Advanced Financial Statement Analysis
ACCT-UB.0030
Professor Julian Yeo

Advanced Financial Statement Analysis

Course Descriptions and Syllabus

Your instructor

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TBA

Course Descriptions

<u>Overview</u>

This course synthesizes financial statement analysis, corporate finance, and the valuation of stocks (i.e., investments). The content is advanced insofar that coursework in all three areas are prerequisites.

This course is all about gaining the knowledge of how financial metrics are mapped into stock prices. The stock market can be an intimidating venture for most people. The determination of stock prices often seems a black-box mystery. Understanding how accounting numbers are tied to the stock price and knowing what to look for in determining how much you think the stock is worth (i.e., intrinsic or fundamental value) are real advantages to investors.

When buying a piece of stock, you are paying for the future performance of the company and you need to be able to monetize and benchmark that performance using financial metrics. You will learn how to quantify the stock price that you are paying into digestible chunks. This course introduces a simple procedure to infer future financial metrics you need to see from the company based on what you are paying. This course also introduces you to a number of useful tools in assessing whether future performance, as implied by the current stock price, is attainable.

The course has a very practical emphasis. You will apply the tools introduced in this course in a series of class exercises, mid-term exams, and a group assignment and presentation involving listed companies.

Part I – Framework for equity valuation

In Part I of the course, we begin with a framework to think about equity valuation. We examine various accounting measures (e.g., dividends, free cash flows, book values, earnings) that can be used as anchors for equity valuations. Through the development of these valuation models from first principles (yes, in this course, we will derive all the models!), we are able to synthesize, compare and contrast the different valuation models (e.g., Dividend Discount Model, Free Cash Flows Model, Residual Income Valuation Model, Abnormal Earnings Growth Model). It is also through the derivation of these models, we are able to pinpoint the relationships (or lack of) between various accounting variables (such as book value, earnings, EBITDA, etc) and intrinsic values. To the extent that stock prices and intrinsic values deviate, we will have a better appreciation of multiples such as P/B, P/E, PEG and other ratios that involve stock prices. Part I of the course concludes with tools that enable us to quantify the stock price, infer future financial metrics we need to see from the company based on what we are paying.

Part II – Analyzing Equity Investment

In Part II of the course, we put our knowledge acquired in Part I in practice and introduce tools that enable us to make a buy/sell/hold decision on equity investment. We also examine how financial statements and specific accounting issues enhance/distort our ability to understand the fundamentals of businesses. We will highlight the need to reformulate the financial statements prepared under GAAP to provide a better depiction of business activities that are important for valuation purposes. A structured approach to identify value drivers (profitability analysis) and sustainable growth is also provided. In addition, we will explore tools that enable us to identify and quantify how changes in particular factors (e.g., business risk factors, business outlook or affiliation with related companies) will impact a company's stock price.

Course Objectives
By the end of the course, you should be able to answer the following questions:
- How financial metrics are mapped into stock price?
- How are fundamental values (or "intrinsic values") estimated?
- What is the relevance (for valuation purposes) of cash-flows? Of dividends? Of earnings? Of book values?
- What business activities determine value?
- How is "value created for shareholders" identified?
- What determines a firm's P/E ratio? How does one calculate what the P/E should be?
- What determines a firm's market-to-book (P/B) ratio? How does one calculate what the P/B should be?
- How does one pull apart the financial statements to get at the relevant information for valuing equities?
- How does ratio analysis help in valuation?
- What is growth? How does one analyse growth? How does one value a growth firm?
- What are the accounting issues that may hinder our understanding of the fundamentals of the business?
- How to utilise valuation models and analysis to facilitate good questions to ask?
- How to quantify the odds of your equity investment?

- How to quantify future payoffs from owning a company's stock into measures that we can constantly monitor?
- How to incorporate what you observe about the company and translate that knowledge into the stock price you are willing to pay?
- How to quantify factors that may potentially impact stock price?
  - How to identify related parties that may impact a company's stock price?
  - How to analyse a company's risk factors?
  - How to draw inferences from a company's (and its peers') SEC filings and earnings calls?

Reading
Ultimate Edge in Beating the Market, manuscript, by Julian Yeo (available on NYU Classes)

Recommended Text
The text is *Financial Statement Analysis and Security Valuation*, 5th edition, by Stephen Penman, published by Irwin/McGraw-Hill, 2012.

Other Materials
You can also access all course-related materials on NYU Classes.

Assessments
Your final grade is calculated based on:

In-Class Assignment	5%
Individual Pop quizzes	10%
2 Open-Booked Mid-term Exams	40%
1 Group Assignment & Presentation	45%

In-Class Assignment & Individual Pop Quizzes
It is crucial that you are able to perform simple algebraic rearrangements to appreciate the materials in this course. The In-Class Assignment is designed to brush up (in some cases, showing off) your simple algebraic skills. During the course, there will be individual pop quizzes.

Open-Booked Mid-term Exams
During the semester, you have one in class 2.5-hour Mid-Term Exams and one take-home Mid-Term Exam. Both exams are open-booked. You may bring any material with you; however, cell phones, lap tops, and any device with wireless connectivity are strictly prohibited during the in-class exam.

Group Assignment & Presentation
   (i)   Objective
   Build your own analysis product and apply the product to make an investment decision (buy, sell or hold).
   (ii)   Group Size
   The group should consist of no more than five (5) members.
   (iii)   Due Date:
   Investment Report (powerpoint slides) and Presentation – see agenda

Tentative Course Schedule
Please see our agenda handout for detailed outlines of each of our sessions.

Overview of Topic Outline and Descriptions

Part I. The Set-up: Choosing a Valuation Model

1. Stock price - a black-box mystery
We may have some idea of what financial metrics are important in determining how much an investment is worth; however, we are unable to pinpoint the exact relation between accounting variables and stock price. Without an understanding of the relationship between accounting variables and stock prices, we may mistakenly see a relationship between that accounting variable and stock price upon seeing a correlation between certain factors and the stock price. How many times have you heard "I am willing to buy stock at P/E below X or P/EBITDE of X times? Such thinking often leads to ill-conceived valuation model that leads you to paying too much for your investment. A real edge comes only when you demystify the black box and gain a true understanding of how things work.

2. Our benchmarks for performance – accounting metrics
In order to employ accounting metrics in valuing our investment, we need to be first introduced to various accounting metrics and how we can employ them in quantifying the company's performance.

3. Show me the money – unraveling the blackbox
You can talk as much as you want but if you can't deliver what you've promised, stop talking. This premise – the expectation that we'll receive what we've been promised – is the basis for our thinking when we are determining how much we are willing to pay for an investment. In unraveling the blackbox, we are quantifying what we need to see from our investments – tangible and measurable payoffs.   We develop a framework to begin appreciating how equity valuation can be conducted.

4. What to bet on – choosing an anchor to gain an edge
We explore various commonly cited valuation models such as the dividend discount model, the discounted cash flows model, the residual income model and the abnormal earnings growth valuation model. We compare, contrast and synthesize the various models and choose the one most likely to produce the best value estimate given our constraints.

Part II: How to Apply the "edge"

5. Quantifying your bet – building blocks
We quantify price into building blocks as our way to decipher price information into digestible chucks.   We learn how to quantify the stock price we are paying into (i) stockholders' claim of asset value, (ii) earnings power, and (iii) speculative growth. We also better understand P/B and P/E ratios and their implication for future financial metrics.

6. Know your odds – inferring expectations from your bet (from the stock price you are willing to pay)
Rather than speculative on future performance, we'll apply the art of reverse engineering, using what's available, to quantify future performance into measurable benchmarks.   We

learn a simple three-step-procedure to infer future performance from a stock's current price. We also further appreciate the stream of expected earnings that we are paying for each building block from topic 5.

7. What worked in the past? Assessing your odds – benchmarking against past performance
How do we assess management performance? We learn how to separate management's operating activities from the company's financing activities. We also focus on ratios of management performance (RNOA, PM and ATO) that directly impact stock price. After we infer future performance monetized in terms of expected financial metrics that we need to observe from the company, we ask whether the implied metrics based on our price and expected rate of return are attainable based on past performance.

8. Let it all hang out – constructing future statements and how each metric is mapped into stock price
We will construct what future financial statements would look like as implied by stock price. We further focus on the implied future sales and earnings we expect from the company.

9. Potential roadblocks – analysis of quality of financial statements
We examine how specific accounting issues enhance/distort our ability to understand the fundamentals of businesses.

10. Sharpening my new "edge"
We examine information contained in SEC filings, specifically the qualitative information,
We will identify, examine, and quantify how changes in particular factors (e.g., business risk factors, business outlook or affiliation with related companies) will impact a company's stock price.

11. Group Presentation – Buy/Sell/Hold
The course has given you the edge to understand the moving variables that determine stock price and quantify these variables into observable financial metrics. You are able to do your own diligence on the stock tips you receive, articulate the future financial metrics you can expect to see from the company. More importantly, you now are able to substantiate your investment decision using financial metrics.

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AGENDA

Part I of the course

Session 1
Reading: Chapter 1 (Yeo, 2013)
Powerpoint Slides: Topic 1
Other Materials: Course Syllabus, Acronyms (see under Important Information)

Chapter 1. Stock price - a black-box mystery
1. The difference between Stock Price and Intrinsic Value
   ▪ Your current process for evaluating equity investment
   ▪ Our approach to equity investment
2. Determinants of Intrinsic Value
3. The need for a Framework to Begin Thinking about Valuation

   ▪ Derivation of the Dividend Discount Model

4. Overview of various valuation models using different financial measures as anchors
   ▪ How a series of financial metrics can be attached to Dividend Discount Model
5. Why ill-developed/ill conceived valuation model such as $V_0 = NI_1 /(r - g)$ is very bad
6. Examples of questions that a fundamental investor would ask
7. Overview of quantifying stock prices into building blocks and inferring implied future financial metrics
8. Common mistakes in Valuation
9. Administration – course logistics

Session 2
Reading: Chapter 2 (Yeo, 2013)
Powerpoint Slides: Topic 2

Chapter 2: Our benchmarks for performance – accounting metrics
1. Articulation of financial statements (how statements are inter-related)
2. How business activities are captured in financial statements
   i. Chocolate Cake Business
3. Choice of measures to monitor performance
4. Examples of accounting issues that aid/hinder the understanding of core business activities
5. Understand the linkage between cash and net income
   • Δ Cash = Net Income - (Δ Non-cash assets- Δ Liabilities) - Dividends

Session 3
Materials: CE01 Savings Account
CE01 Savings Account
1. Reinforce the articulation of financial statements
2. Implementing the dividend discount model with different dividend payout ratios
3. Understand that dividend payout affects future earnings
4. Understand why we are not always willing to pay for earnings growth
5. Observations when $P_0 = B_0$

    i. $NI_{t+1} = rB_t$

    ii. $\dfrac{NI_{t+1}}{NI_t} - 1 = r(1 - \dfrac{d_t}{NI_t})$

Session 4
Materials: In-Class Assignment
1. Converting definition of stock return to dividend discount model
2. Relationship between stock return and earnings
3. Concept of weighted average cost of capital
4. Accommodating growth rate for finite horizon forecasts

Session 5
Reading: Chapter 3 (Yeo, 2013)
Powerpoint Slides: Topic 3
Class Exercises: CE02 Method of Comparables

Chapter 3. Show me the money – unraveling the blackbox
- "Cheap" and Simple Valuation models
    1. Price-multiples approach
        ▪ CE02 Dell: Conceptual and implementation issues
    2. Stock Screening using Price Multiples
        1. What are you risking?
        2. Show why $r \neq d_{t+1} / P_t$ and what's missing from the equation
        3. Show why $r \neq NI_{t+1} / P_t$ and what's missing from the equation
    3. Asset-based Valuation Approach
        ▪ Implementation issues
    4. Basic Graham-Dodd Value, Conceptual Reproduction Value

    Investments with Infinite Time Horizon
1. Valuation Issues
2. Criteria for practical valuation

3. Dividend Discount Model
   - Advantages and disadvantages
   - How to approximate Terminal Value
4. Investments with Finite Time Horizon
   - Understand for investments with finite time horizon, all valuation models should produce the same value estimate
   - A bond and a project

Session 6
Reading: Chapter 3 (Yeo, 2013)
Powerpoint Slides: Topic 3, Topic 4.1
Class Exercises: CE03 C-I and Div in DDM

Discounted Cash Flow Model
1. Derivation
2. Understanding that the choice of anchor for DCF is –debt
3. Appreciate $\rho_E = \rho_F + \dfrac{V_0^D}{V_0^E}(\rho_F - \rho_D)$.
4. Continuing value
   - How to interpret growth in (C-I)?
5. Advantages and disadvantages
6. Measurement problems with (C-I) and its crude proxy
   - Using information from Statement of Cash Flows with leverage adjustments
   - [EBIT(1-tax)+dep/amortization – Change in Working capital] – Capex
   - (C-I) is not free of measurement problems associated with net income
7. How Net income is a better measure

   o CE03
      1. Concept of C-I=f+d
      2. A firm cannot increase its value by borrowing to pay out dividends
      3. Issues with finite forecast horizon

Session 7
Reading: Chapter 4 (Yeo, 2013)
Powerpoint Slides: Topic 4.2
Other Materials: Pop Quiz I, Pop Quiz II

   - Pop Quiz I – Derivation of DDM
   - Pop Quiz II – How to account for g in Continuing Values (or Terminal Values)

Chapter 4: What to bet on – choosing an anchor to gain an edge
   - Residual Income Valuation Model
      1. Derivation

2. Understand the choice of anchor for RI model is Book value of equity and earnings play a role in the premium term
3. ROCE version
4. Valuation errors using DDM, DCF and RI model

Session 8
Reading: Chapters 4 (Yeo, 2013)
Powerpoint Slides: Topic 4.2, Topic 4.3
Class Exercises: CE04 RI Model, CE05 Change in Accounting Treatments

1. Applying the RI model to the 2 examples with finite time horizons
   - Bonds and Projects
2. More on Implementing RI model for evaluating project
   - CE05 Changes in Accounting Treatments
     - Understand why RI model is flexible enough to deal with different accounting treatments

Session 9
Reading: Chapters 4 (Yeo, 2013)
Powerpoint Slides: Topic 4.2, Topic 4.3
Class Exercises: CE04 RI Model, CE05 Change in Accounting Treatments

1. Applying RI model for equity valuation
   - CE04 Residual Income Valuation model & the Dividend Discount model
2. Approximating $P_t - .B_t$
   - Continuing Value – Case 1, 2 and 3
3. Forecasting target price
   - How to implement DDM better

Session 10
Reading: Chapters 5 (Yeo, 2013)
Other Materials: Pop Quiz III

Pop Quiz III – Derivation of RI Model

Chapter 5: Quantifying your bet – building blocks
1. Implementing RI model using analysts forecast
    - One-year ahead, two-year head, long-term growth (3-5 years)
    - Nike
2. Reverse engineering the RI Model
    - Calculated implied growth in RE beyond forecast horizon
    - Converting growth in RE to implied earnings growth

Session 11
Reading: Chapters 5 (Yeo, 2013)
Powerpoint Slides: Topic 4.3
Class Exericses: CE06 CISCO, CE07 Building Blocks
Other Materials: Pop Quiz III.2 (not published), Quickie Template (install SMF add-ins)

1. Quantify Stock Price into building blocks
2. Class Exercise 6: CISCO
3. Class Exercise 7: Constructing Building Blocks
   - Quickie Valuation Template with Analyst Forecasts
4. Pop Quiz III.2

Session 12
Reading: Chapters 5 (Yeo, 2013)
Powerpoint Slides: Topic 4.3 (cont.)

1. Advantages and Disadvantages of RI model
2. Applying RI model to S&P 500 index
3. Formula for expected rate of return
4. Explore what is a change in market premium
   - Return = Earnings + Change in market premium
   - Earnings pattern with constant residual earnings
   - Concept of dividend adjusted earnings

Session 13
Reading: Chapters 5 (Yeo, 2013)
Powerpoint Slides: Topic 4.4, Topic 4.5
Class Exercises: CE08 AEG

Abnormal Earnings Growth Model
1. Derivation
2. Concept of AEG
3. Reconciling AEG model with RI Model
   o Pop Quiz V – AEG and change in RI
4. CE08 Applying the AEG model

Session 14
Reading: Chapters 5 (Yeo, 2013)
Powerpoint Slides: Topic 4.4, Topic 4.5
Class Exercises: CE09 Ko vs PEP
Other Materials: Pop Quiz IV

1. Pop Quiz IV
2. Converting analyst forecasts using AEG model
3. Building Blocks for AEG model
4. CE09 Coca-Cola and Pepsi
5. AEG model and PEG ratio

Sessions 15 & 16
Powerpoint Slides: Topic 4.6
Other Materials: Sample Mid-Term, 2012 Mid-Term

1. Summary of Valuation Models
2. Review of Questions from Sample Exam and Last Year's Exam

Session 17 & 18
Mid-Term Exam I (parts I & II)

Part II of the course
Session 19

Materials: Additional Class Exercise 1
Review of line items on Financial Statements – Coco-Cola

Session 20
Material: Additional Class Exercise 2
Review of line items on Financial Statements – Kimberly-Clark

Session 21
Reading: Chapters 7 & 8 (Yeo, 2013)
Powerpoint Slides: Topic 5.1, Topic 5.2
Class Exercises: CE10 Nike

Chapter 7. What worked in the past?
The need to reformulate financial statements and important Accounting Relations
1. Highlight the importance of separating operating activities and financing activities of a business
   - Why ROCE does not capture operating performance
2. How financial statements should be reformulated for valuation purposes
   - Balance sheet: $NOA = NFO + CSE$
   - Income Statement: $NI = OI - NFE$
   - Statement of cash flows: $C-I = f + d = OI - \Delta NOA$
   - Statement of Shareholders' Equity: $\Delta CSE = NI(comp) - d$ (inv/disinv from shareholders)
3. Familiarize ourselves with all the accounting relations in reformulated statements: CE10 Nike

4. Apply the Modified residual income valuation model – Residual Operating Income Valuation Model
    - Concept of Residual Operating Income (as well as Residual Net Financial Expense)
        - Focus on the operating activities

Chapter 8. Assessing your odds – benchmarking against past performance

5. <u>Analysis of Profitability</u>
    First level break down
    o   ROCE = RNOA + NFO/CSE* (ROA – NBC)

    Second level breakdown
    o   RNOA = OI/NOA = OI/Sales * Sales/NOA
    o   RNOA = OI/NOA = OI/Sales * Sales/OA *OA/NOA

    Third Level breakdown
    o   Components that make up
        - OI/Sales => GM/Sales – individual expense items/Sales
        - Sales/NOA => inventory turnover, acc. Payable turnover, days in receivable, etc

6. Other observations:
    RNOA vs ROA (ROA = EBIT(1-Tax)/Total Assets)
    NFO/CSE vs Debt/Equity
    NBC = NFE/NFO = Fin Expense/NFO - Fin Income/NFO
            = (Fin Expense/FL*FL/NFO)- (Fin income/FA*FA/NFO)
            = (cost of FL * FL/NFO)- (rate of return on FA* FA/NFO)

Session 22
Reading: Chapters 7 & 8 (Yeo, 2013)
Powerpoint Slides: Topic 6.1, Topic 6.2
Class Exercises: CE11.1 Reformulation of Financial Statements (easy), CE11.2 Reformulation of Financial Statements (more complex)

<u>Reformulating the Balance Sheet & Income Statement</u>
    1. CE 11.1 Coke & CE11.2 Coke
        -   Reformulated Balance Sheet: NOA = NFO + CSE
            - How knowledge of the business is incorporated
            - What assets and liabilities typically fall into operating and financing categories
        -   Reformulated Income Statement: OI – NFE = NI
            - What income statement items fall into operating and financing categories
            - How income taxes are allocated to different parts of net income
            - Treatment of restructuring charges and non-recurring items

- Treatment of non-controlling interest holders
- Treatment of dividend payable

Session 23

Reading: Chapters 8 & 9 (Yeo, 2013)
Powerpoint Slides: Topic 6.1, Topic 6.2
Class Exercise: CE 12 Pro Forma forecasting

1. Analysis of Growth
   An important tool
   $Y=AB$
   Change in Y = Change in Y due to change in A + Change in Y due to change in B

   $\Delta A_1 B_1 \quad =(A_1 \text{-} B_1)\text{-}(A_0 \text{-} B_0)$
   $\quad\quad\quad\quad =(A_1 \text{-} A_0)\, B_0 + (B_1 \text{-} B_0)\, A_1$

   Change in RE = Change due to change in (ROCE-r) + Change due to change in CSE

   Explaining ΔRNOA
   Note:
   $RNOA = \text{Core OI/NOA} + \text{Unusual Items/NOA}$
   $RNOA = \text{Core OI from Sales/NOA} + \text{Core Other OI/NOA} + \text{UI/NOA}$
   $RNOA = [\text{Core Sales PM x ATO}] + \text{Core Other OI/NOA} + \text{UI/NOA}$
   $\Delta RNOA = [\Delta\text{Core Sales PM x } ATO_0 + \Delta ATO* \text{Core Sales } PM_1] + \Delta[\text{Core Other OI/NOA} + \text{UI/NOA}]$

   Explaining ΔROCE
   $ROCE = RNOA + (FLEV * SPREAD)$
   $\Delta ROCE = \Delta RNOA + [\Delta SPREAD*FLEV_0] + [\Delta FLEV*SPREAD_1]$

   Explaining ΔCSE
   $\Delta CSE = \Delta NOA - \Delta NFO$
   $\Delta CSE = \Delta(Sales*ATO^{-1}) - \Delta NFO$
   $\Delta CSE = (\Delta Sales*1/ATO_0 + \Delta 1/ATO*Sales_1) - \Delta NFO$

Chapter 9. Let it all hang out - Full Information Forecasting and Valuation
2. 10-Steps in constructing pro-forma BS, IS, SCF and valuation
3. CE 12 Pro Forma Forecasting
   i. Parameters required to build out future statement
   ii. Infering future key metrics using earnings growth from Reverse-engineering

Session 24

Reading: Chapter 10 (Yeo, 2013)

Powerpoint Slides: Topic 8
Class Exercise: CE13

Chapter 10. Sharpening your edge

Class Exercise 13
1. 5 Steps to know a business
2. 10 Earnings Management Sins

Sessions 25 & 26
Groups present analysis of the chosen company

Session 27 & 28
Take-home Mid-Term II