



Security Analysis

- ◆ Fundamental Analysis
- ◆ Technical Analysis
- ◆ Behavioral Analysis



Fundamental Analysis

- ◆ Macroeconomic : Focus on
 1. macro data to predict future economic macro environment on local and international level.
 2. Select specific sectors of a market, i.e. energy , utilities, oil companies etc.



Macroeconomic Data

- ◆ GDP growth
- ◆ Interest rates
- ◆ Payrolls
- ◆ Consumer price index – core CPI
- ◆ Producer price index – core PPI
- ◆ Exchange rates, among EUR/USD/JPY
- ◆ Unemployment rate



Macro date (cont)

- ◆ Retail Sales
- ◆ SMI
- ◆ Productivity rate
- ◆ Labor cost
- ◆ Consumer confidence
- ◆ Trade balance
- ◆ Housing data



Microeconomic Analysis

- ◆ Evaluation and/or rating of specific companies using specific methods of Analysis.
- ◆ The most popular analysis in business, markets and academia



Evaluation methods

- ◆ The Discounted cash flow method
- ◆ Benchmarking
- ◆ Ratio Analysis method
- ◆ Net worth method
- ◆ Research RATING MODELS



The DCF method

- ◆ The only method accepted by financial economics
- ◆ Predict the future cash flows of a company and then discounted them to today's equivalent values
- ◆ Problem : the accuracy of the result is based on several assumptions



The DCF assumptions

- ◆ The interest rate used to discount future flows into today's values
- ◆ The forecast of future incomes and its relevance to reality
- ◆ The forecast of future costs
- ◆ The investment program and the proposed method of financing it.



Benchmarking

- ◆ This method uses benchmark ratios to specific values of the balance sheet and the income statement in order to determine the value of the business.
- ◆ I.e. the value is 10 times its profits, 2 times its turnover , 2 times its book value etc



Benchmarking = rule of thumb

- ◆ Functions better when the stock market functions properly – efficient.
- ◆ In the medium – long run brings the same results with DCF method.
- ◆ Must not be over –emphasized



Ratio Analysis method

- ◆ Evaluate the firm on a ratio - based Analysis.
- ◆ Similar to Benchmarking
- ◆ Problem: accuracy of accounting statements



Most popular Ratios

- ◆ Interest Cover = $\text{PBIT} / \text{interest changes}$
- ◆ Dividend yield = $\text{Dividend} / \text{Market Value}$
- ◆ EPS, P/E, P/BV
- ◆ Debt ratio = $\text{T. Debt} / \text{TA}$
- ◆ Debt/equity ratio = $\text{debt} / \text{equity}$
- ◆ CA/Sales, FA/Sales
- ◆ Gross profit/Sales, Operating cost/Sales
- ◆ Operating Assets/Sales
- ◆ Operating profit / Operating assets



Net Worth method

1. Evaluating the Net worth of a Going concern :

non-depreciated fixed assets

+ short term assets

- short term and long term liabilities

=> Is a snapshot of what the shareholders would take if they could convert into cash the financial property and pay all the obligations in full.



Net Worth method (cont.)

2. Evaluating the company in case of liquidation :

Convert the property into cash

+ collect its receivables

- pay its obligations

Problem : painful and difficult method



Research Rating models

- ◆ ING model
- ◆ Morning star method
- ◆ S&P method
- ◆ Expert Systems model
- ◆ Z – score method



ING Quasi – default model

- ◆ 3 – stages

1. Generation of a default probability
2. Construction of a financial model which explains the default probability
3. Add qualitative factors to the model

Output : the predicted rating that would be also used for scenario analysis



Morningstar rating method

A 6 - step method

1. The analyst conducts company and industry research
2. The depth of the firm's competitive advantage is rated
3. Analyst considers company financial statements and competitive position to forecast FCF
4. DCF model leads to fair value estimate
5. A business risk analysis establishes the margin of safety required from the stock rating
6. The current stock price relative to fair value ,adjusted for risk, determines the rating from 1-star to 5-stars.



S&P 3-measures rating model

1. The expected Growth Rate Measure :

It can be shown that an investor who maximizes the expected rate of growth of wealth will outperform other investors

$$E_{\text{true}}(\log W) = \sum E_{\text{true}}(\log W/X_i) p(X_i)$$

Where $p(X_i)$: probability that the point X_i occurs, $P(X_i) = 1/n$

\Rightarrow then they take as a measure of model performance that the potential expected growth, given P_{true} and P_{model} is given by:

$$1/n \sum (p_{\text{true}} \log(p_{\text{model}}(X_i)) + q_{i\text{true}} \log(1-p_{\text{model}}(X_i))) + \log(2)$$



S&P rating model (cont.)

2. The relative Entropy Measure

This model allows S&P to rank competing models in terms of the accuracy of the information they provide.

However the percentage of growth reduction caused by model misspecification is given by the quantity

$$Q = (1/n \sum_i H(P_{\text{true}}/P_{\text{model}})) / (\log(2) - 1/n \sum_i H(P_{\text{true}}))$$

If model probabilities agree with the true probabilities, the performance measure will have a perfect score of 1.



S&P rating model (cont)

3. The expected log of Likelihood measure

- ◆ It is possible to compute the likelihood of the observed data according to each of the probabilistic models.
- ◆ The higher the likelihood the better the model.
- ◆ The higher the likelihood the higher the logarithm of the likelihood.



S&P rating model (cont)

$$Q = \frac{1/n \sum_i H(P_{i_{\text{true}}})}{1/n \sum_i H(P_{i_{\text{model}}})} \geq 0$$

Conclusion: the 3 related rating models are based on well established economic statistical and information notions.



An Expert System model

- ◆ If $CEY = TBV$, otherwise over and undervalued
- ◆ Then, $FVP = E/TBV$ or $FVP/E = 1/TBV$
- ◆ The ratio of S&P500 price index to the fair value shows the degree of over and under evaluation.
- ◆ If we add up the variables of
 1. Business risk to earnings
 2. Earnings expectations beyond the next 12 months



Expert System model (cont)

- ◆ Then the equation is

$$CEY = a + b \text{ TB Y} + c \text{ RP} - d \text{ L T E G} \Rightarrow$$

$$CEY = a + b \text{ TB Y} + c(\text{CB Y} - \text{TB Y}) - d \text{ L T E G} \Rightarrow$$

if $a=0$ and $b=c=1$ then,

$$CEY = \text{CB Y} - d \text{ L T E G} = \text{TB Y} + \text{RP} - d \text{ L T E G}$$

And since $d = (\text{CB Y} - \text{CE Y}) / \text{L T E G}$, then

$$\text{FVP} = E / (\text{CB Y} - d \text{ L T E G})$$

TB Y = treasury Bond yield, CEY = current earnings yield of 12 month forward earnings of SP500 / SP500 price index, RP = risk premium, L T E G = long term expected earnings growth beyond the 12 months, CB Y = current bond yield

FVP = fair value price, E = expected earnings,



Altman's Z-score rating model

◆ Is based on

1. **Market information:** equity prices, interest rates, derivatives prices, macro data, credit spreads etc
2. **Financial statements information**
3. **Qualitative data:** marital status, income, industry sector domicile etc
4. **Qualitative assessment** by credit analysts
5. **Clients individual financial behavior**



Z – score rating model

◆ $Z = aX1 + bX2 + cX3 + dX4 + eX5,$

where,

$X1 = WC / TA,$ $X2 = \text{retained earnings} / TA$

$X3 = EBITDA / TA,$ $X5 = \text{Sales} / TA$

$X4 = \text{Market Value of equity} / \text{Book Value of total Debt}$

Classification rule: $Z \leq 1.81:$ bankruptcy

$1.81 < Z \leq 2.99:$ zone of ignorance

$Z > 2.99 :$ non bankruptcy

Conclusions

- ◆ Valuation methods is both an art and a science

Depends greatly on the

1. accuracy of info used
2. mastery of the analyst

