

Using Multiples¹ In-Class Problem²

The subject firm in this problem set is Jensen Agri Business, Inc., a fictional firm for which hypothetical values have been presented. 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.

You've been tasked to consider the value of Jensen Agri Business, Inc. (JAB) pursuant to potentially taking an equity stake in the firm. JAB is a domestic grower of agricultural products in the Intermountain West with an operations-centric and focused asset portfolio. The firm includes an innovative research and development unit specializing in genetic seed modification integral to its ongoing operations.

While the firm has significant amounts of cash it also carries substantial inventory and accounts receivable on its books. The firm's record of profits and growth since its incorporation in 1980 have been consistent, if not stellar, and could be bolstered by expanding its genetic seed distribution beyond the region. Your express interest in a potential investment in the firm is for the purpose of funding an expansion of its genetic R&D activities based on the premise the firm will license certain new technologies to you, which you then plan to use to manufacture and distribute GMO seed products to other growers in both the domestic and international markets.

In so doing you've decided to evaluate the firm through various multiples, including its PE and EV/EBITA ratios, and to then consider its ability to grow with or without additional capital resources.

You've received the attached financial statement data along with the following details:

- **The dividend on the common stock is fixed at 15% of EPS**
- **The firm refinanced certain real estate holdings with a mortgage refinance in 2011 in the amount of \$675,440,000 on a 30 year, 5.25% fixed rate mortgage with monthly payments**
- **The firm's bonds are in the form of 30 year term bonds issued in 2005 with a \$1,000 face value, 8% coupon rate, and the bonds pay interest twice yearly and have a 10 year call restriction.**
- **The firm's long-term debt in 2010 equaled \$1,125,515,000**
- **The firm's gross revenues in 2010 equaled \$1,218,644,000**
- **Assume the firm's ROIC, WACC and g for 2015 are expected to be equal to those of 2014 (this may not necessarily be the case, but make this assumption regardless).**

Additionally, you've estimated your investment and involvement in the firm will increase per share earnings for 2015 to \$4.83 based on a revenue increase of 12.77%. Your research reveals the average PE ratio in JAB's industry grouping (farming/agriculture) is at 28.88 for 2014 with trailing and forward multiples of 30.17 and 25.35 respectively, earnings growth of 14.63% over the next 5 years, and price earnings to growth ratio of .93 (NYU Sterns³). Given your aggressive growth plans for the firm, you've chosen to consider a forward valuation based on a 30 times multiple.

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 http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/pedata.html

1. Why might you choose to invest in JAB's combined agricultural production and genetic modification operations rather than seek to acquire the firm's technology unit?

The combination of these business units (farm production and technology) provide a framework for Jensen to test its modified seed products prior to releasing to the market. It also allows Jensen to gain some market advantage by having a lower cost of production or better quality production output than its competitors, presuming the modified seed products are effective. Finally, firms engaged in vertical market integration often lead their respective industries as the result of being on the front lines of production and product development – an investment in Jensen may offer this advantage to your client.

2. Calculate the market value of the firm's capital components for years 2011 – 2014

The market value of common and preferred stock taken as the 12/31 price per share for each year x shares outstanding. The market value of the mortgages taken as the book value. The market value of the bonds derived from for the bond valuation formula:

$$\text{Bond Value} = C \frac{\left[1 - \frac{1}{(1+YTM)^N}\right]}{YTM} + \frac{F}{(1+YTM)^N} \quad \text{this can also be calculated as a PV equation}$$

	2011	2012	2013	2014	2015
Common Stock	1,415,625.00	1,493,750.00	1,553,125.00	1,650,000.00	1,811,250.00
Preferred Stock	121,875.00	122,813.00	122,500.00	123,125.00	123,125.00
Mortgages	675,440.00	667,345.00	659,368.00	650,145.00	642,325.00
Bonds	637,468.79	649,231.86	711,719.67	730,805.48	721,762.40
Total	2,850,408.79	2,933,139.36	3,046,712.67	3,154,075.48	3,298,462.40

3. Calculate the firm's ROIC, g, and WACC for years 2011 – 2014

For this question the following relationships are operative:

- ROIC = NOPLAT/IC
- NOPLAT = ((EPS x Shares Outstanding) + Interest + taxes)(1- Tax rate)
- IC = NWC + FA
- g = % Δ Revenues
- $WACC = \left(\frac{E}{V} \times R_E\right) + \left(\frac{P}{V} \times R_P\right) + \left(\frac{D}{V} \times R_D\right) (1 - T_C)$
- E = book value of common stock
- P = book value of preferred stock
- D = book value of debt
- $R_D = \frac{\text{Interest}_t}{\text{Debt}_{t-1}}$
- $R_P = R_F + \beta(R_M - R_F)$ *this is the CAPM equation for Preferred*
- $R_E = R_F + \beta(R_M - R_F)$ *this is the CAPM equation for Common*
- Tax rate = Taxes Paid/(Net Income + Taxes Paid)

	2011	2012	2013	2014	Forecast 2015
Invested Capital	1214500	1212600	1238500	1283000	1283000
NOPLAT	103,227.466	102,367.577	100,897.213	101,008.861	106,198.675
ROIC	0.0850	0.0844	0.0815	0.0787	0.0828
g	0.0237	0.0252	0.0352	0.0369	0.1277
R_D = YTM	0.0500	0.0480	0.0400	0.0370	0.0370
R_E (CAPM)	0.1344	0.0985	0.0863	0.0978	0.0978
R_P (CAPM)	0.0596	0.0596	0.0544	0.0540	0.0498
E	500,000	500,000	500,000	500,000	500,000
P	75,000	75,000	75,000	75,000	75,000
D	1,125,440	1,117,345	1,109,368	1,100,145	1,092,325
V	1,700,440	1,692,345	1,684,368	1,675,145	1,667,325
WACC	0.0668	0.0554	0.0477	0.0497	0.0497
Tax Rate	0.2537	0.2537	0.2537	0.2537	0.2537

4. Identify the firm's PE ratios for years 2011-2014

For this question use the EPS data as given:

Common Stock	2011	2012	2013	2014	2015
12/31 Price per Share	113.25	119.50	124.25	132.00	144.90
P/E Multiple	28.37	29.20	30.08	30.82	30.00
EPS	3.99	4.09	4.13	4.28	4.83

5. Calculate the firm's EV/EBITA ratios for 2011-2014 based on traditional measures

For this question the following relationships are operative:

- $EV = \text{Market Value of Common and Preferred Stock} + \text{Book value of debt} - \text{Cash}$
- $EBITA = \text{NOPLAT} / (1 - \text{Tax rate})$

	2011	2012	2013	2014	2015
EBITA	138,324.805	137,172.553	135,202.266	135,351.874	142,306.224
Tax Rate	0.2537	0.2537	0.2537	0.2537	0.2537
Enterprise Value	2,537,260.0	2,598,907.5	2,646,043.0	2,735,305.0	1,606,700.0
EV/EBITA Traditional	18.3428	18.9463	19.5710	20.2088	20.2711

6. Calculate the firm's EV/EBITA ratios for 2011-2014 based on the market based measures

For this question the following relationships are operative:

- EV = Market value of all stock + Market Value of Debt
- EBITA = NOPLAT/(1-Tax rate)

	2011	2012	2013	2014	2015
Enterprise Value	2,850,408.79	2,933,139.36	3,046,712.67	3,154,075.48	3,298,462.40
EV/EBITA Market	20.6066	21.3828	22.5345	23.3028	23.1786

7. Calculate the firm's value based on a KVD model only for 2011 -2014

For this question the following relationships are operative:

$$\text{Value}_{\text{KVD}} = \frac{\text{EBITA}(1-T)\left(1-\frac{g}{\text{ROIC}}\right)}{\text{WACC}-g} = \frac{\text{NOPLAT}\left(1-\frac{g}{\text{ROIC}}\right)}{\text{WACC}-g}$$

	2011	2012	2013	2014	2015
CV_{KVD}	1,724,901.35	2,378,136.55	4,586,877.43	4,170,960.60	738,805.05

8. Calculate the firm's EV/EBITA ratios for 2011-2014 based on the KVD formulation

	2011	2012	2013	2014	2015
EV/EBITA KVD	10.8032	14.3079	19.3763	17.3687	5.8850

9. Discuss the differences you observe in the EV/EBITA ratios calculated using the differing metrics and what these might portend for the firm's real value

The values are quite different owing to the differing values for Enterprise Value, which is to be expected as each valuation metric assesses the firm's value differently. The traditional form of Enterprise Value looks at the market capitalization of all stock + book value of debt – cash whereas the market form looks at the market capitalization of all stock + market value of all debt. For these two metrics to result in the same values the following relationship would have to hold: the book value of debt – cash = market value of debt. However, there's simply no rationale credibly connecting these terms. For Value_{KVD} to equal the market based EV the KVD model would have to pick up both the firm's equity and debt values, which the KVD model simply does not do.

The relevant issue however, isn't whether or not these EV/EBITA forms are equal to each other across valuation metrics, but how changes in EV/EBITA from one period to another, or from one firm to another, relate. EV/EBITA is simply a ratio and like most we've considered is only truly useful as a comparative tool.

10. Calculate the firm's IGR and SGR for 2011-2014

For this question the following relationships are operative:

- $ROE = NI/TE$
- $TE = \text{Book Value of Stock} + \text{Accumulated Retained Earnings}$
- $NI = EPS \times \text{Common Shares Outstanding}$
- $ROA = NI/TA$
- $TA = \text{Current Assets} + \text{Fixed Assets}$
- $\text{Retention Ratio} = (NI - \text{Dividends Paid})/NI = b$
- $ROE = PM \times TAT \times EM$
- $PM = NI/\text{Revenues}$
- $TAT = \text{Revenues} / TA$
- $EM = TA / TE$

	2011	2012	2013	2014	2015
IGR	0.0231	0.0236	0.0216	0.0210	0.0246
ROA	0.0371	0.0374	0.0342	0.0329	0.0369
Total Assets	1346364.53	1367404.54	1507571.60	1628952.83	1635381.25
b	0.6095	0.6154	0.6176	0.6259	0.6512
SGR	0.0395	0.0382	0.0363	0.0359	0.0399
ROE	0.0623	0.0598	0.0567	0.0554	0.0590
Total Equity	800620.00	855033.86	910516.31	966404.48	1023910.65
NI	49898.66	51155.82	51633.14	53536.66	60375.00
ROE (Dupont)	0.0623	0.0598	0.0567	0.0554	0.0590
PM	0.04	0.04	0.039	0.039	0.039
TAT	0.9265	0.9353	0.8782	0.8427	0.9466
EM	1.6817	1.5992	1.6557	1.6856	1.5972

11. Discuss how these growth rates relate to the growth rates observed and expectations for growth the firm has expressed.

We see the firm's growth rates for 2011-2014, as expressed through the variable g , as contributing to value creation for the same years. The growth rates (g) average 3.025% for these years and are within the range of sustainable growth rates (SGR) of 3.59 – 3.95% for the same period, and only marginally higher than growth rates which might be internally supported of 2.1 – 2.31%. During these years we see forecasted value increases from \$1,724,901 to \$4,170,960 compared to the firm's equity market cap (market value of all outstanding stock) ranging from \$1,537,500,000 – \$1,773,127,000 – so the market values the firm's stock slightly more highly than does the firm at the beginning of this period and lower than the firm by the end of the period.

The firm's forecasted growth rate of 12.77% for 2015 actually leads to a significant decline in value from \$4,170,960 in 2014 to \$738,805 – a dramatic decline by any measure, begging the question,, "Why?" There are at least two immediately plausible rationale for this decline, which may also shed light on why the firm's forecasted value is not correlated to its market value in 2011-2014: 1) the firm's value isn't a function of revenue growth (g), but a function of NOPLAT growth, which declined

between 2011-2014, but increased in 2015 beyond 2011 levels; and 2) the growth rate of 12.77% is neither internally supported nor sustainable for 2015 as reflected by the firm's IGR and SGR, 2.46% and 3.99% respectively.

This lack of internal growth support as observed through the firm's IGR would suggest the firm can only attain and maintain such growth levels with additional external funding; which might be a reason the firm is open to outside investment and may be considered in possible negotiations.

Following are some of the model forms operative in this problem set:

$$R_D = \frac{\text{Interest}_t}{\text{Debt}_{t-1}}$$

$$R_P = R_F + \beta(R_M - R_F) \text{ this is the CAPM equation for Preferred}$$

$$R_E = R_F + \beta(R_M - R_F) \text{ this is the CAPM equation for Common}$$

$$WACC = \left(\frac{E}{V} \times R_E\right) + \left(\frac{P}{V} \times R_P\right) + \left(\frac{D}{V} \times R_D\right) (1 - T_C)$$

$$\text{Bond Value} = C \left[\frac{1 - \frac{1}{(1+YTM)^N}}{YTM} \right] + \frac{F}{(1+YTM)^N} \text{ this can also be calculated as a PV equation}$$

$$\text{Value}_{KVD} = \frac{EBITA(1-T)\left(1 - \frac{g}{ROIC}\right)}{WACC - g} = \frac{NOPLAT\left(1 - \frac{g}{ROIC}\right)}{WACC - g}$$

$$ROA = NI / TA$$

$$ROE = NI / TE$$

$$ROE_{\text{DUPONT}} = PM * TAT * EM$$

$$PM = \text{Net Income} / \text{Sales}$$

$$TAT = \text{Sales} / \text{Total Assets}$$

$$EM = \text{Total Assets} / \text{Total Equity}$$

Retention ratio: b

$$b = \frac{NI - \text{Dividends}}{NI} = \frac{EPS - DPS}{EPS}$$

Payout Ratio: $1-b$

$$1 - b = \frac{\text{Dividends}}{NI} = \frac{DPS}{EPS}$$

Recall Sustainable and Internal Growth Rates:

$$SGR = \frac{ROE \times b}{1 - (ROE \times b)}$$

$$IGR = \frac{ROA \times b}{1 - (ROA \times b)}$$

Jensen Agri Business, Inc. Select Financials					
aggregate values in 1,000's					
Balance Sheet Data					
	2011	2012	2013	2014	Forecast 2015
Cash	125,680	135,000	138,950	137,965	142,000
Long Term Debt					
Mortgages	675,440	667,345	659,368	650,145	642,325
Bonds	450,000	450,000	450,000	450,000	450,000
Total Long Term Debt	1,125,440	1,117,345	1,109,368	1,100,145	1,092,325
Stock					
Common Stock	500,000	500,000	500,000	500,000	500,000
Preferred Stock	75,000	75,000	75,000	75,000	75,000
Total Stock	575,000	575,000	575,000	575,000	575,000
Accumulated Retained Earnings	225,620	280,034	335,516	391,404	448,911
Current Assets (includes cash)	143,144.53	152,904.54	157,021.60	156,702.83	163,131.25
Current Liabilities	131,864.53	154,804.54	269,071.60	345,952.83	352,381.25
Fixed Assets	1,203,220	1,214,500	1,350,550	1,472,250	1,472,250
Income Statement Data					
Revenues	1,247,466.51	1,278,895.55	1,323,926.79	1,372,734.99	1,548,076.92
Taxes Paid	16,965.55	17,392.98	17,555.27	18,202.47	20,527.50
Interest Expense					
Mortgages	35,460.60	32,623.75	30,013.85	27,612.74	25,403.72
Bonds	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00
Total Interest Expense	71,460.60	68,623.75	66,013.85	63,612.74	61,403.72
Market Data					
Equities					
JAB Common Beta	1.180	1.170	1.140	1.130	1.130
JAB Preferred Beta	0.980	0.980	0.970	0.960	0.990
Market rate: Common	0.120	0.090	0.080	0.090	0.090
Market rate: Preferred	0.060	0.060	0.055	0.055	0.050
Risk Free rate	0.040	0.040	0.035	0.030	0.030
Debt					
Market YTM	0.05	0.048	0.04	0.037	0.037
Common Stock					
Shares Outstanding	12,500	12,500	12,500	12,500	12,500
12/31 Price per Share	113.25	119.50	124.25	132.00	144.90
P/E Multiple	28.37	29.20	30.08	30.82	30.00
EPS	3.99	4.09	4.13	4.28	4.83
Dividends Per Share	0.60	0.61	0.62	0.64	0.72
Market Value	1,415,625	1,493,750	1,553,125	1,650,000	1,811,250
Preferred Stock Value					
Shares Outstanding	2,500	2,500	2,500	2,500	2,500
12/31 Price per Share	48.75	49.125	49.00	49.25	49.25
Dividends Per Share	4.80	4.80	4.80	4.80	4.80
Market Value	121,875	122,813	122,500	123,125	123,125