



Corporate Valuation
Tuck School of Business at Dartmouth
Winter 2011

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*“Successful investing comes down to two basic skills: the ability to value companies and the ability to understand... market behavior. If you do these well, you will make a lot of money.” Warren Buffett, in **Tuck Times**, November 10, 2006, p.4. (Underlining mine).*

Objectives

There is no major corporate investment decision that can be made without first asking and answering the question, ‘What is it worth?’. The goal of this course is to build your skills and confidence in answering that question.

In these turbulent times, it might appear that understanding market behavior is paramount. Even if you could understand it, as Mr. Buffett notes above, the ability to *value* a business is necessarily the flip side of the coin. Regardless of the career path you choose post-business school, valuation is among the handful of essential tools you want to have in your skill set.

The focus of Corporate Valuation (CV) is on making investment decisions in real – as opposed to financial – assets. CV will acquaint you with the widely-used, yet rigorous, ideas that comprise best practice in the valuation of projects, divisions, and companies. CV has three goals. They are:

- To develop the necessary tools to value projects, divisions, and corporations, including in the cross-border setting;
- To explore the interaction of the firm with financial (including foreign exchange) markets and institutions, and how equilibrium pricing relations in these markets matter for investment decisions;
- To acquaint you with making corporate valuation, investment, and (some) risk management decisions in the mergers and acquisitions (M&A) context.

Simply put, by the end of the course, I expect you to be comfortable with the tools and the frameworks to answer the question: *What is a real asset — a new product, a new project, a division, a company — worth?*

Course Synopsis

CV is divided into five parts. The first part, lasting 1.5 sessions, is a quick recap and reinforcement of the ideas that drive all valuations: free cash flow, cost of equity and WACC (including unlevering and relevering betas; the Fama-French model), DCF valuation tools (WACC v. APV v. FTE), other valuation tools (multiples/premiums in precedent transactions, break-up values), and calculation of terminal values. Part 2 applies these ideas to typical valuation situations: project/divisional valuation, IPO valuation, private equity and LBO valuation, valuation in high-growth settings and mature cash flow settings. We also explore the links between valuation tools and the insights these tools offer us to understand “profitable growth.” Part 3 explores *real* options, focusing on how to identify, conceptualize, and value them. Part 4 addresses cross-border valuation, with particular emphasis on understanding the roles that exchange rates and country risk play. We also look at valuation in emerging market settings. Part 5 of CV consists of your group project presentations.

Requirements

The most important requirement of CV is the preparation for discussion in class, the assigned reading material, problem sets, or cases for the day. It means that you and your group will work on the numbers/spreadsheets as appropriate to each session. Classes will probably start with someone being called upon to lead off the discussion (or a study group to present the results of their case analysis, if appropriate). If you do not feel adequately prepared, you must inform me before the class starts that you do not wish to be called on.

I strongly urge that you prepare for *every* class in study groups, whether or not there is a group assignment. To *not* do so will probably constrain your ability to follow all of the issues we cover in a typical session. *Group size should not exceed five* (sorry, no exceptions!).

You can form groups across sections. In that event, the person(s) in the earlier section is (are) responsible for turning in the group written assignments for the day.

I expect you to attend every class. If you are not able to attend class on a particular day, I assume that it is for non-trivial reasons. *Therefore, I do not need to be told the reason.* But you should try and notify me in advance about your impending absence since this avoids inadvertent cold calls on those not in class. (I do not wish to embarrass anyone!) I do assume that you will get caught up on the material you missed.

Please attend the section to which you are assigned. If you do have to switch sections, I will assume that it is due to either a medical or family emergency. Please let me know prior to the start of class that you are switching for the day, so that I do not incorrectly (or, I fail to) assign the class participation grade for that session.

Group Project On Valuation

The course requires you and your group to work on, write up, present, and submit a substantive valuation project based on a recent real-life example involving an acquisition of a ‘target firm’ (or a portion of it) by an ‘acquiring firm.’ While I would be happy to make suggestions, I encourage you to find one that makes sense for you, given your particular industry or career interests. As the economy and the markets are rebounding, M&A activity is on the upswing again. You should have little difficulty in finding interesting ones to work on.

The main requirement of the project will be a detailed valuation of a target firm or division, but your analysis must also contain discussion and evaluation of:

- The acquiring firm, its business, recent financials;
- The target firm, its business, recent financials;
- The acquiring firm's stated strategic and business logic for the acquisition;
- The price paid and medium of exchange used;
- The impact of any major, additional outcome-determining factors – for example regulatory issues; contingent payment commitments; caps or floors in pricing; real options; exchange rate effects; country risk effects; potentially interesting corporate governance issues; government-to-government or cross-cultural issues;
- Relevant multiples and premiums paid in precedent transactions;
- Detailed spreadsheet valuation of the target firm, with clearly articulated assumptions on valuation methodology, cash flows, cost of capital, terminal values, exchange rate effects, and country risk factors;
- Assessment of the acquisition from the standpoint of all the above, most especially the price paid and the medium of exchange used.

Specifically, at the end of your study of the transaction, the primary question you should answer is: ***“At the time of the acquisition announcement, given the facts known then, would you have recommended that the acquisition take place at the price offered? Why, or why not?”***

The final report should *not be more than 12 pages long, including exhibits*. Text should be *double-spaced, with font size of at least 12*. Your report, which should be in PDF format (please: no Word files!), are due by 5 PM on Friday, March 4, 2011. Please also post a PDF copy of your PPT slides onto the course folder prior to 8.00 AM on the day of the presentation so that the other students and I can download it. (Please keep formatting in the posted copy to a minimum, so that it is easy to print out).

A few key dates to keep in mind:

| | |
|----------------------|--|
| End-January: | Decide on acquirer/target, and inform me; |
| Week of February 14: | Set up meetings with me for interim progress report; |
| February 28/March 1: | Class presentations; |
| March 4: | Two (paper) copies of the final group write-up due in my office at 5 PM. |

I recommend that you develop the ability to access an important research database: the ***SDC M&A database***. In addition, if you can learn to navigate ***Bloomberg*** and ***Datastream*** databases, you'll find that they can come in quite handy (both for the course and in the future).

Material

Although there is no textbook for the course, I am a fan of Aswath Damodaran's *Damodaran On Valuation*, 2nd Edition, Wiley Publishing, 2006. For those of you who would like something for your shelves and can afford to purchase it, this is the book I recommend.

(Amazon.com lists it at approximately \$60, at the time of writing). Professor Damodaran – who will also be a visitor to our class – has a wonderful website, and I encourage you to browse, and borrow liberally from it: <http://pages.stern.nyu.edu/~adamodar/>

I am a fan of two other books: Koller, Goedhart, and Wessels, *Valuation: Measuring and Managing the Value of Companies*, John Wiley & Sons, 5th Edition, 2010, and Rappaport and Mauboussin, *Expectations Investing: Reading Stock Prices for Better Returns*, HBS Press, 2003.

Policies

Honor Code

You are expected bring integrity and dedication to your learning process, accept personal responsibility to uphold high ethical standards in your work, and promote a learning environment in which honest, participative, and imaginative work flourishes. This entails adequate preparation, sharing and challenging each others' ideas in the classroom, and contributing to our joint learning on a daily basis. (I am bound by these expectations too.)

The material in this course has been used before. Any use of any prior material or discussions regarding any aspect of the course with someone who is familiar with course material that has been used prior is a violation of the Honor Code. Also, with the exception of the research required for your group project, please do not use any outside information for your group write-ups – in other words, please restrict yourself to the information provided in the course material, or those derived from the classroom. Essentially, please treat the material in this course as self-contained.

And, it goes without saying that you should not pass on any content to anyone who might have the opportunity to take this course in the future.

If you have your laptop open in the classroom, it must be only for the purposes of note-taking, unless the particular class requires the use of your computer. As you no doubt have experienced, if those next to you (or sitting in front of you) are web-surfing, emailing, etc. during class, it detracts from your learning. Please know, if your use of laptops for non class-related purposes is observed (and reported) by one of your colleagues as a distraction, I would be compelled to view it as a negative for evaluation of class participation. ***As a courtesy to visitors, all laptops must remain closed during visitor sessions.***

An Important Note On Some Course Conventions

As we get deeper into the material, we will see that there are many ongoing academic (and practitioner) debates about 'best practices' in the empirical implementation of basic finance concepts.

Such debate covers – and is not limited to – issues such as what is the appropriate market risk premium, whether to add 'size' and 'market-to-book' adjustments to asset pricing, which of the various methods of unlevering/relevering to use, and so forth. We will visit these issues and debates. *Unless otherwise mentioned*, we will use the following as default conventions for this class:

- The market risk premium will be 7% for cases set in the '90s or earlier, and 6% for cases set in the '00s and later;

- The single-factor CAPM will be our default asset pricing model;
- For unlevering (i.e., calculating β_{Asset}) and relevering (i.e., calculating β_{Equity}), we will use $\beta_{Equity} = \beta_{Asset} \times (1 + (1 - t)(D/E))$.¹ However, there may be one or two situations where we will deviate slightly from this convention; it will be made clear when and why.

We will discuss in class the reasons for the use of these as default conventions.

Visitors

Peter Georgiopoulos, T'87
Chairman of the Board
General Maritime Corporation

Peter Friedman, T'03
Director, Corporate Strategy & Development
United Technologies Corporation

Aswath Damodaran
Professor of Finance, Stern Business School at New York University
http://en.wikipedia.org/wiki/Aswath_Damodaran

Grading

There will be **four group write-ups** required, and I will inform you of the details sufficiently in advance of the sessions. There will be a take-home **midterm** exam about two-thirds of the way into the course. The grading system is:

Course Grade = 0.20(C) + 0.20(W) + 0.30(M) + 0.30(G), where,

- C = Class participation (individual)
- W = Written Assignments (group; best 3 out of 4)
- M = Mid-term exam (individual, take-home)
- G = Group project write-up and presentation (group)

(Note: If a group write-up assignment is not turned in, that will necessarily count for a zero grade.)
The mid-term exam is take-home, open book, open notes, and should reflect solely your individual efforts. More details will be forthcoming well in advance.

Please know that class participation is an *earned* grade in this course. (You will get a baseline of five out of the 20 points for just showing up, but the rest is earned). The metric I use to judge the quality of contributions in the classroom is very simple: At the end of every class, I ask, “by dint of his/her contributions to the class that day, did the person, to the best of my judgment, advance the learning in the classroom?”

¹ Should you choose to use the formula: $\beta_{Equity} = \beta_{Asset} + (\beta_{Asset} - \beta_{Debt})(1 - t)(D/E)$ that would be fine too.

Topics/Dates

(* indicates session for which group write-up is due prior to start of session).

Class 1, Tuesday 1/4/2011

Fundamentals of Valuation: Cash Flows, Cost of Capital, Valuation Methods
‘Mini’ Case: Apple’s Financials

Class 2, Wednesday 1/5/2011

Fundamentals of Valuation (Cont): Divisional/Project Valuation
Case: Offshoring at GIS

Class 3, Monday 1/10/2011

Multiples (‘mark-to-market’) v. DCF (‘mark-to-model’)
Case: General Maritime’s Tanker Purchase, May 2010
Visitor: Peter Georgiopoulos, T’87

Class 4, Tuesday 1/11/2011*

Valuation in Mature Cash Flow Settings: The WACC Valuation Method
Case: Schneider SA and Square D Company

Class 5, Tuesday 1/18/2011

Corporate Strategy and Corporate Valuation
Visitor: Peter Friedman, T’03

Class 6, Wednesday 1/19/2011*

Valuation in High-growth Settings
Case: Netscape’s IPO

Class 7, Monday 1/24/2011

Measuring and Managing Value-creating Growth
Case: The BMW Group

Class 8, Tuesday 1/25/2011

The APV Valuation Method
Case: CHS’s Acquisition of Triad Hospitals

Class 9, Monday 1/31/2011

Valuation of a Leveraged Buyout
Case: Medimedia International

Class 10, Tuesday 2/1/2011

Real Options Valuation – 1

Class 11, Monday, 2/7/2011*

Real Options Valuation – 2

Class 12, Tuesday 2/8/2011

Real Options Valuation – 3
Case: Bidding for Antamina

Class 13, Monday 2/14/2011

Cross-border Valuation: Exchange Rates and Country Risks

Class 14, Tuesday 2/15/2011*

Cross-border Valuation: WACC Valuation Method

Case: AZ Satellite Networks

(HAND OUT MID TERM EXAM; DUE BACK 5 PM, FRI 2/18/2011)

Class 15, Monday 2/21/2011

Cross-border Valuation: APV Valuation Method

Case: Aguas Minerales SA and Cadbury Schweppes

Class 16, Tuesday 2/22/2011

Visitor: Professor Aswath Damodaran, New York University

Topic: "Top Ten Errors In Valuation"

Class 17, Monday 2/28/2011

Group Project Presentations

Class 18, Tuesday 3/1/2011

Group Project Presentations

GROUP WRITE-UP DUE FRIDAY, 3/4/2011

Detailed Schedule

Session 1 – 1/4/11

Fundamentals of Corporate Valuation – 1

Read: 1) Sundaram, “Cash Flows” ([LINK IN TUCKSTREAMS](#))
2) Apple’s Financials: September 2009 ([LINK IN TUCKSTREAMS](#))
3) Sundaram, “Cost of Capital, with Extensions to the Cross-border Setting.” (*skim; also, skip Section 9 of the reading for now*). ([LINK IN TUCKSTREAMS](#))

Preparation:

- 1) What is free cash flow? Should interest expenses be considered as part of the cash outflow? Why, or why not?
- 2) Why is increase in net working capital a cash outflow? Why is a decrease in net working capital a cash inflow? How should we deal with ‘Cash and Marketable Securities?’ How should we deal with ‘Short Term Debt?’
- 3) Look at “Apple’s Financials.” Apple reports net income of \$5.7B for 2009. What is your estimate of Apple’s free cash flow? Why is Apple’s free cash flow much higher than its net income?
- 4) What is “WACC?” What are the components of WACC? What is the cost of debt? What is the appropriate tax rate to use?
- 5) What is the capital asset pricing model (CAPM)? What is the “beta”? How can we use CAPM to calculate the cost of equity? How is CAPM implemented in the real world? What market risk premium (MRP) should we use? What is the “equity” beta? The “asset” beta?
- 6) How does leverage affect betas? What is the “Fama-French” adjustment to the CAPM?

Session 2 – 1/5/11

Fundamentals of Corporate Valuation – 2

Case: [OFFSHORING AT GIS \(LINK IN TUCKSTREAMS\)](#)
Read: 1) Sundaram, “Corporate Valuation – General Principles” ([LINK IN TUCKSTREAMS](#))
2) Sundaram, “Terminal Values In Corporate Valuation” ([LINK IN TUCKSTREAMS](#))
3) Some Additional Financial Data for GSD Comparables ([LINK IN TUCKSTREAMS](#))

Preparation:

- 1) What is the WACC method? The APV method? The flow-to-equity (FTE) method? What are the general principles that govern the three approaches – i.e., what are the correct free cash flows and costs of capital to use in each approach?
- 2) What are the types of valuation situations in which one method might be preferable to the others?
- 3) Would you pick one of these as a “generic” approach? Why?

4) Study Questions for “Offshoring at GIS” Case:

- What is the NPV of a decision to offshore 3000 GSD jobs?
- In assessing the NPV, you have to calculate the WACC for GSD based on the data provided for the comparable publicly traded companies.
- Assume that: (i) GSD’s debt-to-equity ratio will be the same as the comparables’ average debt-to-equity ratio; (ii) $r_D = 7\%$, $r_F = 5\%$, $MRP = 6\%$, and the tax rate is 35%; (iii) the terminal growth rate (“g”) is 3% per year.
- By how much should the total value of GIS’s outstanding stock rise if the offshoring opportunity is implemented?
- What are the key assumptions that could make offshoring a “win-win” situation for both developed and developing economies?

Session 3 - 1/10/11

Multiples (‘market-to-market’) v. DCF (‘mark-to-model’) Valuation

Case: [GENERAL MARITIME’S TANKER PURCHASE IN MAY 2010 \(To be distributed\)](#)

Read: [Grimson, ‘General Maritime’ Corporation \(LINK IN TUCKSTREAMS\)](#)

Visitor: *Peter Georgiopoulos, T’87, Chairman, General Maritime Corporation*

Session 4 - 1/11/11*

Valuation of Mature Cash Flows: WACC Valuation Method

GROUP WRITE-UP DUE (*see details below*)

Case: [SCHNEIDER S.A. AND SQUARE D COMPANY \(IN COURSE FOLDER\)](#)

Preparation:

You are Didier Pineau-Valencienne (DPV), the CEO of Schneider SA, a leading French multinational company in the electrical distribution and industrial automation industry. You are faced with the prospect of failure of joint venture discussions that have gone on for two and-a-half years with the US company, Square D. You must decide whether to call of the discussions and go ahead with a tender offer for the US company, and if so, how much you should pay for Square D’s equity.

1) Strategic fit: Assess the strategic fit between the bidder (Schneider) and the target (Square D). From a purely strategic and competitive standpoint, would you recommend to DPV that he should acquire Square D?

2) Target performance: How is Square D performing, as a company? What metrics would you use to assess “performance”? Why? How does their performance stack up against their competition?

3) Base case valuation: Using a 10-year proforma (assume 1991 is the first full year of cash flows), what is the base-case value for Square D’s equity? In order to value Square D, assume the following:

- The valuation will be done in US\$;
- Revenues grow 4% in 1991, 7% per year during 1992 to 1997, with the growth rate linearly declining to 4% per year by 2000;
- EBITDA is 15% of sales;

- Capital expenditures will grow at 5% per year during 1991-00, and is depreciated on a 12-year, straight-line basis; Operating net working capital is 12% of sales; Tax rate is 35%;
- The terminal growth rate in free cash flows will be 4%;
- Square D's current equity beta is 1.02, the market risk premium for DPV's shareholders is 7%, long-term US treasury bonds yield 7.5%, and Square D's cost of debt is 10%;
- Square D's target debt-to-capital ratio is 30%.

4) Operating synergy valuation: DPV estimates that operating synergies will add 34% to the base-case value of Square D. Can you come up with estimates for a few specific components of the synergy valuation to assess whether DPV's assumptions here seem reasonable?

5) Purchase price: What is the total share value for Square D, from DPV's standpoint? What is the price per share he should pay for Square D? How high should he go? What roadblocks should he anticipate, and how can he overcome them?

GROUP WRITE-UP:

YOUR ANSWERS TO QUESTIONS 3 AND 4 ABOVE (SYNERGY + BASE-CASE VALUATION OF SQUARE D, PLUS DISCUSSION OF SYNERGIES) IS DUE AS A GROUP WRITE-UP PRIOR TO START OF CLASS. ONE PAGE MAX FOR THE SPREADSHEET (AT LEAST FONT SIZE 12), AND ONE PAGE MAX WITH A BRIEF DESCRIPTION OF THE ASSUMPTIONS AND DISCUSSION OF WHETHER YOU THINK THE SYNERGIES (i.e., 34% ON TOP OF THE BASE-CASE VALUE) CAN BE JUSTIFIED.

Session 5 - 1/18/11

Visitor: Peter Friedman, T'03, Director of Corporate Strategy and Development, United Technologies Corporation

Topic: Corporate Strategy and Corporate Valuation

Session 6 - 1/19/11*

Valuation of an Initial Public Offering

GROUP WRITE-UP DUE (see details below)

Case: [NETSCAPE'S INITIAL PUBLIC OFFERING \(LINK IN TUCKSTREAMS\)](#)

Read: Ross, Westerfield, Jaffe 8th edition (yes, the first year finance textbook!), *Skim* Chapter 17, incl. appendix; *Read* Chapter 19: 19.1 – 19.5, 19.9

Preparation:

- 1) What is Netscape's strategy? How risky is its competitive position?
- 2) Does Netscape need to go public? What might these sources be for start-ups such as Netscape, and what are their pros and cons? What are the advantages and disadvantages of public equity ownership? Is it wise to always go public if you think you can?
- 3) What explains the "underpricing" phenomenon in IPOs? Should Netscape be concerned about underpricing? Why or why not? What explains the long-run 'underperformance' of IPOs? Is it irrational to invest in a portfolio of IPOs?
- 4) Can the recommended price of \$28 (rather than \$14) and the public offering 5 million (rather than 3.5 million) shares be justified? Use the following assumptions:

- The proforma period is 1996-2005;
- Cost of goods sold = 13.4% of total revenues;
- R&D = 33.8% of total revenues;
- Other operating expenses decline on a straight line basis from 80.9% of revenues in 1995 to 20.9% of revenues in 2001;
- Capital expenditures decline from 43% of revenues in 1995 to 8% by 2001;
- Depreciation on new capex = 7-year, straight line;
- Beginning non-cash current assets are \$9.1 million, and beginning current liabilities (net of ST debt) are \$23.8 million; operating net working capital as percentage of sales will be 2% from 1996 and on;
- Terminal growth rate is 5% annually, after 2005;
- An appropriate beta for a company such as Netscape is 1.85 (ignore beta data in case);
- T-bonds yield 6.71%; The market risk premium is 7%;
- Netscape will have an all-equity capital structure; the tax rate is 40%.

5) What specific metrics did you use to assess whether this price is ‘justified?’ How did you consider the effect of taxes during the first few years when pre-tax income is negative?

6) What would you recommend with respect to the proposed offering price as an executive of Netscape? As an investor in Netscape? As an institutional investor, if you were willing to buy and hold Netscape for \$14 originally, are you still willing buy and hold the stock at \$28?

Note that the base-case data, for 1995, are half-yearly results. You have to annualize them.

GROUP WRITE-UP

*The answers to Question 4 and 5 (Netscape’s valuation, how you considered tax effects, and your assessment—including the metrics you used in making that assessment—of whether \$28 per share is justified) are due as a group write-up prior to start of class. Your write-up should not exceed two pages: one page for the spreadsheet and one page for the assumptions plus your justification. **Font size should be at least 12** (you may use single-spacing).*

Session 7 – 1/24/11

Measuring and Managing ‘Profitable’ Growth

Case: THE BMW GROUP IN DECEMBER 2006 (LINK IN TUCKSTREAMS)

Read: Sundaram, “Value, Growth, WACC, and ROIC: A Technical Note” (LINK IN TUCKSTREAMS)

All performance management systems face trade-offs in simultaneously balancing “profit” versus “growth,” as well as “operational” versus “strategic” concerns. Think of a 2x2, i.e., four cells, with these four attributes – ‘Profit’ and ‘Growth’ on the horizontal axis, and ‘Operational’ and ‘Strategic’ on the vertical axis.

- As we move from the lower left (“Operational/Profit”) to the upper right (“Strategic/ Growth”), what are the trade-offs and tensions that can arise?
- What might be at least one metric that *you* think is appropriate to measure, in each of the four cells? How will these metrics address the tensions you identified above?
- Look at the data provided in the BMW case. Based on this data, try to do a rough calculation of the key metrics you identified as important, for BMW, Audi, and Toyota. What conclusions

can you draw regarding BMW's performance? On what dimensions is it doing well? Where does it need to improve? Specifically, look at (and compare) ROIC and WACC for 2006. What conclusions can you draw?

- Do an 'ROIC decomposition' (see the reading for this session), to diagnose potential areas for improvement for BMW – where do their problems lie?
- Based on your analysis, what would you recommend to the CFO of BMW?

Session 8 - 1/25/11

The APV Valuation Method

Case: [CHS's ACQUISITION OF TRIAD HOSPITALS \(LINK IN TUCKSTREAMS\)](#)

Preparation:

- 1) Examine the economics and market structure of the hospital services business in the US. Is this business unique? If yes, what makes it so?
- 2) What are the forces that determine competitive advantage in the hospital services industry? What are the implications for a firm pursuing a value-creating strategy in this industry?
- 3) The hospital services sector is dominated by non-profits. Are non-profit firms likely to be different from for-profit firms in delivering healthcare? If yes, how? What might be the implications of these differences for the types and quality of healthcare delivered?
- 4) What are the key elements of CHS's strategy? What are CHS's strategic goals in pursuing Triad? Do these goals make sense in light of your analysis of the imperatives of industry structure and strategy?
- 5) Examine the financials and operations of CHS with that of Triad and the rest of the industry (Exhibit 2). Where does CHS outperform its peers, where does it lag? Where does Triad outperform its peers, where does it lag? Also, compare CHS and Triad: do you see synergy opportunities? If so, where? Be specific.
- 6) Undertake a valuation of Triad, from CHS's point of view. Would you advise the CEO to pay \$6.8 billion for Triad? In undertaking the valuation, use the following guidelines:
 - Develop a 7-year proforma (i.e., 2007 – 2013), plus a terminal value calculation for Year 8 and on. Consider 2006 as the base year.
 - Assume that the Debt-to-Book Equity ratio declines by 0.5x every year, i.e., from 4x in 2007 to 1x in 2013, staying at that level thereafter. (This requires you to forecast Book Equity for each year; assume that CHS will continue its current policy of paying no dividends.)
 - Here are some specifics you can use to derive revenue, cost, investment spending forecasts, cost of capital, and terminal value for both the base-case value of Triad and the PV of synergies that CHS expects to bring to it.:

- Total Revenue growth rate equals the sum of growth rates of beds in service, in admissions, average length of stay, and revenue-per-patient-day; in the base year, these grew at 0%, 1.8%, 0%, and 6%, respectively.
- Triad's 'Equity in Affiliate Earnings' (EAE) will grow at the same rate as Total Revenue growth rate.
- 'Other Financial Expense' and 'Income from Discontinued Operations' will be zero, going forward.
- Both 'Salaries+Benefits' as % Sales, and 'Supplies' as % Sales, will decline by 0.1% per year through 2013; 'Provision for Doubtful Debt' as % Sales, and 'Other Operating Costs' as % Sales will stay the same as in 2006.
- Capex as % Sales (assumed to be 8% in 2006) will decline by 0.2% per year through 2013; NWC as % Sales (assumed to be 16.1% in 2006) will decline by 0.2% per year through 2013.
- Pre-tax cost of debt for Triad is 7.0%, the tax rate is 35%, the market risk premium is 6%, and US Treasury bonds yield 4.72%;
- Capex will be depreciated on a 9-year, straight-line basis.
- The terminal growth rate, $g = 3.0\%$ (for both free cash flows and EAE).
- Triad has \$208.6 million in cash.
- Triad has 87.2 million shares outstanding.

7) As an investor, would you invest in CHS in March 2007?

Session 9 – 1/31/11

Valuation of Leveraged Buyout

Case: [MEDIMEDIA INTERNATIONAL \(IN COURSE FOLDER\)](#)

Read: [Tuck Center for Private Equity, "Note On Leveraged Buyouts" \(LINK IN TUCKSTREAMS\)](#)

Preparation:

1) *(The perspective of the equity investors)* In this deal, all the equity is provided by managers of MediMedia. Based on the projections, what is the total value of equity in MediMedia? Is the return to equity investors fair? Does the fact that managers own all the equity create any potential issues for the other claimants to MediMedia's cash flows?

(Notes: (i) Use the APV method of valuation; (ii) Assume US\$ risk-free rate – assumed to be the currency of valuation – is 8.08%, the MRP for MediMedia's equity investors is 7%, the terminal growth rate is 4%, and the tax rate is 35%. (iii) From the data in Exhibit 10, you need to think about which subset of the companies listed might be most appropriate "comparables" to MediMedia).

2) *(The perspective of the senior debtholders)* What are the credit risks inherent in revolver and term loan? What mitigates those risks? Including fees, and assuming a 200-basis point spread between cost of funds and LIBOR, what would be your return (IRR) for participating in the revolver and term loan? Would you recommend that your bank participate in this deal?

3) *(The perspective of the mezzanine investors)*. What advantages does mezzanine financing provide over conventional debt and equity? What is the IRR to investors who buy the mezzanine debt? How did you consider the equity warrants? Is the rate of return sufficient to justify the mezzanine investors' participation?

4) (*The perspective of vendor note investors*) Is D&B being compensated fairly for its investment in the subordinated vendor note? What might explain their investment?

5) Management proposes to invest about \$46 million in “goodwill.” What could justify that? What might create value in this deal? How is this value distributed among the various participants in this deal?

Session 10 – 2/1/11

Real Options Valuation - 1

Read: 1) Sundaram, ‘Note On Options’ (LINK IN TUCKSTREAMS)

2) Options Problem Set (*to be distributed*)

3) Link (see under ‘Calculators’): <http://www.numa.com/derivs/ref/calculat/option/calc-opa.htm>

4) Google’s Daily Stock Price Data (LINK IN TUCKSTREAMS)

Preparation:

1) What is a call option? A put option? What does it mean to sell a call or a put? Is there a difference, in terms of your rights versus obligations, with respect to buying and selling an option? What is the difference between an American and a European option? All else equal, which one should be worth more? Why?

2) Examine the payoff diagrams in the Note. They depict buying calls, puts, stocks, and riskfree bonds. What would the diagrams look like if you were selling these instead?

3) What is put-call parity? Why is it important? Work through the binomial options pricing example presented in the Note. What is the value of the put?

4) What is the intuitive logic behind the Black-Scholes-Merton (B-S-M) model? What is the B-S-M formula for pricing European calls? European puts? American calls? American puts? What are the inputs required for these calculations?

5) Given a time series of stock price data, how will you calculate the annualized ‘volatility’?

6) In what direction do call and put option prices change as you change each of the underlying inputs in B-S-M? What is the rationale for the direction of the option price change?

7) Work on and come prepared to discuss the options problem set. You will need the XLS file (uploaded) to calculate Google’s volatility.

Session 11 – 2/7/11*

Real Options Valuation - 2

GROUP WRITE-UP DUE

- Traditional NPV analysis versus real options
- Options to delay, expand, and abandon
- Using the B-S-M formula in capital budgeting
- B-S-M for European vs. American options (NPV_q analysis)
- Finding, conceptualizing, and concretizing real options

- Read: 1) HBS, 'Capital Projects As Real Options: An Introduction,' 1995. (LINK IN TUCKSTREAMS)
2) Damodaran, "The Promise and Peril of Real Options," (*skim carefully, and only up to page 63*). (LINK IN TUCKSTREAMS)
3) Real Options Problem Set. (LINK IN TUCKSTREAMS)

Preparation:

- 1) What are 'real' options? 'Real,' as opposed to what? What are the common types of real options?
- 2) What kinds of biases can ignoring option values cause in 'traditional' NPV analysis, in capital budgeting, and in corporate valuation situations?
- 3) Can you come up with some examples of (general) factors that reduce or destroy the value of real options?
- 4) What is the NPV_q methodology for pricing options? What are the limitations of the NPV_q approach?
- 5) What are some of the potential problems and limitations with the use of the 'real options' methodology?

GROUP WRITE-UP:

QUESTIONS 3, 4B, 4C, AND 4D OF THE REAL OPTIONS PROBLEM SET ARE DUE AS A GROUP WRITE-UP PRIOR TO START OF CLASS. THE WRITE-UP SHOULD BE DOUBLE-SPACED, AND AT LEAST FONT SIZE 12. PLEASE BE BRIEF AND TO-THE POINT. IN PARTICULAR, YOUR ANSWER TO QUESTION 4C SHOULD NOT NEED MORE THAN TWO SENTENCES.

Session 12 – 2/8/11

Real Options Valuation - 3

Case: BIDDING FOR ANTAMINA (LINK IN TUCKSTREAMS)

Read: Sundaram, "Copper and Zinc Markets in the Mid-1990s: A Brief Assessment" (LINK IN TUCKSTREAMS)

Preparation:

- 1) In what way is the development of a copper mine like Antamina a real option? In what way is the bidding structure put in place by the Peruvian government an option? What other real options does the owner of Antamina have?
- 2) Conceptually, how would you build a real options model to value the Antamina project? For simplicity, use the NPV_q model. Use the following guidelines to start to build the model: (i) Assume you are doing the analysis in December 1996; (ii) Use the numbers from the "expected" scenario in Case Exhibit 1; (iii) Cash flows start in 2001 and go out to 2014; (iv) WACC is the same as RTZ's; (v) The time to maturity of the option is 2 years; (vi) Expected future spot prices

(assumed equal to forward prices) for zinc and copper are calculated on the basis of the estimated ‘convenience yields’ and ‘warehousing/ insurance rate’ for copper and zinc. Copper convenience yield is +5%, zinc convenience yield is –2%, and the warehousing/ insurance rate is 0%. The end-1996 price of copper is US\$0.95/lb, and zinc US\$0.46/lb; (vii) Project inflation is 3.5%, and US\$ inflation is 2.6%; (viii) Volatility in returns, based on the evolution of copper and zinc prices, is 30%; (ix) NWC is 25% of sales, depreciation rule is 5-years, straight line, and tax rate is 30%;

3) Under the bidding rules, the winning bidder states both an initial cash payment as well as an investment commitment that is paid only if they choose to develop the field. Bids are developed by summing the up-front amount and 30% of the investment commitment. If you proceed with development, but fail to spend the full investment commitment, the Peruvian government will fine you 30% of the difference. Submit two bids, each one under a different set of auction procedures:

- If the winning bidder was forced to develop Antamina after completing the exploration phase, what is the most they should be willing to bid?
- If the winning bidder could choose whether or not to develop Antamina at the end of two years, what is the most they should be willing to pay? How would you trade-off the two components of the bid?

4) What are the incentives brought about by the different auction rules? Do the rules seem to meet the likely goals of the Peruvian government?

Session 13 - 2/14/11

Cross-border Valuation: Exchange Rates and Country Risk

Read: 1) Sundaram, “Currency Markets and Parity Conditions” (IN COURSE FOLDER)
2) Sundaram, “Cost of Capital” READ SECTION 9 CAREFULLY (LINK IN TUCKSTREAMS)
3) (*Optional*) Foreign Exchange Problem Set (LINK IN TUCKSTREAMS)

Preparation:

1) Focus on understanding the following definitions and concepts:

- Direct quote, Indirect quote
- Spot rate, Forward rate, Expected future spot rate
- PPP and RPPP, Real vs. Nominal exchange rates
- Covered interest parity, Speculative efficiency, Uncovered interest parity

2) The two generic approaches to deal with the effect of exchange rates in cross-border valuation are “convert and discount”, and “discount and convert.” How do these two approaches differ?

3) How should we consider the effects of:

- Cash flows that are “earned” by the foreign project versus those that are “remitted” back to the parent?
- Hedged cash flows or unhedged cash flows?
- Home country versus foreign country tax rates?
- Country risk on cost of equity and WACC?

Session 14 - 2/15/11*

Cross-border Valuation

GROUP WRITE-UP DUE (see details below)

Case: [AZ SATELLITE NETWORKS \(LINK IN TUCKSTREAMS\)](#)

Preparation:

- 1) What are the RMB free cash flow estimates for the LOS project? What are the annual RMB/US\$ exchange rate forecasts during the proforma period? What are, therefore, the US\$ free cash flow estimates for this project?
- 2) What is the US\$ cost of equity for this project? Should a country risk premium be added to obtain the cost of equity? What is the US\$ weighted average cost of capital (WACC) for this project?
- 3) Should ASN take on the LOS project?
- 4) Undertake the same analysis by using “Approach 2:” deriving the RMB WACC and discounting the RMB cash flows at the RMB WACC, with the US\$ value obtained by converting the RMB NPV at the spot exchange rate of RMB8/US\$? Is your NPV from using this approach the same as the one above? Should it be the same? Why or why not?
- 5) Suppose now the inflation rate in China is the same as that in the US, i.e., 2%, and the RPPP and UIP continue to hold. Do you expect the value of the LOS project to increase, decrease, or stay the same? Why? Re-calculate the values using “Approach 1” and “Approach 2” with the new inflation assumption, and check your intuition. Can you explain what happened here?
- 6) Assume that, despite what PPP predicts, there will be a *real* depreciation of the RMB: Specifically, your exchange rate advisors predict that RMB will depreciate RMB12/US\$ next year, and stay at that exchange rate throughout the life of the project. Re-calculate the values using “Approach 1” and “Approach 2.” What do you find?
- 7) Will you accept this project?

GROUP WRITE-UP DUE:

Your answers to questions 1-4 in the study questions above should be turned in as a group write-up. The write-up should not exceed two pages (one page for the valuation spreadsheet using Approach 1, and the second page for Approach 2). Font size must be at least 12.

(HAND OUT MID TERM EXAM; DUE BACK 5 PM, FRI 2/18/2011)

Session 15 - 2/21/11

Cross-border Valuation – APV Valuation

Case: AGUAS MINERALES SA AND CADBURY SCHWEPPE (IN COURSE FOLDER)

Preparation:

- 1) What risks and opportunities does Cadbury Schweppes (CS) face in Mexico with its proposed acquisition of AMSA?
- 2) How should CS finance the acquisition: should they use debt or equity? Would you recommend full or partial acquisition?
- 3) What should CS pay for AMSA's equity? Undertake a valuation using the APV method, with separate valuations for the base case and synergies. (Note: You'll have to start by forecasting the peso cash flows, which would then be converted to US\$ cash flows and discounted at the US\$ discount rate for this project – i.e., you will use the 'convert and discount' approach).

In addition to relevant case facts, assume:

Base Case Valuation:

- The proforma period will be 1992-2001 (i.e., 10 years), plus terminal value calculation for the periods following.
- Volume will grow at 9% per year from 1992 to 1995, 5% per year from 1996 to 2000, and 2% per year from 2001 and on.
- The price per case increases by 28% in 1992, and is assumed to grow in line with inflation thereafter.
- Mexican inflation rate decreases linearly from 15% to 9%, from 1992 to 1995 (see case Exhibit 7), and then stays flat at 9% from 1996 and on; US inflation rate is assumed to be (and stay at) 4%.
- EBIT/Sales, Depreciation/Sales and Net Working Capital/Sales remain constant at 1991 levels.
- The tax rate is 20% for 1991-1995, 30% thereafter (from 1996 and on).
- Capital expenditure is 8% of Sales in 1991 to 1996, and equal to depreciation thereafter.
- The asset beta is 1.0; Debt remains constant at 1991 level and is perpetual; cost of debt is 9.6%.
- The terminal growth rate assumes that real cash flows will stay constant (i.e., nominal cash flows grow at the rate of inflation).
- Valuation effects of the pension plan will be ignored.

Synergy valuation:

- The overall market of 2.8 billion gallons grows in volume at 6% per year. Price per-gallon grows at inflation rate.
- Current market share = 1.79% (50 mn. gallons in a 2.8 bn. gallon market);

- Synergy produces growth to 4.7% share by 1996 and this share remains the same thereafter.
- Synergy-related capital expenditure equals synergy-related depreciation, and changes in net new working capital are zero.

4) Challenge question (optional): See if you can come up with the same value for AMSA by using the 'discount and convert' approach (i.e., discount the peso cash flows at a peso discount rate, and converting to a US\$ PV using the spot rate).

5) What would you recommend to the board of CS regarding the price to pay, how it should be financed, and whether it should be a JV with FEMSA or an outright purchase?

Session 16 - 2/22/11

Visitor: Professor Aswath Damodaran, New York University

Topic: Top Ten Errors in Valuation

Session 17 – 2/28/11

GROUP PRESENTATIONS

- Valuation Project Presentations

Session 18 – 3/1/11

GROUP PRESENTATIONS (Cont)

- Valuation Project Presentations (cont).

VALUATION PROJECT GROUP WRITE-UP DUE FRIDAY, 3/4/2011