

## Homework Solutions - Lecture 5

### 1. Nike's Stock Price:

- a. As of May 31, 2011, Nike's shares outstanding include 90 million class A shares and 378 million class B shares. In addition, Nike's stock price was \$84.45, the firm's marginal tax rate was 26.1% (from HW 3), and the yield on 10-year treasuries was 3.05%. Use this information, along with any necessary information from the firm's financial statements (and notes to the financial statements) to estimate the value of Nike's outstanding employee stock options as of May 31, 2011.

The notes to Nike's financial statements describe the outstanding employee stock options as of May 31, 2011. The firm has 34.8 million outstanding employee stock options with a weighted average exercise price of \$51.29 and a weighted average remaining life of 6.0 years. The notes also show that the firm used the following assumptions to value their employee options in 2011: dividend yield = 1.6%, volatility = 31.5%, risk-free rate = 1.7%. I will use the firm's assumptions for dividend yield and volatility, but my own estimate of the risk-free rate based on the 10-year Treasury yield (3.05%).

The Black-Scholes option pricing solution for Nike's employee stock options is shown on the attached page. Based on the Black-Scholes model and the inputs provided, Nike's employee stock options are worth \$36.87 per option. Since the firm has 34.8 million outstanding options, the options are worth a total of \$1283.17 million.

- b. You are performing a valuation of Nike based on a Free Cash Flow to the Firm (FCFF) model. After forecasting future FCFF for Nike, you estimate that the present value of future cash flows equals \$39.133 billion. The firm has no minority interest or majority active holdings, but does have other investments. Using your answer to (a) and any other necessary information from the firm's financial statements, estimate the per share value of Nike's stock. (Note: you can assume that class A and B shares are identical.)

To value Nike, we start with the total present value of FCFF and add the market value of non-operating assets to get total firm value. We then subtract the market value of debt (including operating lease debt) and other non-equity claims to arrive at the value of equity available to common stockholders. Finally, we divide by the number of shares outstanding (class A plus class B shares) to get an equity value per share.

PV of FCFF	\$39,133
+ Cash and Investments	+ (1955+2583)
= Total Firm Value	\$43,671
- Total Debt	- 2253.5
- Preferred Stock	- 0.3
- After-tax value of employee options	- 1283.17(1-.261)
= Equity Value to Common Stockholders	\$40,468.94

Price =  $40,468.94 / (90 + 378) = \$86.47$  per share (slightly higher than the actual price of \$84.45).

	Year Ended May 31,		
	2011	2010	2009
Dividend yield	1.6%	1.9%	1.5%
Expected volatility	31.5%	57.6%	32.5%
Weighted average expected life (in years)	5.0	5.0	5.0
Risk-free interest rate	1.7%	2.5%	3.4%

	Weighted Average	
	Shares <sup>(1)</sup>	Option Price
	<i>(In millions)</i>	
Options outstanding May 31, 2008	36.6	\$ 40.14
Exercised	(4.0)	35.70
Forfeited	(1.3)	51.19
Granted	7.5	58.17
Options outstanding May 31, 2009	38.8	\$ 43.69
Exercised	(8.6)	37.64
Forfeited	(0.6)	51.92
Granted	6.4	52.79
Options outstanding May 31, 2010	36.0	\$ 46.60
Exercised	(7.0)	42.70
Forfeited	(0.5)	58.08
Granted	6.3	69.20
Options outstanding May 31, 2011	34.8	\$ 51.29
Options exercisable at May 31,		
2009	21.4	\$ 36.91
2010	20.4	41.16
2011	20.1	\$ 44.05

(1) Excludes stock appreciation rights transactions.

The weighted average contractual life remaining for options outstanding and options exercisable at May 31, 2011 was 6.0 years and 4.5 years, respectively. The aggregate intrinsic value for options outstanding and exercisable at May 31, 2011 was \$1,154 million and \$811 million, respectively. The aggregate intrinsic value was the amount by which the market value of the underlying stock exceeded the exercise price of the options. The total intrinsic value of the options exercised during the years ended May 31, 2011, 2010, and 2009 was \$267 million, \$239 million, and \$108 million, respectively.

<b>Employee Options at Nike</b>							
updated 2011							
<b>Black-Scholes Option Pricing Model</b>				<b>Black-Scholes Option Pricing Model (with dilution)</b>			
<b>Inputs:</b>				<b>Inputs (with dilution effects):</b>			
Stock Price (S)	\$84.45			Stock Price (S)	\$84.45		
Strike Price (X)	\$51.29			Strike Price (X)	\$51.29		
Volatility ( $\sigma$ )	31.50%			Volatility ( $\sigma$ )	31.50%		
Risk-free Rate	3.05%	1.70%		Risk-free Rate	3.05%		
Time to expiration (T)	6.00 yrs			Time to expiration (T)	6.00 yrs		
Dividend Yield	1.60%			Dividend Yield	1.60%		
# of Options (mil)	34.80			# of Options (mil)	34.80		
# Shares Outstanding (mil)	468.00			# Shares Outstanding (mil)	468.00		
Marginal Tax Rate	26.10%			Marginal Tax Rate	26.10%		
<b>Output:</b>				<b>Output:</b>			
				Adjusted S (dilution)	\$81.16		
D1	1.14483			D1	1.09328		
D2	0.37324			D2	0.32169		
N(D1)	0.87386			N(D1)	0.86287		
N(D2)	0.64552			N(D2)	0.62616		
<b>Call Price</b>	<b>\$39.47</b>			<b>Call Price</b>	<b>\$36.87</b>		
<b>Put Price</b>	<b>\$5.46</b>			<b>Put Price</b>	<b>\$5.86</b>		
<b>Value of Call Options (mil)</b>	<b>\$1,373.58</b>			<b>Value of Call Options (mil)</b>	<b>\$1,283.17</b>		
<b>After-tax Option Value (mil)</b>	<b>\$1,015.08</b>			<b>After-tax Option Value (mil)</b>	<b>\$948.26</b>		