Chapter 18

Equity Valuation Models

Models of Equity Valuation

- Balance Sheet Models
  - Book Value
- Dividend Discount Models
- Price/Earning Ratios

Intrinsic Value and Market Price

- Intrinsic Value
  - Self assigned Value
  - Variety of models are used for estimation
- Market Price (MP)
  - Consensus value of all potential traders
- Trading Signal
  - IV > MP Buy
  - IV < MP Sell or Short Sell
  - IV = MP Hold or Fairly Priced

Dividend Discount Models: General Model

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)^t}$$

V_0 = Value of Stock

D_t = Dividend

k = required return

No Growth Model

$$V_0 = \frac{D_1}{k}$$

The no growth model would work for common stocks that have earnings and dividends that are expected to remain constant (this assumption is probably not too realistic).

A good example of a claim that has constant dividends is Preferred Stock

No Growth Model: Example

$$V_0 = \frac{D_1}{k}$$

D_1 = \$5.00

k = 0.15

V_0 = \$5.00 / 0.15 = \$33.33

The constant growth model

$$V_0 = \sum_{t=1}^{\infty} \frac{D_0(1+g)^t}{(1+k)^t}$$

Where $D_1 = D_0(1+g)$

$D_2 = D_1(1+g) = D_0(1+g)^2$

and so on …..

As long as k > g, the sum will converge to:

$$V_0 = \frac{D_0(1+g)}{k-g} = \frac{D_1}{k-g}$$

Constant Growth Model: Example

$$V_0 = \frac{D_0(1+g)}{k-g} = \frac{D_1}{k-g}$$

k = 15% D_1 = \$3.00 g = 8%

(therefore: D_0 = 3/1.08)

V_0 = 3.00 / (0.15 - 0.08) = \$42.86

Constant growth continued

On the previous slide we computed the intrinsic value as

V_0 = 3/(0.15-0.08)=\$42.86. Based on the constant growth model, what is the intrinsic value at t=1, V_1?

$$V_1 = \frac{D_2}{k - g}$$

Because $D_2 = D_1(1+g)$, we can substitute this value for D_2 into the expression for V_1 as follows:

$$V_1 = \frac{D_1(1+g)}{k-g} = \frac{D_1}{k-g}(1+g) = V_0(1+g)$$

In words, the intrinsic value grows at the same rate, g, as dividends.

Constant growth continued

V_0 = 3/(0.15-0.08)=\$42.86 and V_1 = 42.86(1.08) = 46.29

What is the Holding Period Return from t = 0 to t = 1 if prices follow the DDM?

$$HPR = \frac{V_1 - V_0 + D_1}{V_0}$$

$$HPR = \frac{V_1 - V_0}{V_0} + \frac{D_1}{V_0}$$

$$HPR = 8\% + 7\%$$

$$= 15\% = \mathrm{k}$$

Specified Holding Period Model

$$V_0 = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \cdots + \frac{D_N + P_N}{(1+k)^N}$$

P_N = the expected price for the stock at time N

N = the specified number of years the stock is expected to be held

$$P_N = \sum_{t=N+1}^{\infty} \frac{D_t}{(1+k)^t}$$

$$P_N = \frac{D_{N+1}}{k - g_2}$$

Where the growth rate during the stage from N+1 to ∞, g_2, may differ from the growth rate used from periods 1 to N.

Example of 2-stage model

Assume that the current dividend is D_0 = 1.00 and dividends are expected to grow at 10% for the next 3 years (i.e., from t=0 to t=1, t=1 to t=2, and t=2 to t=3). Starting in year 3, dividends will grow at 4% indefinitely (i.e., from t=3 to infinity). Calculate the current intrinsic value based on these assumptions, given k = 8%.

<u>Step 1: Trace out all the dividends</u>

Growth in the first stage, g_1 = 10%

D_1 = 1.00 x 1.10 = \$1.10

D_2 = 1.00 x 1.10^2 = \$1.21

D_3 = 1.00 x 1.10^3 = \$1.33

D_4 = D_3 x 1.04 = \$1.33 x 1.04 = \$1.38 growing at 4% forever.

2-stage model continued

<u>Step 2: Compute the horizon value at t = 3</u>

The second stage is infinite and dividends grow at g_2 = 4%

Because dividends grow at 4% forever (and 4% < k=8%), we can use the constant growth dividend discount model to value the dividends from t=4 onward.

With D_4 = \$1.38, we can calculate P_3 as follows: $P_3 = \frac{D_4}{k-g}$

P_3 = \$1.38/(0.08 – 0.04) = \$34.5

<u>Step 3: Compute overall intrinsic value at t=0</u>

We can now use the holding period version of the dividend discount model to calculate the intrinsic value, V_0.

$$V_0 = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \frac{D_3 + P_3}{(1+k)^3}$$

$$V_0 = \frac{1.10}{1.08} + \frac{1.21}{1.08^2} + \frac{1.33 + 34.50}{1.08^3} = \$30.50$$

2-stage model continued

If the current market price is P_0 = \$30.50, and we buy the stock, then we should expect to earn a holding period return of 8% from t=0 to t =1 (as long as actual prices follow the DDM). Let's see why.

Under this model, the expected selling price at t = 1, P_1, is the present value of the dividends, D_2 and D_3, and the expected price at t=3, P_3. Let's calculate P_1 as follows:

$$P_1 = \frac{1.21}{1.08} + \frac{1.33 + 34.50}{1.08^2} = \$31.84$$

Note the price does not grow by the initial 10% growth rate, since the initial calculation for the price does not depend on a single growth rate. The growth in price = 31.84/30.50 = 1.044 or growth rate in price = 4.4%

We can now compute the holding period return from t=0 to t=1

$$HPR = \frac{P_1 - P_0 + D_1}{P_0} = \frac{31.84 - 30.50 + 1.10}{30.50} = 8\%$$

Estimating Dividend Growth Rates

$$g = ROE \times b$$

g = growth rate in dividends

ROE = Return on Equity for the firm

b = plowback or retention percentage rate

(1- dividend payout percentage rate)

Partitioning Value: Example

ROE = 20%, b = 40% and (1-b) = 60%

E_1 = \$5.00 D_1 = \$3.00 k = 15%

g = 0.20 x 0.40 = 0.08 or 8%

Partitioning Value: Example

$$V_0 = \frac{3.00}{0.15 - 0.08} = \$42.86$$

$$NGV_0 = \frac{5.00}{0.15} = \$33.33$$

$$PVGO = 42.86 - 33.33 = \$9.52$$

V_0= value with growth

NGV_0 = no growth component value

PVGO = Present Value of Growth Opportunities

Price Earnings Ratios

- P/E Ratios are a function of two factors
  - Required Rates of Return (k)
  - Expected growth in Dividends
- Uses
  - Relative valuation
  - Extensive Use in industry

P/E Ratio: No Expected Growth

$$P_0 = \frac{E_1}{k}$$

$$\frac{P_0}{E_1} = \frac{1}{k}$$

E_1: expected earnings for next year

E_1 is equal to D_1 under no growth

k: required rate of return

P/E Ratio with Constant Growth

$$P_o = \frac{D_1}{k - g} = \frac{E_1(1 - b)}{k - (b \times ROE)}$$

$$\frac{P_0}{E_1} = \frac{(1 - b)}{k - (b \times ROE)}$$

b = retention ratio

ROE = Return on Equity

Numerical Example: No Growth

$E_0 = \$2.50 \quad g = 0 \quad k = 12.5\%$

$P_0 = D/k = \$2.50/0.125 = \$20.00$

$PE = 1/k = 1/0.125 = 8$

Numerical Example with Growth

$b = 60\%$ ROE = 15% $(1-b) = 40\%$

$E_1 = \$2.50\ (1 + (0.6)(0.15)) = \$2.73$

$D_1 = \$2.73\ (1-0.6) = \$1.09$

$k = 12.5\%$ $g = 9\%$

$P_0 = 1.09/(0.125-0.09) = \$31.14$

$PE = 31.14/2.73 = 11.4$

$PE = (1 - 0.60) / (0.125 - 0.09) = 11.4\times$

Table 18.3 Effect of ROE and Plowback on Growth and the P/E Ratio

TABLE 18.3

Effect of ROE and plowback on growth and the P/E ratio

	Plowback Rate (b)			
ROE	**0**	**.25**	**.50**	**.75**
	A. Growth rate, g			
10%	0	2.5%	5.0%	7.5%
12	0	3.0	6.0	9.0
14	0	3.5	7.0	10.5
	B. P/E ratio			
10%	8.33	7.89	7.14	5.56
12	8.33	8.33	8.33	8.33
14	8.33	8.82	10.00	16.67

Assumption: $k = 12\%$ per year.

Free Cash Flow Approach

- Discount the free cash flow for the firm
- Discount rate is the firm's cost of capital
- Components of free cash flow
  - After tax EBIT
  - Depreciation
  - Capital expenditures
  - Increase in net working capital

Value Line Investment Example for Honda (May 25, 2012)
(see pages 605 – 607 in the text). Value Line report is the last slide in this. You can get Value Line reports from the UNL Library (http://libraries.unl.edu/).
Log onto your My.UNL Account; Choose E-resources, Browse under the letter V.

Relevant information for late 2009 (row is indicated by letters A – E)

Beta (row A) = 0.95
Recent Price (row B) = $32.88
Dividends (row C) = $1.00 (forecast for 2016)
ROE (row D) = 10%
Dividend payout ratio (row E) = 25%

Growth = g = ROE x b = 10.0% x (1-0.25) = 7.50%

We will use an investment horizon of 2016 and the intrinsic value will be computed as the PV of the dividends for 2013, 2014, 2015, 2016 and the horizon price for 2016 (i.e., P_{2016})

Honda example, continued

$P_{2016} = D_{2017} / (k - g) = \$1.00\ (1.075)/(k-0.075)$

Now we need an estimate of *k* and we will use the CAPM

Inputs given are as follows:
r(f) = 2.0% and suppose the market risk premium is 8.0%

k = 2.0% + 0.95(10.0 – 2.0) = 9.6%

P_{2016} = 51.19 ; D(2013) = 0.78, D(2014) = 0.85, D(2015) = 0.92, and D(2016) = 1.00,

The intrinsic value for 2012, V(2012) is now the present value of the stream of dividends and the horizon value (all discounted at 9.6%%).

V(2012) = $38.29

HONDA MOTOR (ADR) NYSE-HMC

RECENT PRICE 32.88 | P/E RATIO 11.8 (Trailing: 21.3; Median: 11.3) | RELATIVE P/E RATIO 0.82 | DIV'D YLD 2.6% | VALUE LINE

TIMELINESS 3 Raised 03/9/11
SAFETY 2 Raised 3/20/07
TECHNICAL 3 Raised 3/9/12
BETA .85 (1.00 = Market)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
High	23.1	23.8	23.6	26.1	29.7	30.9	40.8	36.4	34.5	38.7	44.6	39.3
Low	13.6	17.0	15.5	19.3	23.8	27.1	31.3	17.3	26.3	28.3	27.5	31.1

Target Price Range 2015 | 2016 | 2017

LEGENDS
— Price Scale
— Relative Price Strength
Options: Yes
Shaded areas indicate recessions

2015-17 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+100%)	20%
Low	50	(+50%)	13%

Insider Decisions

NOT REPORTED

U.S. Institutional Decisions

	2Q2011	3Q2011	4Q2011
to Buy	114	70	76
to Sell	87	103	109
Hld's(000)	1031281	1031211	1030000

Percent shares traded 3 / 2 / 1

% TOT. RETURN 4/12

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-6.0	-3.7
3 yr.	24.0	80.5
5 yr.	6.4	27.3

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	© VALUE LINE PUB. LLC	15-17
.104	.133	.121	.106	.124	.133	.120	.106	.107	.118	.118	.100	.98.23	60.54	83.19	82.0	82.0	80.0	Translation Rate Yen/$(A)	80.0
21.89	23.15	26.32	26.52	26.77	28.41	34.09	40.49	43.55	45.82	51.53	65.96	56.16	50.82	59.61	53.85	68.93	71.30	Sales per ADR *	81.25
1.48	1.60	2.05	2.10	1.67	2.15	2.77	3.36	3.59	3.87	4.48	6.13	4.35	5.32	7.82	5.65	6.90	7.85	"Cash Flow" per ADR	7.90
.90	1.01	1.30	1.27	.96	1.40	1.83	2.30	2.42	2.78	2.75	3.30	.77	1.59	3.05	1.49	2.19	3.75	Earnings per ADR (A)	4.00
.06	.07	.09	.10	.09	.10	.13	.15	.23	.33	.66	.78	.79	.37	.85	.68	.73	.78	Gross Div'ds Decl'd/ADR (B)	1.00
.60	1.19	1.21	1.08	1.18	1.17	1.36	1.43	1.88	2.13	2.78	3.62	3.56	2.32	2.12	2.56	2.63	2.70	Cap'l Spending per ADR	2.85
5.74	6.20	7.51	8.34	8.24	9.93	11.25	14.26	16.56	19.38	20.83	24.98	22.48	25.64	26.68	30.70	33.20	35.50	Book Value per ADR	39.60
1548.7	1548.8	1548.8	1548.8	1548.8	1548.8	1548.8	1507.3	1549.7	1540.9	1524.7	1515.4	1514.6	1514.6	1502.3	1500.0	1500.0	1500.0	Equiv ADRs Outst'g *	1795.0
14.3	18.5	13.6	16.0	19.3	14.3	10.8	8.8	10.5	9.8	12.7	12.1	26.8	19.8	10.3	23.1	Avail Approximate Value Line estimates		Avg Ann'l P/E Ratio	14.0
.90	.96	.71	.91	1.25	.72	.59	.50	.53	.52	.66	.54	2.15	1.32	.84	1.46			Relative P/E Ratio	.90
.4%	.4%	.5%	.3%	.5%	.5%	.7%	.8%	1.0%	1.2%	1.9%	2.3%	2.7%	1.2%	1.8%	1.7%			Avg Ann'l Div'd Yield	2.2%

CAPITAL STRUCTURE as of 3/31/12
Total Debt $90460 mill. Due in 5 Yrs $47876 mill.
LT Debt $77256 mill. LT Interest $1550 mill.
(LT int. earned and total int. coverage: over 200x)
(31% of Cap'l)
Pension Assets-3/11 $13.8 bill. Oblig. $19.5 bill.
Pfd Stock None
Common Stock 1,802.3 mill. shares
(equivalent to 1,802.3 ADRs)
MARKET CAP: $59.3 billion (Large Cap)

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		15-17
66429	77232	80349	84045	94018	119801	121916	92210	107430	96927	123500	128300	Sales ($mill.) *	140850
11.4%	10.3%	9.9%	10.0%	11.0%	12.3%	8.3%	11.6%	13.3%	8.8%	11.5%	12.0%	Operating Margin	12.5%
5342.6	2019.5	2102.2	2202.0	3150.0	6174.0	5497.0	6768.0	7605.1	6475.7	7000	7250	Depreciation ($mill)	7300
3565.5	4360.4	4527.4	5062.0	5623.0	5989.0	1395.0	2885.0	6420.3	2576.0	5700	6800	Net Profit ($mill)	7210
40.2%	38.4%	40.8%	38.9%	30.8%	43.3%	67.9%	42.7%	32.8%	32.8%	32.8%	34.0%	Income Tax Rate	35.0%
5.4%	5.7%	5.6%	6.0%	5.3%	5.0%	1.4%	3.1%	6.0%	2.7%	4.6%	5.3%	Net Profit Margin	4.9%
14164	30153	24237	34165	8182.0	9520.0	3907.0	12640	13486	27578	38825	37750	Working Cap'l ($mill)	46100
9501.5	10195	14522	15896	16190	18032	19675	24081	24062	27580	30000	28500	Long-Term Debt ($mill)	25000
21914	27197	30529	35122	38012	45306	40756	46525	52463	56230	58600	64350	Shr. Equity ($mill)	71060
11.4%	10.9%	10.1%	10.3%	5.8%	10.3%	2.1%	4.2%	8.2%	4.0%	6.5%	7.5%	Return on Total Capital	7.5%
16.2%	16.2%	14.8%	14.5%	13.2%	13.2%	2.4%	8.2%	12.0%	5.0%	9.5%	10.5%	Return on Shr. Equity	10.0%
10.1%	10.0%	13.3%	12.7%	10.7%	9.9%	NMF	4.8%	9.3%	3.0%	7.0%	7.5%	Retained to Com Eq	7.0%
7%	7%	10%	12%	18%	25%	102%	23%	17%	47%	24%	28%	All Div'ds to Net Prof	25%

CURRENT POSITION ($MILL.)	2009	2010	3/31/12
Cash Assets	12027	15273	15200
Receivables	5436	23049	23206
Inventory (FIFO)	10296	10817	12531
Other	15000	7122	6851
Current Assets	42759	56261	57788
Accts Payable	8625	8818	11493
Debt Due	7163	24736	23254
Other	20361	9547	8916
Current Liab.	36149	43103	43663

ANNUAL RATES of change (per ADR)	Past 10 Yrs.	Past 5 Yrs.	Est'd '09-'11 to '15-'17
Sales	7.0%	5.0%	6.5%
"Cash Flow"	11.5%	10.0%	5.0%
Earnings	5.5%	4.5%	12.5%
Dividends	20.5%	20.0%	8.0%
Book Value	11.5%	9.5%	7.5%

Fiscal Year Begins	QUARTERLY SALES ($ mill.) * Jun. 30	Sep. 30	Dec. 31	Mar. 31	Full Fiscal Year
2009	21520	22105	24084	24501	92210
2010	26087	27070	25389	29604	107430
2011	20978	22998	23689	29262	96927
2012	28750	30200	30750	33800	123500
2013	30500	31800	32500	33700	128300

Fiscal Year Begins	EARNINGS PER ADR (A) Jun. 30	Sep. 30	Dec. 31	Mar. 31	Full Fiscal Year
2009	.04	.33	.91	.43	1.68
2010	1.81	.90	.54	.30	3.55
2011	.22	.44	.35	.48	1.49
2012	.65	.90	.75	.80	3.10
2013	.85	1.00	.95	.95	3.75

Cal-endar	GROSS QUARTERLY DIV'DS PAID (B) Mar. 31	Jun. 30	Sep. 30	Dec. 31	Full Year
2008	204	--	403	23	631
2009	116	--	168	291	36
2010	103	--	251	13	48
2011	216	--	185	195	60
2012	185				

Honda Motor Company struggled in fiscal 2011 (year ended March 31, 2012), but ended the year on an improved note. Sales improved 9% in the final quarter, despite unfavorable currency translation. The top-line increase represented a nice recovery from the declines over the first nine months of the fiscal year. Honda's production has accelerated following the earlier natural disaster-driven disruptions. Notably, automotive unit sales increased 15%, as strong performance in North America and Japan more than compensated for decreased sales in Asia, which was attributable to the lingering impact from flooding in Thailand. Meanwhile, motorcycle unit sales remained strong, climbing 18%. The top-line improvement resulted in earnings per ADR of $0.48, which was a penny below our estimate, and a significant increase from the $0.30 in the previous year.

We have raised our fiscal 2012 earnings-per-ADR estimate by $0.10, to $3.10, while lifting our 2013 projection by $0.25, to $3.75. Honda is poised for a substantial earnings recovery in fiscal 2012, as the company moves beyond the impact from the natural disasters of Japan and Thailand. Production should continue to accelerate, and the near-term sales outlook appears increasingly optimistic. Indeed, management provided guidance for global automotive sales volume of 4.3 million units, representing a robust 38% year-over-year gain. Yet, even based on more-conservative sales assumptions, we believe that earnings can easily double this fiscal year.

This neutrally ranked stock has pulled back a bit in recent months. Yet, we believe that there could potentially be some upside to near-term earnings, which would serve as a catalyst for these shares. Moreover, based on the current price, 3- to 5-year price appreciation potential is a bit above average.

Joel Schwed *May 25, 2012*

BUSINESS: Honda Motor Company, Ltd. is Japan's second-largest auto maker & the world's biggest motorcycle producer. Manufactures cars in Japan, United States, Canada, United Kingdom; cycles in 32 countries. Fiscal 2011 unit sales: autos, 3.5 million; cycles, 11.4 mill.; power products, 5.5 mill. Sales by region: United States & Canada, 44%; Japan, 22%; Europe, 7%; other, 27%. Research & development, 5.4% of sales. Has about 170,815 employees. Financial institutions control 12.8% of common stock (3/11 20-F). President & CEO: Takanobu Ito. Inc.: Japan. Address: 1-1, 2-chome, Minami-Aoyama, Minato-ku, Tokyo 107, Japan. United States address: 100 West 56th St., 20th Floor, New York, NY 10019. Telephone: 212-355-9101. Internet: www.honda.com.

Sales (and Operating Margin*) by Business Line

	2009	2010	2011	2012
Automobiles	[illegible]	[illegible]	[illegible]	[illegible]
Motorcycles	[illegible]	[illegible]	[illegible]	[illegible]
Fin Svcs & Other	[illegible]	[illegible]	[illegible]	[illegible]
Company Total	[illegible]	[illegible]	[illegible]	[illegible]

*After depreciation and corporate expenses

(A) All fiscal yearend. (B) FY ends March 31 of following year. Mthly recent quarterly figs based on ex'd avg. each rate for the full year. (C) Dil. egs., based on U.S. accounting, primary through 1996. Each nonfactor gains '96, '97, '10, '11. Next egs. rpt. due late July. Quarterly total may not sum due to rounding. (D) Before 15% Japanese withholding tax. Dividends historically paid in early March, July, Sept., and December. (E) In mill. of American Depositary Receipts, adj. for split. Each common share represents 1 ADR.

Company's Financial Strength	B++
Stock's Price Stability	60
Price Growth Persistence	75
Earnings Predictability	15