Advanced Business Development Course

Valuation and Deal Structuring
Valuation and Deal Structuring

Prepared for:

BIO’s

Advanced Business Development Course

June 2015

Joe Dillon
President

DILLON CAPITAL
Bringing money to medicine®
A Word from the Attorneys

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<td>08:30</td>
<td>Valuation and Deal Structuring Concepts and Trends</td>
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<td>Valuation Tools and Techniques</td>
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<td>Case study work (and break)</td>
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<td>Value Sharing and Deal Terms Structuring</td>
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<td>Program Concludes</td>
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<td>17:30</td>
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“The only thing that you can guarantee about any valuation is that it is wrong.”

– Pharma Exec
Before We Get Started

- Your colleagues here – Know them & learn from them
- People’s expertise differ – Be patient and grow
- The case study – Listen for helpful hints during lecture
- The model – Essential, but it’s not just the math
- Timing – Keep moving, no analysis paralysis
- Checkpoints – Make goals and observe checkpoints
  - Today
  - Tomorrow
  - Last day
- Case study solution – There is no one correct answer
- The Ultimate Goal – Learn, make a deal and have fun.

You are part of the learning experience here

DILLON CAPITAL
STRATEGIES
My Background

- **Small pharma** – 1996 to 2003. Positions as CFO, COO, CEO and Board member.
- **Education** – BBA in Finance, MBA in International Finance and several years teaching at the graduate level.

**Focus:** Partnering/BD, strategic planning, deal strategy, deal structuring, forecasting and valuations
First……

let’s talk a little about deal trends and the reality of value before we worry about the math.
Deal Multiple Trends

Pharmaceutical Product Acquisition Multiples

Multiples are a result, not a tool.

Value Gap
Deal Trends

- **M&A Mania** – M&As by value up, 168% from 2013, even eclipsed the recent high in 2009. Allergan deal and commercial consolidation dominated. Biotech less than 10% of this volume.

- **Number of Biotech Out-licensing Deals** – Still running flat compared to recent years.

- **Value of those Deals** – Continued climb in valuations from already healthy levels. Early stage values up, as are upfronts.

- **Survival of the Bigs** – M&A, including “biobuck” acquisitions, continue. Embracing early stage market. Partnering with each other. Research platform collaborations still up.


*Risk sharing is the structure du jour*
Game-changing Deal Structure Trend
Game-changing Deal Structure Trend
What Drives Market Value?

- **Scarcity Value** – Simple supply and demand. More later.

- **Franchise Value** – The buy-side understands portfolio synergies, so they may bid above the stand-alone value of a product in order to enhance the value of the portfolio (or company) as a whole.

- **Time Value** (of money) – Over the past decade, internal WACC has decreased for most larger companies. Lower discount rates yield higher valuations. (more on this later)

**Reality Check:** Value = What you can get for it.
Scarcity Value

- **Endangered List**
  - Near-term launch
  - Safe and efficacious (minimal baggage)
  - Peak revenues >$500MM, bonus points if >$1B
  - Manageable development costs and risk
  - Strong IP position and longevity
  - Pricing and reimbursement predictability

- **Gaps** - Several Pharmas are forecasting “gaps” that occur simultaneously.

- **Feed the Beast** - Portfolios must “turn” due to aging products and shorter periods of market domination.

*Whomever has the gold rules!*
Managing Risk and Sharing Value

- Acquisitions that include “earn-outs” or contingent value rights (CVRs)
- Collaborative deals
  - A twist on traditional “Option deals”
  - More gambles and rewards being shared
  - Risk/Value inflection points drive deal structure payments
  - Co-marketing/promotion deals far less common
- Early stage deals
  - Forecasting can be dicey at best, but a necessity
  - Values are being bid up, but pay-offs are contingent
    - Require more sophisticated modeling

Enter the new “norms”
The Sobering Fact

Most Deals Fail

Depending on who you cite the number is 50 – 75%
Products in an alliance have a far higher probability of success.

Clue: External diligence > Internal diligence
**The (e)Valuation Process**

Valuations are opportunity evaluations and fact-finding processes yielding much more than “just a number”

- Define the **asset(s)** – what are its attributes, TPP?
  - Compare to the current/future market, needs and competition
- Measure the **investment** – what R&D is required?
- Assess the **risk** – what are the odds we succeed?
- Evaluate **partnering** – can we do this alone?
- Forecast **returns** – what’s the future cash flow?
- Consider **alternatives** – are other outcomes possible?
- Synchronize with **strategy** – how does this fit long-term?
- Structure the **deal** – what are feasible terms?

**Fully understand the Value Proposition**
Uses for Analysis and Valuations

- Provides defendable claim of value (100% of “buy-siders” say they use NPV on PC and later deals)
- Solid basis for discussions and negotiations
- Real-time deal terms and option strategy simulation
- Basis for comparison to alternative opportunities
- Support internal go / no-go decisions
- Develop operating plans / budgets
- Flush-out issues and “surprises”

The “devil” really is in the details.
Why do different parties usually give the same deal a different valuation?

How are these values being calculated?

What assumptions will have to be made?

What is the best time to do a deal?

What is the right amount to receive/pay and how can it be structured to reduce my risk?

How do you strike a balance between what is offered and what works for both parties?
First – What drives value?

- Meeting an unmet need
- Discovering a need and satisfying it
- More effective product (efficacy)
- Safer or easier to use product
- Predictable pricing and reimbursement
- Risk mitigation
- IP protection
- Scarcity, franchise, and time values
- Lower costs

Value is in the wallet of the beholder.
Valuation Methodology

Which valuation methodology is best for technical programs?

- Market – Comparables, standards or multiples?
- Cost Basis?
- Payback Period?
- Income - Discounted Cash Flow (DCF) or NPV?
Be Careful Using Comparables

Deal Term Mix - As Announced
$100 million Deal

- 50% Milestones
- 50% Upfront

$100 million? When? How? What-if?
Be Careful Using Comparables

Actual Deal Terms Mix (including Royalty Payments)

- Upfront - 10%
- Milestones - 10%
- NPV of Royalty Payments - 80%

A different perspective!
Be Careful Using Comparables

Actual Deal Term Mix Probability-adjusted

- Milestones - 6%
- Upfront - 49%
- NPV of Royalty Payments - 44%

Getting Clearer?
Comparables?

- True, useful comps are rare. Critical info often not public.
- Best to have this info to make a “comp” useful
  - Target product(s) profile (TPP), how it would compete in the subject market, AND how it compares to your product
  - **Material** deal terms:
    - Field of Use and Geographic rights
    - Specifics of option timing and terms
    - Upfront payment and/or Option Fee(s)
    - Milestones – each payment, when paid and why
    - Royalty rate(s) and structure (e.g. tiers, net sales definition)
    - Expense/resource sharing or subsidies (esp. R&D and S&M)
    - Transfer price profits
    - Equity and/or debt purchases, rights and structures
    - Partnering scheme/strategies (e.g. co-promote options)
    - Options rights to other related or unrelated technologies
    - Etc., etc...........
Pharma/Biotech Valuation Methodology

- Examples of non-public info in “comps”
  - Buyer to purchase 19.9% of Seller’s common stock. However, purchase price is at a 78% premium to stock’s public market value.
  - Seller to pay $5M upfront and “royalty” on approved product with ~$300M revenue potential. Buyer needs to re-launch product before allergy season - primarily interested in market momentum, transfer price profits and high royalties.
  - Buyer to pay >$400M in milestones for PC product, but >$300M are for future (risky) indications in undisclosed therapeutic area(s).
  - Seller takes deal with upfront <$10M, milestones >$300M and a “royalty.” The bulk of the milestone payments were for practically unobtainable revenue levels and royalties were tiered at 20-33% where “net sales” definition made it similar to profit sharing.
  - Buyer acquires biotech, with PI lead, for $500M. Share purchase over years, contingent on future events and product valuations.
“Standards” are only directional, at best

- Examples of standards include values of drugs by phase, value splits to partners, probabilities of success, market share, R&D and sales force costs, upfronts, milestones, royalty rates.
- Survey data points often have very high deviation from average.
- Life example: “What’s the price of that new car?” The average price of a car in Germany, in 2011, was €25,740. Is this “standard” helpful? Not really, there are many differences between models of cars.
- In portfolio management, products in the same therapeutic area, same indications, and in the same phase of development must be valued independently to see which programs are emphasized or de-emphasized. Variations in valuations can be substantial.
- In in-licensing, business development professionals at “buy-side” companies often have to discern between multiple opportunities within the same therapeutic area or indication, and often even within the same therapeutic target or specific technology.
- Standards provide little, to no, application in these valuations.
On Terms and Value

“Price is what you pay.
Value is what you get.”

— Warren Buffett
BREAK!
(return at 10:00am)
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Pharma/Biotech Valuation Methodology

Comparables?
- True comps are rare. Critical info often not made public.

Multiples (Deal Value ÷ Most recent 12 mo. sales)?
- Variance from average ~2x. Irrelevant unless launched.

Cost Basis?
- Prior R&D spending rarely an indicator of future value.

Payback?
- Ignores product lifecycle after payback.

Income - Discounted Cash Flow (DCF) or NPV
- Applicable to wide variety of technology opportunities
- Risk-adjusting a must for deal structuring
- Used by all “buy-siders” polled in a large survey

Focus on Risk and Return ("Cash is King")
Use of NPV/rNPV and Deal Value

According to Recent “Deal Surveys”:
- “Buy-siders” involved in PC or later deals say they use rNPV to value and structure deals.
- “Sell-siders” are less likely to use rNPV than “buy-siders.”
- Sell-siders who said they used rNPV had consistently and significantly higher upfronts, milestones, royalty rates and overall deal value than average.
- Sell-siders with far lower than average upfronts, milestones and royalty rates were least likely to use NPV prior to deal negotiations.

My Observations after >300 deal analyses:
- Buy-siders do not normally disclose to the sell-side that they are using NPV or rNPV, nor share those NPV results with the sell-side.
- Sell-siders who do not do NPVs also tend to produce revenue forecasts that are “suspect” (to be kind).

The Investment in Analysis is Worth It!
**Net Present Value (NPV)**

**Definition**
Present value of a project’s cash flows – including the invested capital (project cost) discounted at an appropriate discount rate.

**Equation**

\[
NPV(i, N) = \sum_{t=0}^{N} \frac{R_t}{(1 + i)^t}
\]

Or use the formula function in Excel for NPV.

“\(R\)” represents each year’s cash flow. “\(i\)” represents the discount rate. “\(t\)” represents the respective year of the cash flow.

**Decision Rule**
If NPV is zero or positive, consider doing the project; the more positive, the better. A NPV of zero indicates that the project has a rate of return exactly equal to the discount rate, so the discount rate is the same as the internal rate of return (IRR).
**Risk-adjusted Net Present Value (rNPV)**

**Definition**
- Same as NPV, except that future cash flows are probability-adjusted prior to discounting with the discount rate. More on risk later.

**Pros**
- For projects with significant uncertainties in cash flows, such as drugs, devices and diagnostics in various stages of development, results are much more accurate and meaningful than NPV only
- Simulates the application of a decision tree model that reflects the ability to stop the project in case of technological failure
- Facilitates risk-shared deal structuring

**Cons**
- Requires careful consideration of risk (probability of success) at multiple points in a project’s lifecycle
- Requires using an appropriate discount rate
Key Discounted Cash Flow Variables

- Variables which usually impact value the most:
  - Gross Revenue (price and units)
  - Discount Rate
  - Probability of Success
  - R&D and Sales and Marketing Costs
  - Rebates, Allowances and Returns (RARs)
  - Operating Expenses
  - Capital Spending
  - Deal Terms
  - Cost of Goods (increasingly important)
  - Working Capital
  - Taxes

Think Incrementally!!!

Let’s think of some uses for NPV of DCF analyses…
What is a discount rate (in DCF valuations)?

- The discount rate is the rate of “interest” required to justify putting capital at risk and/or waiting for a future pay-back.
- It reflects revealed time preferences and opportunity costs.

Why is it used?

- Think about it – if someone offers you the chance to invest $10,000 to start a business today for a multiple pay-backs in the future, you need to consider that you’ll have the money tied up for some period of time without the ability to invest it in alternative options, and there is overall business risk that the pay-backs may not be as high as initially claimed.
- So, “discount” the forecast future cash flows by a rate that covers your “cost” and if the resulting net present value is above zero, you’ve earned your “discount rate” and more.
Components of the discount rate

- Inflation (when using nominal or current dollars)
- Real risk-free rate (T-bill premium, same maturity)
- Company’s incremental cost of capital (risk premiums)

Considerations

- For variable-risk projects (most all Biopharma transactions), probability of success \( P(s) \) is not included as a component of the discount rate. \( P(s) \) is treated separately. More later.
- Use care when mixing real and nominal figures
  - “Nominal” includes inflation, “Real” does not (lower rate)
- Rates differ widely by company
  - Possible higher valuations with established deal partners

Repeat – Leave project risk out of it!
Which rate to use?

- Weighted average cost of capital (WACC)
- Average or typical WACC for firms in the industry
- Project-specific discount rates
- Real or nominal discount rates
- Hurdle rate or IRR required by top management or investors
## Discount Rates (continued)

### Cost of Equity Capital

\[ E = I + (M - I) + S + IP \]

- **Return for a specific Investment**  \( E \)
- **Risk-free rate**  \( I \)  3.32% 10 year Treasury
- **Return for the equity market as a whole**  \( M \)  10.72%
- **Market risk premium**  \( (M - I) \)  7.40%
- **Small company/Liquidity premium**  \( S \)  0.00%
- **Industry Premium**  \( IP \)  4.00%

**Total Cost of Equity Capital**  14.72%

**Rounded Cost of Equity Capital**  14.7%

### Weighted Average Cost of Capital (WACC)

\[(\text{IRR Debt} \times (1-\text{Tax Rate}) \times \text{Debt:Capital Ratio}) + \text{IRR Equity} \times \text{Equity:Capital Ratio}\]

- **IRR Debt**  7.90% Baa bond yield
- **Average Tax Rate**  38.00%
- **Average Debt:Capital Ratio**  4.00%

**WACC (Discount Rate)**  14.33%

**Rounded Discount Rate**  14.3%

**Marginal Tax Rate**  34%
Feasibility: Project must have NPV > 0

Internal Rate of Return (IRR): Discount rate at which NPV = 0
## Discount Rate - Timing Matters

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Hidden years each have $20.0 cash flow.
### Discount Rate Matters

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Hidden years each have $20.0 cash flow.
Opportunity to double your money!
- Pay $1 for the opportunity to win $2 if you correctly guess the result of a coin flip (heads or tails)

Is this a good bet?

Analysis
- Odds of winning: 50%
- Possible cash flows: -$1 or +$1

The math – probability adjusting
- \[ (-1 \times 1.0) + ((2 \times 0.5) + (0 \times 0.5)) = 0 \]

The decision
- Overtime this bet yields zero gain
Probability of Technical Success – P(s)

- Development (will the science work as planned?)
- Regulatory (will it be approved for marketing?)

Considerations

- Break down by year, phase, study or major inflection points
  - P(s) is usually different year-by-year. And each year’s cash flow must be individually risk adjusted to do deal structuring
- Apply to the target product profile (TPP)
  - This is the profile of what is expected to launch
  - The rest of the forecasts (e.g. revenue) should also be for the TPP
- Use P(s) comps or a qualitative and quantitative rating system
- Consider the resources and capabilities that will be available

Risk changes over time
Overall P(s) is calculated as a progression

- The first year is often indicated as 100% probability because it is unlikely a program will be terminated before most or all of that year’s budget is consumed. Remember, this exercise is to determine the probability of each year’s cash flow.

- First, determine the probability of succeeding in each year, assuming success in the previous year (First line below)

- Then, by multiply each year’s probability times the progressive probability of the previous year (Second line below)

- Years after marketing approval are indicated as 100% (assumed success)

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# Probability of Success - Timing Matters

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Hidden years each have $20.0 cash flow.
# Probability of Success % Matters

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Hidden years each have $20.0 cash flow.
Other Important Valuation Considerations

☐ Terminal Value
  ▪ Estimates the total value of the program for the years after the last year of the cash flow forecast.
  ▪ Our model uses a perpetuity calculation (preferred method).
  ▪ The model input is expressed as a percentage growth (i.e. 5% indicates 5% cash flow growth forever, -5% indicates 5% decline annually until zero is theoretically reached)
  ▪ It is best to forecast a cash flow out far enough to go at least a year beyond patent or exclusivity loss, which ever is later, so the terminal value factor applies to a “smoother” landing. Input -100% to simulate the termination of license rights.
  ▪ The terminal value factor is almost always negative. This is because it is very rare for a high tech product to maintain or grow value forever. There are exceptions.
  ▪ Terminal value can be a substantial value component, so be careful using and interpreting it.
Other Important Valuation Considerations

Terminal Value Examples

Terminal Value Growth Rate -5%

Terminal Value Growth Rate -25%

Terminal Value Growth Rate +5%
Working Capital

- Working capital is defined as (current assets – current liabilities).
- Our model uses the “incremental revenue factor” method, which is accurate and easier to apply than the accounting method.
- It’s considered an “investment” to support daily operations and provide adequate corporate solvency.
- As operations grow, more working capital investment is required.
- A typical pharma company adds working capital at a rate or 10% - 15% of incremental revenue.
- The need to increase working capital is considered a cost associated with projects that grow the company.
- Our model’s working capital input is expressed as a percentage of incremental revenue and adds it as a separate line after tax.
Inflation Factor

- For purposes of our model, we use this to calculate the proper discount rate to use.
- Remember, the nominal rate includes inflation and the real rate does not.
- If our forecast has inflation incorporated in it, then we should use the nominal rate. If the forecast does not have inflation in it, then we should use the real rate.
- The model defaults to the nominal rate unless we enter an “inflation factor” to calculate the real rate.
- To input 3% inflation, type the factor “1.03” in the field provided.
- I’ll describe this more during the case study.
“I can calculate the movement of the stars, but not the madness of men.”

— Sir Isaac Newton

After losing a vast sum of money on an investment in the South Sea Company
Beginning of Case Study Work

We’ll spend a few minutes here to walk through the case study valuation model.
War-gaming Tools

Seat of the pants..............

Sopwith Camel
War-gaming Weapons

..............or “heads up display”

F-14 Tomcat
War-gaming Weapons

.........or world domination
Step into the Cockpit

DCS Opportunity Valuation and Gaming Model

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Dillon Capital Strategies
Bringing money to medicine

<table>
<thead>
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<th>First Year of Cash Flow</th>
<th>Total Product Value</th>
<th>Value to Out-licensor</th>
<th>Value to In-licensor</th>
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<td>Real Discount Rate</td>
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<td>Value Components</td>
<td>Consolidated</td>
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<td>Nominal Discount Rate</td>
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<td>Inflation Factor</td>
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<td>Marginal Tax Rate</td>
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<td>Working Capital as % Revenue</td>
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<td>Scenario Multiples</td>
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<td>9.4% Terminal Value as % Total NPV</td>
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<td>Name of 4th Territory</td>
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Royalty Structure

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<td>350</td>
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<td>2029</td>
<td>8.0%</td>
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Currency

Net Cash Flow

Risk-adjusted Net Present Value

Total Net Present Value

NOTES: Excel pie charts display negative values as positive slices. So, if Total NPV is negative for either partner, the pie chart will display misleading share slices. The Terminal Value amount does not display as a bar in the Net Cash Flow graph because it is not an actual cash flow, however it is added to the total product valuation.
CASE STUDY – until 12:30

------

LUNCH – 12:30 – 13:30
Today’s Program

08:30  Valuation and Deal Structuring Concepts and Trends
09:45  Break
10:00  Valuation Tools and Techniques
11:00  Case study work
12:30  Lunch
13:30  Forecasting and Market Analysis
14:30  Case study work (and break)
16:00  Value Sharing and Deal Terms Structuring
17:00  Program Concludes
17:30  Networking Reception
The Optimist’s Forecasting Process
Major Revenue Forecasting Considerations

- Patient Based
  - Epidemiology - Prevalence, incidence and patient flow
  - Treatment protocol - Doctor’s preference and requirements
  - Dosing regimen
  - Compliance and persistence

- Market Based
  - Competitive set
    - Marketed and in-development
    - Historical and forecast usage
  - Pricing and reimbursement
  - Market lifecycle
    - Line extensions and generic entry

Watch for trends
Example Models

We’ll spend a few minutes here to walk through a few example revenue forecasts.
Reconciling Market and Patient Basis

Expected usage based on treatable population ≠ Usage based on audited sales data

- Possible causes
  - Inaccurate epidemiology data
  - Miscalculated patient flow
  - Misunderstood usage
  - Inaccurate sales audit data
  - Wrong sales audit data pulled
Trending and Eventing

- **Trending** - taking history into account: curve fitting and “eventing” approach to forecasting and use of comparables
  - Curve fitting of historical data using statistical methods

- **Eventing** - taking the future into account: fitting curve into the future, being informed by historical data on comparable products. Example events:
  - Loss of patent or exclusivity protection – Your product or competitor’s
  - Changes in pricing and/or reimbursement strategy or policy
  - Exit of competitor(s)
  - Entrance of competitor(s)
  - Product goes over-the-counter (OTC) – Yours or competitor’s
  - Labeling change of product (e.g. dosing or “black box”)
  - Additional indications (be sure to include R&D and risk)
Trend Breaking

Curve fitted + evented forecast example

PRILOSEC TRx

<table>
<thead>
<tr>
<th>Date</th>
<th>History</th>
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<th>Evented Forecast</th>
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</table>
The key to “event-based” forecasting is the use of analogs (i.e. comparables)

Uses for analogs

- “Sanity check” peak penetration
- Fit uptake curve to already forecast peak
- Affect of generic competition and other IP challenges
- Pricing and reimbursement outcomes
- Labeling (product profile) assumptions

Common variables often sought in analogs:

- Same indication, therapeutic area
- Similar product profile (efficacy, safety, administration, dosing)
- Same physician subgroup
- Similar marketing strategy (e.g. PCP, hospital, DTC)
Competitive Analysis

- Competitors can expand a market as well as compete for market share
- Include pipeline products as well as marketed products in competitive analysis
- Major considerations are:
  - Product profile (mechanism of action, efficacy, safety, side effects, dosing)
  - Indications obtained / likely to be obtained; also product label
  - Likelihood of being used 1\textsuperscript{st} line, 2\textsuperscript{nd} line, etc.
  - Clinical unmet need
  - IP strength
  - Pricing / reimbursement
  - Marketer strength
  - Order of entry
Market Entry Importance

Many market variables can influence share
Projected Patient Shares

Stealing Matrix in Use
Not All Life Cycles are the Same!

Product Life Cycle - Product X

Years on the Market

Revenue ($US millions)

First to Market  Third to Market  Direct Generic  Equiv. Generic  Labeling Issue
Sensitivity Analysis

Changing one variable at a time:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Original</th>
<th>=&gt;</th>
<th>New Value</th>
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<td>Price</td>
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<td>=&gt;</td>
<td>$3.00</td>
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<td>Rx Share</td>
<td>4%</td>
<td>=&gt;</td>
<td>8%</td>
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<tr>
<td>Discount Rate</td>
<td>12%</td>
<td>=&gt;</td>
<td>18%</td>
</tr>
</tbody>
</table>

Identifies the impact that different variables have on key financial measures, such as NPV and IRR.
Scenario Analysis

Changing multiple variables to establish a “case”

- **Worst Case:**
  - Price: $2.00/tab
  - Market Share: 4%
  - Discount Rate: 18%

- **Best Case:**
  - Price: $3.00/tab
  - Market Share: 8%
  - Discount Rate: 12%

Tests your base case assumptions and identifies the range of potential outcomes
What is it?

- A procedure that uses a random number generator to create sets of variables from user-specified probability distributions

How do you do it?

- Using a software add-on to your spreadsheet program (e.g., *Forecast Architect®* or Crystal Ball):
  1. Specify probability distributions, e.g., mean and standard deviation of a normal distribution, for one or more variables in your forecast
  2. Specify output parameters for your forecast and/or valuation
  3. Run the Monte Carlo simulation
What can you learn from it?

- Which variables contribute the most to your outputs or results (i.e., sensitivity analysis)?
- What is the range and distribution of likely outcomes given the variable distributions assigned?
- What are the major risks and the magnitude of those risks?
Monte Carlo Distribution Curves
Monte Carlo – A Few More Curves
Monte Carlo Simulation Example

65% probability
35% probability
23.4% probability
76.6% probability
Monte Carlo Simulation Pros and Cons

Pros

- Relatively inexpensive to evaluate decisions before implementation
- Reveals critical components of the system
- Gives range and probability of results rather than point estimates

Cons

- Results are sensitive to the accuracy of input data
  - One must know variable value ranges and the unique distribution curves
- If you can’t model it, you can’t use Crystal Ball to simulate it
- Does not provide easy answers to complex problems
"A lot of people become pessimists from financing optimists."

— CT Jones
Case Study Work and Break!
(return at 4:00pm)
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Valuation and Deal Structuring Concepts and Trends</td>
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<tr>
<td>09:45</td>
<td>Break</td>
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<tr>
<td>10:00</td>
<td>Valuation Tools and Techniques</td>
</tr>
<tr>
<td>11:00</td>
<td>Case study work</td>
</tr>
<tr>
<td>12:30</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:30</td>
<td>Forecasting and Market Analysis</td>
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<tr>
<td>14:30</td>
<td>Case study work (and break)</td>
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<tr>
<td>16:00</td>
<td>Value Sharing and Deal Terms Structuring</td>
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<tr>
<td>17:00</td>
<td>Program Concludes</td>
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<tr>
<td>17:30</td>
<td>Networking Reception</td>
</tr>
</tbody>
</table>
A good deal results in an arrangement where both parties share in the value created in such a way that each is motivated to maximize that value.

Pharmaceutical deal value is made up of two basic components
- Value of the technology
- Value of the ability generate positive cash flows by commercializing or otherwise applying the technology

Pharmaceutical deals often span many years with multiple gambles, bets and payoffs to be shared by the partners.

It’s not just the math!
Determine the needs / goals of your company and your partner’s:

- Current cash position
  - Payouts may be designed to match needs

- Earnings requirements
  - Consider accretion, gap filling, etc.

- Hurdle rate
  - Can make a huge valuation difference

- Corporate Development Goals
  - Franchise development
  - Expertise development

- Investment goals of stakeholders

*Know your partner well*
Deal Terms Examples

- Up-front payments
  - Lump-sum
  - Prepaid royalties
  - Direct R&D re-funding

- R&D expense subsidies

- Milestone payments
  - Development
  - Commercial

- Running royalties
  - Fixed % of sales
  - Graduated royalty % based on volume
  - Tiered royalties based on revenue, margin or some other metric
  - Agreeing who pays “reach-thru” or “stacked” (legacy) royalties due

- Manufacturing payments
  - Transfer price profit
  - Cost plus mark-up, % of resale price or other such method
Equity and/or Debt Investment
- At fair market value market
- For a premium to fair market value
- Contingent value rights and staged share purchases based on contingent value

Tactical and Strategic Partnering
- Profit splitting
- Shared commercialization rights
- Shared development rights
- Transferring commercial resources
- Transferring R&D resources
- Planned merger, acquisition or other strategic initiative

Related or Unrelated Asset Partnering
- Quids
- Technology platforms leverage
- Follow-on technology rights

Limited only by creativity
Usage of Widely Known Deal Terms

- **Upfront** – common and highly dependent upon risk and asset value
- **Development Milestones** – common with higher use in earlier stage deals, also dependent on risk and value
- **Royalties** – common and somewhat more likely a fixed rate, but more are tiered for early stage deals, almost always based on net sales
- **Co-development** – more common in very early stage, far less common in later stage deals
- **Co-promotion** – not common, unless sell-side is already established in a region
- **Territory** – Far more common to be global or multi-regional
- **Field** – most likely all potential uses for the asset within a therapeutic area
- **Profit-sharing** – not common
- **Commercial Milestones** – very common, especially in earlier stage deals, sometimes exceeding the total of all development milestones
How Much to Pay and Deal Structuring?

Cash Flow vs Risk

Fees / Milestones vs. Costs / Risk
Royalties vs. Op. Profits

Cash Flow ($USmillions)
-20% 0% 20% 40% 60% 80% 100%

Probability of Downside
-20% 0% 20% 40% 60% 80% 100%

Year (Launch = 0)
Inflection Points

Value to Risk Correlation

Launch
Pay Milestones after Inflection Points
Example Deal
Anatomy of a Drug Candidate Licensing Deal

- **Opportunity:**
  - Stage of Development: Pre-clinical
  - Probability of Launch: 11%
  - R&D: $284 Million
  - Launch Year: 2012
  - Forecast Peak Net Sales: $808 million

- **Proposed Deal:**
  - Licensee (Partner) pays R&D
  - Fees and Milestones
    - Upfront: $50 million
    - Enter Phase III: $10 million
    - Launch: $40 million
  - Royalty: 10%
# Cash Flow Forecast Excerpts

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<td>40.0</td>
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<td>70.1</td>
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<td><strong>Net Cash Flow - Originator</strong></td>
<td>NPV =</td>
<td>181.6</td>
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<td>(20.3)</td>
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<td>(35.6)</td>
<td>(4.5)</td>
<td>79.4</td>
<td>252.6</td>
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</table>

This cash flow was made smaller by hiding some rows and deleting some columns to make the image readable on this slide.

**S T R A T E G I E S**
Partner’s Cash Flow Timing

Cash Flow Share

Fees / Milestones vs. Costs / Risk
Royalties vs. Op. Profits

($US millions)

Partner Originator

Partner Originator

DILLON CAPITAL
STRATEGIES
Resulting Shares of the Pie

Total Net Present Value ($US millions)

Total Value = $1002

- $820 (82%)
- $182 (18%)

Originator Partner

Diagram showing the distribution of total net present value with $820 representing 82% and $182 representing 18%.
**Investment and Milestone Risk Gaming**

Program's Probability of Launch: 11%

Probability of Progressing:
- PreClinical: 59%
- Phase I: 52%
- Phase II: 57%
- Phase III: 70%
- Registration: 90%

Probability of Failure in Phase:
- PreClinical: 41%
- Phase I: 48%
- Phase II: 43%
- Phase III: 30%
- Registration: 10%

Probability of Phase's Cashflow:
- PreClinical: 100.0%
- Phase I: 59.0%
- Phase II: 30.7%
- Phase III: 17.5%
- Registration: 12.2%
- Launch: 0.0%

Graph showing the probability of phase's cashflow from PreClinical to Launch.
Risk and Value Sharing

Cash Flow Share

($US millions)

Probability of Cash Flow

Partner 
Originator 
Probability of Cash Flow
Shares of the Pie – Simple Method

Total Net Present Value ($US millions)
Total Value = $1002

- $182 (18%)
- $820 (82%)

Originator
Partner
Resulting Shares of the Pie – Phased Method

Risk-adjusted Net Present Value ($US millions)

Total Value = $91

$61 (67%)

$30 (33%)

Originator Partner

Resulting Shares of the Pie

Phased Method

<table>
<thead>
<tr>
<th>Originator</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>$61</td>
<td>$30</td>
</tr>
<tr>
<td>67%</td>
<td>33%</td>
</tr>
</tbody>
</table>

DILLON CAPITAL

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DILLON CAPITAL STRATEGIES
Even with this skewed deal structure, it exceeds the partner’s investment hurdle rate of 13.4% nominal.
Using the Phased Method is Worth the Effort

Comparison of Simple and Phased Probability Adjusting Share of Deal Value

Phased: 67% (Originator) 33% (Partner)
Simple: 18% (Originator) 82% (Partner)
Impact of Changing Fees and Milestones

Risk-adjusted Net Present Value ($US millions)

Total Value = $91
Moved $18MM from Upfront to Phase III milestone and reduced launch milestone to $20MM

$45.5
50%

$45.5
50%

Originator
Partner
Value Adding

Risk Adjusted Value

($US millions)

PC  P I  P II  P III  Reg  Launch

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Partnering Timing - Shifting Value Shares

Risk Adjusted Share of Value

- PC
- P I
- P II
- P III
- Reg
- Launch

Legend:
- Partner
- Originator

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STRATEGIES
Pre-Partnering - Investment vs. Return

Development Cost vs Value ($USMM)

Risk Adjusted Value

Development Spend

Pre-Partnering - Investment vs. Return

Risk Adjusted Value

Development Spend

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S T R A T E G I E S
Pre-Partnering - Investment vs. Return

Development Cost vs Value ($USMM)

Risk Adjusted Value

Development Spend

IRR = 99%

11% P(s) 36%

PC P I P II

Risk Adjusted Value Development Spend
Model Strengths and Weaknesses

- **Strengths of robust models**
  - Transparency of key assumptions and variables
  - Flexibility in setting/changing parameters
  - Allows war-gaming and real-time negotiation back-up
  - Speaks decision maker’s language
  - Provides charts and graphs for presentations

- **Weaknesses of some models**
  - Sensitive to poorly understood variables
  - Important variables sometimes arbitrary
  - May not simulate the situation at hand – “the model doesn’t do that”
  - Scenario testing can be time-consuming
  - May not be able handle risk adjusting
  - User may be inexperienced – “….but the model says…..”
  - Formula errors can lurk without being noticed
Finer Points of Deal-making

- Adjusting Deal Structure to bridge disconnects
  - Cost of Capital
  - Probability of success
  - Timing of achievements
  - Revenue (units, price, lifecycle)
  - Terminal Value
  - Costs & Expenses
  - Performance
  - Cash needed is less than value
  - Out-licensor wants to develop
  - Out-licensor wants to market

<table>
<thead>
<tr>
<th>Cost of future capital to be invested</th>
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<tr>
<td>Upfront, milestones &amp; options</td>
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<td>Milestones, options</td>
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<td>Royalty rate &amp; “bonus” payments</td>
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<td>Term, royalty tier, option</td>
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<td>Definitions, limits, sharing</td>
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<td>Definitions, limits, bonus payments</td>
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<tr>
<td>M&amp;A, equity stake, loans</td>
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<td>R&amp;D subsidies, staff sharing</td>
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<td>Profit share, S&amp;M share, splits</td>
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Remember - It’s Not Just the Math

“Beware of geeks bearing formulas.”

— Warren Buffet
Thank You!

Joe Dillon
President

DILLON CAPITAL STRATEGIES
Bringing money to medicine®

202.255.3780
jdillon@dilloncapital.com