Fundamental Analysis, B7021, Spring 2017

Course Syllabus

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I. CONTACT DETAILS
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II. COURSE DESCRIPTION
Fundamental analysis, conducted using quantities derived from financial reports and other sources, is used in performance evaluation, risk assessment, forecasting, and valuation, as well as for other purposes. B7021 covers various modules of fundamental analysis, focusing on equity valuation.

The course covers four topics: Financial reporting, ratio analysis, fundamental-based relative valuation, and fundamental valuation. Please see Section VII for course outline and summary of content.

While the course covers the theoretical underpinning of the various analyses, it focuses on implementation and practical uses. Many real-world examples will be analyzed, including using Excel tools that will be provided to the students.

III. COURSE ADMINISTRATION
Class Material
The course material consists of detailed class notes, text book, presentations, practice exercises, problem sets, and optional readings. A good preparation for each class would be to read the class notes and skim through the presentation. Reviewing the presentation carefully after class and solving the practice exercises and problem sets would help reinforce the material. This is important especially because for some topics we will not have sufficient class time to discuss all the points and examples contained in the class notes and presentations. The text book and optional readings elaborate on the discussion and analyses.

All items (other than the text book) will be made available electronically before class, saved in an acrobat version that allows for the addition of comments to the electronic documents. You may use a laptop or tablet during class to help you follow the discussion, to take notes, or to add
comments to the electronic documents as needed (please use the laptop/tablet for those purposes only – otherwise, it may negatively impact your learning experience and that of your peers). One objective of the class is that you will each obtain a detailed, familiar, and customized (through your additions) set of notes that you will be able to use in your careers.

There will be four assigned problem sets to be handed in:

<table>
<thead>
<tr>
<th>Problem Set</th>
<th>Class Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Review of financial reporting</td>
<td>January 28</td>
</tr>
<tr>
<td>2. Ratio analysis</td>
<td>February 11</td>
</tr>
<tr>
<td>3. Valuation</td>
<td>March 4</td>
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</tbody>
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Grade and Course Project

The course grade will be based on problem sets (3 problem sets; 10% each) and a project (70%). Grading of the problem sets will be based on effort only. The project can be either individual or group (up to four participants). Individual projects should be between 8 and 12 pages (including exhibits; single line space). Group projects should be proportionally longer, depending on the number of members. The project can focus on one company or a small group of comparable companies. The analysis should emphasize fundamentals-related aspects. The structure of the project is flexible. Examples of projects from previous classes are available on Canvas. Potential analyses include:

*Estimating the value of a company using fundamentals-based relative valuation* – The project should include a discussion of the comparability of the peers (selection, evaluations, tiering), the fundamentals used, the value measures used, the multiples, and how the different value estimates were combined to obtain a final value measure.

*Estimating the value of a company using fundamentals-based DCF* – The project should include a short discussion of reformulation adjustments to the financial statements, primary inputs (e.g., WACC, steady-state assumptions), forecasting assumptions, the steps from DCF value to value per share, and sensitivity and scenario analyses.

*Conducting comprehensive ratio analysis* – for example, analyzing profitability, examining measures of overall earnings quality, distinguishing the effects of organic versus acquired growth, forecasting revenue or earnings using fundamental analysis, conducting fundamentals-based risk analysis, and relating value ratios to fundamentals. In addition to calculating relevant ratios, there should be a discussion of inferences from the analysis and their implications for valuation analyses.

Assignment Designation

The project is classified as Type B according to the Columbia MBA Class Assignment Descriptions. This means that you may discuss concepts of the project with other students, but the submitted project must be your own individual (or group) work.
IV. CONNECTION WITH THE CORE AND OTHER ELECTIVES

This course builds on knowledge from the core courses Financial Accounting (B5000) and Corporate Finance (B5300), which introduce students to basic financial reporting and analysis concepts. In particular, B7008 requires a basic understanding of the following:

- Financial statements, including the balance sheet, income statement, and cash flow statement
- How accrual accounting differs from cash accounting, including revenue recognition (realization principle), expense recognition (matching principle), and asset and liability measurement (historical cost, selective fair value)
- Time value of money and present value calculations

In B7008, students acquire a deep understanding of accounting information and how to intelligently use it in making investment, credit, and similar resource allocation decisions.

V. TEXT


VI. OPTIONAL READINGS

VII. COURSE OUTLINE AND SUMMARY OF CONTENT

- **Review of financial reporting** (topic #1; Chapter #1; Presentation #1)
  - Primary financial statements
    - The balance sheet (statement of financial position)
    - The income statement (statement of earnings/operations/profit or loss/P&L)
    - The cash flow statement
  - Secondary financial statements
    - Statement of equity (statement of changes in equity)
    - Statement of comprehensive income
  - The relationships among the different financial statements
  - Other disclosures: Notes, MD&A, Risk Factors, Market Risk, …
  - Underlying accounting concepts
    - Asset and liability recognition and measurement
      - Internally-developed versus acquired intangible assets
      - Executory contracts (e.g., employment, purchase commitments, leases)
      - Contingencies (e.g., pending law suits)
      - Historical cost versus fair value
    - Accounting conservatism (e.g., impaired assets are written down but assets that increase in value are not written up)
    - Revenue recognition: Realization principle
    - Expense recognition: Matching principle
  - Limitations and distortions of the financial statements, and implications for financial analysis and valuation
    - Understated assets and equity due to: the omission of internally-developed intangibles, historical cost accounting, conservative accounting practices, and the realization principle
    - Overstated earnings due to historical cost accounting (e.g., depreciation based on historical cost is smaller than economic depreciation)
    - Overstated profitability (relative to economic profitability) due to the above distortions
    - Hidden risks: omission of executory contracts and some loss contingencies, other off-balance sheet exposures (e.g., borrowing through associated companies, exposure to unconsolidated variable interest entities)
    - Expense recognition inconsistent with matching (e.g., R&D, advertising, impairment, restructuring, resolution of contingencies and other uncertainties)
  - Summary of line-specific GAAP and differences relative to IFRS
  - The concepts of earnings management and earnings quality

- **Ratio analysis** (topic #2; chapter #2; presentation #2)
  - Introduction
  - Reformulating the financial statements
    - Operating versus financing versus “other” activities
      - “Other” – equity method investments, real estate not used in operations, …
    - Recurring versus transitory items
  - Analyzing profitability
- Controlling versus non-controlling profitability
- Recurring versus transitory profitability
- Operating profitability versus financial leverage effect versus the impact of net other assets
- Drivers of operating profitability: profit margin, asset turnover, operations funding ratio (leverage from operating credit)
- Turnover and expense ratios
- Drivers of the financial leverage effect on profitability: financial leverage, financial spread (operating profitability minus net borrowing cost)
- Drivers of the impact of net other assets on profitability: Relative size of net other assets, excess profitability of net other assets

- Evaluating earnings quality
  - Qualitative analysis
  - “Big picture” indicators of earnings quality: cash flows versus accruals, net operating assets relative to sales, discretionary expenses relative to sales
  - Key line-item-related indicators of earnings quality; for example,
    - Revenue recognition: receivables relative to sales, deferred revenue relative to sales, revenue mix, gross margin, …
    - Inventory and related expenses: inventory relative to cost of goods sold, production costs relative to cost of goods sold, payables relative to operating expenditures, …
    - Fixed assets and related expenses: estimated useful life and average age of fixed assets, asset replacement ratio (capex relative to depreciation), …

- Risk analysis
  - Qualitative analysis
  - Quantitative analysis
    - Capital structure (balance sheet composition, off-balance sheet exposures, financial leverage, debt service ratios, coverage ratios)
    - Liquidity (current ratio, quick ratio, cash flow ratios, working capital ratios)
    - Operating volatility (sales volatility, operating leverage, profit margin as a “buffer”, profit volatility, cash flow volatility, …)
    - Other risk-related ratios (e.g., size, market risk measures)

- Relative valuation (topic #3; presentation #3)
  - Price multiples
    - Value = Fundamental × Multiple
    - Fundamental = The firm’s earnings, book value, cash flow, sales, or other financial metric
    - Multiple = Average of (Price / Fundamental) for a group of comparable companies
  - Assumptions
    - Value is proportional to the fundamental used
    - A similar proportionality holds for “comparable” companies, that is, firms from the same industry and/or with similar characteristics (e.g., size, leverage, expected growth)
    - Comparable firms are, on average, fairly priced
- Linking price multiples to fundamentals
  - Identifying and measuring the determinants of various price multiples (e.g., P/E, earnings growth, earnings quality, earnings retention, equity risk and long-term interest rates)
  - For each price multiple, which determinant/s is/are particularly important?
  - Industry-specific and other considerations
- Implementing relative valuation
  - Which fundamental to use (e.g., EPS, EBITDA, BVPS, revenue) and how to measure it (e.g., net versus recurring, actual versus forecast, annual versus trailing, dealing with accounting distortions, changes in invested capital and share count issues)
  - Which value measure to use (e.g., price per share, equity value, enterprise value)
  - How to select peers (e.g., industry classification, relevant characteristics, tiering)
  - How to calculate the multiple (mean versus median versus harmonic mean; dealing with outliers)
- Conditional price multiples
  - Instead of using the average (unconditional) multiple across the peers, use the (conditional) fitted value from a regression of the multiple (e.g., price/book) on relevant characteristics (e.g., ROE)
    - This approach facilitates simultaneous extraction of information from more than one fundamental (e.g., book value and earnings) as well as from dissimilar peers (e.g., by explicitly controlling for differences in ROE)
    - On the other hand, greater potential for estimation error …
- Using time-series instead of cross-sectional analysis in measuring multiples
- Uses of relative valuation
  - As the primary method of valuation
    - Common in sell-side, less so in buy-side
  - As an alternative valuation approach
    - Quite common – given the many assumptions involved in DCF, it is important to conduct a price-multiple analysis as a plausibility check of the DCF valuation
  - Method of choice in sum-of-the-parts valuation
    - For example, by business or geographic segment
  - Integrated into DCF
    - To calculate the terminal value or as a check on the reasonableness of the terminal value (“exit multiple” or “terminal multiple”)
    - To value investments in associates (equity method investees) or non-controlling interests
    - To derive price-based forecasts (e.g., implied cost of capital, implied growth, implied future profitability)

**DCF valuation** (topic #4; presentation #4)
- Basics of fundamental valuation
  - The value of any investment or asset (e.g., project, business, company, stock, bond) is the present value of the net cash flow that the asset is expected to generate or save
  - Measuring and forecasting the net cash flow
  - Estimating the discount rate
  - The dividend discount model as an example
- The discounted cash flow (DCF) model for equity valuation
  - Synopsis of the model
    - Enterprise value = Present value of free cash flow (FCF) discounted at the weighted average cost of capital (WACC) + value of non-operating/non-financial assets (e.g., investments in unconsolidated affiliated companies, real estate not used in operations)
    - Equity value = enterprise value – value of net debt
    - From equity value to value per share: parent equity versus non-controlling interests, common equity versus contingent claims (options, conversion features of convertibles)
  - Deriving the model
    - Required assumption – the following ratios are assumed to remain constant over time: The required rate of return on debt, the corporate tax rate, the required rate of return on equity, and the leverage ratio (measured using market values)
      - Implications for measuring the discount rate
    - Defining and measuring FCF and cash flows to the various claim holders (equity holders, debt holders, other stakeholders)
      - FCF = NOPAT - ∆Net operating assets
      - Measuring FCF as EBIT×(1-t) + Dep&Amort – capex - ∆working capital, as is often done, results in a biased FCF measure
        - Operating assets other than working capital and cash-acquired fixed assets
        - Operating liabilities other than working capital liabilities
  - Template for DCF valuation
    - Calculating the PV of FCF: Explicit forecasts, steady-state assumptions, transition/convergence forecasts, WACC, and terminal value
    - From DCF value to value per share
  - Forecasting FCF
    - Information for forecasting
    - Forecasting revenue
      - Extrapolating from past growth rates
      - Time-series models
      - Asset growth effects
      - Contracted future revenue
      - Sales-generating units: Stores, drugs, ships, …
      - Firm characteristics
      - Analysts’ forecasts
      - Growth decomposition
      - Segment disclosures and related analyses
      - Non-financial metrics: employee turnover, employee headcount, customer satisfaction, customer retention, patents count, governance structure, …
    - Forecasting expenses
      - Extrapolating from past margins
      - Considering peer information
      - Analysts’ forecasts
      - Forecasting expense line items
- Earnings quality indicators
- Cost structure implications
- Growth implications
- Macro predictors

• Forecasting assets
  - Extrapolating from past turnover
  - Considering peer information
  - Forecasting asset line items
  - Macro predictors
  - Firm characteristics
• Forecasting operating liabilities
  - Extrapolating from past operations funding ratios (net operating assets / operating assets)
  - Considering peer information
  - Predicting operating liabilities line items

- Steady-state ratios
  - Steady-state growth
  - Steady-state profitability

- Estimating WACC
  - Sources of financing (equity, debt, hybrid equity/debt, operating credit, leasing and other off-balance sheet financing)
    - Debt versus operating credit
    - Gross versus net debt
    - Market versus book leverage
    - Current versus long-term or target leverage
  - Determinants of the availability and cost of the various financing sources
    - Pretax cost of debt
    - Tax rate on interest expense
    - Cost of equity capital
    - Earnings retention and payout policy (dividends, share repurchases)
    - Short- versus long-term debt
    - Asset-backed financing
    - Lines of credit versus holding cash and other liquid funds
    - The effects of leverage on operations

• Fundamental risk measures
• Risk management
• Special issues: WACC and investments in unconsolidated affiliates, WACC in segment DCF, inflation and the cost of capital

• Forecasting financing activities and constructing pro forma financial statements

- Terminal value
  - Constant growth (Gordon) formula
  - Exit/continuing value multiples
- From DCF value to value per share
  - From DCF value to enterprise value
  - From enterprise value to equity value
- From equity value to parent equity value
- From parent equity value to value per share

Sensitivity and scenario analyses
- How sensitive is the intrinsic value estimate to changes in key assumptions?
- How much loss would be incurred if the “bad” scenario materializes?
- How big are the potential gains if the “good” scenario occurs?
- How significant is the value effect of real options?
- What are the likely value effects of alternative courses of actions?