming parts: 1. Classification items. 2. use non-GAAP metrics.
   -One way to gauge earnings: earnings(t+1)=$\alpha+\beta_1$ earnings(t)+ε

3. Accruals:
   earnings(t+1)=$\alpha+\beta_1$ cash flow(t)+β_2 accruals + ε
   Acruals from normal business: non-discretionalry accruals
   Red flag: A company reports positive net income while negative operating cash flow.

4. Other indicators: companies repeatedly meet or barely beat consensus estimates. External: enforcement actions.

11.7   Explain mean reversion in earnings and how the accruals component of earnings affects the speed of mean reversion

Extreme earnings will revert back to mean. When earnings are largely comprised of accruals, mean reversion will occur more.

11.8   Evaluate the earnings quality of a company

1. Earnings manipulations: 1. Revenue recognition issues; 2. Expense recognition issues (capitalization)

2. Revenue recognition issues:

   (a) Issues
       1. Channel-stuffing, bill-and-hold
       2. higher growth rate of receivables wrt the growth rate of revenue
       3. Increasing days' sales outstanding over time

    (b) Steps
- -1. Understand the basics
- -2. Evaluate and question ageing receivables
- -3. Cash vs accruals
- -4. Compare financials with physical data provided by the company.
- -5. Evaluate revenue trends and compare with peers
- -6. Check for related party transactions

3. Expense Capitalization
   Checking steps
   -1. Understand the basics
   -2. Trend and comparative analysis. Stable profit margins with a buildup of non-current assets is bad.
   -3. Check for related party transactions.

11.9   Describe indicators of cash flow quality

1. High-quality cash flow: reported CF is high; reporting quality is high.

2. Startup: negative OCF is OK. Mature: negative OCF is bad.

3. Operating CF is most important. OCF that is sustainable and adequate are good.

4. Manipulate CF via strategic decisions (timing issues)

11.10   Evaluate the cash flow quality of a company

Steps

1. Checking for any unusual items or items that not shown in prior yrs.

2. Checking revenue quality.

3. Checking for strategic provisioning.

4. Remember: different standards of GAAP and IFRS may influence cash flow.

11.11   Describe indicators of balance sheet quality

11.12   Evaluate the balance sheet quality of a company

Completeness, unbiased measurement, clarity of presentation

1. Completeness
   - If off-balance-sheet liabilities exist, then need to restate the balance sheet.
   - Equity method can make certain ratios higher than acquisition method. If firms use equity method rather than acqusion method, then pay attention to it.

2. Unbiased Measurement. Some subjectiveity:
   - Value of the pension liability, based on several assumptions
   - Value of investment in debt or equity of other companies for which a market vvalue is not available
   - Goodwill value
   - Inventory valuatoin
   - Impairment of PP&E

3. Clear Presentation
   A single-line item or items grouped together? Although standard doesn't specify how much items must be presented. Clear presentation is good.

11.13   Describe sources of information about risk

Financial statements; Auditor's report; Notes to financial stmts; Management discussion and Analysis; SEC form "NT"; Financial press

12   Reading 20: Integration of Financial Statement Analysis Techniques

12.1   Demonstrate the use of a framework for the analysis of financial statements, given a particular problem, question, or purpose. (e.g., valuing equity based on comparables, critiquing a credit rating, obtaining a comprehensive picture of financial leverage, evaluting the perspectives given in management's discussion of financial results)

Steps: in notebook.

12.2   Identify financial reporting choices and biases that affect the quality and comparability of companies' financial statements and explain how such biases may affect financial decisions

1. Sources of Earnings and Return on Equity: Use DuPont decomposition

   (a) Use DuPont to find the performance drivers.

   $$ROE = \frac{NI}{EBT} \times \frac{EBT}{EBIT} \times \frac{EBIT}{Revenue} \times \frac{revenue}{average assets} \times \frac{average}{average equity}$$

   (b) Consider, if the income is generated internally or externally. Remove them from DuPont analysis.

   (c) Rm pro-rata share of investee's earnings in influential investments.

   (d) In equity method, Rm the carrying value of investments in balance sheet.

2. Asset Base
   Try to present balance sheet items in a common-size format. To get an overview of the changes in the compoisition of assets over time.

3. Capital Structure
   Must be able to support management's strategic objectives as well as honor obligations in future.
   Some liabilities are more burdensome than others.

4. Capitall Allocation Decision

   (a) Financial stmts should be disaggreated by segment.
       - Business segment: > 10%of a large company
       - Geographic segement

   (b) Compare methods
       - Compare EBIT margin to capital allocations, to see if the company invest on most profitable segment.
       - Compare cash flow generated by each segment with capital allocations . Cash flow ≈ EBIT + depreciation + amortization

12.3   Analyze and interpret how balance sheet modifications, earnings normalization, and cash flow statement related modifications affect a company's financial statements, financial ratios, and overall financial condition

1. Earnings quality and cash flow analysis

   (a) Earnings quality: persistence and sustainability. Earnings closer to OCF are good. Check ratio of accruals to net operating assets to measure earnings quality. Split accruals and cash flow in earnings with balance method or cashflow stmt method.

   (b) Accruals Ratio
       -Balance sheet method:

   $$Accruals = \Delta Asset - \Delta Liability - \Delta Cash = NOA_{end} - NOA_{beg}$$

   where $NOA = Net operating asset = Asset - Liability - Cash$.

   $$accrual ratio^{bs} = \frac{NOA_{end} - NOA_{beg}}{(NOA_{end} + NOA_{beg})/2}$$

   -Cash flow statement approach

   $$Accruals = NI - CFO - CFI$$

   Higher ratio or wide fluctuated ratio are bad, indicating earnings manipulation.
   To compare these two measures.Eliminate cash paid for interest and taxes from OCF by adding them back. They are not opearting income. – CGO, cash generated from opeartions.

   $$CGO = EBIT + non - cash charges - increase in working capital$$

   Compare CGO vs operating income to see if any problems.

   (c) Market Value Decomposition
       It's good to determine the standalone value of the parent company.

12.4   Evaluate the quality of a company's financial data and recommend appropriate adjustments to improve quality and comparability with similar companies, including adjustments for differences in accounting standards, methods, and assumptions.

1. Off-Balance-Sheet Financing
   Some important items are not reported on Blance sheet. Example: Opearting Leases. In analysis, an operating lease should be treated as a finance lease.
   Methods to convert operating lease:
   –Euqity is OK. Since assets and liabilities are increased by the same amount.
   –Income statement: replace the rental expense for the operating lease with depreciation expense (on the lease asset) and interest expense(on the lease liability).

13   Reading 21: Capital Budgeting

1. Warm-up: Basics of Capital Budgeting

2. Categories of Capital Budgeting Projects
   - Replacement project to maintain business
   - Replacement projects for cost reduction

- Expansion projects
- New product or market
- Mandatory
- Other projects

3. Principles of Capital Budgeting

   (a) Based on cash flows:
       -Sunk cost: costs that cannot be avoided.
       Externalities: effects that the acceptance of a project may have on other cash flows

   (b) Cash flows are based on opportunitiy costs.
       -OC: cash flow that the firm might lose by undertaking the project.

   (c) The timing of cash flow is important.

   (d) Cash flows are anayzed on an after-tax basis.

   (e) Financing costs are reflected in the project's required rate of return.

4. Modified Accelerated Cos Recovery System (MACRS)

   (a) Definition: A depreciation method that most US companies used for tax purpose. Should use it as well in capital budgeting.

   (b) You will have a MACRS table to compute incremental cash flows

   (c) Half-year convention: asset is is in service in the middle of the first year. Therefore, 3-yr asset will have 4 calendar years.

   (d) Depreciable basis: purchase price + any shipping or handling and installation costst.

13.1   Calculate the yearly cash flows of expansion and replacement capital projects and evaluate how the choice of depreciation method affects those cash flows

1. Classification: 1, Initial investment outlay. 2, Operating cash flow over the project's life. 3, terminal-year cash flow
   - Initial investment outlay = FCInve + NWCInv = invest in Fixed capital + investment in net working capital. NWCInv = Δnon-cash current assets - Δnon-debt current liabilties = ΔNWC = changes in networking capital. Cash is not operating asset. If NWCInv is positive, cashflow will be negative. Cash is needed to invest in NWC.
   - After-tax operating cash flows: CF = (S-C-D)(1-T)+D = (Sales-Cash operating expense - Depreciation expense)(1-marginal tax rate)+D
   - Terminal year after-tax non-operating cash flows(TNOCF). Sometimes, NWCInv can be reverted at the terminal year.

2. Expansion Project Analysis: increase both the size and earnings of a business. Using Initial investment outlay, After-tax ocf, and TNOCF to calculate NPV and IRR. Then decide if we should accept the project.

3. Other Presentatoin Formats.
   -Type: table format with cash flows collected by yr; tbl formate with cf collected by type.

4. Replacement Project Analysis. Different from Expansion
   -Initial outlay, old asset will be sold: Outlay = FCInv+NWCInv-Sal_0+T(Sal_0-B_0)
   -Incremental operating CF, CF from new asset - CF from old asst: ΔCF=(ΔS-ΔC)(1-T)+TΔD
   -TNOCF = ($\text{Sal}_T New$-$\text{Sal}_T Old$)+NWCInv-T[($\text{Sal}_T New$-$B_T New$)-($\text{Sal}_T Old$-$B_T old$)]

13.2   Expain how inflation affects capital budgeting analysis

1. Analyzing nominal or real CF. Nominal CF has inflation, while real CF not. CF should be discounted at a correct rate. (Nominal rate or real rate.)

2. Changes in inflation affect project profitability. Changes in inflation rate will change the value of future CF.

3. Inflation reduces the tax savins from depreciation. Because the depreciation savings is less valuable, the tax paid is more.

4. Inflation decreases the value of payments to bondholders.

5. Inflation may affect revenues and costs differently.

13.3   Evaluate cpaital projects and determine the optimal capital project in situation of 1)Mutally exclusive projects with unequal lives, using either the least common multiple of lives approach or the equivalent annual annuity approach, and 2) capital rationing.

1. Mutually Exculive Projects with Different Lives

   (a) Least Common multiple of lives approach.
   For example. a-3yr, b-6yr. We will use Cashflows for 2*a to compare with b-6yr.

   (b) Equivalent annual annuity approach: Use FV=0 and current PV, to calculate the PMT.

2. Capital Rationing
   Firms will continue to invest in positive NPV until marginal return = marginal cost.
   If Firm doesn't have enough funds, it needs to allocate funds to maximize NPV.

13.4   Explain how sensitivity analysis, scenario analysis, and Monte Carlo simulation can be used to asses the stand-alone risk of a capital project.

Sensitivity analysis: change an input to see the changes in results.
Scenario analysis: A risk analysis technique that considers both the sensitivity of key output variable to key input variables and the likely probability distributions of these variables. It studies different possible scenarios, like *worst case, best case, base case.*

13.5   Explain and calculate the discount rate, based on market risk methods, to use in valuing a capital project

1. CAPM: $R_{project} = R_F + \beta_{Project}[E(R_{MKT}) - R_F]$
   The calculated R is the appropriate discount rate. Also, it's the required return rate specific for one project.

2. R=Hurdal rate

13.6   Describe types of real options and evaluate a capital project using real options

1. Real options: allow managers to make future decisions that change the value of capital budgeting decisions made today.

2. Types of real options:
   -Timing options: allow to delay aking an investment with the hope of having better information in the future.
   -Abandonment options: right to drop a project
   -Expansion options: right to make additional investments.
   -Fleibility options: 1. price-setting options: allow the company to change the price of of a product. 2. production-flexibility options: give some flexibilities in productions.
   -Fundamental options: projects that themselves are options. b/c the payoff depend on the price of an underlying asset.

3. Evaluate project with real options. Approaches:
   1. Determine the NPV of the project w/t the option.
   2. Calculate the project NPV without the option and then add the estimated value of the real option.

$$overallNPV = projectNPV(basedonDCF) - optioncost + optionvalue$$

   3. Use decision trees.
   4. Use option pricing models.

13.7 Describe common capital budgeting pmistaks

1. Failing to incorporte ecnomic response into the analysis. Example: low barriers to entry will have more competitors.

2. Misusing standardized templates.

3. Pet projects of senior management. Projects backed by influential people are usually overrated.

4. Basing investment decisions on EPS or ROE. Managers whose incentive is related related to ROE.

5. Using the IRR criterion for project decision. NPV is good.

6. Poor cash flow estimation.

7. Misestimation of overheaded costs.

8. Using the incorrect discount rate. Should use the rate for a specific project.

9. Politics involved wity spending the entire capital budget. Spend entire budget and then ask for an increase for the next year.

10. Failure to generate alternative investment ideas.

11. Improper handling of sunk and opportunity costs. Shouldn't consider sunk costs in the evaluation of a project.

12.

13.8 Calculate and interpreat accounting income and economic income in the context of capital budgeting.

1. Economic income and Accounting income
   Economic income=cash flow + (ending market value - begin market value) =cash flow - economic depreciation. begining market value is PV of the remaining after-tax cash flows.
   Accounting income=net income

2. Difference
   1. Accounting depreciation is based on the original cost
   2. Financing costs are subtracted out to arrive at net income.

13.9   Distinguish among the economic profic, residual income, and claims valuation models for capital budgeting and evaluate a capital project using each

1. **Economic profit:** EP=NOPAT - \$WACC=Net operating profit after tax - WACC*capital. Capital = dollar amount of investment=equity + debt
   Returns on all supplies of income.
   Company value = NPV + initial capital investment

2. MVA: market value added, is the NPV based on economic profit
   NPV=MVA=$\sum_{t=1}^{\infty} \frac{EP_t}{(1+WACC)^t}$

3. **Residual income**: returns on equity
   Residual income = net income - equity charge
   $RI_t = NI_t - r_e B_{t-1}$. r_e: required return on equity. B_{t-1}: beginning of period book value of equity
   NPV =$\sum_{t=1}^{\infty} \frac{RI_t}{1+r_e}^t$
   Company value = NPV + initial capital = NPV + inital euqity + debt

4. **Claims valuation approach**: Valuae debt and equity cash flows separately.

   (a) Cash flows to debt holders: interest and principal payments, discounted at the cost of debt

   (b) Cash flows to equity holders: dividends and share repurchases. rate at the cost of equity.
       CF to equity = Operating income - principle payment to debt = NI + depreciation - principal payments

   (c) company value = market value of debt + mv of equity

14   Reading 22: Captial Structure

14.1   Capital Structure Theory

14.2   Expalin the Modigliani-Miller propositions regarding capital structure, including the effects of levergae, taxes, financial distress, agency costs, and asymmetric information on a company's cost of equity, cost of capital, and optimal capital structure

1. MM Proposition I(No Taxes): The capital Structure Irrelevance Proposition
   Sum: MM proved that the value of a firm is unaffected by its capital structure under some restrictive assumptions.
   Assumptions:
   - Capital markets are perfectly competitve. No transactions costs, taxes, bankruptcy costs.
   - Investors have homogeneous expectations.
   - Riskless borrowing and lending: borrow at risk-free rate.
   - No agency costs: no conflict of interest between managers and shareholders.
   - Investment decisions are unaffected by financing decisions.
   Results: Value$_{leverge}$=Value$_{unleverage}$

2. MM Proposition II(No Taxes): Cost of Equity and Leverage Proposition
   Sum: the cost of equity increases linearly as a company increases its proportion of debt financing.
   Result: -Debtholders have a priority claim on assets and income, thus cost of debt < cost of equity.
   -If the use of debt is increasing, the risk increase. Cost of equity is increasing. -No change in WACC
   -$r_e = r_0 + \frac{D}{E}(r_0 - r_d)$; r_e is the cost of CAPITAL. r_0 is unleveraged equity.

3. MM Proposition I(With Taxes): Value is Maximized at 100% Debt
   Tax shield provided by debt: Firms like using debt because interest is tax-deductible.
   $V_L = V_U + (t \times d)$; Value of Leverage firm = Value of unxx firm + tax rate times value of debt
   Value will be maximized if use 100% debt.

4. MM Proposition II(Wtih Taxes): WACC is Minimized at 100% Debt
   $r_E = r_0 + \frac{D}{E}(r_0 - r_D)(1 - T_c)$

5. Costs and Their Potential Effect on the Capital Structure

   (a) Costs of financial distress
       - Costs of finanical distress and bankrupty: direct(direct fees), indirect(lost some investment opportunities and trust from customers, suppliers, etc)
       - Probability of financial distress: Higer amounts of leverage result in higher probabilty of distress. Higher expected cost of fin. distress will discourage companies from debt.

   (b) Agency costs of euqity: conflicts between interest between managers and shareholders.
       Net agency cost of euqity has 3 components
       - Monitoring costs: costs to supervise management
       - Bonding costs: assumed by manageent to assure shareholders that the managers are working in the shareholder's best interest.
       - Residual losses