



# Valuation Models and Multiples

Model	Asset Based Equation	Equity Based Equation	Variable Construction
<b>Dividend Yield</b>	$\sum \frac{NOPLAT_t}{(1+WACC)^t} + \frac{NOPLAT_1}{WACC-g} \frac{1}{(1+WACC)^t}$	$\sum \frac{NI_t}{(1+COE)^t} + \frac{NI_1}{COE-g} \frac{1}{(1+COE)^t}$	$NOPLAT = EBIT(1 - T)$
<b>Key Value Driver</b>	$\sum \frac{FCF_t}{(1+WACC)^t} + \frac{NOPLAT_1(1-\frac{g}{ROIC})}{WACC-g} \frac{1}{(1+WACC)^t}$	$\sum \frac{CFE_t}{(1+COE)^t} + \frac{CFE_1(1-\frac{g}{ROE})}{COE-g} \frac{1}{(1+COE)^t}$	$IC = FA + NWC$ $ROIC = \frac{NOPLAT}{IC}$
<b>Free Cash Flow</b>	$\sum \frac{FCF_i}{(1+WACC)^t} + \frac{FCF_1}{(WACC-g)} \frac{1}{(1+WACC)^t}$	$\sum \frac{CFE_i}{(1+COE)^t} + \frac{CFE_1}{(COE-g)} \frac{1}{(1+COE)^t}$	$WACC = (\frac{E}{V} \times R_E) + (\frac{P}{V} \times R_P) + (\frac{D}{V} \times R_D)(1 - T_C)$
<b>Economic Profit</b>	$IC_0 + \sum \frac{IC_{t-1}(ROIC-WACC)}{(1+WACC)^t} + \frac{IC_0(ROIC_1-WACC_1)}{WACC_1-g} \frac{1}{(1+WACC)^t}$	$TE_0 + \sum \frac{TE_{t-1}(ROE-COE)}{(1+COE)^t} + \frac{TE_0(ROE_1-COE_1)}{COE_1-g} \frac{1}{(1+COE)^t}$	$FCF = NOPLAT + D\&A - \Delta NWC - NCS$
<b>Adjusted Present Value</b>	$\sum \frac{FCF_i}{(1+k_u)^t} + \frac{FCF_1}{(k_u-g)} \frac{1}{(1+k_u)^t} + \sum \frac{Tax\ Shield_i}{(1+k_{tax})^t} + \frac{Tax\ Shield_1}{(k_{tax}-g)} \frac{1}{(1+k_{tax})^t}$		$TS = Interest\ Paid(T)$ $FCF = \frac{NOPLAT(1-\frac{g}{ROIC})}{WACC-g}$
<b>Forward Multiple</b>	$\sum \frac{FCF_t}{(1+WACC)^t} + \frac{EBIT_1 \times FMM}{(1+WACC)^t}; \quad FMM = \frac{EV_0}{EBIT_0}$	$\sum \frac{CFE_t}{(1+COE)^t} + \frac{EBIT_1 \times FMM}{(1+COE)^t}; \quad FMM = \frac{EV_0}{EBIT_0}$	$ROE = \frac{NI}{TE}$ $ROA = \frac{NI}{TA}$
			$COE = (\frac{E}{V} \times R_E) + (\frac{P}{V} \times R_P)$
			$D' = (1 - D\&A)$ $CFE = NI - \Delta TE - OCI$
			$M = \frac{EBIT}{Sales}$ $T' = (1 - T)$

Asset Based Firms		
Multiple	Equational Form	g Solution
$\frac{EV}{Sales}$	$\frac{ROIC-g}{ROIC(WACC-g)} (1-T)(M)$	$\frac{ROIC[(T' \times EBIT)-(EV \times WACC)]}{(T' \times EBIT)-(EV \times ROIC)}$
$\frac{EV}{EBITDA}$	$\frac{ROIC-g}{ROIC(WACC-g)} (1-T)(1-D)$	$\frac{ROIC[(T' \times EBIT)-(EV \times WACC)]}{(T' \times EBIT)-(EV \times ROIC)}$
$\frac{EV}{EBIT}$	$\frac{ROIC-g}{ROIC(WACC-g)} (1-T)$	$\frac{ROIC[(T' \times EBIT)-(EV \times WACC)]}{(T' \times EBIT)-(EV \times ROIC)}$
$\frac{EV}{NOPLAT}$	$\frac{ROIC-g}{ROIC(WACC-g)}$	$\frac{ROIC[NOPLAT-(EV \times WACC)]}{NOPLAT-(EV \times ROIC)}$
$\frac{EV}{FCF_{OPS}}$	$\frac{ROIC-g}{ROIC(WACC-g)} (1-T)$	$\frac{ROIC[(T' \times EBIT)-(EV \times WACC)]}{(T' \times EBIT)-(EV \times ROIC)}$
$\frac{EV}{FCF_{ENT}}$	$\frac{1}{WACC-g}$	$\frac{(EV \times WACC)-FCF_{ENT}}{EV}$
$\frac{EV}{IC}$	$\frac{ROIC-g}{ROIC(WACC-g)} (ROIC) = \frac{ROIC-g}{WACC-g}$	$\frac{NOPLAT-(EV \times WACC)}{IC-EV}$
$\frac{EV}{Units}$	$\frac{ROIC-g}{ROIC(WACC-g)} \times \frac{NOPLAT}{Units}$	$\frac{ROIC \times [NOPLAT-(EV \times WACC)]}{NOPLAT \times (EV \times ROIC)}$

g Solution		
$\frac{EV}{EBIT} = \frac{NOPLAT_1(1-\frac{g}{ROIC})}{WACC-g}$	$EV = \frac{(1-T)(1-\frac{g}{ROIC})}{WACC-g}$	
$\widehat{EV} = PV_{CV} = \frac{FCF_1}{(1+WACC)^t}$	$Let\ WACC' = (1+WACC)^t$	$g = \frac{(\widehat{EV} \times WACC' \times WACC) - FCF}{\widehat{EV} \times WACC'}$

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

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