

Fast DCF model

FINANCE TOYS

In this spreadsheet we will create a DCF model but we'll do it fast using very rough estimates and some tricks. The example may help you to understand the logic of DCF model. Also sometimes you have to do things like this at work because you simply don't have time to dig in details. Simple does not mean bad. When you logically simplify your model you often come up with more accurate projections.

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We'll use financials of one American company which name we won't disclose to avoid any complaints. We'll use 2008-2010 data for our model.

Please remember that some calculations will be simplified to a great extent (for the sake of the speed) and some approaches shouldn't be used in the detailed complicated models (for M&A or LBO, for example). Some formulas may look inappropriate although their logic is correct. All that is done for the simplicity of the model.

STEP 1 Understanding of what we need for the model

We use 10-K form to insert key numbers in our model. This form is usually available on companies' website or at <http://www.sec.gov/edgar.shtml> for the stocks traded in US

First we present a final form for DCF model (it's empty for now), so we understand which numbers we need to get from financial reports.

The basic idea of DCF model: we need to find free cash flows for the forecasting period (FCF= Fully taxed EBIT + DD&A - investments), calculate Terminal value, discount everything to current moment in time and that's it.

Basically we just need to fill the data in the table below and the model is ready

DCF model	2011F	2012F	2013F	2014F	2015F
EBIT (or operating profit)					
Tax rate					
Fully taxed EBIT (NOPAT)					
DD&A					
Unleveraged cash flows					
Investments (or CAPEX)					
Movements in working capital					
Unleveraged free cash flows					
Terminal value					
Net debt					
WACC					
Terminal growth rate					
NPV					

For now we leave this table empty

Where do we get all the data? - From company's financial reports. We will mark red all the important inputs

The last row (NPV) is the fair value that we get for the end of every year
 EBIT (Earnings before interest and tax) or operating income comes from the Income statement
 Tax rate - is the corporate tax rate in the country where the company operates (our company is incorporated in US)
 Fully taxed EBIT or NOPAT (net operating profit after tax)
 DD&A - depreciation, depletion and amortization
 Unleveraged cash flows = Fully taxed EBIT + DD&A
 Investments or CAPEX (capital expenditure) - we get it from Cash flow statement
 Movements in working capital (WC) is calculated using the Balance Sheet items
 Net debt also comes from the Balance sheet
 WACC - weighted average cost of equity. It's calculation will be shown below
 Note: F is for forecast

STEP 2 Forecasting income statement

It's important to understand that we can't forecast income statement, balance sheet and cash flows statement one after the other. We have to leave some items for later because they are linked to other forms.

As it is a short model, we'll use financial data only for three years (2008, 2009, 2010). And only for two years (2009, 2010) for the Balance sheet. We start with the Income statement.

We ignore full costs breakdown and put only DD&A, other costs, total operating costs and net interest expense.

We use the financials of oil company and therefore our forecast will be pretty much straightforward: we assume that the revenue is driven primarily by the oil price (WTI - West Texas Intermediate). We get the oil price forecast from Bloomberg terminal using the function CPF <GO>. If you don't have the terminal we recommend to use the current oil price and adjust it for US inflation (CPI) every year.

Income statement	2008	2009	2010	2011	2012F	2013F	2014F	2015F
Oil price (\$/bbl)	98	62	79	110	100	110	117	115
in \$mn	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Revenue	821	370	438	610	555	610	649	638
DD&A	-222	-166	-163	-181	-187	-193	-200	-206
Other operating costs	-226	-155	-168	-280	-232	-267	-290	-275
Total operating costs	-448	-321	-331	-460	-419	-460	-490	-481
EBIT (operating income)	373	49	108	150	136	150	160	157
Net interest expense	-31	-31	-33	-33	-33	-33	-33	-33
Other non-operating expense/income	-754	-83	0	0	0	0	0	0
Profit before tax	-413	-65	74	117	103	117	126	123
Tax expense (benefits)	156	26	-28	-41	-36	-41	-44	-43
tax rate	35%	35%	35%	35%	35%	35%	35%	35%
tax rate actual	neg.	neg.	37,5%					
other	-3	-0	-0					
Net income	-260	-39	46	76	67	76	82	80

To make forecasts for 2011-2015 we'll use the table below

Ratios table which will help us to forecast	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Oil price growth		-37%	27%	39%	-9%	10%	6%	-2%
Revenue change		-55%	18%	39%	-9%	10%	6%	-2%
EBIT margin	45%	13%	25%	25%	25%	25%	25%	25%
Net interest expense as % of total debt		6,5%	7,1%	7,1%	7,1%	7,1%	7,1%	7,1%

COMMENTS

Taken from Bloomberg terminal

Changes in line with oil price change

We calculate it as a percentage of Property and Equipment (simplified formula)

Calculated backwards, i.e. Revenue minus EBIT

First input to our DCF model. Calculated using EBIT margin

Constant percentage of total debt (simplified calculation)

This line is too volatile and non-sustainable, we just ignore it

EBIT minus financial expenses

Profit before tax multiplied by tax rate. US corporate tax rate is 35%

Official corporate tax rate

Actual tax rate base on historical data

We do not calculate deferred tax income/loss for time saving purposes

Profit before tax minus tax expense

COMMENTS

We assume that the revenue will change in line with oil price change

We use 2010 EBIT margin for the whole forecasting period (can also use average)

Total debt = Long-term debt + Short-term debt (from balance sheet)

STEP 3 Forecasting Balance sheet

Now we make Balance sheet forecast
Again we use only the most important items from the balance sheet

in \$mn	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Cash and equivalents	38	86	196	273	370	474	568	
Accounts receivable	54	47	65	59	65	70	68	
Other current assets	16	27	27	27	27	27	27	
Total current assets	109	161	161	161	161	161	161	161
Property and equipment	1 316	1 573	1 626	1 682	1 739	1 798	1 859	
Other long-term assets	10	13						
Total non-current assets	1 326	1 586	1 626	1 682	1 739	1 798	1 859	1 859
Total assets	1 435	1 746	1 787	1 843	1 900	1 959	2 020	2 020
Accounts payable and accrued liabilities	61	82	114	103	114	121	119	
Short-term debt	0	0	0	0	0	0	0	
Other	43	81	81	81	81	81	81	
Total current liabilities	104	163	195	184	195	202	200	200
Long-term debt	471	472	472	472	472	472	472	
Other long-term liabilities	181	232	232	232	232	232	232	
Total non-current liabilities	652	704	704	704	704	704	704	704
Equity	679	880	889	955	1 001	1 053	1 117	1 117
Total liabilities and equity	1 435	1 746	1 787	1 843	1 900	1 959	2 020	2 020
check	0	0	0	0	0	0	0	0
Ratios table which will help us to forecast	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Receivables turnover ratio	6.83	9.33	9.33	9.33	9.33	9.33	9.33	9.33
Payables turnover ratio	5.28	4.05	4.05	4.05	4.05	4.05	4.05	4.05
DDA as % of Property and equipment	0.13	0.10	0.11	0.11	0.11	0.11	0.11	0.11

COMMENTS

Cash comes from Cash flow statement. It should always be positive!
We calculate it using receivables turnover ratio (in the table below)
Leave this line unchanged

We add CAPEX and subtract DD&A. Simplified calculation.

We calculate it using payables turnover ratio (in the table below)
Debt changes via the Statement of cash flows (see the link in the cell)
Leave this line unchanged

Debt changes via the Statement of cash flows (see the link in the cell)
Leave this line unchanged

It's a little trick. We determine Equity extracting liabilities from total assets

COMMENTS

We use simplified formulas in calculations. Correct formulas are shown below
Correct formula for that is: Net credit sales/Average accounts receivables
Correct formula for that is: Cost of goods sold/Average accounts payables
We need that ratio to forecast DD&A

STEP 4 Forecasting Cash flow statement

in \$mn	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Cash flows from operating activities								
Net income	-260	-39	46	150	136	150	160	157
EBIT				181	187	193	200	206
DD&A	222	166	163					
Other adjustments	604	98	49					
Operating cash flow before changes in WC	566	225	258	331	323	343	359	363
(Increase) decrease in accounts receivable	26	3	-7	-18	6	-6	-4	1
Increase (decrease) in accounts payable	-4	2	0	32	-10	10	7	-2
Change in other WC items	0	-4	8					
Total change in WC	22	1	1	14	-4	4	3	-1
Net cash flow from operating activities	588	226	259	344	319	347	362	362
Cash flows from investing activities								
Capital expenditures (CAPEX)	-675	-215	-354	-234	-242	-250	-259	-268
Other	81	36	5					
Net cash used in investing activity	-594	-179	-349	-234	-242	-250	-259	-268
Cash flows from financing activities								
Proceeds from long-term debt	0	221	0					
Payments of long-term debt	-6	-331	0					
Proceeds from short-term debt								
Payments of short-term debt								
Net proceeds from issuances of stocks	9	110	143					
Other	-2	-9	-5					
Dividend payouts								
Net cash provided by financing activities	1	-8	137	0	0	0	0	0
Net increase/decrease in cash	-5	38	48	110	77	97	103	95
Cash at the beginning of the year	6	0	38	86	196	273	370	474
Cash at the end of the year	0	38	86	196	273	370	474	568

COMMENTS

Different adjustments in cash flow statement are often not sustainable and sometimes it's better just to ignore them and focus on core numbers

We introduce this line for simplicity and time saving purposes.

Calculated as a constant share of property and equipment

We ignore that because it's time consuming to project different items

In fact we use EBITDA (EBIT + DD&A) as a proxy for operating cash flows

CAPEX is one of the most important lines in the whole model. But now we calculate it as a fixed share of DD&A

Non-sustainable volatile items. We ignore them for the sake of simplicity

Use these 4 lines to adjust cash flows. You need to have positive cash at the end of the year. You can achieve that by regulating company's debt. Ideally you should dig into 10-K filing to find a debt maturity schedule. But we're not looking for perfection right now.

We introduce this line. If you see that the company generates too much cash you may assume that it will pay some dividends

The sum of operating, investing and financing cash flows

CAPEX calculation

CAPEX/DD&A	3.04	1.30	2.18	1.30	1.30	1.30	1.30	1.30
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To be honest capex deserves detailed calculation because it often determines company's growth. But for the sake of simplicity we will assume that the company invests proportionally to DD&A, i.e. it not only replaces old (depreciated) assets but also constantly buy new assets proportionally.

NOTE: As you may see, a lot of calculations were simplified, which is actually not that bad. We do not build this model for merger or acquisition purposes. It looks more like a buy-side model for some asset management company. PMs often use a very simple way to determine FCF (free cash flow = operating cash flows - investing cash flows); they just extract CAPEX from EBITDA and that's it. EBITDA is a good proxy for operating cash flows while CAPEX is a good proxy for cash flow from investing because the majority of smaller items are often non sustainable and projecting them correct is a real pain in the ass.

STEP 5 Check your financials model

To check your model calculate basic financial ratios and see if there any rapid changes in ratios which look not logical

Liquidity ratios	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Current ratio	1.05	0.99	0.83	0.87	0.87	0.83	0.80	0.80
Cash ratio	0.37	0.53	1.01	1.48	1.90	2.34	2.84	2.84
Profitability ratios								
Return on Assets (ROA)	-3%	3%	4%	4%	4%	4%	4%	4%
Return on Equity (ROE)	-6%	5%	9%	7%	8%	8%	7%	7%
EBIT margin	45%	13%	25%	25%	25%	25%	25%	25%
EBITDA margin	72%	58%	62%	54%	58%	56%	55%	57%
Net margin	-32%	-11%	11%	12%	12%	12%	13%	13%

Current assets/Current liabilities

(Cash + cash equivalents + invested funds)/Current liabilities

Net income/Average total assets (we don't use average for simplicity)

Net income/Average equity (we don't use average for simplicity)

EBIT/Revenue. The higher - the better

EBITDA/Revenue. The higher - the better

Net income/revenue. The higher - the better

	2008	2009	2010	2011F	2012F	2013F	2014F	2015F
Solvency ratios								
Total debt/EBITDA		2,19	1,74	1,43	1,46	1,37	1,31	1,30
Interest coverage ratio	11,99	1,61	3,22	4,49	4,08	4,49	4,77	4,69
Debt-to-Equity ratio		0,69	0,54	0,53	0,49	0,47	0,45	0,42
Performance ratios								
Cash flow-to-revenue	0,72	0,61	0,59	0,56	0,57	0,57	0,56	0,57
Cash return-on-assets		16%	15%	19%	17%	18%	18%	18%
Cash return-on-equity		33%	29%	39%	33%	35%	34%	32%

The lower - the better. Compare it with sector's average value
EBIT/Interest expense. The higher the better
Total debt/Equity.
Cash flows from operations/Revenue. The higher - the better
Cash flows from operations/Total assets. The higher - the better
Cash flows from operations/Equity. The higher - the better

IF you want to know more different ratios used in financial analysis you can download our FREE iPhone app <http://itunes.apple.com/app/cfaformula/id456730098?mt=8>
 OR you can find these formulas on our website in CFA exam section http://www.financetoys.com/cfa/cfa_financials.html

STEP 6 Calculation of WACC

The detailed explanation of WACC calculation can be found here <http://www.financetoys.com/valuation/wacceng.htm>
 You can also download our iPhone app for calculation of WACC here <http://itunes.apple.com/app/informs/id444850569?mt=8>
 You can find WACC calculation in Bloomberg terminal (use function <Ticker> <Equity> <wacc> + Enter)
 Or calculate Beta manually using our tutorials <http://www.financetoys.com/risk/udbetaeng.htm>

WACC calculation

Cost of equity	5,6%
Rf (Risk free rate)	2,0%
Rm (market return)	5,0%
B (Beta)	1,2
Cost of debt	7,1%
Tax rate	35%
Market capitalization (\$mn)	1 481
Total debt (\$mn)	472
Weight of equity	75,8%
Weight of debt	24,2%
WACC	5,4%

STEP 7 Calculation of fair value

Now we need a DCF model table from STEP 1
 We just fill the table with values calculated above

	2011F	2012F	2013F	2014F	2015F
EBIT (or operating profit)	150	136	150	160	157
Tax rate	35%	35%	35%	35%	35%
Fully taxed EBIT	98	89	98	104	102
DD&A	181	187	193	200	206
Unleveraged cash flows	278	275	291	303	308
Investments (or CAPEX)	-234	-242	-250	-259	-268
Movements in working capital	14	-4	4	3	-1
Unleveraged free cash flows	58	29	45	48	40
Terminal value					2 604
Net debt	275	199	101	-2	-97
WACC					5,4%
Terminal growth rate					1%
NPV	1 817	1 948	2 131	2 309	2 480

COMMENTS

From income statement
 From income statement
 EBIT x (1 - tax rate)
 From income statement or cash flows statement
 Fully taxed EBIT (NOPAT) + DD&A
 From cash flow statement.
 From balance sheet or Cash flow statement
 We added and extracted DD&A to demonstrate the logic for terminal value, i.e. we show that we invest only to compensate DD&A
 The rate of growth after the forecasting period
 We use NPV function in excel to calculate the fair value of the company at the end of each year

We came with a fair value of \$1 948mn for the company at the end of 2012. We do not disclose the name of the company but it's current market capitalization is \$1481mn.
 Thus our fair value implies a 31.5% upside potential to the current price by the end of this year ((1948/1481 - 1) x 100)
 If you need to find stock's fair value - simply divide the fair value (\$1 948mn) by the number of shares

That's it.

If you have any questions or comment - mail me iamanalista@gmail.com
 Or write something in the comments section on the page with this model <http://www.financetoys.com/valuation/valmodels.html>