SAP: Status Quo

Avg Reinvestment rate = 36.94%

Return on Capital 19.93%

Current Cashflow to Firm
EBIT(1-t) :   1414
- Nt CpX   831
- Chg WC   - 19
= FCFF   602
Reinvestment Rate = 812/1414
              =57.42%

Reinvestment Rate
57.42%

Expected Growth in EBIT (1-t)
.5742*.1993=.1144
11.44%

Stable Growth
g = 3.41%; Beta = 1.00;
Debt Ratio= 20%
Cost of capital = 6.62%
ROC= 6.62%; Tax rate=35%
Reinvestment Rate=51.54%

Terminal Value$_{10}$= 1717/(.0662-.0341) = 53546

First 5 years

Growth decreases gradually to 3.41%

Year	1	2	3	4	5	6	7	8	9	10	Term Yr
EBIT	2,483	2,767	3,083	3,436	3,829	4,206	4,552	4,854	5,097	5,271	5451
EBIT(1-t)	1,576	1,756	1,957	2,181	2,430	2,669	2,889	3,080	3,235	3,345	3543
- Reinvestm	905	1,008	1,124	1,252	1,395	1,501	1,591	1,660	1,705	1,724	1826
= FCFF	671	748	833	929	1,035	1,168	1,298	1,420	1,530	1,621	1717

Op. Assets   31,615
+ Cash: 3,018
- Debt   558
- Pension Lian   305
- Minor. Int.   55
=Equity   34,656
-Options   180
Value/Share106.12

Cost of Capital (WACC) = 8.77% (0.986) + 2.39% (0.014) = 8.68%

Debt ratio increases to 20%
Beta decreases to 1.00

On May 5, 2005, SAP was trading at 122 Euros/share

Cost of Equity 8.77%

Cost of Debt
(3.41%+..35%)(1-.3654)
= 2.39%

Weights
E = 98.6% D = 1.4%

Riskfree Rate:
Euro riskfree rate = 3.41%

+

Beta
1.26

X

Risk Premium
4.25%

Unlevered Beta for Sectors: 1.25

Mature risk premium 4%

Country Equity Prem 0.25%

SAP : Optimal Capital Structure

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	1.25	8.72%	AAA	3.76%	36.54%	2.39%	8.72%	$39,088
10%	1.34	9.09%	AAA	3.76%	36.54%	2.39%	8.42%	$41,480
20%	1.45	9.56%	A	4.26%	36.54%	2.70%	8.19%	$43,567
30%	1.59	10.16%	A-	4.41%	36.54%	2.80%	7.95%	$45,900
40%	1.78	10.96%	CCC	11.41%	36.54%	7.24%	9.47%	$34,043
50%	2.22	12.85%	C	15.41%	22.08%	12.01%	12.43%	$22,444
60%	2.78	15.21%	C	15.41%	18.40%	12.58%	13.63%	$19,650
70%	3.70	19.15%	C	15.41%	15.77%	12.98%	14.83%	$17,444
80%	5.55	27.01%	C	15.41%	13.80%	13.28%	16.03%	$15,658
90%	11.11	50.62%	C	15.41%	12.26%	13.52%	17.23%	$14,181

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SAP: Restructured

Avg Reinvestment rate = 36.94%

Reinvest more in emerging markets

Return on Capital 19.93%

Current Cashflow to Firm
EBIT(1-t) :   1414
- Nt CpX   831
- Chg WC   - 19
= FCFF   602
Reinvestment Rate = 812/1414
=57.42%

Reinvestment Rate 70%

Expected Growth in EBIT (1-t)
.70*.1993=.1144
13.99%

Stable Growth
g = 3.41%; Beta = 1.00;
Debt Ratio= 30%
Cost of capital = 6.27%
ROC= 6.27%; Tax rate=35%
Reinvestment Rate=54.38%

First 5 years

Growth decreases gradually to 3.41%

Terminal Value$_{10}$= 1898/(.0627-.0341) = 66367

Year	1	2	3	4	5	6	7	8	9	10	Term Yr
EBIT	2,543	2,898	3,304	3,766	4,293	4,802	5,271	5,673	5,987	6,191	6402
EBIT(1-t)	1,614	1,839	2,097	2,390	2,724	3,047	3,345	3,600	3,799	3,929	4161
- Reinvest	1,130	1,288	1,468	1,673	1,907	2,011	2,074	2,089	2,052	1,965	2263
= FCFF	484	552	629	717	817	1,036	1,271	1,512	1,747	1,963	1898

Op. Assets   38045
+ Cash: 3,018
- Debt   558
- Pension Lian   305
- Minor. Int.   55
=Equity   40157
-Options   180
Value/Share 126.51

Cost of Capital (WACC) = 10.57% (0.70) + 2.80% (0.30) = 8.24%

Cost of Equity 10.57%

Cost of Debt
(3.41%+1.00%)(1-.3654)
= 2.80%

Weights
E = 70% D = 30%

On May 5, 2005, SAP was trading at 122 Euros/share

Use more debt financing.

Riskfree Rate:
Euro riskfree rate = 3.41%

+

Beta 1.59

X

Risk Premium 4.50%

Unlevered Beta for Sectors: 1.25

Mature risk premium 4%

Country Equity Prem 0.5%

Blockbuster: Status Quo

Current Cashflow to Firm
EBIT(1-t) :   163
- Nt CpX   39
- Chg WC   4
= FCFF   120
Reinvestment Rate = 43/163
                    =26.46%

Reinvestment Rate
26.46%

**Expected Growth
in EBIT (1-t)**
.2645*.0406=.0107
1.07%

Return on Capital
4.06%

Stable Growth
g = 3%; Beta = 1.00;
Cost of capital = 6.76%
ROC= 6.76%; Tax rate=35%
Reinvestment Rate=44.37%

Terminal Value$_5$= 104/(.0676-.03) = 2714

Op. Assets   2,472
+ Cash: 330
- Debt   1847
=Equity   955
-Options   0
Value/Share $ 5.13

	1	2	3	4	5	Term Yr
EBIT (1-t)	$165	$167	$169	$173	$178	184
- Reinvestment	$44	$44	$51	$64	$79	82
FCFF	$121	$123	$118	$109	$99	102

Discount at Cost of Capital (WACC) = 8.50% (.486) + 3.97% (0.514) = 6.17%

**Cost of Equity
8.50%**

Cost of Debt
(4.10%+2%)(1-.35)
= 3.97%

Weights
E = 48.6% D = 51.4%

Riskfree Rate:
Riskfree rate = 4.10%

+

Beta
1.10

X

Risk Premium
4%

Unlevered Beta for
Sectors: 0.80

Firm's D/E
Ratio: 21.35%

Mature risk
premium
4%

Country
Equity Prem
0%

Blockbuster: Restructured

Current Cashflow to Firm
EBIT(1-t) :   249
- Nt CpX   39
- Chg WC   4
= FCFF   206
Reinvestment Rate = 43/249
                  =17.32%

Reinvestment Rate
17.32%

Return on Capital
6.20%

**Expected Growth
in EBIT (1-t)**
.1732*.0620=.0107
1.07%

Stable Growth
g = 3%; Beta = 1.00;
Cost of capital = 6.76%
ROC= 6.76%; Tax rate=35%
Reinvestment Rate=44.37%

Terminal Value$_5$= 156/(.0676-.03) = 4145

Op. Assets   3,840
+ Cash: 330
- Debt   1847
=Equity   2323
-Options   0
Value/Share $ 12.47

	1	2	3	4	5	Term Yr
EBIT (1-t)	$252	$255	$258	$264	$272	280
- Reinvestment	$44	$44	$59	$89	$121	124
FCFF	$208	$211	$200	$176	$151	156

Discount at Cost of Capital (WACC) = 8.50% (.486) + 3.97% (0.514) = 6.17%

**Cost of Equity
8.50%**

Cost of Debt
(4.10%+2%)(1-.35)
= 3.97%

Weights
E = 48.6% D = 51.4%

Riskfree Rate:
Riskfree rate = 4.10%

+

Beta
1.10

X

Risk Premium
4%

Unlevered Beta for
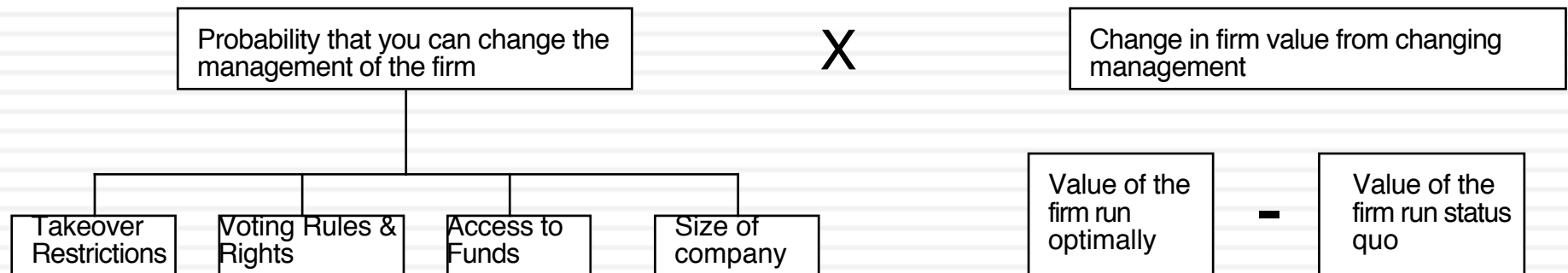Sectors: 0.80

Firm's D/E
Ratio: 21.35%

Mature risk
premium
4%

Country
Equity Prem
0%

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The Expected Value of Control

The Value of Control

Probability that you can change the management of the firm	X	Change in firm value from changing management

Takeover Restrictions	Voting Rules & Rights	Access to Funds	Size of company

Value of the firm run optimally	**-**	Value of the firm run status quo

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Why the probability of management changing shifts over time….

- <u>Corporate governance rules can change over time</u>, as new laws are passed. If the change gives stockholders more power, the likelihood of management changing will increase.

- <u>Activist investing ebbs and flows</u> with market movements (activist investors are more visible in down markets) and often in response to scandals.

- Events such as <u>hostile acquisitions</u> can make investors reassess the likelihood of change by reminding them of the power that they do possess.

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Estimating the Probability of Change

□ You can estimate the probability of management changes by using historical data (on companies where change has occurred) and statistical techniques such as probits or logits.

□ Empirically, the following seem to be related to the probability of management change:

  ◘ Stock price and earnings performance, with forced turnover more likely in firms that have performed poorly relative to their peer group and to expectations.

  ◘ Structure of the board, with forced CEO changes more likely to occur when the board is small, is composed of outsiders and when the CEO is not also the chairman of the board of directors.

  ◘ Ownership structure, since forced CEO changes are more common in companies with high institutional and low insider holdings. They also seem to occur more frequently in firms that are more dependent upon equity markets for new capital.

  ◘ Industry structure, with CEOs more likely to be replaced in competitive industries.

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Manifestations of the Value of Control

☐ Hostile acquisitions: In hostile acquisitions which are motivated by control, the control premium should reflect the change in value that will come from changing management.

☐ Valuing publicly traded firms: The market price for every publicly traded firm should incorporate an expected value of control, as a function of the value of control and the probability of control changing.

  ◼ Market value = Status quo value + (Optimal value – Status quo value)* Probability of management changing

☐ Voting and non-voting shares: The premium (if any) that you would pay for a voting share should increase with the expected value of control.

☐ Minority Discounts in private companies: The minority discount (attached to buying less than a controlling stake) in a private business should be increase with the expected value of control.

1. Hostile Acquisition: Example

- In a hostile acquisition, you can ensure management change after you take over the firm. Consequently, you would be willing to pay up to the optimal value.

- As an example, Blockbuster was trading at $9.50 per share in July 2005. The optimal value per share that we estimated as $ 12.47 per share. Assuming that this is a reasonable estimate, you would be willing to pay up to $2.97 as a premium in acquiring the shares.

- Issues to ponder:
  - Would you automatically pay $2.97 as a premium per share? Why or why not?
  - What would your premium per share be if change will take three years to implement?

2. Market prices of Publicly Traded Companies: An example

□ The market price per share at the time of the valuation (May 2005) was roughly $9.50.

  ❑ Expected value per share = Status Quo Value + Probability of control changing * (Optimal Value – Status Quo Value)

  ❑ $ 9.50 = $ 5.13 + Probability of control changing ($12.47 - $5.13)

□ The market is attaching a probability of 59.5% that management policies can be changed. This was after Icahn's successful challenge of management. Prior to his arriving, the market price per share was $8.20, yielding a probability of only 41.8% of management changing.

	Value of Equity	Value per share
Status Quo	$ 955 million	$ 5.13 per share
Optimally mana ged	$2,323 million	$12.47 per share

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Value of stock in a publicly traded firm

- ☐ When a firm is badly managed, the market still assesses the probability that it will be run better in the future and attaches a value of control to the stock price today:

$$\text{Value per share } = \frac{\text{Status Quo Value } + \text{ Probability of control change (Optimal } - \text{ Status Quo Value)}}{\text{Number of shares outstanding}}$$

- ☐ With voting shares and non-voting shares, a disproportionate share of the value of control will go to the voting shares. In the extreme scenario where non-voting shares are completely unprotected:

$$\text{Value per non - voting share } = \frac{\text{Status Quo Value}}{\text{\# Voting Shares } + \text{ \# Non - voting shares}}$$

$$\text{Value per voting share } = \text{Value of non - voting share } + \frac{\text{Probability of control change (Optimal } - \text{ Status Quo Value)}}{\text{\# Voting Shares}}$$

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3. Voting and Non-voting Shares: An Example

- To value voting and non-voting shares, we will consider Embraer, the Brazilian aerospace company. As is typical of most Brazilian companies, the company has common (voting) shares and preferred (non-voting shares).
  - Status Quo Value = 12.5 billion $R for the equity;
  - Optimal Value = 14.7 billion $R, assuming that the firm would be more aggressive both in its use of debt and in its reinvestment policy.

- There are 242.5 million voting shares and 476.7 non-voting shares in the company and the probability of management change is relatively low. Assuming a probability of 20% that management will change, we estimated the value per non-voting and voting share:
  - Value per non-voting share = Status Quo Value/ (# voting shares + # non-voting shares) = 12,500/(242.5+476.7) = 17.38 $R/ share
  - Value per voting share = Status Quo value/sh + Probability of management change * (Optimal value – Status Quo Value) = 17.38 + 0.2* (14,700-12,500)/242.5 = 19.19 $R/share

- With our assumptions, the voting shares should trade at a premium of 10.4% over the non-voting shares.

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4. Minority Discount: An example

□ Assume that you are valuing Kristin Kandy, a privately owned candy business for sale in a private transaction. You have estimated a value of $ 1.6 million for the equity in this firm, assuming that the existing management of the firm continues into the future and a value of $ 2 million for the equity with new and more creative management in place.

   ❏ Value of 51% of the firm = 51% of optimal value = 0.51* $ 2 million = $1.02 million

   ❏ Value of 49% of the firm = 49% of status quo value = 0.49 * $1.6 million = $784,000

□ Note that a 2% difference in ownership translates into a large difference in value because one stake ensures control and the other does not.

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Alternative Approaches to Value Enhancement

- Maximize a variable that is correlated with the value of the firm. There are several choices for such a variable. It could be
  - an accounting variable, such as earnings or return on investment
  - a marketing variable, such as market share
  - a cash flow variable, such as cash flow return on investment (CFROI)
  - a risk-adjusted cash flow variable, such as Economic Value Added (EVA)
- The advantages of using these variables are that they
  - Are often simpler and easier to use than DCF value.
- The disadvantage is that the
  - Simplicity comes at a cost; these variables are not perfectly correlated with DCF value.

Economic Value Added (EVA) and CFROI

□ **The Economic Value Added (EVA) is a measure of surplus value created on an investment.**

- ❑ Define the return on capital (ROC) to be the "true" cash flow return on capital earned on an investment.
- ❑ Define the cost of capital as the weighted average of the costs of the different financing instruments used to finance the investment.
- ❑ EVA = (Return on Capital - Cost of Capital) (Capital Invested in Project)

□ **The CFROI is a measure of the cash flow return made on capital**

- ❑ It is computed as an IRR, based upon a base value of capital invested and the cash flow on that capital.

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The bottom line…

- The value of a firm is not going to change just because you use a different metric for value. All approaches that are discounted cash flow approaches should yield the same value for a business, if they make consistent assumptions.

- If there are differences in value from using different approaches, they must be attributable to differences in assumptions, either explicit or implicit, behind the valuation.

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A Simple Illustration

- Assume that you have a firm with a book value value of capital of $ 100 million, on which it expects to generate a return on capital of 15% in perpetuity with a cost of capital of 10%.

- This firm is expected to make additional investments of $ 10 million at the beginning of each year for the next 5 years. These investments are also expected to generate 15% as return on capital in perpetuity, with a cost of capital of 10%.

- After year 5, assume that

  - The earnings will grow 5% a year in perpetuity.

  - The firm will keep reinvesting back into the business but the return on capital on these new investments will be equal to the cost of capital (10%).

Firm Value using EVA Approach

Capital Invested in Assets in Place   = $ 100

EVA from Assets in Place = (.15 − .10) (100)/.10   = $ 50

+ PV of EVA from New Investments in Year 1 = [(.15 −− .10)(10)/.10]   = $ 5

+ PV of EVA from New Investments in Year 2 = [(.15 −− .10)(10)/.10]/1.1= $ 4.55

+ PV of EVA from New Investments in Year 3 = [(.15 −− .10)(10)/.10]/1.1^2= $ 4.13

+ PV of EVA from New Investments in Year 4 = [(.15 −− .10)(10)/.10]/1.1^3= $ 3.76

+ PV of EVA from New Investments in Year 5 = [(.15 −− .10)(10)/.10]/1.1^4= $ 3.42

Value of Firm   =   **$ 170.85**

PV of Excess Returns, 70.85

Capital Invested, 100

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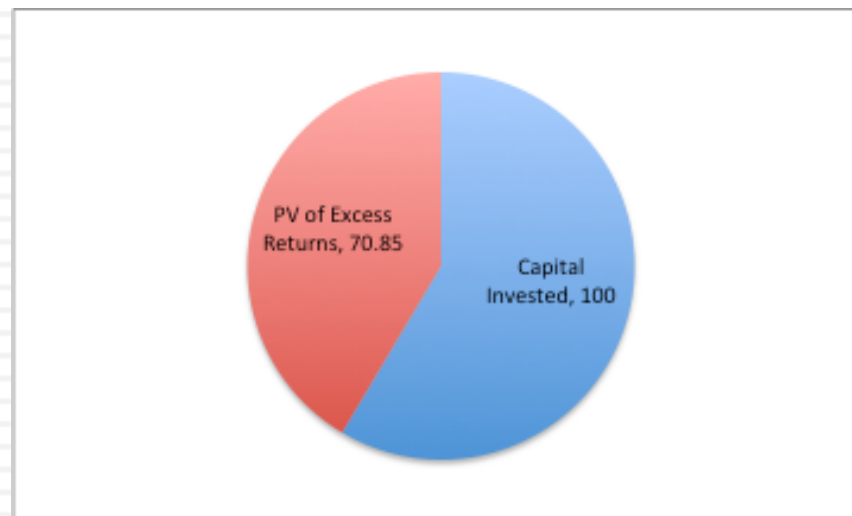
Firm Value using DCF Valuation: Estimating FCFF

	Base Year	1	2	3	4	5	Term. Year
EBIT (1-t) : Assets in Place	$ 15.00	$ 15.00	$ 15.00	$ 15.00	$ 15.00	$ 15.00	
EBIT(1-t) :Investments- Yr 1		$ 1.50	$ 1.50	$ 1.50	$ 1.50	$ 1.50	
EBIT(1-t) :Investments- Yr 2			$ 1.50	$ 1.50	$ 1.50	$ 1.50	
EBIT(1-t): Investments -Yr 3				$ 1.50	$ 1.50	$ 1.50	
EBIT(1-t): Investments -Yr 4					$ 1.50	$ 1.50	
EBIT(1-t): Investments- Yr 5						$ 1.50	
Total EBIT(1-t)		$ 16.50	$ 18.00	$ 19.50	$ 21.00	$ 22.50	$ 23.63
- Net Capital Expenditures	$10.00	$ 10.00	$ 10.00	$ 10.00	$ 10.00	$ 11.25	$ 11.81
FCFF		$ 6.50	$ 8.00	$ 9.50	$ 11.00	$ 11.25	$ 11.81

After year 5, the reinvestment rate is 50% = g/ ROC

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Firm Value: Present Value of FCFF

Year	0	1	2	3	4	5	Term Year
FCFF		$ 6.50	$ 8.00	$ 9.50	$ 11.00	$ 11.25	$ 11.81
PV of FCFF	($10)	$ 5.91	$ 6.61	$ 7.14	$ 7.51	$ 6.99	
Terminal Value						$ 236.25	
PV of Terminal Value						$ 146.69	
Value of Firm	$170.85						

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Implications

- Growth, by itself, does not create value. It is growth, with investment in excess return projects, that creates value.
  - The growth of 5% a year after year 5 creates no additional value.
- The "market value added" (MVA), which is defined to be the excess of market value over capital invested is a function of tthe excess value created.
  - In the example above, the market value of $ 170.85 million exceeds the book value of $ 100 million, because the return on capital is 5% higher than the cost of capital.

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Year-by-year EVA Changes

- Firms are often evaluated based upon year-to-year changes in EVA rather than the present value of EVA over time.

- The advantage of this comparison is that it is simple and does not require the making of forecasts about future earnings potential.

- Another advantage is that it can be broken down by any unit - person, division etc., as long as one is willing to assign capital and allocate earnings across these same units.

- While it is simpler than DCF valuation, using year-by-year EVA changes comes at a cost. In particular, it is entirely possible that a firm which focuses on increasing EVA on a year-to-year basis may end up being less valuable.

Gaming the system: Delivering high current EVA while destroying value…

- □ <u>The Growth trade off game</u>: Managers may give up valuable growth opportunities in the future to deliver higher EVA in the current year.

- □ <u>The Risk game</u>: Managers may be able to deliver a higher dollar EVA but in riskier businesses. The value of the business is the present value of EVA over time and the risk effect may dominate the increased EVA.

- □ <u>The Capital Invested game</u>: The key to delivering positive EVA is to make investments that do not show up as part of capital invested. That way, your operating income will increase while capital invested will decrease.

Delivering a high EVA may not translate into higher stock prices...

- The relationship between EVA and Market Value Changes is more complicated than the one between EVA and Firm Value.

- The market value of a firm reflects not only the Expected EVA of Assets in Place but also the Expected EVA from Future Projects

- To the extent that the actual economic value added is smaller than the expected EVA the market value can decrease even though the EVA is higher.

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When focusing on year-to-year EVA changes has least side effects

- 1. Most or all of the assets of the firm are already in place; i.e, very little or none of the value of the firm is expected to come from future growth.
  - This minimizes the risk that increases in current EVA come at the expense of future EVA
- 2. The leverage is stable and the cost of capital cannot be altered easily by the investment decisions made by the firm.
  - This minimizes the risk that the higher EVA is accompanied by an increase in the cost of capital
- 3. The firm is in a sector where investors anticipate little or not surplus returns; i.e., firms in this sector are expected to earn their cost of capital.
  - This minimizes the risk that the increase in EVA is less than what the market expected it to be, leading to a drop in the market price.

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