Advanced Discounted Cash Flow (DCF) Valuation Using R

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R output formatted in Excel (reference next sheet)

Details of Text Valuation Models

Miscellaneous

LEEPV	Noncircular Asset Valuation. Alternative to APV model. No separate discounting of tax shields
LEEDE	Noncircular, lagged Market 'Debt-to-Equity' Ratio
LEEDA	Noncircular, lagged Market 'Debt Ratio'
LEEIET3	Noncircular 3rd term in After-tax WACC (Adjustment is made to WACCbt)

Discount Rate Legend

WACC	Circular 'After-tax' WACC discount rate
LEEWACC	Noncircular 'After-tax' WACC discount rate
WACCbt	Circular 'Pretax' WACC discount rate
LEEWACCbt	Noncircular 'Pretax' WACC discount rate
LEEPT	Noncircular discount rate for discounting 'Pretax FCFF'
Ke	Circular levered cost of equity discount rate
LEEKe	Noncircular levered cost of equity discount rate
Ku	Unlevered cost of equity
Kd	Cost of debt discount rate
Rf	Risk-free rate discount rate

N/a

General Case (Kd <> r_debt)
Special Case (Kd = r_debt)
N/a

Noncircular solution
Circular solution

No, N/a

ALL UNIFIED DCF VALUATION RESULTS

Debt Valuation	Equity Valuation	Asset Valuation						Circular Solutions			Noncircular Solutions			Forward Rate Discounting			Spot Rate Discounting			Flow Definitions			Discount Rates		
A	B	A + B	R Model #	Valuation Description	Calculations	Case	R function name	Debt Value	Equity Value	Asset Value	Debt Value	Equity Value	Asset Value	Debt Value	Equity Value	Asset Value	Debt Value	Equity Value	Asset Value	Debt Value	Equity Value	Asset Value	Debt Value	Equity Value	Asset Value
$281,414			1	Debt valuation @ Kd			debt_value				Direct			Yes			Yes			CFd			Kd		
	$1,110,517		2	Equity valuation @ Ku			equity_value					Direct			Yes			Yes			ECF			Ku	
	$1,110,517		3	Equity valuation @ circular Ke			equity_value_circ		Direct						Yes			Yes			ECF			Ke	
	$1,110,517		4	Risk-adjusted ECF Equity valuation @ Ku | uses Circular Ke|			equity_value_circ_2		Direct						Yes			Yes			ECF Adj.			Ku	
		$1,391,932	5	Asset valuation @ WACC as a function of Ku			asset_value_circ			Direct						Yes			Yes			FCFF			WACC; Ku
		$1,391,932	6	Asset valuation @ Ku			asset_value						Direct			Yes			Yes			FCFF Adj.			Ku
		$1,391,931	7	Asset valuation summing Methods 7 (Debt) & 8 (Equity)			asset_value_2						Sum							CFd	ECF Adj.		Kd	Ku	
		$1,391,932	8	Asset valuation using LEEPV model @ Kd_Ku_Kd_Ku			asset_value_LEEPV				Direct	Residual	Direct	Yes		Yes			Yes			CCF + Adj.	Kd		Kd + Ku + (Kd)(Ku)
		$1,391,932	9	Asset valuation of unlevered firm + value of tax shields			asset_value_apv						Direct			Yes			Yes			FCFF + Adj.			Ku
		$1,391,932	10	Asset valuation using adjusted CCF @ Ku			asset_value_ccf						Direct			Yes			Yes			CCF + Adj.			Ku
		$1,391,932	11	Asset valuation @ LEEWACCbt			asset_value_ccf_LEEWACCbt						Direct			Yes			Yes			CCF			LEEWACCbt
		$1,391,932	12	Asset valuation @ LEEWACC			asset_value_fcff_LEEWACC						Direct			Yes			Yes			FCFF			LEEWACC
	$1,110,517		13	Equity valuation @ LEEKe			equity_value_ecf_LEEKe					Direct			Yes			Yes			ECF		LEEKe	
Stand alone R Code			14	Fernandez article - Valuation using LEEKe, LEEWACC & LEEWACCbt			only_APV				Direct	Direct	Direct	Yes	Yes	Yes				CFd	ECF	FCFF, CCF	Kd	LEEKe	LEEWACC, LEEWACCbt
$281,414	$1,110,517	$1,391,931	15	Equity valuation @ LEEKe = f(b)			equity_value_LEEKe				Direct	Direct	Sum	Yes	Yes			Yes		CFd	ECF		Kd	LEEKe = f(b)	
$281,414	$1,110,518	$1,391,932	16	Asset valuation @ LEEWACC = f(c)			asset_value_LEEWACC				Direct	Residual	Direct	Yes		Yes			Yes	CFd		FCFF	Kd		LEEWACC = f(c)
$281,414	$1,110,517	$1,391,932	17	Asset valuation @ LEEWACCbt = f(d)			asset_value_LEEWACCbt				Direct	Residual	Direct	Yes		Yes			Yes	CFd		CCF	Kd		LEEWACCbt = f(d)
$281,414	$1,110,517	$1,391,931	18	Equity valuation @ Ke defined as a function of LEEDE			equity_value_Ke_LEEDE				Direct	Direct	Sum	Yes	Yes			Yes		CFd	ECF		Kd	Ke = f(LEEDE)	
$281,414		$1,391,932	19	Asset valuation using circular 3-term WACC = f(Ke,Kd)			asset_value_3_term_WACC_LEEIET3	Direct	Residual	Direct				Yes		Yes			Yes	CFd		FCFF	Kd		3-term WACC = f(Ke,Kd)
$281,414		$1,391,932	20	Asset valuation using circular 3-term WACC = f(Ku)			Same as above	Direct	Residual	Direct				Yes		Yes			Yes	CFd		FCFF	Kd		3-term WACC = f(Ku)
$281,414	$1,110,518	$1,391,932	21	Asset valuation using noncircular 3-term WACC = f(Ke,Kd)			Same as above				Direct	Residual	Direct	Yes		Yes			Yes	CFd		FCFF	Kd		3-term WACC = f(Ke,Kd)
$281,414	$1,110,518	$1,391,932	22	Asset valuation using noncircular 3-term WACC = f(Ku)			Same as above				Direct	Residual	Direct	Yes		Yes			Yes	CFd		FCFF	Kd		3-term WACC = f(Ku)
$281,414		$1,391,932	23	Asset valuation using circular 3-term WACCbt = f(Ke,Kd)			asset_value_2_term_WACCbt	Direct	Residual	Direct				Yes		Yes			Yes	CFd		CCF	Kd		2-term WACCbt = f(Ke,Kd)
$281,414		$1,391,932	24	Asset valuation using circular 2-term WACCbt = f(Ku)			Same as above	Direct	Residual	Direct				Yes		Yes			Yes	CFd		CCF	Kd		2-term WACCbt = f(Ku)
$281,414	$1,110,518	$1,391,932	25	Asset valuation using noncircular 2-term WACCbt = f(Ke,Kd)			Same as above				Direct	Residual	Direct	Yes		Yes			Yes	CFd		CCF	Kd		2-term WACCbt = f(Ke,Kd)
$281,414	$1,110,518	$1,391,932	26	Asset valuation using noncircular 2-term WACCbt = f(Ku)			Same as above				Direct	Residual	Direct	Yes		Yes			Yes	CFd		CCF	Kd		2-term WACCbt = f(Ku)
$281,414		$1,391,932	27	Asset valuation using 2 noncircular methods (LEEShield)			asset_value_apv_3				Direct		Direct			Yes / DVTS			Yes / DVTS			FCFF + (IE)(T)			Ku; LEEShield
$281,414	$1,110,518	$1,391,932	28	Risk-adjusted FCFF Asset valuation @ Ku | uses Circular WACC|			asset_value_circ_2	Direct	Residual	Direct				Yes		Yes			Yes	CFd		FCFF\\Ku			Ku
$281,414	$1,110,518	$1,391,932	29	Certainty Equivalent Asset valuation @ Rf | uses circular WACC|			asset_value_CE_Rf	Direct	Residual	Direct				Yes		Yes			Yes	CFd		FCFF + Adj.			Rf
$281,414	$1,110,518	$1,391,932	30	Certainty Equivalent Equity valuation @ Rf | uses circular Ke|			equity_value_CE_Rf	Direct	Direct	Sum					Yes			Yes			ECF Adj.			Rf	
$281,414			31	Certainty Equivalent Debt valuation @ Rf rate			debt_value_CE_Rf	Direct						Yes			Yes			CFd Adj.			Rf		
$281,414			32	Noncircular' Debt valuation @ Rf rate			debt_value_Rf				Direct			Yes			Yes			CFd Adj.			Rf		
$281,414	$1,110,517	$1,391,931	33	Equity valuation using 'Adjusted' ECF @ Rf rate			equity_value_Rf_rate_LEEKe_adj				Direct	Direct	Sum	Yes	Yes			Yes			ECF Adj.		Kd	Rf	
$281,414	$1,110,518	$1,391,932	34	Asset valuation using 'Adjusted' FCFF @ Rf rate			Asset_value_Rf_rate_LEEKWACC_adj				Direct	Residual	Direct	Yes		Yes			Yes	CFd		FCFF Adj.	Kd		Rf
$281,414	$1,110,517	$1,391,932	35	Asset valuation using 'Adjusted CFF' @ Rf rate			Asset_value_Rf_rate_LEEKWACCbt_adj				Direct	Direct	Direct	Yes		Yes			Yes	CFd		CFF Adj.	Kd		Rf
$281,414	$1,110,517	$1,391,931	36	Equity valuation using EP Method @ circular Ke			equity_value_EP_circ_2	Direct	Direct	Sum				Yes	Yes			Yes / EP		CFd	EP #2			Ke	
$281,414	$1,110,518	$1,391,932	37	Asset valuation Discounting EVA @ WACC - Method 1			asset_value_EVA_circ_1	Direct	Residual	Direct				Yes		Yes			Yes	CFd		EVA1	Kd		3-term WACC = f(Ke,Kd)
$281,414	$1,110,518	$1,391,932	38	Asset valuation Discounting EVA @ WACC - Method 2			asset_value_EVA_circ_2	Direct	Residual	Direct				Yes		Yes			Yes	CFd		EVA2	Kd		3-term WACC = f(Ke,Kd)
$281,414	$1,110,518	$1,391,932	39	Asset valuation Discounting EVA @ WACC - Method 3			asset_value_EVA_circ_3	Direct	Residual	Direct				Yes		Yes			Yes	CFd		EVA3	Kd		3-term WACC = f(Ke,Kd)
Stand alone R Code			40	Treasury Spot & Forward Rate calculations used in CAPM																					
Stand alone R Code			41	Utility Ratemaking - Present Value of Revenue Requirements (PVRR)			PUF_article_NPV_PVRR				Direct	Residual	Direct	Yes		Yes				CFd		FCFF	Kd		LEEWACC
$281,414	$1,110,518	$1,391,932	42	Asset valuation Discounting 'Pretax FCFF' @ LEEPT			asset_value_Pretax_FCFF				Direct	Residual	Direct	Yes		Yes			Yes	CFd		FCFFpt	Kd		LEEPT