

Corporate Valuation Analysis

Valuing Private and Publicly Traded Companies

PERSONAL NOTE

THIS IS WHAT I LEARNED OVER 34 YEARS VALUING COMPANIES

- *Valuing a company is highly subjective*
- *There is a lot of interpretation of the data used for the valuation methods*
- *Although there are several methods to value a company, the valuation is both art and science.*
- *There is some judgement that goes in choosing the data*
- *Regarding the valuation of successful start-ups (Amazon, Meta, Tesla) started with convincing storytelling. A good story is simple, credible and persuasive.*
- *Naturally, the buyer has a different perspective than the seller and therefore the valuation assessment could be derived differently*
- *Final Thought: We can spend hours and days analyzing the value of the company but at the end of the day **the value of anything is what someone is willing to pay.***

Valuation Analysis Overview

METHOD	DESCRIPTION	TYPE	TECHNICAL/ FUNDAMENTAL
1	Using the current stock price as a basis of valuation	Market	Technical
2	Intrinsic value and Capital Asset Pricing Model (CAPM)	Market	Technical
3	Dividend Discount Model (DDM)	Market	Technical
4	Comparable method using trading EBITDA multiples	Market	Fundamental
5	Comparable method using acquisition EBITDA multiples	Market	Fundamental
6	Discount cash flow method (DCF)	Income	Fundamental
7	Leveraged buyout private equity expectation model (LBO)	Income	Fundamental
8	Black-Scholes option pricing model	Options	Fundamental

Valuation of Publicly Traded Companies.

Testing the current Stock Price

CASE STUDY:
HYATT HOTELS CORPORATION (H)

Methods 1-7 - Summary:

Putting All the Values Together

ENTERPRISE VALUATION ANALYSIS								
	EV (000's)	Debt (000's)	Cash (000's)	Eq Value (000's)	Shares Outs (000's)	Stock Price	Recommend	(-10%/ +10%)
METHOD #1 - Market Value / Using the Stock Price	17,525,896	3,782,000	1,383,000	15,126,896	95,480	\$158.43		
METHOD #2- Intrinsic Value	15,712,825	3,782,000	1,383,000	13,313,825	95,480	\$ 139.44	Sell	-11.99%
METHOD #3- Dividend Discount Model (DDM)	8,042,189	3,782,000	1,383,000	5,643,189	95,480	\$ 59.10	Sell	-62.69%
METHOD #4 -Average EBITDA Industry Trading Multipl	13,940,758	3,782,000	1,383,000	11,541,758	95,480	\$ 120.88	Sell	-23.70%
Method #4 using direct Competitors EBITDA x	18,832,457	3,782,000	1,383,000	16,433,457	95,480	\$ 172.11	Hold	8.64%
METHOD #5 - Using Averige EBITDA Transaction Multipl	13,705,150	3,782,000	1,383,000	11,306,150	95,480	\$ 118.41	Sell	-25.26%
METHOD #6 - Discount Cash Flow Valuation Analysis	16,113,615	3,782,000	1,383,000	13,714,615	95,480	\$ 143.64	Sell	-9.34%
METHOD #7 - LBO Cash Flow Valuation Analysis	17,957,175	3,782,000	1,383,000	15,558,175	95,480	\$ 162.95	Hold	2.85%
Average of other methods (excl. low)	14,391,166			11,992,166		\$ 142.91	Sell	-9.80%

Methods 1-6: Valuation of Public Traded Companies

- **Method 1: Using the Stock Price as the Basis of Valuation**

- The formula to value the firm or the enterprise value (EV) is as follows:

$$EV = MVE + D - C$$

where EV is enterprise value, MVE is the market value of the equity, D is the total debt outstanding, and C is the cash and cash equivalents of the company.

- The stock price that represents the market value of each share when multiplied by the shares outstanding will give us the market value of the equity.

$$MVE = (SP \cdot SO)$$

Series A, B, C

where MVE is the market value of the equity, SP is the stock price and SO is the shares outstanding.

Methods 1-6: Valuation of Public Traded Companies

Method 1: Using the Stock Price as the Basis of Valuation

METHOD #1 - Market Value / Using the Stock Price

Company	Symbol	Stock Price 11/21/2025	Stocks Outstanding (\$000) 11/21/2025	Equity Value (\$000) 11/21/2025	Debt (ST<) (\$000) 6/30/2025	Cash (\$000) 6/30/2025	Enterprise Value (\$000) 11/21/2025
Hyatt	H	\$ 158.43	95,480	15,126,896	6,014,000	749,000	20,391,896

Methods 1-6: Valuation of Public Traded Companies

- Method 2: Intrinsic Value and CAPM

The expected return is calculated by applying the capital asset pricing model (CAPM):

$$E_r = Rf_r + \beta (M_r - Rf_r) \text{ or CAPM or } k$$

where E_r is the expected return, Rf_r is the risk-free rate, β is the beta of the company that is analyzed, and M_r is market return.

The formula for today's intrinsic value is

$$v_0 = \frac{D_1 + P_1}{1 + E_r}$$

where D_1 is the dividend expected to receive within a year, P_1 is the expected stock price a year from now, and E_r is the discount rate or expected rate of return – using CAPM rate above

Methods 1-6: Valuation of Public Traded Companies

- Method 2: Intrinsic Value and CAPM (k)
- $$V_0 = \frac{D_1 + P_1}{1 + E_r}$$

METHOD #2- Intrinsic Value

Using CAPM = $k = R_f + (\text{Beta} * \text{Premium})$

Risk Free (10-year Treasury) =	4.38%
Beta =	1.23x
Market Premium=	5.50%
Market Return ($R_f + \text{Premium}$)=	9.88%
Expected Equity Return using CAPM=	11.17%

Intrinsic Value = $V_0 = [E(D_1) + E(P_1)] / (1+k)$

D1=	\$0.60
Exp (P1)=	\$154.42
k=	11.17%
Stock Val=	\$ 139.44

$$E_r = R_{f_r} + \beta (M_r - R_{f_r})$$

Methods 1-6: Valuation of Public Traded Companies

- **Method 3: Dividend Discount Model (DDM)**

To calculate such value using the DDM method, the analyst needs the expected price of the stock a year from the date of the analysis, the expected dividend per share paid within the year, and a discount rate, which derived using the capital asset pricing model (CAPM).

- $$V = \frac{D_1}{k-g}$$

where D_1 is the expected dividend, k is the discount rate E_r (from previous page) or CAPM in this case, and g is the expected growth rate.

Methods 1-6: Valuation of Public Traded Companies

- Method 3: Dividend Discount Model (DDM) • $V = \frac{D1}{k-g}$

METHOD #3- Dividend Discount Model (DDM)

Constant-Growth DDM (Gordon Model) $V0 = D1 / (k-g)$

D1 =	\$0.60	
Expected Equity Return (k)=	11.17%	
Expected Growth (g) =	10.06%	90%
Stock Val =	\$ 59.10	

Expected HPR = $E\ 9r = [E\ (d1) + (E(p1) - P0) / P0]$

Dividend (d1)	\$0.60	0.379% yield
P1 = P0+D	\$159.03	
P0	\$ 158.43	
Exp. HPR=	0.76%	

Methods 1-6: Valuation of Public Traded Companies

- Method 5: Using Comparable Acquisition EBITDA Multiples

Target	Acquirer	Acquisition Price /Share	Shares Outstanding	Equity Value (\$mm)	Total Net Debt (\$mm)	Enterprise Value (EV)	EBITDA (last reported)	EBITDA Multiple
Dalata Hotel Group	Pandox AB (London)	\$ 6.45				\$ 2,100	\$ 157.5	13.33x
Playa Hotel & Resort	Hyatt Hotels Corporation	\$ 13.50	125,300,000	\$ 1,692	\$ 900	\$ 2,592	\$ 235.0	11.03x
Wyndham Hotel & Resorts	Choice Hotels	\$ 90.00	82,960,000	\$ 7,466	\$ 2,081	\$ 9,547	\$ 573.0	16.66x
Extended Stay America	Blackstone Group	\$ 19.50	177,560,000	\$ 3,462	\$ 2,303	\$ 5,766	\$ 356.4	16.18x
WoodSpring Suites (spin-off Choie	Blackstone Group	Private				\$ 1,500	\$ 82.0	18.29x
Starwood Hotels	Marriott Hotels	\$ 72.08	154,000,000	\$ 11,100	\$ 1,090	\$ 12,190	\$ 980.0	12.44x
Hilton Hotels	Blackstone Group	\$ 47.50	390,400,000	\$ 18,544	\$ 6,180	\$ 24,724	\$ 1,680.0	14.72x
Four Seasons*	Kingtomb Hotels Int'l	\$ 82.00	33,078,000	\$ 2,712	\$ 279	\$ 2,991	\$ 93.8	31.90x
Fairmont/Raffles	Kingtomb Hotels Int'l	\$ 45.00	73,335,000	\$ 3,300	\$ 124	\$ 3,424	\$ 187.2	18.29x
Hilton International	Hilton Hotels Corp.			\$ 5,578	\$ -	\$ 5,578	\$ 504.0	11.07x
Starwood Hotels	Host Marriott					\$ 4,096	\$ 315.1	13.00x
La-Quinta Corp	Blackstone Group	\$ 12.22	203,000,000	\$ 2,481	\$ 926	\$ 3,406	\$ 229.7	14.83x
Wynham Int'l	Blackstone Group	\$ 1.15	172,053,000	\$ 198	\$ 2,682	\$ 2,880	\$ 245.0	11.75x
John Q. Hammons Hotels	JQH Acquisition LLC	\$ 24.00	19,583,000	\$ 470	\$ 765	\$ 1,235	\$ 85.0	14.53x
Boca Resorts	Blackstone Group	\$ 24.00	40,284,000	\$ 967	\$ 217	\$ 1,184	\$ 90.1	13.15x
Prime Hospitality	Blackstone Group	\$ 12.25	44,808,000	\$ 549	\$ 244	\$ 792	\$ 55.1	14.38x
Extended Stay	Blackstone Group	\$ 19.93	95,077,000	\$ 1,895	\$ 1,232	\$ 3,126	\$ 224.9	13.90x
							Average	15.26x
Haytt's Enterprise Value		13,705,150	Stock Val=		\$ 118.41	Using LTM EBITDA=		898,000

Method 6: DCF Valuation Analysis

To value the company using the DCF method the analyst needs to derive the following four items:

- Setting up a stream of cash flows
- Identifying an exit year
- Calculating the value at exit year (terminal value)
- Using the appropriate discount rate to value the present value of the firm

Method 6: DCF Valuation Analysis

To value the company using the DCF method the analyst needs to derive the following four items:

- Setting up a stream of cash flows

	HISTORICAL																		LTM
	RECESSION									COVID-19 COVID-19									
	31-Dec	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	30-Sep
(\$000's)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Revenue	3,738,000	3,837,000	3,330,000	3,527,000	3,698,000	3,949,000	4,184,000	4,415,000	4,328,000	4,265,000	4,462,000	4,454,000	5,020,000	2,066,000	3,028,000	5,891,000	6,667,000	6,648,000	6,914,000
<i>Revenue Growth</i>			-13.2%	5.9%	4.8%	6.8%	6.0%	5.5%	-2.0%	-1.5%	4.6%	-0.2%	12.7%	-58.8%	46.6%	94.6%	13.2%	-0.3%	4.0%
Cost of Revenue	2,847,000	2,934,000	2,751,000	2,864,000	2,957,000	3,121,000	3,283,000	3,433,000	3,377,000	3,356,000	3,477,000	3,475,000	4,077,000	2,067,000	2,603,000	4,603,000	5,361,000	5,351,000	5,556,000
Gross Profit	891,000	903,000	579,000	663,000	741,000	828,000	901,000	982,000	951,000	909,000	985,000	979,000	943,000	(1,000)	425,000	1,288,000	1,306,000	1,297,000	1,358,000
<i>Gross profit</i>	23.8%	23.5%	17.4%	18.8%	20.0%	21.0%	21.5%	22.2%	22.0%	21.3%	22.1%	22.0%	18.8%	0.0%	14.0%	21.9%	19.6%	19.5%	19.6%
Total Operating Expenses	506,000	539,000	530,000	555,000	588,000	669,000	668,000	703,000	628,000	641,000	725,000	647,000	746,000	631,000	676,000	861,000	975,000	881,000	909,000
EBIT (Operating Income or Loss)	385,000	364,000	49,000	108,000	153,000	159,000	233,000	279,000	323,000	268,000	260,000	332,000	197,000	(632,000)	(251,000)	427,000	331,000	416,000	449,000
Interest Expense	43,000	75,000	56,000	54,000	57,000	70,000	65,000	71,000	68,000	76,000	80,000	76,000	75,000	128,000	163,000	150,000	145,000	180,000	282,000
EBT & other Income/Expenses	342,000	289,000	(7,000)	54,000	96,000	89,000	168,000	208,000	255,000	192,000	180,000	256,000	122,000	(760,000)	(414,000)	277,000	186,000	236,000	167,000
Other Income/Expenses Net	(132,000)	85,000	44,000	(34,000)	13,000	(6,000)	(153,000)	(317,000)	61,000	(90,000)	(542,000)	(695,000)	(884,000)	200,000	(458,000)	(86,000)	(124,000)	(1,327,000)	142,000
EBT	474,000	204,000	(51,000)	88,000	83,000	95,000	321,000	525,000	194,000	282,000	722,000	951,000	1,006,000	(960,000)	44,000	363,000	310,000	1,563,000	310,000
Income Tax Expense	208,000	90,000	(8,000)	37,000	(28,000)	8,000	116,000	179,000	70,000	76,000	332,000	182,000	240,000	(257,000)	266,000	(92,000)	90,000	267,000	111,000
Net Income	266,000	114,000	(43,000)	51,000	111,000	87,000	205,000	346,000	124,000	206,000	390,000	769,000	766,000	(703,000)	(222,000)	455,000	220,000	1,296,000	199,000
Depreciation	385,000	364,000	49,000	108,000	153,000	159,000	233,000	279,000	323,000	268,000	260,000	332,000	197,000	(632,000)	(251,000)	427,000	331,000	416,000	449,000
Working Capital	47,000	(179,000)	(82,000)	70,000	35,000	(67,000)	(31,000)	24,000	25,000	(36,000)	125,000	(79,000)	(13,000)	(424,000)	388,000	167,000	203,000	188,000	(138,000)
Capital Expenditure	-	(258,000)	(216,000)	(310,000)	(331,000)	(301,000)	(232,000)	(253,000)	(269,000)	(211,000)	(298,000)	(297,000)	(369,000)	(122,000)	(111,000)	(201,000)	(198,000)	(170,000)	(194,000)
Current Portion of Long Term Debt	-	-	-	-	-	-	-	-	-	-	-	11,000	11,000	260,000	10,000	660,000	751,000	456,000	407,000
Long Term Debt	794,000	1,874,000	1,620,000	1,516,000	1,221,000	1,229,000	1,289,000	1,381,000	1,042,000	1,445,000	1,440,000	1,623,000	1,612,000	2,984,000	3,968,000	2,453,000	2,305,000	3,326,000	5,607,000
Total Debt	794,000	1,874,000	1,620,000	1,516,000	1,221,000	1,229,000	1,289,000	1,381,000	1,042,000	1,445,000	1,440,000	1,634,000	1,623,000	3,244,000	3,978,000	3,113,000	3,056,000	3,782,000	6,014,000
EBITDA (\$ 000's)	770,000	728,000	98,000	216,000	306,000	318,000	466,000	558,000	646,000	536,000	520,000	664,000	394,000	-1,264,000	-502,000	854,000	662,000	832,000	898,000

Method 6: DCF Valuation Analysis

To value the company using the DCF method the analyst needs to derive the following four items:

- Setting up a stream of cash flows

[illegible]

Method 6: DCF Valuation Analysis

	HISTORICAL						PROJECTED					
	COVID-19 COVID-19					LTM						
	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	30-Sep	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31
(\$000's)	2020	2021	2022	2023	2024	2025	2025	2026	2027	2028	2029	2030
Total Revenue	2,066,000	3,028,000	5,891,000	6,667,000	6,648,000	6,914,000	7,166,081	7,882,689	8,434,478	9,024,891	9,656,633	10,332,598
Revenue Growth	-58.8%	46.6%	94.6%	13.2%	-0.3%	4.0%	7.8%	10.0%	7.0%	7.0%	7.0%	7.0%
Cost of Revenue	2,067,000	2,603,000	4,603,000	5,361,000	5,351,000	5,556,000	5,677,493	6,245,243	6,682,410	7,150,179	7,650,691	8,186,239
Gross Profit	(1,000)	425,000	1,288,000	1,306,000	1,297,000	1,358,000	1,488,588	1,637,447	1,752,068	1,874,713	2,005,942	2,146,358
Gross profit	0.0%	14.0%	21.9%	19.6%	19.5%	19.6%	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%
Total Operating Expenses	631,000	676,000	861,000	975,000	881,000	909,000	1,015,001	1,116,501	1,194,656	1,278,282	1,367,762	1,463,505
EBIT (Operating Income or Loss)	(632,000)	(251,000)	427,000	331,000	416,000	449,000	473,587	520,945	557,411	596,430	638,180	682,853
Interest Expense	128,000	163,000	150,000	145,000	180,000	282,000						
EBT & other Income/Expenses	(760,000)	(414,000)	277,000	186,000	236,000	167,000						
Other Income/Expenses Net	200,000	(458,000)	(86,000)	(124,000)	(1,327,000)	142,000						
EBT	(960,000)	44,000	363,000	310,000	1,563,000	310,000						
Income Tax Expense	(257,000)	266,000	(92,000)	90,000	267,000	111,000						
Net Income	(703,000)	(222,000)	455,000	220,000	1,296,000	199,000						
Depreciation	(632,000)	(251,000)	427,000	331,000	416,000	449,000	441,206	485,327	519,300	555,651	594,547	636,165
Working Capital	(424,000)	388,000	167,000	203,000	188,000	(138,000)	(19,346)	(21,281)	(22,770)	(24,364)	(26,070)	(27,895)
Capital Expenditure	(122,000)	(111,000)	(201,000)	(198,000)	(170,000)	(194,000)	(213,525)	(234,878)	(251,319)	(268,912)	(287,735)	(307,877)
Current Portion of Long Term Debt	260,000	10,000	660,000	751,000	456,000	407,000						
Long Term Debt	2,984,000	3,968,000	2,453,000	2,305,000	3,326,000	5,607,000						
Total Debt	3,244,000	3,978,000	3,113,000	3,056,000	3,782,000	6,014,000	5,713,300	5,412,600	5,111,900	4,811,200	4,510,500	4,209,800
OPERATING ASSUMPTIONS	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	LTM 6/30	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31	Dec 31
	2020	2021	2022	2023	2024	2025	2025	2026	2027	2028	2029	2030
EBITDA (\$ 000's)	-1,264,000	-502,000	854,000	662,000	832,000	898,000	914,793	1,006,272	1,076,712	1,152,081	1,232,727	1,319,018
Revenue Growth	-58.8%	46.6%	94.6%	13.2%	-0.3%	4.0%	7.8%	10.0%	7.0%	7.0%	7.0%	7.0%
Cost of Revenue as % of Revenue	100.0%	86.0%	78.1%	80.4%	80.5%	80.4%	79.2%	79.2%	79.2%	79.2%	79.2%	79.2%
Operating Expense as % of Revenues	30.5%	22.3%	14.6%	14.6%	13.3%	13.1%	14.2%	14.2%	14.2%	14.2%	14.2%	14.2%
Working Capital as % of Revenues	20.5%	-12.8%	-2.8%	-3.0%	-2.8%	2.0%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Capex % Revenue	5.9%	3.7%	3.4%	3.0%	2.6%	2.8%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Depreciation % Revenue	-30.6%	-8.3%	7.2%	5.0%	6.3%	6.5%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%
Total Debt	3,244,000	3,978,000	3,113,000	3,056,000	3,782,000	6,014,000	5,713,300	5,412,600	5,111,900	4,811,200	4,510,500	4,209,800
Debt Repayment \$							300,700	300,700	300,700	300,700	300,700	300,700
Estimated Debt Repayment % starting outstanding Debt							5.0%					

Method 6: DCF Valuation Analysis

To value the company using the DCF method the analyst needs to derive the following four items:

- Using the appropriate discount rate to value the present value of the firm
 - WACC for Firm Value
 - CAPM for Equity Value

Cost of Equity Calculation		WACC Calc:					
Risk Free Rate (5 year)	4.38%	Total Debt	3,782,000	% Cap	20.0%	RoR	6.583%
Premium based on MC =	5.50%	MV Equity	15,126,896		80.0%	AT RoR	5.134%
Hyatt Beta =	1.23x	Total Cap	18,908,896		100.0%	WACC=	9.965%
Expected Equity Return =	11.17%						
Cost of Debt Calculation		WACC (Firm Valuation Discount Rate)					
Avg Debt	4,284,000	CAPM (Equity Valuation Discount Rate)					
Interest	282,000						
Rate	6.583%						

Method 6: DCF Valuation Analysis

METHOD #6 - Discount Cash Flow Valuation Analysis

	HISTORICAL			PROJECTED				EXIT YEAR	
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenues	5,891,000	6,667,000	6,648,000	7,166,081	7,882,689	8,434,478	9,024,891	9,656,633	10,332,598
Revenue Growth		13.2%	-0.3%	7.8%	10.0%	7.0%	7.0%	7.0%	7.0%
Cost of Revenues (CoGS)	(4,603,000)	(5,361,000)	(5,351,000)	(5,677,493)	(6,245,243)	(6,682,410)	(7,150,179)	(7,650,691)	(8,186,239)
Operating Expenses (Excl. Non-rec.)	(861,000)	(975,000)	(881,000)	(1,015,001)	(1,116,501)	(1,194,656)	(1,278,282)	(1,367,762)	(1,463,505)
EBIT	427,000	331,000	416,000	473,587	520,945	557,411	596,430	638,180	682,853
Less Taxes (tax rate x of EBIT)	22.00%			(104,189)	(114,608)	(122,631)	(131,215)	(140,400)	(150,228)
Plus Depreciation				441,206	485,327	519,300	555,651	594,547	636,165
Less Working Capital				(19,346)	(21,281)	(22,770)	(24,364)	(26,070)	(27,895)
Less Capex				(213,525)	(234,878)	(251,319)	(268,912)	(287,735)	(307,877)
Cash Flow				577,733	635,506	679,991	727,591	778,522	833,019
EBITDA			832,000					1,232,727	
Debt (assuming 5% reduction of intial principal per year)			3,782,000					4,510,500	
Terminal Value	Assumptions		Growth						
EBITDA Multiple Method	15.52x						Exit year's EBITDA x Trading Multiple	19,137,137	
Perpetuity Method	9.96%	WACC	7.00%				Next Year's CF / (WACC - growth)	28,096,887	
Average								23,617,012	
Less Debt Outstanding (at Exit)								(4,510,500)	
Equity Value at Terminal								19,106,512	
Equity Cash Flows	11.17%			577,733	635,506	679,991	727,591	19,885,034	
Hyatt's EquityValue			\$13,714,615						
		Stock Price	\$ 143.64						
Cost of Equity Calculation				WACC Calc:	Amount	% Cap	RoR	AT RoR	WACC
Risk Free Rate (5 year)	4.38%			Total Debt	3,782,000	20.0%	6.583%	5.134%	1.027%
Premium based on MC =	5.50%			MV Equity	15,126,896	80.0%	11.172%	11.172%	8.938%
Hyatt Beta =	1.23x			Total Cap	18,908,896	100.0%		WACC=	9.965%
Expected Equity Return =	11.17%								
Cost of Debt Calculation				WACC (Firm Valuation Discount Rate)			9.965%		
Avg Debt	4,284,000			CAPM (Equity Valuation Discount Rate)			11.172%		
Interest	282,000								
Rate	6.583%								

Method 7: Using the Leveraged Buyout Model (LBO) Method

- While the DCF analysis is used for determining today's value of the company based on future cash flows, **the value of the company using this LBO method is determined based on investor expectation, which means return determines the acquisition price of the firm.**
 - Building the Transactions Sources and Uses
 - Setting up the Debt Schedules
 - Calculating the Expected Equity Return
 - Running Projections
 - Determining the Terminal Value
 - Determining the Value of the Firm

Method 7: Using the Leveraged Buyout Model (LBO) Method

METHOD #7 - Leveraged Buyout (LBO) Valuation Analysis			
LBO Transaction Sources	Debt Capacity	Amount	% cap
Bank Debt	3.5x	3,143,000	14%
Corporate Bonds	2.5x	2,245,000	10%
Total Debt	6.0x	5,388,000	25%
Equity	18.2x	16,387,123	75%
Total		21,775,123	100%
Improvements			
Operating Expenses	60%		

LBO Transaction Uses	Price	Outstanding	Amount \$	
Purchase Common Stock	\$158.43	95,480	\$15,126,896	
Refinancing Total Debt			6,014,000	
Fees & Expenses	3.00%		634,227	
Total			<u>\$21,775,123</u>	
8%	8%	8%	8%	8%

Method 7: Using the Leveraged Buyout Model (LBO) Method

	HISTORICAL			PROJECTED				EXIT YEAR	
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenues	5,891,000	6,667,000	6,648,000	7,166,081	7,882,689	8,434,478	9,024,891	9,656,633	10,332,598
Revenue Growth		13.2%	-0.3%	7.8%	10.0%	7.0%	7.0%	7.0%	7.0%
Cost of Revenues (CoGS)	(4,603,000)	(5,361,000)	(5,351,000)	(5,677,493)	(6,245,243)	(6,682,410)	(7,150,179)	(7,650,691)	(8,186,239)
Operating Expenses (Excl. Non-rec.)	(861,000)	(975,000)	(881,000)	(609,001)	(669,901)	(716,794)	(766,969)	(820,657)	(878,103)
EBIT	427,000	331,000	416,000	879,587	967,546	1,035,274	1,107,743	1,185,285	1,268,255
Interest	8.00%			(70,367)	(77,404)	(82,822)	(88,619)	(94,823)	(101,460)
EBT				809,220	890,142	952,452	1,019,124	1,090,462	1,166,795
Less Taxes (tax rate x of EBIT)	16.00%			(129,475)	(142,423)	(152,392)	(163,060)	(174,474)	(186,687)
Plus Interest				70,367	77,404	82,822	88,619	94,823	101,460
Plus Depreciation				441,206	485,327	519,300	555,651	594,547	636,165
Less Working Capital				(19,346)	(21,281)	(22,770)	(24,364)	(26,070)	(27,895)
Less Capex				(213,525)	(234,878)	(251,319)	(268,912)	(287,735)	(307,877)
Cash Flow				958,447	1,054,292	1,128,092	1,207,059	1,291,553	1,381,961
EBITDA			832,000	-	-	-	-	1,232,727	-
Debt	1.00%		5,388,000	5,334,120	5,280,240	5,226,360	5,172,480	5,118,600	5,118,600
Terminal Value	Assumptions		Growth						
EBITDA Multiple Method	15.52x			Exit year's EBITDA x Trading Multiple				19,137,137	
Perpetuity Method	9.96% WACC		8.00%	Next Year's CF / (WACC - growth)				70,335,695	
Average								44,736,416	
Less Debt Outstanding (at Exit)								(5,118,600)	
Equity Value at Terminal	Target	IRR						39,617,816	
Equity Unlevered				958,447	1,054,292	1,128,092	1,207,059	1,291,553	
Less Interest				(70,367)	(77,404)	(82,822)	(88,619)	(94,823)	
Less Principal		1.00%		(53,880)	(53,880)	(53,880)	(53,880)	(53,880)	
Equity Cash Flows	25.00%	24%	(16,387,123)	834,200	923,008	991,390	1,064,559	40,760,666	
Hyatt's Equity Value			\$15,558,175						
Stock Price			\$ 162.95	= NPV(CAPM, CF1, CF2, CF3, CF4, CF5)					

Methods 1-7 - Summary:

Putting All the Values Together

ENTERPRISE VALUATION ANALYSIS							
	EV (000's)	Debt (000's)	Cash (000's)	Eq Value (000's)	Shares Outs (000's)	Stock Price	Recommend (-10%/ +10%)
METHOD #1 - Market Value / Using the Stock Price	17,525,896	3,782,000	1,383,000	15,126,896	95,480	\$158.43	
METHOD #2- Intrinsic Value	15,712,825	3,782,000	1,383,000	13,313,825	95,480	\$ 139.44	Sell -11.99%
METHOD #3- Dividend Discount Model (DDM)	8,042,189	3,782,000	1,383,000	5,643,189	95,480	\$ 59.10	Sell -62.69%
METHOD #4 -Average EBITDA Industry Trading Multipl	13,940,758	3,782,000	1,383,000	11,541,758	95,480	\$ 120.88	Sell -23.70%
Method #4 using direct Competitors EBITDA x	18,832,457	3,782,000	1,383,000	16,433,457	95,480	\$ 172.11	Hold 8.64%
METHOD #5 - Using Average EBITDA Transaction Multipl	13,705,150	3,782,000	1,383,000	11,306,150	95,480	\$ 118.41	Sell -25.26%
METHOD #6 - Discount Cash Flow Valuation Analysis	16,113,615	3,782,000	1,383,000	13,714,615	95,480	\$ 143.64	Sell -9.34%
METHOD #7 - LBO Cash Flow Valuation Analysis	17,957,175	3,782,000	1,383,000	15,558,175	95,480	\$ 162.95	Hold 2.85%
Average of other methods (excl. low)	14,391,166			11,992,166		\$ 142.91	Sell -9.80%

Valuation of Private Companies

Valuating Established, Distressed and Start-up Businesses

Applying methods 6-8

Method 6: Discount Cash Flow Method (DCF)

- One of the most effective ways to value a private company is to dive into the company's projections and change the assumptions based on the investor's view of how the revenue will grow and at what cost.
- Since there is no stock price that trades, which gives the investor a direct indication of what the company is worth (market value), an important method used by professionals is the discount cash flow (DCF) method, which measures the company's intrinsic value.
- The conduction of this method is to calculate the first the equity cash flows, identify the exit year, estimate the terminal value in the exit year, and use the expected equity return as the discount rate.

Valuation Analysis – Celerity Technology Inc

Celerity Technogy Inc. ("CTI")

Discount Cash Flow Valuation Method (000's)

	Year -1	Year 0	PROJECTED				
			Year 1	Year 2	Year 3	EXIT YEAR Year 4	Year 5
Revenues	960,000	1,110,000	1,228,140	1,344,200	1,442,919	1,529,268	1,605,161
Cost of Revenues	(345,000)	(420,000)	(463,078)	(506,823)	(544,053)	(576,709)	(605,474)
Operating Expenses	(230,000)	(257,000)	(271,501)	(289,448)	(306,442)	(322,900)	(338,999)
EBITDA	385,000	433,000	493,561	547,928	592,424	629,659	660,688
Less Depreciation & Amortization	(60,000)	(65,000)	(73,688)	(80,652)	(86,575)	(91,756)	(96,310)
EBIT	325,000	368,000	419,872	467,276	505,849	537,902	564,378
Less Taxes			(129,769)	(147,070)	(156,960)	(158,461)	(162,851)
EAT			290,103	320,206	348,889	379,441	401,527
Plus Depreciation & Amortization			73,688	80,652	86,575	91,756	96,310
Less Working Capital			2,870	(4,548)	(3,869)	(3,384)	(2,974)
Less Capital Expenditures and Investments			(193,626)	(211,923)	(227,487)	(241,101)	(253,066)
Cash Before Financing Payments			173,036	184,386	204,109	226,713	241,796
Less Debt Service (Principal + Interest)			(125,450)	(129,600)	(153,450)	(201,750)	(237,250)
Free Cash Flow			47,586	54,786	50,659	24,963	4,546
TERMINAL VALUE (TV)			TV Assumptions				
Terminal Value using EBITDA Multiple Method			EBITDA Multiple = 7.5x				
Terminal Value using Perpetuity Method			Discount Rate = 10%				
Average Terminal Value			Growth = 5%				
Less Debt							
Equity Value at Exit Year							
Equity Cash Flows			Equity Expected Return = 20%				
Present Value of Equity			47,586	54,786	50,659	3,774,145	
Plus Debt			39,655	38,046	29,316	1,820,093	
Less Cash							
Firm Enterprise value							
Enterprise Value / EBITDA							

Figure 17.10

Method 7: Leveraged Buyout (LBO) Method for Private Companies

Celerity Technology Inc. ("CTI")									
LBO Method (000's)									
TRANSACTION SOURCES & USES									
Sources	Capacity EBITDA x	Amount	% Capital	Inter. / Exp. Ret.	WACC	Uses	Purchase EBITDA Multiple	Amount	
Bank Loan	3.5x	1,515,500	33.8%	5.0%	1.1%	Purchase Enterprise Value	10.0x	4,330,000	
Corporate Bonds	2.5x	1,082,500	24.2%	8.0%	1.2%	Fees (% EV)	3.50%	151,550	
Total Debt	6.0x	2,598,000	58.0%		0.0%				
Equity		1,883,550	42.0%	25.0%	10.5%				
Total Sources		4,481,550	100.0%		10.5%			4,481,550	
Tax Rate = 36%									
DEBT SCHEDULES									
	Years	Interest	Year 0	Year 1	Year 2	Year 3	EXIT YEAR Year 4	Year 5	
Bank Loan - Outstanding	5	5.0%	1,515,500	1,363,950	1,212,400	1,060,850	909,300	-	
Bank Loan - Principal Incr./Decr.				151,550	151,550	151,550	151,550	909,300	
Bank Loan - Interest Payment				75,775	68,198	60,620	53,043	45,465	
Bonds - Outstanding	10	8.0%	1,082,500	1,082,500	1,082,500	1,082,500	1,082,500	1,082,500	
Bonds - Principal Incr./Decr.									
Bonds - Interest Payment				86,600	86,600	86,600	86,600	86,600	
CASH FLOW PROJECTIONS									
	Year -1	Year 0	Year 1	Year 2	Year 3	EXIT YEAR Year 4	Year 5		
Revenues	960,000	1,110,000	1,228,140	1,344,200	1,442,919	1,529,268	1,605,161		
Cost of Revenues	(345,000)	(420,000)	(463,078)	(506,823)	(544,053)	(576,709)	(605,474)		
Operating Expenses	(230,000)	(257,000)	(271,501)	(289,448)	(306,442)	(322,900)	(338,999)		
EBITDA	385,000	433,000	493,561	547,928	592,424	629,659	660,688		
Less Depreciation	(60,000)	(65,000)	(73,688)	(80,652)	(86,575)	(91,756)	(96,310)		
Less Amortization			(30,310)	(30,310)	(30,310)	(30,310)	(30,310)		
EBIT	325,000	368,000	389,562	436,966	475,539	507,592	534,068		
Less Taxes			(140,242)	(157,308)	(171,194)	(182,733)	(192,265)		
EAT			249,320	279,658	304,345	324,859	341,804		
Plus Depreciation & Amortization			103,998	110,962	116,885	122,066	126,620		
Less Working Capital			2,870	(4,548)	(3,869)	(3,384)	(2,974)		
Less Capital Expenditures and Investments			(193,626)	(211,923)	(227,487)	(241,101)	(253,066)		
Cash Before Financing Payments			162,563	174,149	189,874	202,441	212,383		
Less Debt Service (Principal + Interest)			(125,450)	(129,600)	(153,450)	(201,750)	(237,250)		
Free Cash Flow			37,113	44,549	36,424	691	(24,867)		
TERMINAL VALUE (TV)									
TV Assumptions									
Terminal Value using EBITDA Multiple Method		EBITDA Multiple =	10.0x			6,296,585			
Terminal Value using Perpetuity Method		Discount Rate =	10.5%			3,856,429			
Average Terminal Value		Growth =	5.0%			5,076,507			
Less Debt						(1,030,000)			
Equity Value at Exit Year						4,046,507			
Equity Cash Flows		Equity Expected Return =	25%	37,113	44,549	36,424	4,047,197		
Present Value of Equity				1,734,583	29,690	28,511	18,649	1,657,732	
Plus Debt				2,598,000					
Less Cash				-					
Firm Enterprise value				4,332,583					
Enterprise Value / EBITDA				10.0x					

Figure 17.11

Method 8- Valuation of Distress or Startup Businesses

Using Black-Scholes Option Pricing Model to Value Distress or Start-up Businesses

$$C = Se^{-\delta t} [N(d1)] - Xe^{-it} N(d1)$$

$$\text{Payoff} = \text{Enterprise Value} - \text{Debt or Development Cost}$$

Where Payoff is the call option payoff at expiration (C), Enterprise Value represents the stock price (S) as expiration and the Debt or Development Cost is the predetermined amount assumed for distress and startups, respectively.



 Payoff =  Enterprise Value – Debt or Development Cost

Method 8: Valuation of Distress Firms

- **Option Pricing Model Framework**

- In option pricing and specifically in call options the payoff formula or intrinsic value of the option is

$$\text{Option payoff} = \text{Max}(0, S - X)$$

where S is the stock price and X is the exercise price.

- To calculate the enterprise value

$$EV = E + D - C \text{ or } EV = E + \text{net } D$$

where EV is the enterprise value of the firm, E is the equity value, D is the debt and C is cash. The net D is referred to as debt minus cash implied that the current debt could be paid with cash on hand.

- Solving for equity:

$$E = EV - \text{net } D$$

where E is the equity, EV is the enterprise value and net D is the net debt.

Method 8: Valuation of Distress Firms

- **Option Pricing Model Framework**

The Black-Scholes formula is

$$C_{\text{option payoff}} = Se^{-\delta \cdot t} \cdot N(d1) - Xe^{-i \cdot t} \cdot N(d2)$$

where S is the stock price, δ is the dividend yield, t is time until expiration, X is the option exercise price, i is the risk-free interest rate, and N is the normal distribution.

$$d1 = \frac{\left[\ln\left(\frac{S}{X}\right) + \left(i - \delta + \frac{\sigma^2}{2}\right) \cdot t \right]}{\sigma \sqrt{t}} \text{ and } d2 = d1 - \sigma \sqrt{t}$$

where S is the current stock price, X is the contractual exercise price, i is the risk-free interest rate, δ is the dividend yield, σ is the standard deviation, and t is time to expiration.

Method 8: Valuation of Distress Firms

Input:

- S = Value of the firm = \$1 billion
- X = Exercise price = debt value = \$1,200 million
- σ = Standard deviation of the asset = 20%
- t = Time = term of the bond = 5 years
- i = Risk-free rate = 3%
- δ = Dividends = cash flow paying the equity = \$0
- C = Equity value = E = ?

Formulas and output:

Using the formula to determine the deviations d_1 and d_2 :

$$d_1 = \frac{\left[\ln\left(\frac{S}{X}\right) + \left(i - \delta + \frac{\sigma^2}{2}\right) \cdot t \right]}{\sigma\sqrt{t}} \text{ and } d_2 = d_1 - \sigma\sqrt{t}$$

$$d_1 = .7671 \text{ and } N(d_1) = .7785$$

$$d_2 = .5678 \text{ and } N(d_2) = .7149$$

Using the Black Sholes formula:

$$C = Se^{-\delta \cdot t} \cdot N(d_1) - Xe^{-i \cdot t} \cdot N(d_2)$$

$$C = \$152.0 \text{ million}$$

Valuation Analysis of Distress Company – Spirit Air.

- Spirit Air., an airline company that entered bankruptcy in November 2024. At the time of the filing, the debt outstanding, representing the exercise price X , was at \$3.3 billion with a remaining life or duration of 5 years. To establish the value of equity, the enterprise value needs to be calculated. The management put together a business plan including 5 years of projections. In the first year, the company is planning to spend more money, representing restructuring costs and downsizing. Based on the 5 years' projection, the equity analyst could calculate the present value of the future cash flows, an estimated terminal value, and an assumed discount rate using the weighted average cost of capital of 10.0%.
- The DCF analysis yields an Enterprise Value using DCF of \$2 billion. Obviously with $S = \$2$ billion and $X = \$3.3$ billion the equity is out of the money. Using the Black-Scholes option pricing model the equity or the call option C is calculated at \$695 million after taking into consideration the combined variance for both debt and equity using the following formula:

$$\sigma_{sb}^2 = s^2 \cdot \sigma_s^2 + b^2 \cdot \sigma_b^2 + 2 (Ws \cdot Wb \cdot \sigma_s \cdot \sigma_b) \cdot \rho$$

where σ_{sb}^2 is the combined variance of bonds and stocks, Ws is the percentage of stocks to total capitalization, σ_s^2 is the stock price variance prior to bankruptcy, Wb is the bond outstanding as percentage of total capitalization, σ_b^2 is the bond price variance prior to bankruptcy, and ρ is the correlation between the stock and bond prices.

Valuation Analysis of Distress Company – Spirit Air.

Spirit Airlines Files for Chapter 11 Bankruptcy Restructuring

MT Newswires

Mon, November 18, 2024 at 12:02 PM EST 1 min read

In This Article:

Spirit Airlines (SAVE) said Monday it has entered into Chapter 11 bankruptcy restructuring with the support of a supermajority of its debtors.

The bankruptcy, filed with the US Bankruptcy Court for the Southern District of New York, will result in the likely delisting of the company from the New York Stock Exchange and the cancellation of its shares, the company said.

The discount airline said it has received commitments for \$350 million in equity investments and \$300 million in financing from existing debtors. The company will also equitize \$795 million in debt.

The company said flights, ticket sales, and reservations as well as payments to employees, vendors, and secured debtors are to continue as normal during the bankruptcy proceedings. The airline's Free Spirit loyalty program and Saver\$ Club perks and credit card terms for its customers will also continue, it added.

The restructuring of finances is meant to reduce debt, provide financial flexibility, and provide for investments in passenger services, the company said.

The company said it expects to complete the financial restructuring process in Q1 of 2025.

Company Description

Spirit Airlines, Inc. provides airline services. The company also offers hotels and rental cars services. It serves 93 destinations in 15 countries in the United States, Latin America, and the Caribbean. As of December 31, 2023, the company operated a fleet of 205 Airbus single-aisle aircraft. The company was formerly known as Clippert Trucking Company and changed its name to Spirit Airlines, Inc. in 1992. Spirit Airlines, Inc. was incorporated in 1964 and is headquartered in Miramar, Florida.

Valuation Analysis of Distress Company – Spirit Air

Spirit Airline Corporation

File for Bankruptcy

DEBT ASSUMPTIONS

Debt Outstanding =	3,266.9 million
Weighted Average Duration=	5 years
Weighted Average maturity=	8.7 years
WACC=	10.0%
Tax Rate =	26.0%

VALUE ASSUMPTIONS (Pre-bankruptcy)

Stock Montly Var. (3 year before Bankruptcy) =	3.35%
Bonds Monthly Var. (3 years before Bankruptcy) =	2.16%
Correlation between Stock/Bond (3 years)	0.25
Debt proportion (3 years) =	88.30%
Outstanding Shares	109.52

			LTM					
Operating Assumptions	2022	2023	2024	2025	2026	2027	2028	2029
Revenue		5.80%	-4.40%	0.00%	10.00%	10.00%	10.00%	10.00%
CoGS % Revenue	98.4%	89.0%	94.5%	94.51%	85.00%	85.00%	80.00%	80.00%
Oper. Expense % of Revenue	17.5%	18.3%	18.8%	19.00%	18.00%	17.00%	15.00%	15.00%
			LTM					
Discount Cash Flow Analysis (\$ millions)	2022	2023	2024	2025	2026	2027	2028	2029
Revenue	5,068.4	5,362.5	5,126.7	5,126.7	5,639.4	6,203.3	6,823.7	7,506.0
CoGS	(4,989.4)	(4,771.7)	(4,845.1)	(4,845.1)	(4,793.5)	(5,272.8)	(5,458.9)	(6,004.8)
Oper. Exp.	(888.8)	(983.1)	(964.6)	(974.1)	(1,015.1)	(1,054.6)	(1,023.6)	(1,125.9)
EBIT	(809.7)	(392.3)	(683.0)	(692.5)	(169.2)	(124.1)	341.2	375.3
EBIT (t)				(180.0)	(44.0)	(32.3)	88.7	97.6
EBIT (i-t)				(512.4)	(125.2)	(91.8)	252.5	277.7
Less Maintenance Capex (offset by Depreciation)				-	-	-	-	-
Less W/C (assumiung \$0)				-	-	-	-	-
Cash Flow				(512.4)	(125.2)	(91.8)	252.5	277.7
Terminal Value assumption	10.0x			EBIT				3,753.0
EV (PV) of the firm	\$2,036.9			(512.4)	(125.2)	(91.8)	252.5	4,030.7

Valuation Analysis of Distress Company – Spirit Air

Step 1 - Find the annualized in stock and bond prices:

Annualized Variance in Stock Price $\sigma^2 =$	0.401902 (annual)	St. Dev.=	0.633957
Annualized Variance in Bond Price $\sigma^2 =$	0.2592 (annual)	St. Dev.=	0.509117

Step 2 - Find the annualized variance in firm value

$$(w_e^2 \times \sigma_e^2) + (w_b^2 \times \sigma_b^2) + 2 \cdot (w_e \times w_d \times \rho_{ed} \times \sigma_e \times \sigma_d) \cdot \text{Cor}$$

We=	11.70%	C=	0.25
Wd=	88.30%		

Annualized Variance in firm value 0.211765

The five-year bond rate (corresponding to the weighted average duration of 5.1 years) is 6.0%

Step 3 - Find the value of call based upon the following parameters of equity as a call option

Value of the underlying asset = S = Value of the firm =	\$2,036.9
Exercise Price = X = Face Value of outstanding debt =	\$3,266.9
Life of the option = t = Weighted average duration of debt=	5 years
Variance in the value of the underlying asset = $\sigma^2 =$	0.2117651
Riskless Rate = I = T-Bond for option life =	6.00%

d1=	0.346962	N (d1) =	0.6356901
d2=	-0.68203	N (d2) =	0.2476099

Value of the call (Equity) = 695.1 million

Per share \$ 6.35

Restructuring of Debt	2,571.8
Debt Recovery	78.7%

Method 8: Valuation of Startup Businesses

- **Option Pricing Model Framework**

- In option pricing and specifically in call options the payoff formula or intrinsic value of the option is

$$\text{Option payoff} = \text{Max} (0, S - X)$$

where S is the stock price and X is the exercise price.

- To calculate the intrinsic value of a Startup

$$\text{Value of Investment} = \text{Exit Value} - \text{Development Cost}$$

components of Black-Scholes

$$C = Se^{-\delta t} [N(d1)] - Xe^{-it} N(d1)$$

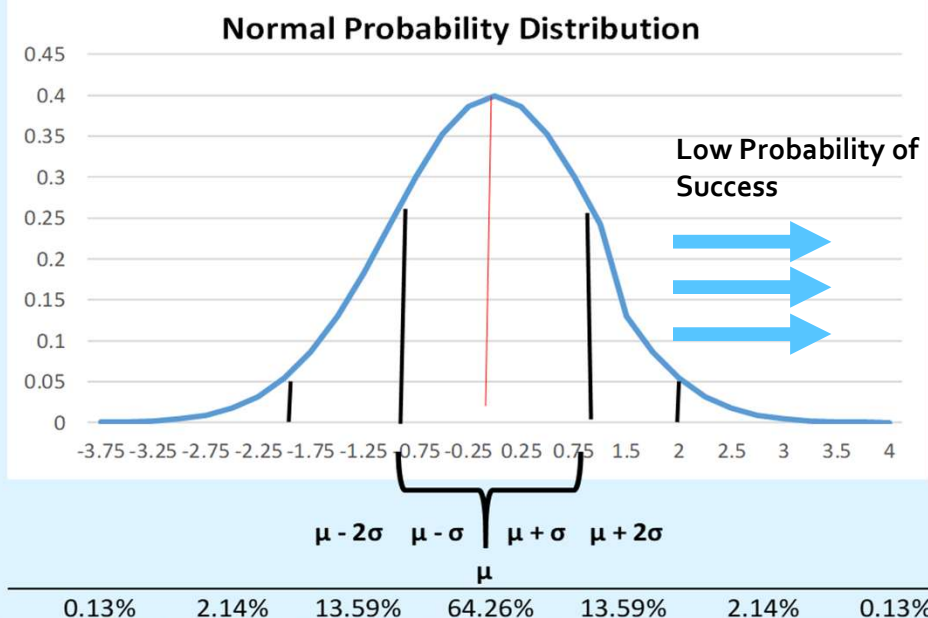
Where Payoff is the call option payoff at expiration (C), Enterprise Value represents the stock price (S) as expiration and the Debt or Development Cost is the predetermined amount assumed for distress and startups, respectively.

Using Black-Scholes Option Pricing Model to predict how out of money call option can be profitable

$$C = Se^{-\delta t}[N(d1)] - Xe^{-it}N(d1)$$

$$d1 = \frac{\ln(\frac{S}{X}) + \left(i - \delta + \frac{\sigma^2}{2}\right) t}{\sigma\sqrt{t}}$$

$$d2 = d1 - \sigma\sqrt{t}$$



NORMAL DISTRIBUTION TABLE									
d	N(d)	d	N(d)	d	N(d)	d	N(d)	d	N(d)
3.200	0.999	1.900	0.971	0.600	0.726	-0.700	0.242	-2.000	0.023
3.100	0.999	1.800	0.964	0.500	0.691	-0.800	0.212	-2.100	0.018
3.000	0.999	1.700	0.955	0.400	0.655	-0.900	0.184	-2.200	0.014
2.900	0.998	1.600	0.945	0.300	0.618	-1.000	0.159	-2.300	0.011
2.800	0.997	1.500	0.933	0.200	0.579	-1.100	0.136	-2.400	0.008
2.700	0.997	1.400	0.919	0.100	0.540	-1.200	0.115	-2.500	0.006
2.600	0.995	1.300	0.903	0.000	0.500	-1.300	0.097	-2.600	0.005
2.500	0.994	1.200	0.885	-0.100	0.460	-1.400	0.081	-2.700	0.003
2.400	0.992	1.100	0.864	-0.200	0.421	-1.500	0.067	-2.800	0.003
2.300	0.989	1.000	0.841	-0.300	0.382	-1.600	0.055	-2.900	0.002
2.200	0.986	0.900	0.816	-0.400	0.345	-1.700	0.045	-3.000	0.001
2.100	0.982	0.800	0.788	-0.500	0.309	-1.800	0.036	-3.100	0.001
2.000	0.977	0.700	0.758	-0.600	0.274	-1.900	0.029	-3.200	0.001

Using Black-Scholes Option Pricing Methodology to Value Startups

- Is there a real option embedded in a decision or an asset (**Opportunity**)? **YES**
 - Applying the $C = S - X$
Call price (C) as the Investment Payoff (**Premium**) , Strike Price (X) as the Cost of Development or the initial investment and Value of the start-up in the future as the underline Asset (S)
- Does that real option have significant economic value (**5x – 10x the original investment or is the “C” 5.0x-10x the “X”**)? **YES**
 - For example, questions like What is the competition? Is this idea exclusive? Can this idea solve problems? Is this a good time?
- Can that value be estimated using option pricing model (i.e. **Totally Addressable Market**)? **YES**
 - Leading to $S - X > \text{Minimum Return Expectation}$ (**5x – 10x**)

First: Projections – Building the Financial Model

- All Companies that are in the process of raising capital, start with the base case financial model.
- The base case is the first approach to building the financial model.
- Since this model will be shared with all the stakeholders, including new and existing investors as well as management, the case needs to be simple, reasonable, and basic before any adjustments that need to be made to run other scenarios, such as the upside case, downside case and breakeven case.

Projections – Building the Financial Model

Building the Base Case

- The base case is the first projected scenario that the company sets up before making any of his or her own customized adjustments.
- When building this case, it is important for the company to arrange the revenue drivers or the cost assumptions so that are in line with industry or market standards and so the proper comparison can be made for follow-up adjustments.

Projections – Building the Financial Model

Revenue Drivers

- **The revenue drivers are customized based on the industry performance measurements that the company competes in.**
- This makes it easier to compare the results versus the industry operating benchmarks. For example, the assumptions used for a hotel company could be based on the average daily rate (ADR) representing what the customer will pay to rent the room for a night; the number of rooms available per property; and the occupancy rate (OR), which represents the rooms that are rented as a percentage of total available rooms.
- For companies that sell products, the revenues are typically driven by volume and price.
- For companies that is the service business, the revenues are typical service fees by the number of customers
- The company runs different assumptions on the volume growth and price increase/decrease assumption to drive the future revenue.
- The best starting approach of setting up these assumptions is to use historical growth rates based on market demand and extend them going forward. Then the company can use discretion to adjust these numbers based on expectation.

Case Study

Using both Income Method (DCF Analysis) and Option Pricing methods for valuating IP

- The Value of a firm's new innovative products that will be put to commercialization can be derived using the option pricing model
- Value of the Firm = Value of products after it is commercialized or licensed (DCF Analysis)
- Measuring the efficiency of the firm for converting its Development Cost into a commercial product and revenue.

Case Study

Using both Income Method (DCF Analysis) and Option Pricing methods for valuating IP

- **The Company:** A clean tech start-up company that developed an air monitoring device that can be used for both commercial and consumer use. The device assess Indoor Air Quality (IAQ) and promptly detect and report hazardous incidents that directly impact health and well-being. This smart device is empowered by AI and continuously monitors and measures factors such as temperature, humidity, CO₂, VOCs, PM₁, 2.5, 4, 10, and NO_x. airbeld™ is suitable for diverse industries and indoor environmental conditions for human presence and activity
- **The Opportunity:** The sales of devices and on-going SaaS opportunity are assumed based on market analysis (TAM) and penetration %s.
- **The Global Market:** The Global IAQ monitoring market size is projected to grow to \$10.15 billion by 2030. The Total Addressable Market (TSM) that this device can be used is currently at \$6.0 Billion. The device can be used in residential homes (376 million), Offices (130 million) and classrooms (9 million)

Case Study

Building the Sources and Uses through the Phase I – III and steady commercialization

Source of Capital (€)	Phase I	Phase II	Phase III
Government / University Grands	100,000	100,000	-
Equity Investment	-	100,000	650,000
Total Sources of Capital	100,000	200,000	650,000
Uses of Capital	Phase I	Phase II	Phase III
Materialas (Inventory)		10,000	65,000
Labor		-	110,860
Overhead			5,100
General Expenses	9,000	36,000	11,000
Administrative (Salaries)	45,000	90,000	566,500
Capex			
Cash Reserve	46,000	74,000	(43,460)
Total Use of Capital	100,000	200,000	650,000
Net Cash Burn	46,000	120,000	76,540

Case Study

Building the Top Line Revenue 6-year projection

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
OPERATING ASSUMPTIONS							
Product							
Price per Unit		\$340.00	\$340.00	\$340.00	\$340.00	\$340.00	\$340.00
% Increase/(Decerease)			0.0%	0.0%	0.0%	0.0%	0.0%
Quantity Sold		0	500	2000	5000	10000	20000
Segment Revenue	\$	-	\$ 170,000	\$ 680,000	\$ 1,700,000	\$ 3,400,000	\$ 6,800,000
Service							
Services \$		\$100.00	\$100.00	\$100.00	\$100.00	\$100.00	\$100.00
% Increase/(Decerease)			0.0%	0.0%	0.0%	0.0%	0.0%
Quantity Sold		0	500	2000	5000	10000	20000
Segment Revenue	\$	-	\$ 50,000	\$ 200,000	\$ 500,000	\$ 1,000,000	\$ 2,000,000
Total Sales	\$	-	\$ 220,000	\$ 880,000	\$ 2,200,000	\$ 4,400,000	\$ 8,800,000

Case Study

Building the Top Line Cost Assumptions 6-year projection

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Cost of Goods Sold						
Avg Prod Cost of Unit		\$120.00	\$120.00	\$120.00	\$120.00	\$120.00
Cost of unit as % of Price		35%	35%	35%	35%	35%
Avg Cost of Service		\$10.00	\$10.00	\$10.00	\$10.00	\$10.00
Cost of unit as % of Price		10%	10%	10%	10%	10%
Materials	\$0	\$65,000	\$260,000	\$650,000	\$1,300,000	\$2,600,000
Avg Wages per hour		\$11.50	\$11.50	\$11.50	\$11.50	\$11.50
% Increase/(Decrease)		0.0%	0.0%	0.0%	0.0%	0.0%
Number of Labor workers		2	2	3	3	4
Hours per year		4,820	9,640	9,640	9,640	9,640
Labor Cost	\$0	\$110,860	\$221,720	\$332,580	\$332,580	\$443,440
Overhead as % of Manufacturing Sales		3.0%	3.0%	3.0%	3.0%	3.0%
Overhead	\$ -	\$5,100	\$20,400	\$51,000	\$102,000	\$204,000
Total COGS	\$ -	\$180,960	\$502,120	\$1,033,580	\$1,734,580	\$3,247,440

Case Study

Building the Top Line Cost Assumptions 6-year projection

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Operational Expenses						
Marketing/Selling						
Selling as % of Sales		10.0%	10.0%	10.0%	10.0%	10.0%
Selling	\$5,000	\$22,000	\$88,000	\$220,000	\$440,000	\$880,000
General (Rent, Supplies, Other)						
General as Percentage of Sales		2.0%	2.0%	2.0%	2.0%	2.0%
General	\$10,000	\$1,000	\$4,000	\$10,000	\$20,000	\$40,000
Administrative						
Number of Salaried Employees						
CEO	1	1	1	1	1	1
CTO	1	1	1	1	1	1
VP Marketing	1	1	2	2	2	2
Other Employees	1	2	5	7	10	10
Salaries						
CEO	\$ 50,000	\$ 90,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
CTO	\$ 40,000	\$ 80,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ 90,000
VP Marketing	\$ 35,000	\$ 70,000	\$ 75,000	\$ 75,000	\$ 75,000	\$ 75,000
Other Employees	\$ 30,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
Salaries	\$ 155,000	\$ 360,000	\$ 640,000	\$ 760,000	\$ 940,000	\$ 940,000
Other Administrative Expenses % of Salaries	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Other Administrative Expenses	\$ 15,500	\$ 36,000	\$ 64,000	\$ 76,000	\$ 94,000	\$ 94,000
Administrative	\$ 170,500	\$ 396,000	\$ 704,000	\$ 836,000	\$ 1,034,000	\$ 1,034,000
Other	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Opex	\$ 185,500	\$ 419,000	\$ 796,000	\$ 1,066,000	\$ 1,494,000	\$ 1,954,000

Case Study

Building the Cash Flow Assumptions 6-year projection

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Cash Flow Assumptions						
Accounts Receivable Days	60	60	60	60	60	60
Inventory Days	60	60	60	60	60	60
Other Current Assets as % of Revenue	0%	0%	0%	0%	0%	0%
Accounts Payable Days	30	30	30	30	30	30
Accrued Expenses as % of Revenues	0%	0%	0%	0%	0%	0%
Other Current Liabilities as % of Revenues	0%	0%	0%	0%	0%	0%
Capex as % of Revenues	5%	5%	5%	5%	5%	5%
Other Assets as % of Revenue	0%	0%	0%	0%	0%	0%

Case Study

Deliverable Financial Information

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
INCOME STATEMENT						
Revenues						
Product	-	170,000	680,000	1,700,000	3,400,000	6,800,000
Services	-	50,000	200,000	500,000	1,000,000	2,000,000
Total Revenue	-	220,000	880,000	2,200,000	4,400,000	8,800,000
Revenue growth %						
Cost of Revenue	-	180,960	502,120	1,033,580	1,734,580	3,247,440
Gross Profit	-	39,040	377,880	1,166,420	2,665,420	5,552,560
Operating Expenses	185,500	419,000	796,000	1,066,000	1,494,000	1,954,000
EBITDA	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Depreciation	-	-	-	-	-	-
Amortization	-	-	-	-	-	-
EBIT	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Interest	-	-	-	-	-	-
EBT	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Taxes	12% -	-	-	-	-	-
Net Income	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560

Case Study

Deliverable Financial Information

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
BALANCE SHEET							
Cash	120,000	584,500	142,502	545,492	275,244	807,404	3,118,332
Accounts Receivable	-	-	36,164	144,658	361,644	723,288	1,446,575
Inventory	-	-	29,747	82,540	169,904	285,136	533,826
Other Current Assets	-	-	-	-	-	-	-
Total Current Assets	120,000	584,500	208,413	772,690	806,792	1,815,828	5,098,733
Property, Plant & Equipment	-	-	11,000	55,000	165,000	385,000	825,000
Less Accum. Depreciation	-	-	-	-	-	-	-
Net Property, Plant & Equipment	-	-	11,000	55,000	165,000	385,000	825,000
Other Assets	-	-	-	-	-	-	-
Total Assets	120,000	584,500	219,413	827,690	971,792	2,200,828	5,923,733
Accounts Payable	-	-	14,873	41,270	84,952	142,568	266,913
Accured Expenses	-	-	-	-	-	-	-
Other Current Expenses	-	-	-	-	-	-	-
Total Current Liabilities	-	-	14,873	41,270	84,952	142,568	266,913
Government Grands	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Long Term Debt	-	-	-	-	-	-	-
Other Long-term Liabilities	-	-	-	-	-	-	-
Total Liabilities	200,000	200,000	214,873	241,270	284,952	342,568	466,913
Common Stock	100,000	750,000	750,000	1,750,000	1,750,000	1,750,000	1,750,000
Retained Earnings	(180,000)	(365,500)	(745,460)	(1,163,580)	(1,063,160)	108,260	3,706,820
Total Net Worth	(80,000)	384,500	4,540	586,420	686,840	1,858,260	5,456,820
Total Liabilities & Net Worth	120,000	584,500	219,413	827,690	971,792	2,200,828	5,923,733

Case Study

Deliverable Financial Information

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
CASH FLOW STATEMENT							
Net Income		(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Add Depreciation		-	-	-	-	-	-
Add Amortization		-	-	-	-	-	-
Cash Income		(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Working Capital Activity							
Change in Accounts Receivable		-	(36,164)	(108,493)	(216,986)	(361,644)	(723,288)
Change in Inventory		-	(29,747)	(52,793)	(87,363)	(115,233)	(248,689)
Change in Other Current Assets		-	-	-	-	-	-
Change in Accounts Payable		-	14,873	26,397	43,682	57,616	124,345
Change in Accrued Expenses		-	-	-	-	-	-
Change in Other Current Liabilities		-	-	-	-	-	-
Total Working Capital		-	(51,038)	(134,890)	(260,668)	(419,260)	(847,632)
Investment Activity							
Capital Expenditures		-	(11,000)	(44,000)	(110,000)	(220,000)	(440,000)
Change in Other Assets		-	-	-	-	-	-
Total Investments		-	(11,000)	(44,000)	(110,000)	(220,000)	(440,000)
Financing Activity							
Government / University Grands		-	-	-	-	-	-
Long Term Debt		-	-	-	-	-	-
Other Liabilities		-	-	-	-	-	-
Equity Issuance		650,000	-	1,000,000	-	-	-
Total Financing Activity		650,000	-	1,000,000	-	-	-
Free Cash Flow		464,500	(441,998)	402,990	(270,248)	532,160	2,310,928
Beginning Cash		120,000	584,500	142,502	545,492	275,244	807,404
Free Cash Flow		464,500	(441,998)	402,990	(270,248)	532,160	2,310,928
Ending Cash		584,500	142,502	545,492	275,244	807,404	3,118,332

Case Study

Using both Income Method (DCF Analysis) and Option Pricing methods for valuating the Startup

	R&D Stage		Commercialization Stage					
	Phase I	Phase II	Phase III		Phase IV			
	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
REVENUES			-	220,000	880,000	2,200,000	4,400,000	8,800,000
EBITDA	(54,000)	(136,000)	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Less Capex	-	-						
Less Working Capital								
Cash Flow from Operations and after Capex and WC	(54,000)	(136,000)	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Less Cash Reserve								
Cash Needs		(190,000)	(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560

Case Study

Using both Income Method (DCF Analysis) and Option Pricing methods for valuating the Startup

VENTURE CAPITAL LEVEL DCF									
FIRST YEAR PRODUCT COMMERCIALIZATION									
	Year -1	Year 0		Phase I/II	Phase III	Year 3	Year 4	Year 5	Year 6
Revenue					220,000	880,000	2,200,000	4,400,000	8,800,000
EBITDA	(54,000)	(136,000)		(185,500)	(379,960)	(418,120)	100,420	1,171,420	3,598,560
Cash Flow				464,500	(441,998)	402,990	(270,248)	532,160	2,310,928
Terminal Value									
Technology Revenue Multiple Assumption	3.0x							13,200,000	
Technology EBITDA Multiple Assumption	10.0x							11,714,200	
Perpetuity Method	12.0%							19,257,731	
Average Terminal Value								14,723,977	
Cash Flows			▼ (750,000)	464,500	(441,998)	402,990	(270,248)	15,256,137	
Present Value of Enterprise Value	30% Exp. IRR (VC Level)								
Equit Investment				\$4,293,498					
Equity IRR				91.6%					

Case Study

Using both Income Method (DCF Analysis) and Option Pricing methods for valuating IP

SEED & ANGEL FINANCING LEVEL					
COST BASIS VALUATION				CALL OPTION PRICING VALUATION	
	Year -1	Year 0	Phase I/II	Phase III	INPUT
Transaction Uses - Cash Needs - from operations		(190,000)		(565,460)	IP Patent/Repla 10 years
Commulative			(190,000)	(755,460)	Cost of Delay = 0.0% 2.0/10
Transdaction Sources - Capital Raising					Rfr= 3.00%
Government Grands - Firm					Variance = 11.00%
New Government Grands Expected			200,000		$\sigma = 33.2\%$ (High/Low deviat.)
Equit Investment		Private Equity	100,000	650,000	OUTPUT
Other Investors					d1 = 3.688301 (deviation of value)
Total Sources of Cash			300,000	850,000	d2 = 2.639492
Total Funding				1,150,000	N(d1) = 0.999887 (prob. of success)
Equit Investment			-		N(d2) = 0.995848
					Value= 3,746,210
					Equit Investment 750,000