# Valuation of Early Stage Life Science (Biotech) Companies

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A BETTER POINT OF VIEW

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# INTRODUCTION

- Valuing early-stage biotechnology companies provides a unique set of challenges
- Combining risk-adjusted discount rates and probability adjusted scenarios provides for conclusions consistent with market conditions
- A discussion and sample calculation illustrates a simple approach
- Methodology presented incorporates a reasonability test

# Background and Challenges

# Background and Challenges

- We have used this valuation approach for
  - Shares underlying options, e.g., 409a and ASC718 (formally 123R)
  - 83(b) election 280(g)
  - Fairness opinions
- Built from techniques described in existing guidance
- Approach is simple to understand and clients like it
- Successful third-party review
- Answers make sense relative to market conditions and relative to the company's progression of milestones over time

# Background and Challenges

- Lack of historical financial results inherit in early-stage companies
- Management provides a financial forecast that is risky due to:
  - Stage of product development
  - Unknowns regarding market acceptance
  - Estimated costs to complete product development
  - Timing delays
- Valuation Challenge:
  - How to develop a fair market value based upon a risky financial forecast?
  - Derivation of discount rate can incorporate qualitative risks but how do you prove reasonableness of quantitative risk captured in discount rate?

# Background and Challenges

- Other Challenges:
  - Lack of publicly-traded comparable companies or peers
  - Market and private valuations frequently milestone based
  - Length of time between prior rounds and recent achievements (or failures)
  - Limited product pipelines, frequently not diverse
  - Complicated capital structures from multiple rounds of financing
  - Frequently need significant additional funding to reach successful product launch
  - Usually only one realistic exit scenario: A strategic sale
    - Not likely to remain an independent pharmaceutical company in the long term
    - IPOs only for the largest issuers and the IPO is a financing event rather than a liquidity event

# Background and Challenges

- Other Challenges (Continued):
  - Nature of industry
    - The biotech industry is highly competitive and requires ongoing, extensive search for technological innovation and investment capital to develop and commercialize new drugs.
    - The biotech industry is characterized by:
      - Rapidly advancing technologies
      - Intense competition
      - A strong emphasis on proprietary products
    - It also requires, among other things, the ability to effectively:
      - Discover
      - Develop
      - Test
      - Obtain regulatory approvals
      - Ability to effectively commercialize, market and promote approved products

# Existing Guidance and Resources

# Existing Guidance and Resources

- Privately-Held-Company Stock Issued as Compensation best practice guide published by the AICPA
  - Published 2004
  - Exposure draft released for comment
- IPR&D guide – Published 2001
- Advanced BV courses (e.g., BV 204,BV 301, BV 302)
- Deloitte Recap
- PwC money tree report

# Market Conditions

# Market Conditions

- Returns have been disappointing for biotech funds
  - Consequently there is little interest in funding development stage biotech
  - Seeking big pharma orphans and re-purposing well understood mechanisms of action
- Investors shifting from early-stage to later-stage companies due to the "Patent Cliff" expiration
  - Pharma companies have been hesitant to take on the risk of funding early-stage companies' R&D with the inherent uncertainty of reaching commercialization
- IPOs have been few and are focused on the best and largest issuers and activity has shifted toward late stage companies

# Quantifying Risk Factors

# Risk Factors

- Risks captured in the WACC
  - Systematic risk
  - Industry risk
  - Small company risk
  - Company specific risk
    - Stage of development
    - Breadth, depth and experience of management
    - Diversity of customers and products (lack thereof)
    - Et al

# Risk Factors - continued

- Additional risk factors specific to early-stage biotech companies
  - Product development risk
    - Number of products
    - Stage of development (pre-clinical, phase I, II, III, IV)
    - Indication
    - Small molecule vs. large
  - Commercial development risk
    - Size of market for product(s)
    - Product pricing and reimbursement rate
    - Commercial launch date and delays
    - Rate of market acceptance
    - Gross profit margin
    - Marketing and distribution costs

# Sample of Method

# Overview of Subject Company

- One compound for dermatology condition
  - Technology had been licensed from another company
- Awaiting results for Phase II trials
- No revenue
- No partnerships, but in negotiations for a collaborative partnership
- Approximately $16 million had been raised to date in A-1 and A-2 rounds
- New management team in place

# Quantifying Risk Factors - WACC

- WACC -
  - Systematic risk
  - Industry risk
- Using Guideline Public Company betas for WACC
  - Use large integrated pharma companies
  - Careful not to use
    - Bulletin board and thinly traded stocks
    - Small development stage companies
    - One product companies
    - Preceding risks measured elsewhere
  - Consider a small company premium
  - Consider a company specific risk, but do not incorporate factors related to product development or commercialization risk

# Example – Derivation of WACC

**Weighted Average Cost of Capital Calculation**
**As of May 31, 2011**
**($ in 000's)**

| Company (a) | Ticker | Beta (b) | Total Debt | No. of Shares (000) | Stock Price as of 5/31/2011 | Equity Market Value | Debt/ Total Capital | Debt/ Equity Market Value | Income Tax Rate | Unlevered Beta |
|---|---|---|---|---|---|---|---|---|---|---|
| Allergan Inc. | NYSE:AGN | 0.51 | 2,214,700 | 304,783 | 82.73 | 25,214,698 | 8.1% | 8.8% | 27% | 0.47 |
| Medicis Pharmaceutical Corp. | NYSE:MRX | 1.20 | 169,326 | 59,669 | 37.47 | 2,235,790 | 7.0% | 7.6% | 40% | 1.12 |
| Obagi Medical Products, Inc. | NasdaqGS:OMPI | 0.72 | - | 18,535 | 9.99 | 185,161 | 0.0% | 0.0% | 41% | 0.72 |
| Valeant Pharmaceuticals International, Inc. | TSX:VRX | 0.12 | 4,716,371 | 298,062 | 50.79 | 15,138,569 | 23.8% | 31.2% | 27% | NA |
| Mean | | 0.64 | | | | | 9.7% | 11.9% | 33.7% | 0.77 |
| Median | | 0.61 | | | | | 7.6% | 8.2% | 33.6% | 0.72 |

| Cost of Equity Calculation | |
|---|---|
| Unlevered Beta | 0.72 |
| Debt to Equity Market Value (c) | 8.2% |
| Expected Income Tax Rate (d) | 40.0% |
| Risk Free Rate (e) | 3.9% |
| Relevered Beta | 0.76 |
| Equity Market Risk Premium (f) | 6.0% |
| Size Premium - 10th Decile (f) | 6.4% |
| Company Specific Premium (h) | 2.0% |
| **Cost of Equity** | **16.8%** |

| Cost of Debt Calculation | |
|---|---|
| **Cost of Debt (g)** | 8.0% |
| Income Tax Rate (d) | 40.0% |
| **After-Tax Cost of Debt** | **4.8%** |

| WACC Calculation | | | |
|---|---|---|---|
| Debt (c) | 4.8% | 7.6% | 0.4% |
| Equity | 16.8% | 92.4% | 15.5% |
| **Weighted Average Cost of Capital (Rounded)** | | | **16.0%** |

**Notes:**

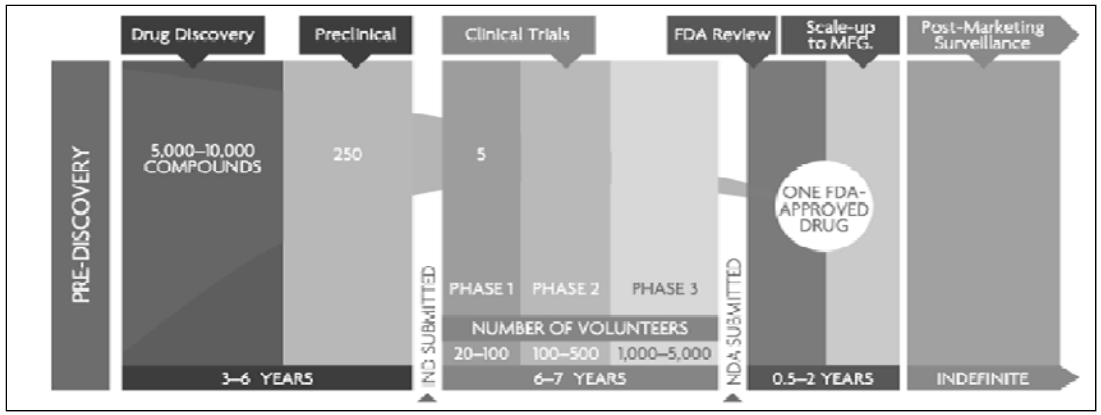
*(a) Certain Guideline Public Companies were excluded due to the early stages of development.*
*(b) Capital IQ, 3 year weekly betas compared to the S&P 500.*
*(c) Leverage ratios reflect the median exhibited by the guideline companies.*
*(d) Based upon U.S. statutory federal, state and local corporate tax rates.*
*(e) Federal Reserve Statistical Release H.15 - rate for 20 year constant maturities treasury as of May 31, 2011.*
*(f) Ibbotson Associates 2011 Valuation Yearbook. Long-horizon supply side equity risk premium.*
*(g) Based on the Company current borrowing rate.*
*(h) Lack of a diversified product base and a similar competing product being developed by Galderma Laboratories, LP that is ahead of subject product in its stage of development.*

# Steps to Probability Adjusted DCF

- Probability adjust cash flows for commercial and product development risks.
  - Use academic and industry studies supplemented with management's estimates.
  - Apply cumulative probability of successful product development and commercialization to the cash flows.
- Use the present value of the probability adjusted DCF, to calculate the IRR of a DCF model using cash flows unadjusted for commercial and product developmental risks.
- Reasonability Test: Is implied IRR commensurate with risk of a venture capital investor?

# Probability Adjustment for Product Development Risks

- Use of academic and industry studies regarding probability of success for each stage of clinical trials
  - DiMassi, et al
  - Adjust based on diligence and management
    - Well understood indication and mechanism of action compared to novel
    - Large compound or small compound
  - Apply to each product in development pipeline
  - Pre-clinical companies even more speculative




*Source: Pharmaceutical Research and Manufacturers of America, Drug Discovery and Development*

# Probability of Successful Drug Development*

**Probability of Successfully Completing a Given Phase (%)**

| Sources | Preclinical | Phase I | Phase II | Phase III | NDA Approval |
|---|---|---|---|---|---|
| A - Lehman | 39 | 72 | 52 | 65 | 91 |
| B - DiMasi | n/a | 69 | 41 | 78 | n/a |
| C - Tufts/Hambrecht & Quist | 40 | 75 | 48 | 64 | n/a |
| D - PriceWaterhouseCoopers | 50 | 72 | 44 | 87 | 73 |
| E - Centre for Medicines Research Int'l | 50 | 63 | 46 | 78 | 90 |
| Average | 45 | 70 | 46 | 74 | 85 |
| **Average Transitional Probability of Success** | **45** | **70** | **45** | **75** | **85** |
| **Average Cumulative Probability of Success** | **9** | **20** | **29** | **64** | **85** |

Sources:

A - Lehman Brothers, Dec 1997, "The Changing Economics/Dynamics of Pharmaceutical R&D Due to Enabling Technologies: R&D Cost Per NCE to Fall?", in *Parexel's Pharmaceutical R&D Statistical Sourcebook 2001*, p. 125

B - Dimasi, J.A., May 2001, "Risks in New Drug Development: Approval Success Rates for Investigational Drugs", *Clin Pharmacol Ther*, vol. 69, p. 297-307

C - Tufts Center for the Study of Drug Development and Hambrecht & Quist estimates in *Parexel's Pharmaceutical R&D Statistical Sourcebook 2002*, p. 230

D - PricewaterhouseCoopers, 1998, "Pharma 2005: An Industrial Revolution in R&D", in *Parexel's Pharmaceutical R&D Statistical Sourcebook 2002,* p. 151

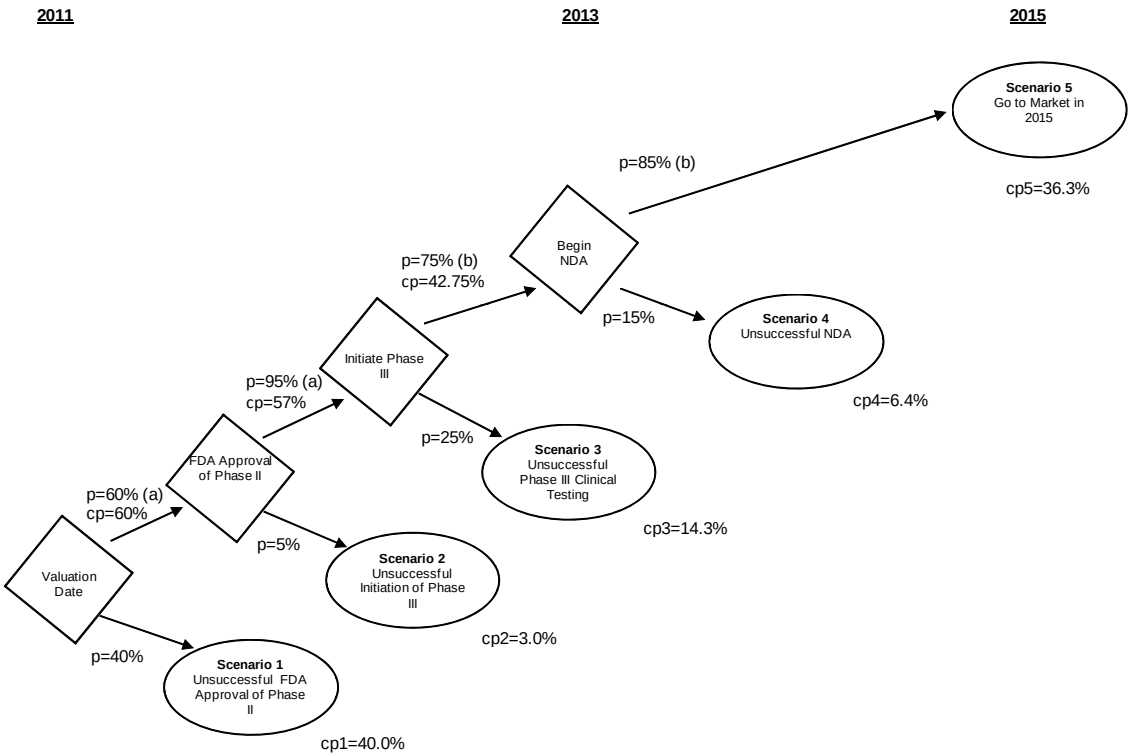
E - CMRI 1999 Annual Report, in *Parexel's Pharmaceutical R&D Statistical Sourcebook 2002,* p. 231

***Sourced from presentation of:**

***Valuation Issues and Financing Strategies for Biotech Firms, Biotech 2006, October 16-17, 2006.***

# Probability Tree and Scenario Analysis

**Probability Tree and Scenario Analysis**
**As of May 31, 2011**




cp1 + cp2 + cp3 + cp4 + cp5 = 100%

**Notes:**

*p= probability*

*cp= cumulative probability*

*(a) Based on the presentation of Valuation Issues and Financing Strategies for Biotech Firms, Biotech 2006, October 16-17, 2006. Prior to initiating Phase III clinical testing, the Company would need to obtain positive feedback from the FDA and sufficient capital.*

*(b) Source: Sourced from presentation of Valuation Issues and Financing Strategies for Biotech Firms, Biotech 2006, October 16-17, 2006.*

# Adjustments for Commercial Development Risks

- Product forecasts have several unknown variables due to unapproved status
  - Commercial launch and acceptance
  - Pricing
  - Gross margin
  - Growth rate and acceptance rate
  - Consider probability adjusting one or two key (most sensitive) variables based on discussions with management, common key variables include:
    - Timing of product launch
    - Profitability
    - Expected development costs to be incurred
  - Upside and downside scenarios relate to total sales in forecast due to compliance factors and price per unit

# Upside Forecast

**Discounted Cash Flow Analysis**
**As of May 31, 2011**
**($ in 000's)**

| | | *Upside Scenario* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **7 ME** | **For the year ending December 31,** | | | | | | | | | | |
| | | **12/31/2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **>>>>>>** |
| Pre-Tax Income (a) | | ($11,711) | ($9,000) | ($9,500) | ($6,000) | $12,281 | $86,849 | $142,470 | $183,946 | $209,104 | $224,732 | $234,301 | >>>>>>> |
| Less: Income Tax (b) | 40.0% | - | - | - | - | - | (19,219) | (56,988) | (73,578) | (83,642) | (89,893) | (93,720) | >>>>>>> |
| Net Cash Flow | | (11,711) | (9,000) | (9,500) | (6,000) | 12,281 | 67,631 | 85,482 | 110,367 | 125,463 | 134,839 | 140,580 | >>>>>>> |
| *Cumulative Probability of Success* | | *57.00%* | *57.00%* | *42.75%* | *42.75%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | |
| **Probability Weighted Net Cash Flow** | | **(6,675)** | **(5,130)** | **(4,061)** | **(2,565)** | **4,463** | **24,575** | **31,062** | **40,105** | **45,590** | **48,997** | **51,083** | |
| Discount Rate | | 16.0% | | | | | | | | | | | |
| Periods to Discount | | 0.29 | 1.09 | 2.09 | 3.09 | 4.09 | 5.09 | 6.09 | 7.09 | 8.09 | 9.09 | 10.09 | >>>>>>> |
| Present Value Factor | | 0.9574 | 0.8511 | 0.7337 | 0.6325 | 0.5453 | 0.4701 | 0.4052 | 0.3493 | 0.3011 | 0.2596 | 0.2238 | >>>>>>> |
| Present Value | | (6,391) | (4,366) | (2,980) | (1,622) | 2,433 | 11,552 | 12,587 | 14,010 | 13,729 | 12,720 | 11,432 | >>>>>>> |
| Sum of Present Values | | 104,763 | | | | | | | | | | | |
| **Fair Market Value (Rounded)** | | **$104,800** | | | | | | | | | | | |

**Notes:**
*(a) Provided by Managementt through 2026.*
*(b) Income taxes were calculated based on pre-tax incomes and have been adjusted by net operating loss ("NOL") carryforwards.*

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# Upside Forecast (Continued)

**Discounted Cash Flow Analysis**
**As of May 31, 2011**
**($ in 000's)**

| | | Upside Scenario | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **2022** | **2023** | **2024** | **2025** | **2026** | **2027 (c)** | **2028 (c)** | **2029 (c)** | **2030 (c)** | **2031 (c)** | **2032 (c)** |
| Pre-Tax Income (a) | | $240,376 | $244,560 | $247,753 | $250,437 | $252,861 | $46,137 | $36,909 | $27,682 | $18,455 | $9,227 | $0 |
| Less: Income Tax (b) | 40.0% | (96,150) | (97,824) | (99,101) | (100,175) | (101,144) | (18,455) | (14,764) | (11,073) | (7,382) | (3,691) | - |
| Net Cash Flow | | 144,226 | 146,736 | 148,652 | 150,262 | 151,716 | 27,682 | 22,146 | 16,609 | 11,073 | 5,536 | - |
| *Cumulative Probability of Success* | | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* |
| **Probability Weighted Net Cash Flow** | | **52,408** | **53,320** | **54,016** | **54,601** | **55,130** | **10,059** | **8,047** | **6,035** | **4,024** | **2,012** | **-** |
| Discount Rate | | 16.0% | | | | | | | | | | |
| Periods to Discount | | 11.09 | 12.09 | 13.09 | 14.09 | 15.09 | 16.09 | 17.09 | 18.09 | 19.09 | 20.09 | 21.09 |
| Present Value Factor | | 0.1929 | 0.1663 | 0.1434 | 0.1236 | 0.1066 | 0.0919 | 0.0792 | 0.0683 | 0.0588 | 0.0507 | 0.0437 |
| Present Value | | 10,111 | 8,868 | 7,745 | 6,749 | 5,874 | 924 | 637 | 412 | 237 | 102 | - |

patent expiration

**Notes:**

*(a) Provided by Managementt through 2026.*

*(b) Income taxes were calculated based on pre-tax incomes and have been adjusted by net operating loss ("NOL") carryforwards.*

*(c) After patent expiration in 2026 net income is expected to sharply decline. No terminal value because 1) there would be a steep loss of revenue after patent expiration and 2) generic adoption reaches as high as 94% adoption rate 1 week after hitting the market*

# Downside Forecast

**Discounted Cash Flow Analysis**
**As of May 31, 2011**
**($ in 000's)**

| | | Downside Scenario | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 ME | For the year ending December 31, | | | | | | | | | | | | |
| | | 12/31/2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | >>>>>> |
| Pre-Tax Income (a) | | ($11,711) | ($9,000) | ($9,500) | ($6,000) | $4,068 | $48,754 | $73,960 | $91,467 | $101,377 | $107,533 | $111,302 | $114,205 | $116,589 | >>>>>>> |
| Less: Income Tax (b) | 40.0% | - | - | - | - | - | (695) | (29,584) | (36,587) | (40,551) | (43,013) | (44,521) | (45,682) | (46,635) | >>>>>>> |
| Net Cash Flow | | (11,711) | (9,000) | (9,500) | (6,000) | 4,068 | 48,059 | 44,376 | 54,880 | 60,826 | 64,520 | 66,781 | 68,523 | 69,953 | >>>>>>> |
| *Cumulative Probability of Success* | | *57.00%* | *57.00%* | *42.75%* | *42.75%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | |
| **Probability Weighted Net Cash Flow** | | **(6,675)** | **(5,130)** | **(4,061)** | **(2,565)** | **1,478** | **17,463** | **16,125** | **19,942** | **22,103** | **23,445** | **24,267** | **24,900** | **25,419** | |
| Discount Rate (d) | | 16.0% | | | | | | | | | | | | | |
| Periods to Discount | | 0.29 | 1.09 | 1.29 | 2.09 | 2.29 | 3.29 | 4.29 | 5.29 | 6.29 | 7.29 | 8.29 | 9.29 | 10.29 | >>>>>>> |
| Present Value Factor | | 0.9574 | 0.8511 | 0.8254 | 0.7337 | 0.7115 | 0.6134 | 0.5288 | 0.4558 | 0.3930 | 0.3388 | 0.2920 | 0.2518 | 0.2170 | >>>>>>> |
| Present Value | | (6,391) | (4,366) | (3,352) | (1,882) | 1,052 | 10,712 | 8,527 | 9,090 | 8,686 | 7,942 | 7,087 | 6,269 | 5,517 | >>>>>>> |
| Sum of Present Values | | 62,997 | | | | | | | | | | | | | |
| **Fair Market Value (Rounded)** | | **$63,000** | | | | | | | | | | | | | |

**Notes:**
*(a) Provided by Managementt through 2026.*
*(b) Income taxes were calculated based on pre-tax incomes and have been adjusted by net operating loss ("NOL") carryforwards.*

# Downside Forecast (Continued)

**Discounted Cash Flow Analysis**
**As of May 31, 2011**
**($ in 000's)**

| | | *Downside Scenario* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | For the year ending December 31, | | | | | | | | |
| | | **2024** | **2025** | **2026** | **2027 (c)** | **2028 (c)** | **2029 (c)** | **2030 (c)** | **2031 (c)** | **2032 (c)** |
| Pre-Tax Income (a) | | $118,408 | $119,936 | $121,317 | $21,136 | $16,909 | $12,682 | $8,454 | $4,227 | $0 |
| Less: Income Tax (b) | 40.0% | (47,363) | (47,975) | (48,527) | (8,454) | (6,764) | (5,073) | (3,382) | (1,691) | - |
| Net Cash Flow | | 71,045 | 71,962 | 72,790 | 12,682 | 10,145 | 7,609 | 5,073 | 2,536 | - |
| *Cumulative Probability of Success* | | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* | *36.34%* |
| **Probability Weighted Net Cash Flow** | | **25,816** | **26,149** | **26,450** | **4,608** | **3,687** | **2,765** | **1,843** | **922** | **-** |
| Discount Rate (d) | | 16.0% | | | | | | | | |
| Periods to Discount | | 11.29 | 12.29 | 13.29 | 14.29 | 15.29 | 16.29 | 17.29 | 18.29 | 19.29 |
| Present Value Factor | | 0.1871 | 0.1613 | 0.1390 | 0.1199 | 0.1033 | 0.0891 | 0.0768 | 0.0662 | 0.0571 |
| Present Value | | 4,830 | 4,218 | 3,678 | 552 | 381 | 246 | 142 | 61 | - |

patent expiration

**Notes:**

*(a) Provided by Managementt through 2026.*

*(b) Income taxes were calculated based on pre-tax incomes and have been adjusted by net operating loss ("NOL") carryforwards.*

*(c) After patent expiration in 2026 net income is expected to sharply decline. No terminal value because 1) there would be a steep loss of revenue after patent expiration and 2) generic adoption reaches as high as 94% adoption rate 1 week after hitting the market*

# Scenario Analysis – Special Notes

- Assumes generic competition and related revenue degradations at the end of the forecast horizon due to patent expiration
- No terminal value
  - Due to degradation of cash flows
  - Discounting leads to deminimis values after 20 years

# Summary of DCF Values

**Summary of Probability Weighted Values**
**As of May 31, 2011**
**(Values in $'000s)**

| Scenario | Probability Weighted Minority, Marketable Equity Value | Less: Loan Payable | Add: Cash & Equivalents | Probability Weighted Minority, Marketable Equity Value |
|---|---|---|---|---|
| Upside | $104,800 | ($2,500) | $5,170 | $107,470 |
| Downside | 63,000 | (2,500) | 5,170 | 65,670 |
| **Average Indicated Value (Rounded)** | **$83,900** | | | **$86,600** |

# IRR Test

**Internal Rate of Return**
**As of May 31, 2011**
**($ in 000's)**

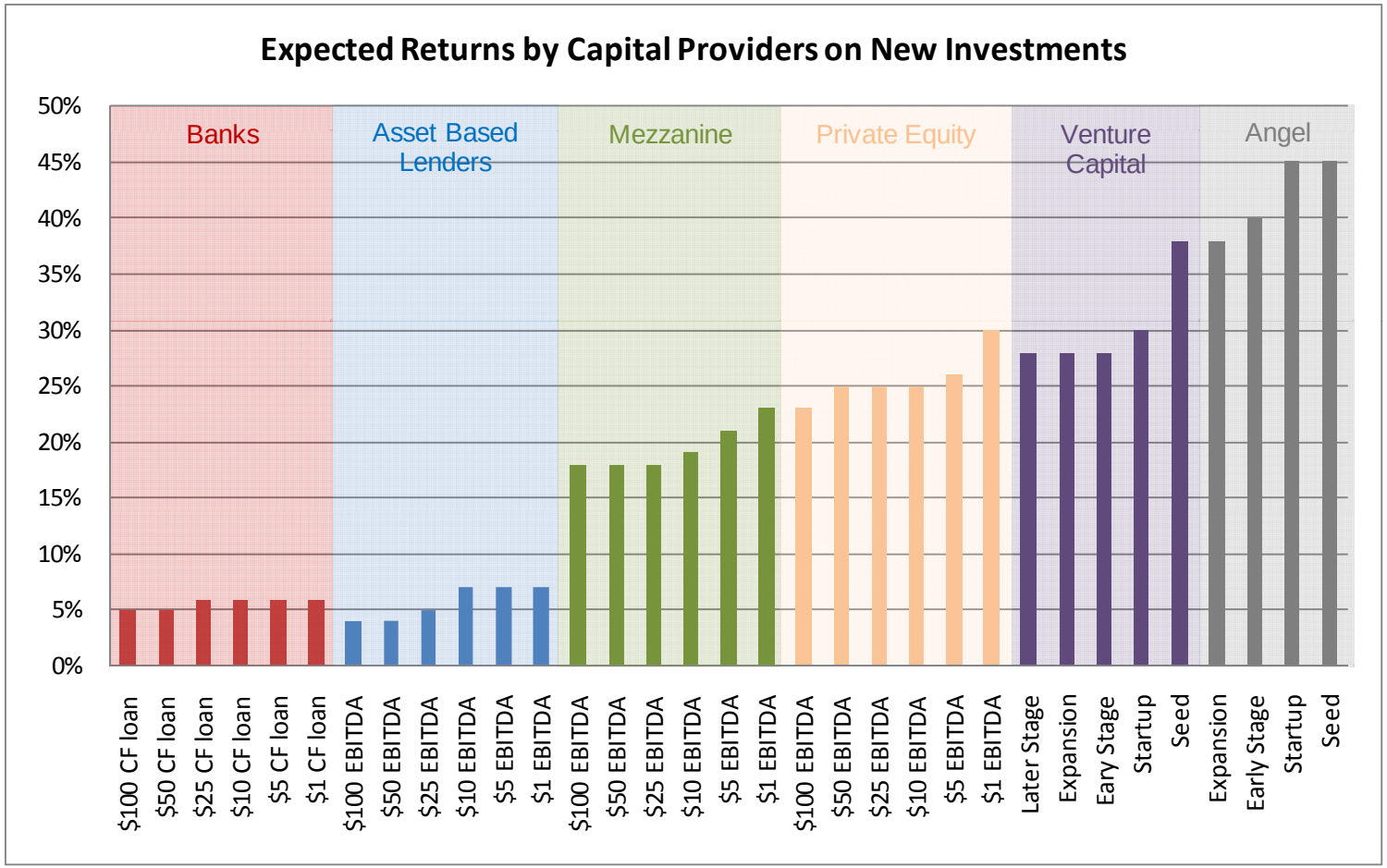
| | | 7 ME | For the year ending December 31, | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 12/31/2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 (c) | 2029 (c) | 2030 (c) | 2031 (c) | 2032 (c) |
| Upside Pre-Tax Income (a) | | (11,711) | (9,000) | (9,500) | (6,000) | 12,281 | 86,849 | 142,470 | 183,946 | 209,104 | 224,732 | 234,301 | 240,376 | 244,560 | 247,753 | 250,437 | 252,861 | 46,137 | 36,909 | 27,682 | 18,455 | 9,227 | - |
| Downside Pre-Tax Income (a) | | (11,711) | (9,000) | (9,500) | (6,000) | 4,068 | 48,754 | 73,960 | 91,467 | 101,377 | 107,533 | 111,302 | 114,205 | 116,589 | 118,408 | 119,936 | 121,317 | 21,136 | 16,909 | 12,682 | 8,454 | 4,227 | - |
| Average Pre-Tax Income | | (11,711) | (9,000) | (9,500) | (6,000) | 8,175 | 67,802 | 108,215 | 137,707 | 155,241 | 166,133 | 172,801 | $177,291 | $180,574 | $183,080 | $185,187 | $187,089 | $33,636 | $26,909 | $20,182 | $13,455 | $6,727 | $0 |
| Less: Income Tax (b) | 40.0% | - | - | - | - | - | (9,957) | (43,286) | (55,083) | (62,096) | (66,453) | (69,120) | (70,916) | (72,230) | (73,232) | (74,075) | (74,836) | (13,455) | (10,764) | (8,073) | (5,382) | (2,691) | - |
| Net Cash Flow | | (11,711) | (9,000) | (9,500) | (6,000) | 8,175 | 57,845 | 64,929 | 82,624 | 93,144 | 99,680 | 103,681 | 106,374 | 108,344 | 109,848 | 111,112 | 112,253 | 20,182 | 16,145 | 12,109 | 8,073 | 4,036 | - |
| Discount Rate | | 27.1% | | | | | | | | | | | | | | | | | | | | | |
| Periods to Discount | | 0.29 | 1.09 | 2.09 | 3.09 | 4.09 | 5.09 | 6.09 | 7.09 | 8.09 | 9.09 | 10.09 | 11.09 | 12.09 | 13.09 | 14.09 | 15.09 | 16.09 | 17.09 | 18.09 | 19.09 | 20.09 | 21.09 |
| Present Value Factor | | 0.9322 | 0.7708 | 0.6066 | 0.4773 | 0.3756 | 0.2956 | 0.2326 | 0.1830 | 0.1440 | 0.1134 | 0.0892 | 0.0702 | 0.0552 | 0.0435 | 0.0342 | 0.0269 | 0.0212 | 0.0167 | 0.0131 | 0.0103 | 0.0081 | 0.0064 |
| Present Value | | (10,917) | (6,937) | (5,763) | (2,864) | 3,071 | 17,098 | 15,103 | 15,124 | 13,417 | 11,299 | 9,248 | 7,467 | 5,985 | 4,775 | 3,801 | 3,022 | 427 | 269 | 159 | 83 | 33 | - |
| Sum of Present Values | | 83,900 | | | | | | | | | | | | | | | | | | | | | |
| **Fair Market Value (Rounded)** | | **$83,900** | | | | | | | | | | | | | | | | | | | | | |

**Notes:**
*(a) Provided by Managementt through 2026.*
*(b) Income taxes were calculated based on pre-tax incomes and have been adjusted by net operating loss ("NOL") carryforwards.*
*(c) After patent expiration in 2026 net income is expected to sharply decline. No terminal value because 1) there would be a steep loss of revenue after patent expiration and 2) generic adoption reaches as high as 94% adoption rate 1 week after hitting the market*

Indicated IRR of 27% compares well to that of returns expected by private equity investors.

*Source: Pepperdine, Private Capital Markets Project, Survey Reports*

# Private Capital Returns




Source: Pepperdine, Private Capital Markets Project, Survey Reports

# Summary Indications of Value

**Summary of Indications of Value**
**As of May 31, 2011**

| | Downside | Upside |
|---|---|---|
| Potential Transaction #1 | $98,100,000 | $141,000,000 |
| Potential Transaction #2 | 64,600,000 | 107,600,000 |
| Discounted Cash Flow Analysis | 65,700,000 | 107,500,000 |
| Average | 76,133,333 | 118,700,000 |
| **Concluded Equity Value, Minority, Marketable Basis** | | **$97,400,000** |

# Summary and Conclusions

- Indicated Equity Value can now be used to calculate a per share value, if required.
  - Consider the capitalization of company and liquidation preferences
  - Can use BSOPM or other to determine value attributable to common stock
  - Consider discount for lack of marketability carefully
- Buy combining traditional DCF and probability weighted scenario analysis, appraiser can develop a supportable aggregate equity value for a pre-revenue biotech company.
  - Being careful not to double count risks between WACC and various probabilities
- Support conclusion with:
  - Un-weighted indicated IRR
  - Transactions in the stock of the company and achievement of milestones since last round
  - Smaller guideline public companies