Valuation Models and Multiples

Model	Asset Based Equation	Equity Based Equation
Dividend Yield	$\sum \frac{NOPLAT_t}{(1+WACC)^t} + \frac{\frac{NOPLAT_1}{WACC-g}}{(1+WACC)^t}$	$\sum \frac{NI_t}{(1+COE)^t} + \frac{\frac{NI_1}{COE-g}}{(1+COE)^t}$
Key Value Driver	$\sum \frac{FCF_t}{(1+WACC)^t} + \frac{\frac{NOPLAT_1\left(1-\frac{g}{ROIC}\right)}{WACC-g}}{(1+WACC)^t}$	$\sum \frac{CFE_t}{(1+COE)^t} + \frac{\frac{CFE_1\left(1-\frac{g}{ROE}\right)}{COE-g}}{(1+COE)^t}$
Free Cash Flow	$\sum \frac{FCF_i}{(1+\mathrm{WACC})^t} + \frac{\frac{FCF_1}{(WACC-g)}}{(1+WACC)^t}$	$\sum \frac{CFE_i}{(1+\mathrm{COE})^t} + \frac{\frac{CFE_1}{(COE-g)}}{(1+COE)^t}$
Economic Profit	$\mathrm{IC}_0 + \sum \frac{IC_{t-1}(ROIC-WACC)}{(1+WACC)^t} + \frac{\frac{IC_0\ (ROIC_1-WACC_1)}{WACC_1-g}}{(1+WACC)^t}$	$TE_0 + \sum \frac{TE_{t-1}(ROE-COE)}{(1+COE)^t} + \frac{\frac{TE_0\ (ROE_1-COE_1)}{COE_1-g}}{(1+COE)^t}$
Adjusted Present Value	$\sum \frac{FCF_i}{(1+\mathrm{k_u})^t} + \frac{\frac{FCF_1}{(k_u-g)}}{(1+k_u)^t} + \sum \frac{\text{Tax Shield}_i}{(1+\mathrm{k_{tax}})^t} + \frac{\frac{Tax\ Shield_1}{(k_{tax}-g)}}{(1+k_{tax})^t}$	
Forward Multiple	$\sum \frac{FCF_t}{(1+WACC)^t} + \frac{EBIT_1\ x\ FMM}{(1+WACC)^t}; \quad FMM = \frac{EV_0}{EBIT_0}$	$\sum \frac{CFE_t}{(1+COE)^t} + \frac{EBIT_1\ x\ FMM}{(1+COE)^t}; \quad FMM = \frac{EV_0}{EBIT_0}$

Variable Construction

$NOPLAT = EBIT(1-T)$	
$IC = FA + NWC$	$ROIC = \frac{NOPLAT}{IC}$
$\mathrm{WACC} = \left(\frac{E}{V}\ x\ R_E\right) + \left(\frac{P}{V}\ x\ R_P\right) + \left(\frac{D}{V}\ x\ R_D\right)(1-T_C)$	
$FCF = NOPLAT + D\&A - \Delta NWC - NCS$	
$TS = Interest\ Paid\ (T)$	$\mathrm{FCF} = NOPLAT\left(1-\frac{g}{ROIC}\right)$
$ROE = \frac{NI}{TE}$	$ROA = \frac{NI}{TA}$
$COE = \left(\frac{E}{V}\ x\ R_E\right) + \left(\frac{P}{V}\ x\ R_P\right)$	
$D' = (1-D\&A)$	$CFE = NI - \Delta TE - OCI$
$M = \frac{EBIT}{Sales}$	$T' = (1-T)$

Asset Based Firms

Multiple	Equational Form	g Solution
$\frac{EV}{Sales}$	$\frac{ROIC-g}{ROIC(WACC-g)}(1-T)(M)$	$\frac{ROIC[(T'x\ EBIT)-(EV\ x\ WACC)]}{(T'x\ EBIT)-(EV\ x\ ROIC)}$
$\frac{EV}{EBITDA}$	$\frac{ROIC-g}{ROIC(WACC-g)}(1-T)(1-D)$	$\frac{ROIC\ [(T'\ x\ EBIT)-(EV\ x\ WACC)]}{(T'x\ EBIT)-\ (EV\ x\ ROIC)}$
$\frac{EV}{EBIT}$	$\frac{ROIC-g}{ROIC(WACC-g)}(1-T)$	$\frac{ROIC\ [(T'\ x\ EBIT)-(EV\ x\ WACC)]}{(T'x\ EBIT)-\ (EV\ x\ ROIC)}$
$\frac{EV}{NOPLAT}$	$\frac{ROIC-g}{ROIC(WACC-g)}$	$\frac{ROIC\ [NOPLAT-(EV\ x\ WACC)]}{NOPLAT-(EV\ x\ ROIC)}$
$\frac{EV}{\mathrm{FCF}_{OPS}}$	$\frac{ROIC-g}{ROIC(WACC-g)}(1-T)$	$\frac{ROIC\ [(T'\ x\ EBIT)-(EV\ x\ WACC)]}{(T'x\ EBIT)-\ (EV\ x\ ROIC)}$
$\frac{EV}{\mathrm{FCF}_{ENT}}$	$\frac{1}{WACC-g}$	$\frac{(EV\ x\ WACCC)-FCF_{ENT}}{EV}$
$\frac{EV}{IC}$	$\frac{ROIC-g}{ROIC(WACC-g)}(ROIC) = \frac{ROIC-g}{WACC-g}$	$\frac{NOPLAT-(EV\ x\ WACC)}{IC-EV}$
$\frac{EV}{Units}$	$\frac{ROIC-g}{ROIC(WACC-g)}\ x\ \frac{NOPLAT}{Units}$	$\frac{ROIC\ x\ [NOPLAT-(EV\ x\ WACC)]}{NOPLAT\ x\ (EV\ x\ ROIC)}$

g Solution

$$\frac{EV}{EBIT} = \frac{NOPLAT_1\left(1-\frac{g}{ROIC}\right)}{WACC-g} \qquad EV = \frac{(1-T)\left(1-\frac{g}{ROIC}\right)}{WACC-g}$$

$$\widehat{EV} = PV_{CV} = \frac{\frac{FCF_1}{WACC-g}}{(1+WACC)^t};\ Let\ WACC' = (1+WACC)^t \qquad g = \frac{(\widehat{EV}x\ WACC'x\ WACC)-FCF}{\widehat{EV}\ x\ WACC'}$$

Equity Based Firms

Multiple	Equational Form	g solution
$\frac{Price}{Earnings}$	$\frac{ROE-g}{ROE\ (COE-g)}$	$\frac{ROE\ [NI-(MCE\ x\ COE)]}{NI-(MCE\ x\ ROE)}$
$\frac{Price}{Cash\ Earnings}$	$\frac{ROE-g}{ROE\ (COE-g)}\ x\ \frac{NI}{CE}$	$\frac{ROE\ [NI-(MCE\ x\ COE)]}{NI-(MCE\ x\ ROE)}$
$\frac{Price}{Book\ Value}$	$\frac{ROE-g}{COE-g}$	$\frac{NI-(MVE\ x\ COE)}{TE-MVE}$
$\frac{Price/Earnings}{Earnings\ Growth}$	$\frac{ROE-g}{100\ x\ g\ x\ ROE\ (COE-g)}$	$\frac{ROE[(\%\Delta NI*NI)-(MCE*100*COE)]}{(\%\Delta NI*NI)-(MCE*100*ROE)}$

Richard E. Haskell, PhD, Associate Professor of Finance, Bill & Vieve Gore School of Business, Westminster College, Salt Lake City, Utah 2017
rhaskell@westminstercollege.edu