COURSE BACKGROUND

The course is taught by a mixture of lecture, discussion, and case method. Students will be taught a framework for critically evaluating and valuing healthcare businesses, with a focus upon drug and medical technology companies. The course will seek to sensitize students to common risks/pitfalls in life science investing. Issues that may impact the industry in the future will also be vetted through discussion. Students should be aware that there will be some limited reading of scientific literature for the class.

COURSE OBJECTIVES

• Acquire a framework to critically evaluate healthcare investment opportunities.
• Learn the basic structure of the US healthcare system and its history with regard to product regulation and payment.
• Evaluate science by understanding how to effectively apply an understanding of clinical context, regulatory requirements, and basic statistics.
• Understand the importance of intellectual property and the impact it has upon healthcare business models.
• Forecast income statements for various kinds of healthcare business models. Become thoughtful when faced with thinking about product pricing, market forecasting, reimbursement, patent expiration, litigation, competition, and operating expenses.
• Perform valuation analysis including basic DCF and comparables analysis. Appreciate the strengths and limitations of valuation approaches.
• Appreciate macroeconomic and industry challenges and be aware of how this may impact healthcare business models in the future.

COURSE REQUIREMENTS

Class Participation – 50% of the grade. Attendance is mandatory.

Written Work – 30% of the grade. 2 assignments.
• Assignment 1 – estimate likelihood of development success for a healthcare product.
• Assignment 2 – build valuation scenarios for a healthcare company and render an investment opinion.
Final Exam – 20% of the grade. Multiple choice exam covering lecture materials.

COURSE POLICIES

Attendance. Attendance is mandatory at all regular class meetings. Exceptions for personal or family emergencies will be granted on a case by case basis.

Tardiness. No assignment will be accepted beyond the announced deadline. As with attendance, exceptions for emergencies will be granted on a case by case basis.

COMPANIES COVERED

- Abiomed (Medical Device)
- Alexion Pharmaceuticals (Biotech)
- Amgen (Biotech)
- Intuitive Surgical (Capital Equipment)
- Masimo (Hospital Supplies)

SESSION / DATE

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<th>Industry Overview</th>
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Lecture – Introduce the scope and size of the various subsectors of healthcare and understand how they interact.

Discussion - Via discussion, the class will be introduced to a research framework that can be applied to a large proportion of science-based businesses.

Lecture – Review drug and device development and regulatory processes.

Lecture - Government and private insurance market overview.
Pre-reading for this session:


2 Nov 8 Evaluating Science: Process and Pitfalls

Lecture – Introduction to scientific analysis and basic clinical trial statistics.

Case – Compare and contrast the clinical data from Eculizumab and Denosumab (do not use outside materials). Questions for thought:
1. Which trial is stronger from a statistical perspective?
2. Which drug do you think is stronger from a clinical perspective?
3. What drug has a higher likelihood of being approved by the FDA?

Discussion – We will discuss the following issues:
1. How might the current and future state of science impact success probabilities in the future?
2. What influence does the FDA have upon success probabilities and how should this be incorporated in your analysis?

Pre-reading for this session:


Alexion/Amgen Resources:

Assignment due next class:
Read the paper discussing Abiomed’s minimally invasive cardiac pump. Assign a likelihood of success for their ongoing clinical trial and ultimate regulatory approval.

Assignment materials:
- Abiomed US feasibility study presentation handout

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Lecture – Introduction to intellectual property, generic drug regulation, and legal strategy.

Case – What might Amgen’s denosumab revenue curve in osteoporosis look like for the life cycle of the drug? Questions for thought:
1. How would you approach estimating the size of the potential osteoporosis market?
2. How would you get a sense of how denosumab might fit into the treatment paradigm?
3. What will Fosamax’s (a currently approved drug) revenue curve look like?

Discussion – Please be prepared to discuss the following issues:
1. How might different approaches to revenue forecasting differ in their reliability?
2. What role does regulation play in forecasting revenue curves (in particular tails) for small molecule drugs and biologics? How about for devices and services?
3. How is intellectual property law changing and how might it impact revenue curves in the future?

Pre-reading for this session:


Amgen Denosumab Resources (please feel free to do additional research):

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Case - Compare and contrast Intuitive Surgical and Masimo’s business models.
   1. How might their revenue trajectories differ?
   2. How do the risks to their business models differ?
   3. Explain why their R&D as a percentage of revenue may be similar or different.
   4. Explain why their SG&A as a percentage of revenue may be similar or different.

Discussion – We will spend some time discussing the following issues:
   1. How might R&D as a percentage of sales for life science companies change over time?
   2. How might deal structures between players in industry change over time?
   3. Can we expect future estimates of dilution to look like past benchmarks?

Pre-reading for this session:


Intuitive Surgical & Masimo Labs Resources:
   • Investor Presentation
   • 10K

Assignment due next class:

Build an operating income statement for Myriad Genetics assuming their only product is the BRACAnalysis molecular diagnostic. Forecast revenues and justify your assumptions. Also justify your assumptions for R&D and SG&A.

Assignment Resources:
   • Handout of historical BRACAnalysis revenues, units, and operating costs to date.
   • Your own web research on various ways to estimate revenue trajectory into the future.
   • Your own estimates of future operating costs and justifications.

5 Dec 6 Valuation Approaches and Limitations

Lecture – Review key attributes of healthcare companies and how they are reflected by traditional valuation approaches. Within discounted cash flows; how to think about terminal value, scenario based analysis, discount rate, and dilution. Within comparables analysis; why companies with similar growth profiles trade at different multiples, and
how to think about the „appropriate“ multiple. The practical use of real options analysis. How potential acquirers think about M&A valuation. Approaches for valuing technology platform companies.

Case – How much is Myriad Genetics worth? Questions to think about:
1. Review income statement together.
2. What valuation methods can be utilized here? What are their limitations?

Discussion – We will spend some time discussing the current valuation of various types healthcare companies and how this may change in the future. Some questions to think about.
1. What do you think about the implied terminal value of specialty pharmaceutical companies? Is this appropriate?
2. How should managed care companies be valued?
3. What are the key valuation drivers for clinical research organizations?
4. What factors are key for the future valuation of biotechnology companies?

Guest Speaker – Pfizer Jeff Meckler

Pre-reading for this session:


6 Dec 13 Industry Challenges and Macroeconomic Issues

Final Exam – 45 minute multiple choice exam covering lectures.

Discussion - Healthcare reform.

Discussion – International healthcare markets and globalization.

Discussion - Impacts of the economic crisis on Europe.