

9. A Financial Tool You Can Use: The DuPont Profitability Model

Brian Briggeman

<bbrigg@k-state.edu>

Brian Briggeman is an Associate Professor in Agricultural Economics at KSU, and the Director of the Arthur Capper Cooperative Center. His research and extension program include topics on agricultural finance, agribusiness and cooperative management and macroeconomic implications for U.S. agriculture. He also teaches agricultural finance. Prior to joining KSU, Brian was an economist with the Federal Reserve Bank of Kansas City. He holds a bachelor's degree in agribusiness from KSU, an M.S. degree in agricultural economics from Texas A&M University and a Ph.D. degree in agricultural economics from Purdue University. He is originally from Iuka, Kansas where his parents own and operate the family farm.

Abstract/Summary

Making sound financial decisions about your farming operation is critical to near and long-term success. These decisions can become quite complex because one financial decision can have a ripple effect, positive or negative, throughout your entire farm. While unraveling and discussing all of these decisions can take days if not months to figure out, there is one straightforward financial model that can help start the process of identifying financial areas to fix and/or growth opportunities. In this session, Dr. Brian Briggeman will introduce and apply the DuPont Model to Kansas farmers by discussing the fundamentals of maximizing return on equity (ROE). For more, please read the following article:

http://www.agweb.com/topproducer/article/financial_decisions_made_easy_NAA_Ed_Clark/

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2014 Risk & Profit Conference and Trade Show

August 21-22, 2014
Manhattan, KS

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The importance of understanding ROE

- Ensuring the firm continues to generate efficient and sufficient returns to equity is critical for any firm
 - When I think about ensuring the long-term profitability of any firm, it is all about ROE
- According to Warren Buffett, ROE is one of the most important factors in making successful stock investments
- Also, ROE tells the financial story of the firm

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**WHAT'S OUR APPROACH / COMPETITIVE
ADVANTAGE IN MAXIMIZING RETURN ON
EQUITY (ROE)?
IS IT FROM OPERATIONS? FINANCES?**

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Profitability Analysis

The DuPont Model


Article in Top Producer,
“Financial Decisions Made Easy”

http://www.agweb.com/topproducer/article/financial_decisions_made_easy_NA_A_Ed_Clarke/

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Financial Linkage Model

- Developed in 1919 by DuPont 
- Needed a way to easily assess financial position
 - Operating Performance
 - Financial Performance
- Links key financial ratios we have discussed

Breaking down ROE tells us a lot... DuPont Model

$$\text{ROE} = \text{Earnings} \times \text{Turns} \times \text{Leverage}$$

Name that FIRM!

- Using only the key ratios in a DuPont Analysis, match the mystery firm with the following firms:
 - Average Kansas Farmer (2010 KFMA data)
 - Walmart
 - Chesapeake Energy Corporation
 - American Express

$$\text{ROE} = \text{EARNINGS} \times \text{TURNNS} \times \text{LEVERAGE}$$

Name that FIRM!

Firm #1	Firm #2	Firm #3	Firm #4
EARNNS = 0.038	EARNNS = 0.213	EARNNS = 0.485	EARNNS = 0.022
TURNS = 2.33	TURNS = 0.213	TURNS = 0.3	TURNS = 0.312
ROA = 8.9%	ROA = 4.5%	ROA = 14.6%	ROA = 6.49%
LEVERAGE = 2.64	LEVERAGE = 10.8	LEVERAGE = 2.17	LEVERAGE = 0.31
ROE = 23.5%	ROE = 49.0%	ROE = 31.6%	ROE = 7.33%

Data for DuPont Analysis

1. Gross Revenue (Sales)
 2. Other Income
 3. Variable Expense
 4. Fixed Expense
 5. Interest Expense
 6. Total Assets
 7. Total Liabilities
 8. Equity (Net Worth)
- Income Statement**
- Balance Sheet**

Focusing on Operating Performance

- The first set of calculations in the DuPont model is on the firm's operating performance
- Operating performance primarily focuses on:
 - Margins earned
 - Efficiently turning assets
- The ultimate measure of operating performance is return on assets or ROA

DuPont Analysis Operating Performance

- Operating Profit Margin

$$\left[\begin{array}{l} \text{Net Income} \\ + \\ \text{Interest Expense} \end{array} \right] + \text{Gross Revenues} = \begin{array}{l} \text{Operating} \\ \text{Profit} \\ \text{Margin} \end{array}$$

EARN!

DuPont Analysis Operating Performance

- Asset Turnover Ratio

$$\frac{\text{Gross Revenues} + \text{Total Assets}}{\text{Total Assets}} = \frac{\text{Asset Turnover Ratio}}{\text{Asset Turnover Ratio}}$$

TURN!

DuPont Analysis Operating Performance

- Return on Assets (ROA)

$$\begin{array}{rcl} \text{Operating} & & \text{Asset} \\ \text{Profit Margin} & \times & \text{Turnover} & = & \text{ROA} \\ \text{Ratio} & & \text{Ratio} & & \\ \text{EARNINGS} & \times & \text{TURNS} & = & \text{ROA} \end{array}$$

Focusing on Financial Performance

- The second set of calculations in the DuPont model is on the firm's financial performance
- Financial performance primarily focuses on:
 - Cost of debt
 - Capital structure
- Combining financial performance measures with the operating performance measures return on equity or ROE

DuPont Analysis Financial Performance

- Return on Equity (ROE)

$$\text{ROA} + \left\{ \text{ROA} - \frac{\text{Interest Expense}}{\text{Total Liabilities}} \right\} \times \left\{ \frac{\text{Total Liabilities}}{\text{Total Equity}} \right\} = \text{ROE}$$

Spread between ROA and Average Cost of Debt

Leverage

HOW CAN FIRMS USE DEBT TO INCREASE THEIR EQUITY?

Relationship between ROA and ROE

- A key financial relationship exists between ROA and ROE
- Since ROA includes farm interest expense and ROE subtracts farm interest expense out...
 - The cost of credit provides a link between the two profitability measures
 - This calculation is called the average Cost of Debt (COD)

$$\text{COD} = \frac{\text{Interest Expense}}{\text{Total Liabilities}}$$

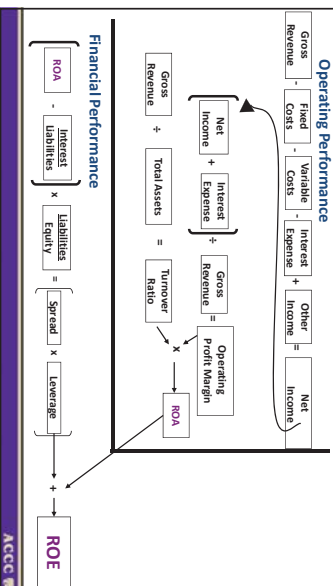
- Why do you not want COD > ROA?

Relationships between ROA, COD, and ROE

- If COD > ROA, then increasing the level of debt in the business will reduce equity growth and therefore reduce ROE
 - COD > ROA > ROE
 - In this case, debt is bad...you want to reduce debt
- If ROA > COD, then increasing the level of debt in the business will increase equity growth and ROE
 - ROE > ROA > COD
 - In this case, debt is okay...you MAY want to use debt
- If ROA = COD, then ROE = ROA = COD

DuPont Analysis

Putting it all together

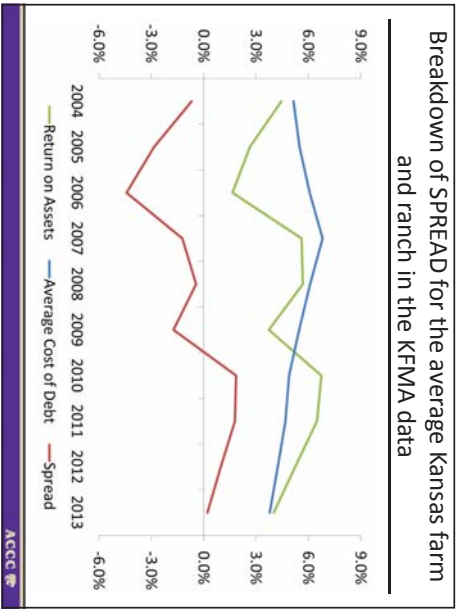
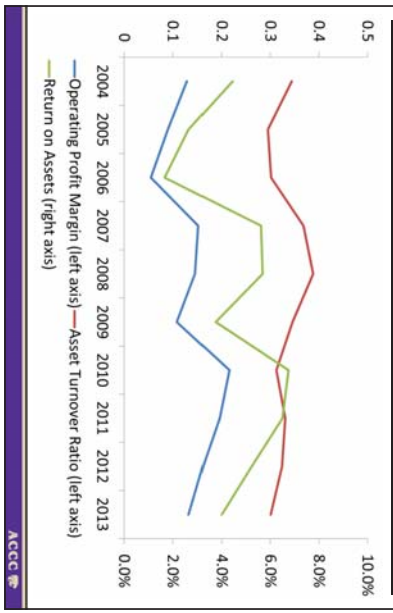


LET'S WALK THROUGH THE DUPONT EXCEL SPREADSHEET USING KFMA DATA

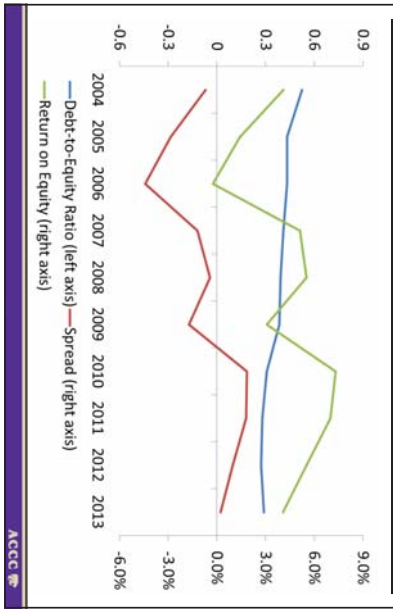
Enter the data for your business in the "Data Input Area" cells below. The spreadsheet will automatically calculate all other cells.

Data Input Area		Operating Profit Margin		Return on Assets		Debt-to-Equity Ratio		Return on Equity	
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Net Operating Income									
Fixed Expenses									
Variable Expenses									
Other Income									
Other Expenses									
Total Assets									
Total Liabilities									
Total Equity									
Operating Profit Margin									
Return on Assets									
Debt-to-Equity Ratio									
Return on Equity									

Operating performance for the average Kansas farm and ranch in the KFMA data



Financial performance for the average Kansas farm and ranch in the KFMA data



Implications

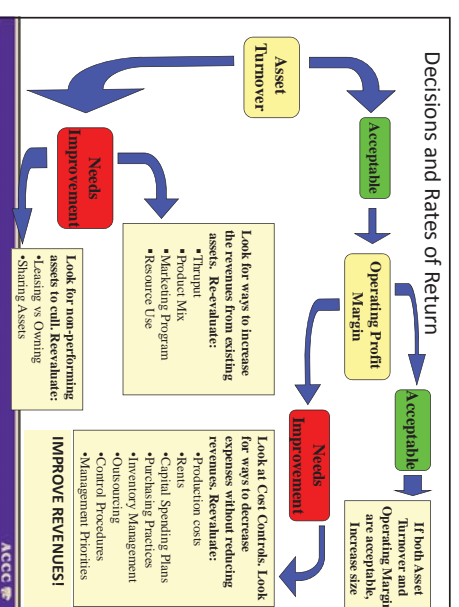
- If ROE > ROA
 - Cost of Debt (COD) less than ROA
 - Making money on borrowed money
 - Increase ROE by borrowing more (but be careful)

Implications

- If ROE < ROA
 - Cost of Debt (COD) greater than ROA
 - Losing money on borrowed money
 - Reduce interest cost
 - Reduce debt
 - Improve operating performance (ROA)

Improving Performance

- Ways to enhance operating performance (ROA)
 - Increase operating profit margin
 - Increase volume per dollar invested or capital turnover
- Ways to enhance equity return (ROE)
 - Enhance operating performance
 - Reduce financing costs
 - Leverage – more debt (BUT BE CAREFUL)



Thank you

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