Dupont Identity and Growth Rates[1]
In-Class Problem[2]

The subject firm in this problem set is National Media Management, a Utah based LLC from 1994 through 1999. The Income Statement, Balance Sheet, and Other Financial Information used herein are also used in other In-Class Problems in support of building a body of Corporate Finance In-Class Problems.

Suppose that you're the CFO of a small media management firm, National Media Management (NMM)[3], with the attached balance sheet, income statement, and other financial data. You know that your CEO has been in talks with a major competitor regarding purchasing your firm and you've been asked to provide some important cash flow figures. The firm considering acquiring NMM will be backed by a private equity firm and you need to be as clear as possible with respect to what values should be reported based on traditional finance practices.

The private equity managers are sticklers when it comes to understanding return on assets (ROA) and return on equity (ROE), so much so that they insist on not only seeing calculations for these measures, but also for validating them with alternative measures, and decomposing these measures to isolate potential problems or opportunities. You know that some ways of doing this can be accomplished through the Dupont Identity, the Internal Growth Rate and the Sustainable Growth Rate.

a. Use the Dupont Identity to calculate the Return on Equity for this firm.

ROE = PM * TAT * EM

PM = Profit margin = Net Income / Sales

$= \frac{352{,}875}{9{,}687{,}246} = 0.0364$ or 3.64%

TAT = Total asset turnover = Sales / Total Assets

$= \frac{9{,}687{,}246}{3{,}271{,}807} = 2.96$

EM = Equity multiplier = Total Assets / Total Equity = 1 + D/E ratio

$= \frac{3{,}271{,}801}{1{,}959{,}504} = 1.67$

ROE = .0364 x 2.96 x 1.67 = .1799 or 17.99%

Which seems high, so let's see if we can't validate it through the basic formula for ROE

ROE = Net Income / Total Equity = NI/TE = Basic Formula

$= \frac{352{,}875}{1{,}959{,}504} = .1801 = 18.01\%$

And this is virtually the same value excepting for some minor rounding differences.

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[1] This problem and solution set is intended to present an abbreviated discussion of the included finance concepts and is not intended to be a full or complete representation of them or the underlying foundations from which they are built.

[2] This problem set was developed by Richard Haskell, PhD (rhaskell@westminstercollege.edu), Gore School of Business, Westminster College, Salt Lake City, Utah (2015).

[3] While National Media Management is the name of an actual firm incorporated in the State of Utah from 1994-1999, the values presented are not representative of actual firm values.

b. What is the return on asset (ROA) rate for this firm using a Dupont style disaggregation?

ROA = $\frac{\textbf{Net Income}}{\textbf{Total Assets}} = \frac{\textbf{352,875}}{\textbf{3,271,807}} = \mathbf{.1079}$ **or 10.79%**

$= \frac{\textbf{Net Income}}{\textbf{Sales}} \; \boldsymbol{x} \; \frac{\boldsymbol{Sales}}{\boldsymbol{Total\ Equity}} \boldsymbol{x} \frac{\boldsymbol{Total\ Equity}}{\textbf{Total Assets}}$

$= \frac{\textbf{352,875}}{\textbf{9,687,246}} \boldsymbol{x} \frac{\textbf{9,687,246}}{\textbf{1,959,504}} \boldsymbol{x} \frac{\textbf{1,959,504}}{\textbf{3,271,807}}$

$= \; .0364 \; x \; 4.94 \; x \; .5989 = \; .1077$ or 10.77%

And this is virtually the same value excepting for some minor rounding differences.

c. What is the functional difference between ROE and ROA?

ROE measures the efficiency of a firm's operation as a function of its total equity, while ROA measures the firm's efficiency as a function of its assets. While we might argue that the firm's assets are there as a direct result of its equity shareholder's investment, we must also recognize that assets come about through debt capital and equity is at least partially a function of retained earnings, which is more a management result than an investor result.

d. Why might an analyst want to use the Dupont Identity to derive ROE or ROA rather than the basic ROE and ROA formulae?

While a firm's ROE and ROA are important to would-be investors and current shareholders alike, decomposing these return oriented ratios into their component parts might often help us see problem areas on which the firm's management might make improvements, or opportunities through which the firm might profit.

e. What is this firm's Internal Growth rate (IGR)?

To measure a firm's IGR we must establish its retention ratio or "b". The retention ratio $\frac{Net\ Income - Dividends\ Paid}{Net\ Income}$ and is simply a ratio of the retained earnings (Net Income – Dividends Paid) to Net Income.

$b = \frac{352{,}875-(25{,}317+20{,}000)}{352{,}875}$ = 0.8716 or 87.16% - the firm retains 87% of its earnings for internal investment and growth

$$\mathrm{IGR} = \frac{\mathrm{ROA\ x\ b}}{1-\mathrm{ROA\ x\ b}}$$

$= \frac{.1079\ \mathrm{x}\ .8716}{1-.1079\ \mathrm{x}\ .8716} = .\frac{.09405}{.906}$ = 0.1038 or 10.38%

f. What is the firm's Sustainable Growth Rate (SGR)?

$$\text{SGR} = \frac{\text{ROE x b}}{1-\text{ROE x b}}$$

$$= \frac{.18 \text{ x } .8716}{1-.18 \text{ x } .8716} = \frac{.1569}{.8431} = .1861 \text{ or } 18.61\%$$

g. What is the firm's Dividend Payout Ratio and what does it represent?

Dividend Payout Ratio = $\frac{\text{Cash Dividends}}{\text{Net Income}} = \frac{45{,}317}{352{,}875}$ = 0.1284 or 12.84%

= 1 - b = 1 - 0.8716 = 0.1284 or 12.84%

The dividend payout ratio is the corollary of the firm's "plow back ratio" (retention ratio). It represents the firm's dividend distribution to investors as a function of its net income, while the retention ratio represents the net income the firm plows back into itself for growth and investment purposes.

h. What is the functional difference between a firm's IGR and SGR?

The IGR informs us of the rate of growth a firm can attain via internal resources (accumulated retained earnings and existing productive capital assets), while the SGR lets us know what type of growth the firm might be able to sustain over time with given its equity capital structure and ability to attract debt financing, while keeping its debt ratio constant.

National Media Management
Balance Sheet
as of December 31

	2013	2014		2013	2014
Current Assets			Liabilitites		
Cash	213,960	243,850	Accounts Payable	214,414	192,480
Accounts Receivable	651,552	858,318	Total	214,414	192,480
Inventory	*621,807*	*712,296*			
Total	1,487,319	1,814,464			
			Long Term Debt		
Fixed Assets			Mortgages (interest only)	271,700	285,300
Buildings	722,862	757,328	Credit Line	99,022	134,508
Equipment	378,522	425,015	Bonds	628,522	700,015
Technology	250,000	275,000	Total	999,244	1,119,823
Total	1,351,384	1,457,343			
			Owner's Equity		
Total Assets	2,838,703	3,271,807	Common Stock	292,564	319,465
			Preferred Stock	200,000	200,000
			Accumulated Retained Earnings	1,132,481	1,440,039
	-	-	Total	1,625,045	1,959,504
			Total Liabilities and Owner's Equity	2,838,703	3,271,807

Additional Financial Information

Preferred Stock			Common Stock	
Shares Outstanding		200,000	Shares Outstanding	319,465
12/31 Price per Share		1.65	12/31 Price per Share	13.75
Market Value (Market Cap)		330000	Market Value (Market Cap)	4,392,644
Bonds ($1,000 face value)			Beta	1.3
Coupon Rate	5.00%		R_M	12.00%
YTM	7.00%		R_F	2.00%
Years Remaining	20			
P/YR	2		Book Value / Liabilities	1,312,303

National Media Management
Income Statement
January 1 - December 31, 2014

Sales	
Products	7,535,221
Services	2,152,025
Total Sales	9,687,246
Expenses - COGS	
Admin and Mgt	852,873
Production	1,529,884
Materials	6,524,879
Depreciation	145,734
Total Expenses - COGS	9,053,370
EBIT (Operating Income)	633,876
Non-Operating Expense	
Credit Line Interest Expense	44,579
Mortgage Interest Expense	11,412
Bond Interest Expense	35,001
Total Non-Operating Expense	90,992
Pre-Tax Income	542,884
Tax (35%)	190,009
Net Income	352,875
Distribution of Earnings	
Dividends (Common)	25,317
Dividends (preferred)	20,000
Addition to Retained Earnings	307,558