Formula Sheet
Introduction to Corporate Finance

$A = L + SE$

$MVE = SO \times MPS$

$MB = \frac{MVE}{BVE}$

$EV = MVE + D - C$

$EPS = \frac{NI}{SO}$

$RE = NI - Div$

$CSE = NI - Div + SS - RS$

$EBITDA = EBIT + D + A$

$ND = TD - ECSTI$

$GM = \frac{GP}{S}$

$OM = \frac{OI}{S}$

$EBITM = \frac{EBIT}{S}$

$NPM = \frac{NI}{S}$

$CR = \frac{CA}{CL}$

$QR = \frac{C+STI+AR}{CL}$

$CashR = \frac{C}{CL}$

$ARD = \frac{AR}{ADS}$

$APD = \frac{AP}{ADCS}$

$ID = \frac{I}{ADCS}$

$IT = \frac{ACOS}{I}$

$ART = \frac{AS}{AR}$

$APT = \frac{ACOS}{AP}$

$ICR(EBIT) = \frac{EBIT}{IE}$

$ICR(EBITDA) = \frac{EBITDA}{IE}$

$DE = \frac{TD}{TE}$

$DTC = \frac{TD}{TE+TD}$

$DTEV = \frac{ND}{EV}$

$BEM = \frac{TA}{BVE}$

$MEM = \frac{EV}{MVE}$

$PE = \frac{MVE}{NI}$

$PE = \frac{MPS}{EPS}$

$EVR = \frac{EV}{EBIT}\ or\ \frac{EV}{EBITDA}\ or\ \frac{EV}{S}$

$ROE = \frac{NI}{BVE}$

$ROA = \frac{NI+IE}{TA}$

$ROIC = \frac{EBIT(1-T_C)}{BVE+ND}$

$ROE = \frac{NI}{S} \times \frac{S}{TA} \times \frac{TA}{BVE}$

$AT = \frac{S}{TA}$

$V_1 = C_0(1+r)$

$V_0 = \frac{C_1}{(1+r)}$

$NPV = PV(CF)$

$Price(A+B) = Price(A) + Price(B)$

$E(R) = \frac{E(G)}{IC}$

$V_n = C_0 \times (1+r)^n$

$V_0 = C_n \left(\frac{1}{1+r}\right)^n = \frac{C}{(1+r)^n}$

$V_0 = C_0 + \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} + \cdots + \frac{C_N}{(1+r)^N}$

$$V_0 = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n}$$

$$V_0 = \frac{C_1}{r}$$

$$V_0 = \frac{C}{r} - \frac{C}{r}\left(\frac{1}{1+r}\right)^N = \frac{C}{r}\left(1 - \left(\frac{1}{1+r}\right)^N\right)$$

$$V_N = \frac{C}{r}((1+r)^N - 1)$$

$$V_0 = \frac{C_1}{r-g}$$

$$V_0 = \frac{C}{r-g}\left(1 - \left(\frac{1+g}{1+r}\right)^N\right)$$

$$V_t = \frac{C}{r-g}((1+r)^N - (1+g)^N)$$

$$r(t) = (1+r)^n - 1$$

$$r(t) = \frac{APR}{k}$$

$$r_r = \frac{r-i}{1+i}$$

$$V_0 = \frac{C_n}{(1+r_n)^n}$$

$$V_0 = C_0 + \frac{C_1}{(1+r_1)} + \frac{C_2}{(1+r_2)^2} + \cdots + \frac{C_N}{(1+r_N)^N}$$

$$V_0 = \sum_{n=0}^{N} \frac{C_n}{(1+r_n)^n}$$

$$r_{AT} = r - (\tau \times r) = r(1-\tau)$$

$$r(1) = e^{APR} - 1$$

APR = ln(1+*r(1)*)

$$CPN = \frac{CR \times FV}{N}$$

$$P = \frac{FV}{(1+YTM_n)^n}$$

$$YTM_n = \left(\frac{FV}{P}\right)^{1/n} - 1$$

$r_n = YTM_n$

$$P = CPN \times \frac{1}{y}\left(1 - \left(\frac{1}{(1+y)^N}\right)\right) + \frac{FV}{(1+y)^N}$$

$$CP = DP - CPN\left(\frac{DSLC}{DICP}\right)$$

$$E(CF) = \sum p \times CF$$

$$PI = \frac{NPV}{RC}$$

$$UNI = EBIT \times (1-\tau_c) = (R - E - D)(1-\tau_c)$$

	Depreciation Rate for Recovery Period					
Year	3 Years	5 Years	7 Years	10 Years	15 Years	20 Years
0	33.33	20.00	14.29	10.00	5.00	3.750
1	44.45	32.00	24.49	18.00	9.50	7.219
2	14.81	19.20	17.49	14.40	8.55	6.677
3	7.41	11.52	12.49	11.52	7.70	6.177
4		11.52	8.93	9.22	6.93	5.713
5		5.76	8.92	7.37	6.23	5.285
6			8.93	6.55	5.90	4.888
7			4.46	6.55	5.90	4.522
8				6.56	5.91	4.462
9				6.55	5.90	4.461
10				3.28	5.91	4.462
11					5.90	4.461
12					5.91	4.462
13					5.90	4.461
14					5.91	4.462
15					2.95	4.461
16						4.462
17						4.461
18						4.462
19						4.461
20						2.231

FCF = UNI + D – CE - ΔNWC

NWC = CA – CL = C + AR + I – AP

$$FCF = (R - E - D) \times (1-\tau_c) + D - CE - \Delta NWC$$

$$FCF = (R - E) \times (1-\tau_c) - CE - \Delta NWC + \tau_c \times D$$

$$PV(FCF_t) = \frac{FCF_t}{(1+r)^t} = FCF_t \times \frac{1}{(1+r)^t}$$

G = SP – BV

BV = PP – AD

ATCF = SP – τ_c × G

$$P_0 = \frac{D_1 + P_1}{1+r_E}$$

$$r_E = \frac{D_1+P_1}{P_0} - 1 = \frac{D_1}{P_0} + \frac{P_1 - P_0}{P_0}$$

$$P_0 = \frac{D_1}{1+r_E} + \frac{D_2+P_2}{(1+r_E)^2}$$

$$P_0 = \frac{D_1}{1+r_E} + \frac{D_2}{(1+r_E)^2} + \cdots + \frac{D_N}{(1+r_E)^N} + \frac{P_N}{(1+r_E)^N}$$

$$P_0 = \sum_{n=1}^{\infty} \frac{D_n}{(1+r_E)^n}$$

$$P_0 = \frac{D_1}{r_E - g}$$

$r_E = \frac{D_1}{P_0} + g$

$D_t = \frac{E_t}{SO_t} \times DPR_t$

$NI_t = E_t \times RR_t$

$RR_t = 1 - DPR_t$

$\Delta E_{t+1} = NI_t \times RONI_t$

$EGR_{t+1} = \frac{\Delta E_{t+1}}{E_t}$

$EGR_{t+1} = RR_t \times RONI_t$

$g_{t+1} = RR_t \times RONI_t$

$P_0 = \frac{PV(FTDR)}{SO}$

$NI = CE - D$

$FCF = EBIT(1-\tau_c) - NI - \Delta NWC$

$V_0 = PV(FCF)$

$P_0 = \frac{V_0 + C_0 - D_0}{SO_0}$

$V_0 = \frac{FCF_1}{1+r_{wacc}} + \frac{FCF_2}{(1+r_{wacc})^2} + \cdots + \frac{FCF_N + V_N}{(1+r_{wacc})^N}$

$V_N = \frac{FCF_{N+1}}{r_{wacc} - g_{FCF}}$

$FPE = \frac{P_0}{EPS_1} = \frac{D_1/EPS_1}{r_E - g}$

$\frac{V_0}{EBITDA_1} = \frac{FCF_1/EBITDA_1}{r_{wacc} - g_{FCF}}$

$E(R) = \sum_R p_R \times R$

$Var(R) = \sum_R p_R \times \left(R - E(R)\right)^2$

$SD(R) = \sqrt{Var(R)}$

$R_{t+1} = \frac{Div_{t+1}}{P_t} + \frac{P_{t+1} - P_t}{P_t}$

$1+R_L = (1+R_{S1})\,(1+R_{S2})\,(1+R_{S3})\ldots.$

$\bar{R} = \frac{1}{T}\sum_{t=1}^{T} R_t$

$Var(R) = \frac{1}{T-1}\sum_{t=1}^{T}(R_t - \bar{R})^2$

$SD(R) = \sqrt{Var(R)}$

$SE = \frac{SD}{\sqrt{N}}$

$CAR = [(1+R_1) \times (1+R_2) \times \cdots \times (1+R_T)]^{1/T} - 1$

$MRP = E[R_{Mkt}] - r_f$

$r_i = r_f + \beta_i \times \left(E(R_{Mkt}) - r_f\right)$

$MV_i = NSO_i \times P_i$

$x_i = \frac{MV_i}{TMV}$

$r_{Mkt} = \frac{D_1}{P_0} + g$

$\left(R_i - r_f\right) = \alpha_i + \beta_i\left(R_{Mkt} - r_f\right) + \varepsilon_i$

$E[R_i] = r_f + \beta_i\left(E[R_{Mkt}] - r_f\right) + \alpha_i$

$r_d = (1-p)y + p(y-L) = y - pL$

Table 12.2: Percent Annual Default Rates by Debt Rating

Rating	AAA	AA	A	BBB	BB	B	CCC	CC-C
Ave.	0.0	0.1	0.2	0.5	2.2	5.5	12.2	14.1
Recessions	0.0	1.0	3.0	3.0	8.0	16.0	48.0	78.0

Table 12.3: Average Debt Betas

By Rating	A above	BBB	BB	B	CCC
Avg. Beta	<.05	.10	.17	.26	.31

By Maturity	*1-5 Yr*	*5-10 Yr*	*10-15Yr*	*> 15Yr*
Avg. Beta	0.01	0.06	0.07	0.14

$r_u = \left(\frac{E}{E+D}\right) r_e + \left(\frac{D}{E+D}\right) r_d$

$\beta_u = \left(\frac{E}{E+D}\right) \beta_e + \left(\frac{D}{E+D}\right) \beta_d$

$ND = D - EC$

$r_{at} = r\,(1 - \tau_c)$

$r_{wacc} = \left(\frac{E}{E+D}\right) r_E + \left(\frac{D}{E+D}\right) r_d (1 - \tau_c)$

$r_{wacc} = r_u - \left(\frac{D}{E+D}\right) \tau_c r_D$

$MVE = MVA - MVL$

$\alpha_s = E[R_s] - r_s$

$E + D = U = A$

$$\left(\frac{E}{E+D}\right)R_E + \left(\frac{D}{E+D}\right)R_D = R_U$$

$$R_E = R_U + \frac{D}{E}(R_U - R_D)$$

$$r_E = r_U + \frac{D}{E}(r_U - r_D)$$

$$E(R_E) = E(R_U) + \frac{D}{E}\big(E(R_U) - E(R_D)\big)$$

$$r_U = \left(\frac{E}{E+D}\right)r_E + \left(\frac{D}{E+D}\right)r_D$$

$r_{wacc} = r_U = r_A$

$$\beta_U = \left(\frac{E}{E+D}\right)\beta_E + \left(\frac{D}{E+D}\right)\beta_D$$

$$\beta_E = \beta_U + \frac{D}{E}(\beta_U - \beta_D)$$