



# The Free Cashflow to Equity Model

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# Sony: Background on Japanese firms

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- Japanese firms have proved to be among the most difficult to value for several reasons:
  - The earnings in 1999 for most Japanese firms was depressed relative to earnings earlier in the decade and in the 1980s, reflecting the Japanese economy
  - Japanese accounting standards tend to understate earnings and overstate book value of equity, as firms are allowed to set aside provisions for unspecified expenses
  - The earnings of many export oriented Japanese firms tends to be heavily influenced by exchange rate movements
  - The cross holdings that Japanese firms have in other firms, and the lack of transparency in these holdings, makes it difficult to value these holdings.

## Valuing Sony: August 2000

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- Sony had net income of 31 billion JPY in 1999, down from 76 billion JPY in 1997 and 38 billion in 1998. The return on equity at Sony dropped from 5.25% in 1997 to 2.13% in 1999. The firm paid out dividends of 21 billion JPY in 1999.
- Capital expenditures in 1999 amounted to 103 billion JPY, whereas depreciation is 76 billion JPY.
- Non-cash working capital at Sony in 1999 was 220 billion JPY on revenues of 2593 billion yet, yielding a non-cash working capital to revenue ratio of 8.48%.
- The long term government bond rate in Japan was 2% at the time of this valuation.

## Sony: Rationale for Model

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- We will normalize earnings to reflect the fact that current earnings are depressed. To normalize earnings, we will use the return on equity of 5.25%, which is the return on equity that Sony had last year and is close to return on equity it used to earn in the early 1990s.
- We will assume that the firm's dominant market share will keep it from posting high growth. Over the last 5 years, the growth rate in revenues has been 3.5%. We will assume a long term stable growth rate of 3% (higher than the Japanese economy due to global exposure)
- We will assume that the net capital expenditures will grow at the same rate and that non-cash working capital will stay at 8.48% of revenues
- Sony's current book debt to capital ratio is 25.8%; we will assume that they will finance reinvestment with this ratio (rather than the market value)
- We will use a beta of 1.10, to reflect the unlevered beta of electronic firms (globally) and Sony's market value debt to equity ratio (16%)

# Estimating the Inputs

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- Normalized Earnings:
  - Book Value of Equity (3/1999) = 1795 billion JPY
  - Estimated Return on Equity = 5.25%
  - Normalized Net Income next year = 1795 billion \* .0525 = 94.24 billion
- Reinvestment Needs
  - Current Net Capital Expenditures = (103 - 76) = 27 billion JPY
  - Expected Net Capital Expenditures = 27 billion (1.03) = 27.81 billion
  - Current Revenues = 2593 billion
  - Expected Revenues next year = 2593(1.03) = 2671 billion
  - Expected Change in non-cash Working Capital = (2671 - 2593)\*.0848  
= 6.60 billion JPY
- Book Value Debt Ratio = 25.8%
- Cost of Equity = 2% + 1.10 (4%) = 6.40%

# The Valuation

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- Expected FCFE next year

Expected Net Income = 94.24 billion

- (Net Cap Ex) (1- Debt Ratio) = 27.81 (1-.258) = 20.64

- ( Non-cash WC) (1-Debt ratio) = 6.6 (1-.258) = 4.89

FCFE = 68.71 billion JPY

- Valuation

- Cost of Equity = 6.4%; Stable growth rate = 3%;

Value of Equity = 68.71 billion / (.064 - .03) = 2021 billion JPY

Sony was trading at a market value of equity of 7146 billion JPY

# The Effect of Cross-holdings

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- When firms have minority passive holdings in other companies, they report only the dividends they receive from these holdings as part of net income.
- Consequently, we tend to understate the value of these crossholdings in valuations.
- To value them right, we have to estimate the value of the companies in which these holdings are, and then take the percentage of the value of these firms owned by the firm you are valuing.

## Nestle: Rationale for Using Model

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- Earnings per share at the firm has grown about 5% a year for the last 5 years, but the fundamentals at the firm suggest growth in EPS of about 11%. (Analysts are also forecasting a growth rate of 12% a year for the next 5 years)
- Nestle has a debt to capital ratio of about 37.6% and is unlikely to change that leverage materially. (How do I know? I do not. I am just making an assumption.)
- Like many large European firms, Nestle has paid less in dividends than it has available in FCFE.



# Nestle: Summarizing the Inputs

## ■ General Inputs

- Long Term Government Bond Rate (Sfr) = 4%
- Current EPS = 108.88 Sfr; Current Revenue/share =1,820 Sfr
- Capital Expenditures/Share=114.2 Sfr; Depreciation/Share=73.8 Sfr

	<i>High Growth</i>	<i>Stable Growth</i>
Length	5 years	Forever after yr 5
Beta	0.85	0.85
Return on Equity	23.63%	16%
Retention Ratio	65.10% (Current)	NA
Expected Growth	15.38%	5.00%
WC/Revenues	9.30% (Existing)	9.30% (Grow with earnings)
Debt Ratio	37.60%	37.60%
Cap Ex/Deprecn	Current Ratio	150%

## Estimating the Risk Premium for Nestle

	<i>Revenues</i>	<i>Weight</i>	<i>Risk Premium</i>
North America	17.5	24.82%	4.00%
South America	4.3	6.10%	12.00%
Switzerland	1.1	1.56%	4.00%
Germany/France/UK	18.4	26.10%	4.00%
Italy/Spain	6.4	9.08%	5.50%
Asia	5.8	8.23%	9.00%
Rest of W. Europe	13	18.44%	4.00%
Eastern Europe	4	5.67%	8.00%
<b>Total</b>	<b>70.5</b>	<b>100.00%</b>	<b>5.26%</b>

- The risk premium that we will use in the valuation is 5.26%
- Cost of Equity = 4% + 0.85 (5.26%) = 8.47%

## Nestle: Valuation

	1	2	3	4	5
Earnings	\$125.63	\$144.95	\$167.25	\$192.98	\$222.66
- (Net CpEX)*(1-DR)	\$29.07	\$33.54	\$38.70	\$44.65	\$51.52
- WC*(1-DR)	\$16.25	\$18.75	\$21.63	\$24.96	\$28.79
Free Cashflow to Equity	\$80.31	\$92.67	\$106.92	\$123.37	\$142.35
Present Value	<b>\$74.04</b>	<b>\$78.76</b>	<b>\$83.78</b>	<b>\$89.12</b>	<b>\$94.7</b>

Earnings per Share in year 6 =  $222.66(1.05) = 231.57$

Net Capital Ex<sub>6</sub> = Deprec'n<sub>6</sub> \* 0.50 =  $73.8(1.1538)^5(1.05)(.5) = 78.5$  Sfr

Chg in WC<sub>6</sub> =  $(Rev_6 - Rev_5)(.093) = 1820(1.1538)^5(.05)(.093) = 13.85$  Sfr

FCFE<sub>6</sub> =  $231.57 - 78.5(1-.376) - 13.85(1-.376) = 173.93$  Sfr

Terminal Value per Share =  $173.93/(.0847-.05) = 3890.16$  Sfr

Value =  $\$74.04 + \$78.76 + \$83.78 + \$89.12 + \$94.7 + 3890/(1.0847)^5 = 3011$  Sf

The stock was trading 2906 Sfr on December 31, 1999

## Nestle: The Net Cap Ex Assumption

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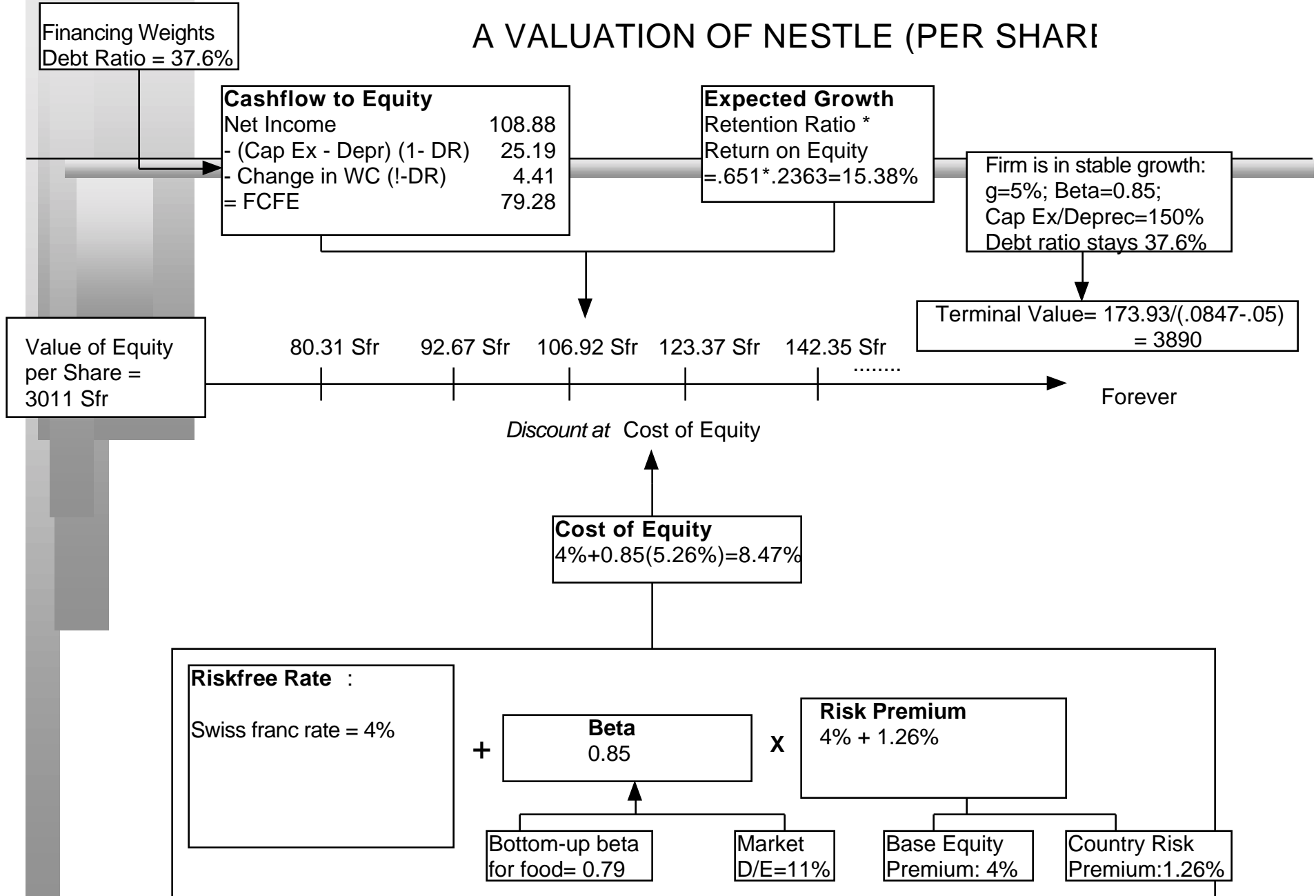
- In our valuation of Nestle, we assumed that cap ex would be 150% of depreciation in steady state. If, instead, we had assumed that net cap ex was zero, as many analysts do, the terminal value would have been:

$$\text{FCFE}_6 = 231.57 - 13.85(1-.376) = 222.93 \text{ Sfr}$$

$$\text{Terminal Value per Share} = 222.93/(\text{.0847} - \text{.05}) = 4986 \text{ Sfr}$$

$$\text{Value} = \$74.04 + \$78.76 + \$83.78 + \$89.12 + \$94.7 + 4986/(1.0847)^5 = 3740.91 \text{ Sfr}$$

# A VALUATION OF NESTLE (PER SHARE)



# The Effects of New Information on Value

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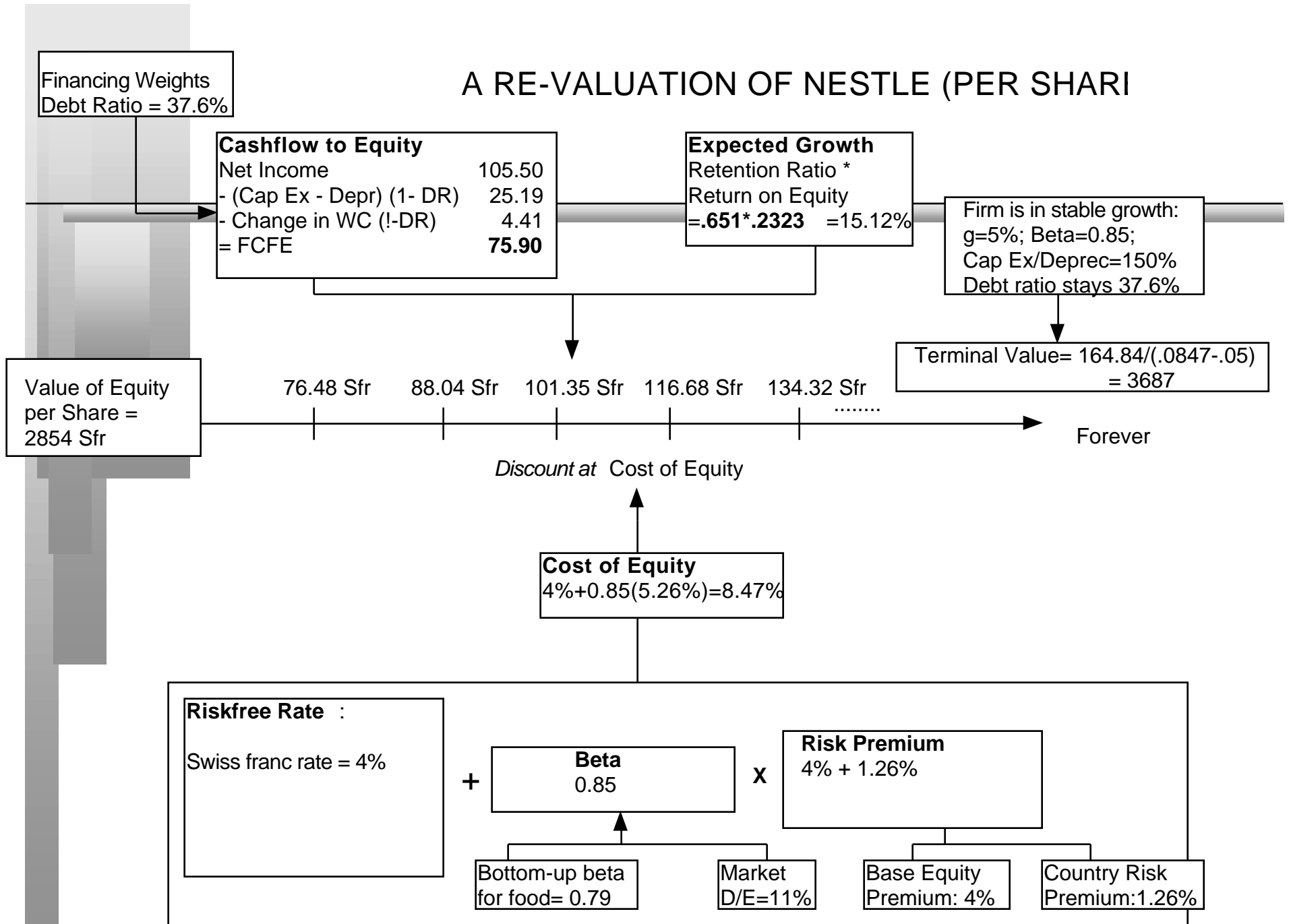
- No valuation is timeless. Each of the inputs to the model are susceptible to change as new information comes out about the firm, its competitors and the overall economy.
  - Market Wide Information
    - Interest Rates
    - Risk Premiums
    - Economic Growth
  - Industry Wide Information
    - Changes in laws and regulations
    - Changes in technology
  - Firm Specific Information
    - New Earnings Reports
    - Changes in the Fundamentals (Risk and Return characteristics)

# Nestle: Effects of an Earnings Announcement

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- Assume that Nestle makes an earnings announcement which includes two pieces of news:
  - The earnings per share come in lower than expected. The base year earnings per share will be 105.5 Sfr instead of 108.8 Sfr.
  - Increased competition in its markets is putting downward pressure on the net profit margin. The after-tax margin, which was 5.98% in the previous analysis, is expected to shrink to 5.79%.
- There are two effects on value:
  - The drop in earnings will make the projected earnings and cash flows lower, even if the growth rate remains the same
  - The drop in net margin will make the return on equity lower (assuming turnover ratios remain unchanged). This will reduce expected growth.

# A RE-VALUATION OF NESTLE (PER SHARI)





# Tsingtao Breweries: Rationale for Using Model

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- *Why three stage?* Tsingtao is a small firm serving a huge and growing market – China, in particular, and the rest of Asia, in general. The firm's current return on equity is low, and we anticipate that it will improve over the next 5 years. As it increases, earnings growth will be pushed up.
- *Why FCFE?* Corporate governance in China tends to be weak and dividends are unlikely to reflect free cash flow to equity. In addition, the firm consistently funds a portion of its reinvestment needs with new debt issues.

# Background Information

- In 2000, Tsingtao Breweries earned 72.36 million CY(Chinese Yuan) in net income on a book value of equity of 2,588 million CY, giving it a return on equity of 2.80%.
- The firm had capital expenditures of 335 million CY and depreciation of 204 million CY during the year.
- The working capital changes over the last 4 years have been volatile, and we normalize the change using non-cash working capital as a percent of revenues in 1999:

Normalized change in non-cash working capital =  $(\text{Non-cash working capital}_{1999} / \text{Revenues}_{1999}) (\text{Revenues}_{1999} - \text{Revenues}_{1998}) = (180/2253) * (2253 - 1598) = 52.3$  million CY

Normalized Reinvestment

= Capital expenditures – Depreciation + Normalized Change in non-cash working capital

= 335 - 204 + 52.3 = 183.3 million CY

- As with working capital, debt issues have been volatile. We estimate the firm's book debt to capital ratio of 40.94% at the end of 1999 and use it to estimate the normalized equity reinvestment in 1999.

## Inputs for the 3 Stages

	High Growth	Transition Phase	Stable Growth
Length	5 years	5 years	Forever after yr 10
Beta	0.75	Moves to 0.80	0.80
Risk Premium	4%+2.28%	-->	4+0.95%
ROE	2.8%->12%	12%->20%	20%
Equity Reinv.	149.97%	Moves to 50%	50%
Expected Growth	44.91%	Moves to 10%	10%

■ We will assume that

Equity Reinvestment Ratio = Reinvestment (1 - Debt Ratio) / Net Income

$$= 183.3 (1 - 0.4094) / 72.36 = 149.97\%$$

Expected growth rate - next 5 years

$$= \text{Equity reinvestment rate} * \text{ROE}_{\text{New}} + [(\text{ROE}_5 - \text{ROE}_{\text{today}}) / \text{ROE}_{\text{today}}]^{1/5} - 1$$

$$= 1.4997 * .12 + [((.12 - .028) / .028)^{1/5} - 1] = 44.91\%$$

# Tsingtao: Projected Cash Flows

Year	Expected Growth	Net Income	Equity Reinvestment Rate	FCFE	Cost of Equity	Present Value
Current		CY72.36	149.97%			
1	44.91%	CY104.85	149.97%	(CY52.40)	14.71%	(CY45.68)
2	44.91%	CY151.93	149.97%	(CY75.92)	14.71%	(CY57.70)
3	44.91%	CY220.16	149.97%	(CY110.02)	14.71%	(CY72.89)
4	44.91%	CY319.03	149.97%	(CY159.43)	14.71%	(CY92.08)
5	44.91%	CY462.29	149.97%	(CY231.02)	14.71%	(CY116.32)
6	37.93%	CY637.61	129.98%	(CY191.14)	14.56%	(CY84.01)
7	30.94%	CY834.92	109.98%	(CY83.35)	14.41%	(CY32.02)
8	23.96%	CY1,034.98	89.99%	CY103.61	14.26%	CY34.83
9	16.98%	CY1,210.74	69.99%	CY363.29	14.11%	CY107.04
10	10.00%	CY1,331.81	50.00%	CY665.91	13.96%	CY172.16
Sum of the present values of FCFE during high growth =						(CY186.65)

# Tsingtao: Terminal Value

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- Expected stable growth rate = 10%
- Equity reinvestment rate in stable growth = 50%
- Cost of equity in stable growth = 13.96%
- Expected FCFE in year 11
  - = Net Income<sub>11</sub> \* (1 - Stable period equity reinvestment rate)
  - = CY 1331.81 (1.10)(1-.5) = CY 732.50 million
- Terminal Value of equity in Tsingtao Breweries
  - = FCFE<sub>11</sub> / (Stable period cost of equity – Stable growth rate)
  - = 732.5 / (.1396 - .10) = CY 18,497 million

# Tsingtao: Valuation

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- Value of Equity

- = PV of FCFE during the high growth period + PV of terminal value

- = -CY186.65 + CY18,497 / (1.1471<sup>5</sup> \* 1.1456 \* 1.1441 \* 1.1426 \* 1.1411 \* 1.1396)

- = CY 4,596 million

- Value of Equity per share = Value of Equity / Number of Shares

- = CY 4,596 / 653.15 = CY 7.04 per share

- The stock was trading at 10.10 Yuan per share, which would make it overvalued, based upon this valuation.