Applying the Free Cash Flow to Equity Valuation Model in Coca-Cola Hellenic

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ABSTRACT

In this paper, I present the process of applying the Free Cash Flow to Equity valuation model in Coca -Cola Hellenic Bottling Company S.A. in order to determine the value of its stock. The value of the firm's stock is calculated by forecasting Free Cash Flow to Equity and discounting this cash flow back to the present at the appropriate required cost of equity. In addition to computing free cash flow to equity, this paper will show you how to calculate the expected growth rate pattern and the cost of equity. To achieve this, the Free Cash Flow to Equity was calculated in the period of 2009-2011 based on a sum-of-the-parts approach that values the three main geographic businesses of the company separately: Western Europe and both Eastern Europe and West Africa. Additionally, an anticipated growth rate was used to estimate the future value of Free Cash Flow to Equity in a three years period. Also, the present value of this flow in the appropriate growth pattern was forecast regarding yield discount rate which was demanded the stock of Coca-Cola Hellenic from the year 2012 to 2014. Finally, the real value of Coca-Cola Hellenic will be calculated using the sum of 3 anticipated Free Cash Flow to Equity plus the end value of the company at t=3. Dividing the total value of equity by the number of outstanding shares gives the value of its stock.

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Εφαρμογή του Μοντέλου Αποτίμησης των Ελεύθερων Ταμειακών Ροών στα Ίδια Κεφάλαια της Coca-Cola 3E

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ΠΕΡΙΛΗΨΗ

Σε αυτό το άρθρο παρουσιάζω τη διαδικασία εφαρμογής του μοντέλου αποτίμησης της Ελεύθερης Ταμειακής Ροής στα Ίδια Κεφάλαια της Coca-Cola Ελληνική Εταιρεία Εμφιαλώσεως Α.Ε. με σκοπό τον προσδιορισμό της αξίας της μετοχής της. Η αξία του μετοχικού κεφαλαίου της επιχείρησης υπολογίζεται με την πρόβλεψη της Ελεύθερης Ταμειακής Ροής στα Ίδια Κεφάλαια και την προεξόφληση αυτής της ταμειακής ροής στο παρόν με το απαιτούμενο κόστος ιδίων κεφαλαίων. Εκτός από τον υπολογισμό της ελεύθερης ταμειακής ροής στα ίδια κεφάλαια, το παρόν άρθρο θα σας δείξει πώς να υπολογίσετε το αναμενόμενο ρυθμό ανάπτυξης και το κόστος των ιδίων κεφαλαίων. Για να επιτευχθεί αυτό, η Ελεύθερη Ταμειακή Ροή στα Ίδια Κεφάλαια υπολογίστηκε την περίοδο 2009-2011 με βάση μια προσέγγιση αθροίσματος των μερών που εκτιμά ξεχωριστά τις τρεις κύριες γεωγραφικές δραστηριότητες της εταιρείας: τη Δυτική Ευρώπη και την Ανατολική Ευρώπη και τη Δυτική Αφρική. Επιπρόσθετα, χρησιμοποιήθηκε αναμενόμενος ρυθμός ανάπτυξης για την εκτίμηση της μελλοντικής αξίας της Ελεύθερης Ταμειακής Ροής στα Ίδια Κεφάλαια σε περίοδο τριών ετών. Επίσης, η τρέχουσα αξία αυτής της ροής στο μοντέλο με τον κατάλληλο ρυθμό ανάπτυξης προβλέφθηκε για το προεξοφλητικό επιτόκιο απόδοσης που προβλέφθηκε για την μετοχή της Coca-Cola 3E από το 2012 έως το 2014. Τέλος, η πραγματική (εσωτερική) αξία της Coca-Cola 3E θα υπολογιστεί χρησιμοποιώντας το ποσό των τριών προβλεπόμενων Ελεύθερων Ταμειακών Ροών στα Ίδια Κεφάλαια συν την Τελική Αξία της εταιρείας σε t = 3. Η διαίρεση της συνολικής αξίας των μετοχών από τον αριθμό των κυκλοφορούντων μετοχών δίνει την αξία της μετοχής της.

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1. Free Cash Flow to Equity valuation model to get the value of Equity

In this conference, I will introduce a conceptual understanding of free cash flows and the Free Cash Flow to Equity (FCFE) valuation model based on them. In FCFE valuation model, the value of equity is obtained by discounting expected cash flows to equity at the cost of equity, i.e., the rate of return required by equity investors in the firm (Aswath Damodaran, 2002, p. 17).

$$\text{Value of Equity} = \sum_{t=1}^{t=n} \frac{\text{CF to Equity}_t}{(1+k_e)^t}$$

where,

CF to Equity_t = Expected Cash flow to Equity in period t

k_e = Cost of Equity

Dividing the total value of equity by the number of outstanding shares gives the value per share.

The most commonly accepted method for calculating the required rate of return on equity comes from the Nobel Memorial Prize-winning capital asset pricing model (CAPM), where: **Cost of Equity (Ke) = Rf + Beta (Rm-Rf)**. The elements of this formula are:

Rf - Risk-Free Rate - This is the amount obtained from investing in securities considered free from credit risk, such as government bonds from developed countries.

ß - Beta - This measure how much a company's share price moves against the market as a whole. A beta of one, for instance, indicates that the company moves in line with the market. If the beta is in excess of one, the share is exaggerating the market's movements; less than one means the share is more stable. Occasionally, a company may have a negative beta (e.g. a gold mining company), which means the share price moves in the opposite direction to the broader market.

(**Rm – Rf) = Equity Market Risk Premium** - The equity market risk premium (EMRP) represents the returns investors expect, over and above the risk-free rate, to compensate them for taking extra risk by investing in the stock market. In other words, it is the difference between the risk-free rate and the market rate. It is a highly contentious figure. Many commentators argue that it has gone up due to the notion that holding shares has become riskier.

2. Free Cash Flow to Equity

The Free Cash Flow to Equity model defines FCFE as follows:

Free Cash Flow to Equity (FCFE) = Net Income

- (Capital Expenditures - Depreciation)

- (Change in Non-cash Working Capital)

+ (New Debt Issued - Debt Repayments)

According to Aswath Damodaran (2002, p. 487-490) (see also "Equity Asset Valuation", p. 175), this calculation can be simplified if we assume that the net capital expenditures and working capital changes are financed using a fixed mix of debt and equity. If d is the proportion of the net capital expenditures and working capital changes that are raised from debt financing, the effect on cash flows to equity of these items can be represented as follows:

Equity Cash Flows associated

with Capital Expenditure Needs = – (Capital Expenditures - Depreciation)*(1 - d)

Equity Cash Flows associated

with Working Capital Needs = - (D Working Capital)* (1-d)

Accordingly, the cash flow available for equity investors after meeting capital expenditure and working capital needs, assuming the book value of debt and equity mixture is constant, is:

Free Cash Flow to Equity = Net Income

- (Capital Expenditures - Depreciation)*(1 - d)

- (D Working Capital)*(1-d)

3. Computing Free Cash Flow to Equity for Coca-Cola Hellenic Bottling Company S.A.

I evaluate Coca-Cola Hellenic by FCFE valuation model. I have used Free Cash Flow to Equity method because of its importance for the stockholders and avoiding accounting presuppositions present in income structure and its role in assessing the financial suitability of a firm.

Coca-Cola Hellenic is the largest European manufacturer of alcohol-free beverages. It is one of the leading players in sparkling category in Europe and West Africa and the largest coke bottler globally in terms of revenue. Coca-Cola Hellenic is the second-largest bottler of products of The Coca-Cola Company in terms of volume. Its unique portfolio of world-leading brands, mix of geographies (operations across 28 countries), and market execution capabilities make Coca-Cola Hellenic a leader in the alcohol-free beverage industry.

Coca-Cola Hellenic groups its markets into three following segments:

a)Established markets (in West Europe): Austria, Cyprus, Greece, Italy, Northern Ireland, Republic of Ireland, Switzerland),

b) Developing markets (in East Europe): (Baltics (Estonia, Latvia, Lithuania), Croatia, Czech Republic, Hungary, Poland, Slovakia, Slovenia) and

c) Emerging markets (in East Europe & West Africa): Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, FYROM, Moldova, Montenegro, Romania, Russia, Serbia, Ukraine, Nigeria).

(See http://www.coca-colahellenic.com)

As such, the FCFE valuation model is based on a sum-of-the-parts approach that values the three main markets of the company separately. I deem this approach to be appropriate as the Group operates in regions with different levels of growth; margin and risk.

First, I estimate the Free Cash Flows to Equity for the three main markets of the Coca-Cola Hellenic each year from 2009 to 2014 using the calculation described above, according to Aswath Damodaran. To do so, first the related data from 2009 to 2011 were extracted from Coca-Cola Hellenic's financial statements for its three markets needed to anticipate corresponding amounts in the future three years time period from 2012 to 2014 based to the last Compounded Annual Growth rate (CAGR) (see Appendix 1).

The following tables show the computation of Capital Expenditure and the Change in Working Capital, respectively, from 2009 to 2014.

(in millions of euro)	2009	2010	2011	2012	2013	2014
Capital Spending CAPEX = Ending Net Fixed Assets - Beginning Net Fixed Assets + Depreciation						
Established countries	0,2189	0,1589	0,1325	0,1578	0,1676	0,1781
Ending Net Fixed Assets	0,0966	0,1232	0,1188	0,1317	0,1461	0,1620
Beginning Net Fixed Assets		0,0966	0,1232	0,1188	0,1317	0,1461
Developing countries	0,1258	0,0851	0,0659	0,0565	0,0724	0,0806
Ending Net Fixed Assets	0,0488	0,0610	0,0465	0,0209	0,0094	0,0042
Beginning Net Fixed Assets		0,0488	0,0610	0,0465	0,0209	0,0094
Emerging countries	0,4004	0,1798	0,1477	0,1726	0,1833	0,1945
Ending Net Fixed Assets	0,2390	0,2362	0,2055	0,1906	0,1767	0,1638
Beginning Net Fixed Assets		0,2390	0,2362	0,2055	0,1906	0,1767
Total	0,7451	0,4238	5,1604	-4,4274	0,4234	0,4531
Ending Net Fixed Assets	0,3844	0,4204	5,1851	0,3432	0,3322	0,3301
Beginning Net Fixed Assets		0,3844	0,4204	5,1851	0,3432	0,3322

(in millions of euro)	2009	2010	2011	2012	2013	2014
Change in Work. Capital = Ending NWC - Beginning NWC						
Established countries	2,5695	-0,0842	-2,4191	-0,5495	-0,3479	-0,2393
Ending NWC =Total Current Assets (2) - Total Current Liabilities (2)	2,5695	2,4853	0,0662	-0,4832	-0,8312	-1,0704
Beginning NWC = Total Current Assets (1) - Total Current Liabilities (1)		2,5695	2,4853	0,0662	-0,4832	-0,8312
Developing countries	0,7791	-0,0999	-0,6611	-0,1564	-0,0956	-0,0642
Ending NWC =Total Current Assets (2) - Total Current Liabilities (2)	0,7791	0,6792	0,0181	-0,1383	-0,2339	-0,2981
Beginning NWC = Total Current Assets (1) - Total Current Liabilities (1)		0,7791	0,6792	0,0181	-0,1383	-0,2339
Emerging countries	1,6168	0,0444	0,0396	0,0416	0,0410	0,0403
Ending NWC =Total Current Assets (2) - Total Current Liabilities (2)	1,6168	1,6612	1,7008	1,7423	1,7834	1,8236
Beginning NWC = Total Current Assets (1) - Total Current Liabilities (1)		1,6168	1,6612	1,7008	1,7423	1,7834
Total	4,0497	0,6989	-5,0991	1,2241	-0,1602	-0,0093
Ending NWC =Total Current Assets (2) - Total Current Liabilities (2)	4,0497	4,7486	-0,3505	0,8736	0,7134	0,7040
Beginning NWC = Total Current Assets (1) - Total Current Liabilities (1)		4,0497	4,7486	-0,3505	0,8736	0,7134

Now, Equity Cash Flows associated with Capital Expenditure and Working Capital Needs can be calculated. When Net Income, Equity Cash Flows associated with Capital Expenditure, and Working Capital Needs are combined we have FCFE. I calculate these FCFE separately for established, developing and emerging markets.

The following table shows the computation of the Equity Cash Flows associated with Capital Expenditure and Working Capital Needs, the proportion d (=Debt/Asset) and the Free Cash Flows to Equity in the period between 2009 and 2012 and anticipated Free Cash Flows to Equity from 2012 to 2014 for each market of Coca Cola Hellenic.

(in millions euro)	Established countries					
	2009	2010	2011	2012	2013	2014
Net Income	0,1549	0,0893	0,0661	0,0432	0,0282	0,0184
- (1- d) (Capital Exp. - Deprec'n)	0,0613	0,0189	-0,0029	0,0089	0,0100	0,0114
- (1- d) Change in Work. Capital	1,6294	-0,0598	-1,6165	-0,3759	-0,2432	-0,1707
d	36,6%	29,0%	33,2%	31,6%	30,1%	28,7%
Free Cash flow to Equity (FCFE)	**-1,5358**	**0,1302**	**1,6855**	**0,4102**	**0,2614**	**0,1778**

(in millions of euro)	Developing countries					
	2009	2010	2011	2012	2013	2014
Net Income	0,0623	0,0661	0,0455	0,0389	0,0332	0,0284
- (1- d) (Capital Exp. - Deprec'n)	0,0309	0,0087	-0,0097	-0,0175	-0,0080	-0,0037
- (1- d) Change in Work. Capital	0,4941	-0,0709	-0,4417	-0,1070	-0,0669	-0,0458
d	36,6%	29,0%	33,2%	31,6%	30,1%	28,7%
Free Cash flow to Equity (FCFE)	**-0,4627**	**0,1284**	**0,4969**	**0,1634**	**0,1081**	**0,0779**

(in millions of euro)	Emerging countries					
	2009	2010	2011	2012	2013	2014
Net Income	0,1826	0,2308	0,1403	0,1230	0,1078	0,0945
- (1- d) (Capital Exp. - Deprec'n)	0,1516	-0,0020	-0,0205	-0,0102	-0,0097	-0,0092
- (1- d) Change in Work. Capital	1,0252	0,0315	0,0265	0,0284	0,0287	0,0287
d	36,6%	29,0%	33,2%	31,6%	30,1%	28,7%
Free Cash flow to Equity (FCFE)	**-0,9942**	**0,2012**	**0,1344**	**0,1048**	**0,0888**	**0,0749**

4. Free Cash Flow to Equity valuation model to get the value of Coca-Cola Hellenic

I discount the projected free cash flows to equity at the cost of equity for the period 2012-2014 to estimate the present value of free cash flow to equity. I apply the constant FCFE growth model for the established market and the two-stage FCFE growth model for both developing and emerging markets. The table presents a view of the assumptions related to Coca-Cola Hellenic's discount rate (cost of equity) and growth rate to perpetuity.

DCF Analysis	
Variable	**Base case estimate**
Beta	0,85
Risk free rate	7%
Equity risk premium	4,36%
FCFE perpetuity growth rate	0,5%
FCFE 1st stage growth	1,5%
FCFE 2nd stage perpetuity growth	1,0%
Cost of Equity	**10,7%**

The value of equity, under the constant growth model in Coca Cola Hellenic's Established markets, is a function of the expected FCFE in the next period, the stable growth rate, and the required rate of return (Aswath Damodaran, 2002, p. 498).

$$P_0 = \frac{FCFE_1}{k_e - g_n}$$

where,

P_0 = Value of equity

$FCFE_1$ = Expected FCFE next year

k_e = Cost of equity of the firm

g_n = Growth rate in FCFE for the firm forever

Under the two-stage FCFE model in Coca Cola Hellenic's developing and emerging markets, the value of equity is the present value of the FCFE per year for the extraordinary growth period plus the present value of the terminal price at the end of the period (Aswath Damodaran, 2002, p. 505).

Value= PV of FCFE + PV of terminal price

or

$$\text{Value} = \sum \frac{FCFE_t}{(1+k_e)^t} + \frac{P_n}{(1+k_e)^n}$$

where,

$FCFE_t$ = Free Cash Flow to Equity in year t

P_n = Value at the end of the extraordinary growth period

ke = Cost of equity in high growth (hg) and stable growth (st) periods

The terminal value represents the present value of Coca-Cola Hellenic's free cash flows into perpetuity at some point in the future. Below, I calculate the "terminal value" for Coca-Cola Hellenic in each market separately. So we have:

The terminal value in Coca-Cola Hellenic's established markets for the year 2014 is € 1,742.098 million, which is equal to 0,145.100 million divided by the required rate of return, 10,7% minus the anticipated growth rate of 0,5% and equals € 2,135.100 million.

The terminal value in Coca-Cola Hellenic's developing markets for the year 2014 is € 0,858.377 million, which is equal to 0,079.022 million divided by the required rate of return, 10,7% minus the anticipated growth rate of 1,5% and equals € 1,052.000 million.

The terminal value in Coca-Cola Hellenic's emerging markets for the year 2014 is € 0,673.976 million, which is equal to € 0,062.046 million divided by the required rate of return, 10,7% minus the anticipated growth rate of 1,5% and equals € 0,826.000 million.

Thus, the current equity value of Coca-Cola in its market is the sum of the three anticipate Free Cash Flow to Equity, plus the present value of the value of the firm at time t=3. So we have:

The discounted present value of the Free Cash Flow to Equity for the constant growth period in Coca-Cola Hellenic's established markets for the three years from 2012 to 2014 is € 0,791.400 million, and the present value of the terminal value is € 2,135.100 million. Therefore, Equity $Value_1$ is € 2,926.500.

The discounted present value of the Free Cash Flow to Equity for the two-stage growth period in Coca-Cola Hellenic's developing markets for the three years from 2012 to 2014 is € 0,324.600 million, and the present value of the terminal is € 1,052.000 million. Therefore, Equity Value2 is € 1,376.600.

The discounted present value of the Free Cash Flow to Equity for the two-stage growth period in Coca-Cola Hellenic's emerging markets for the three years from 2012 to 2014 is € 0,246.100 million, and the present value of the terminal value is € 0,826.000 million. Therefore, Equity $Value_3$ is € 1,072.100. The following table shows analytically the computation of equity value in each market.

(in millions euro)	2012	2013	2014
	Established countries		
PV(FCFE)	0,4102	0,2361	0,1451
PV(terminal value)	2,1351		
Equity Value 1	2,9265		
	Developing countries		
PV(FCFE)	0,1634	0,0977	0,0635
PV(terminal value)	1,0520		
Equity Value 2	1,3766		
	Emerging countries		
PV(FCFE)	0,1048	0,0802	0,0611
PV(terminal value)	0,8260		
Equity Value 3	1,0721		

Coca-Cola Hellenic's "equity value" as determined by the FCFE valuation model—is equal to the sum of all of the present values of each of the accounting period's (year's) free cash flows and terminal value calculated by adding the equity value in each market. Thus, the total value of Coca-Cola is € 5,375.200 million, as it is shown in following table.

EQUITY VALUE (TOTAL)	5,3752

Dividing the total value of equity (€ 5,375.200 million) by the number of outstanding shares (362.084.314) gives the value of Coca Cola Hellenic's stock. My model values Coca-Cola Hellenic at € 14,85 per share for the end of 2012.

Price (€)	**14,85 €**

I estimate this price with the separate valuation of West European (established countries), East European, and Nigerian operations (both developing and emerging countries). Figures are broken down across the regions according the following assumptions and results of the sum-of-the-parts analysis:

	Assumptions and results of the sum-of-the-parts analysis (2011-2014)			
	Established countries	Developing countries	Emerging countries	Aggregate
Revenues CAGR	-2,08%	0,54%	8,16%	**2,35%**
Volume CAGR	-2,98%	1,46%	2,44%	**0,34%**
EBITDA margin	12,2%	12,0%	13,1%	**12,4%**
Tax rate	69%	33%	17%	**34,9%**
Cost of Equity	10,7%	9,9%	9,9%	9,9%
Equity Value(€ million)	2,9265	1,3766	1,0721	**5,3752**
Price (€)				**14,85**
	West Europe	**East Europe & Nigeria**		

5. Sensitivity analysis

However, the value of Coca Cola Hellenic is very sensitive to the inputs (see "Equity Asset Valuation" about Sensitivity analysis, p. 141-2). For this reason, I value except the base case valuation the highest and lowest reasonable alternative estimates in the following table. The following Sensitivity analysis values Coca Cola Hellenic per share at aggregate level.

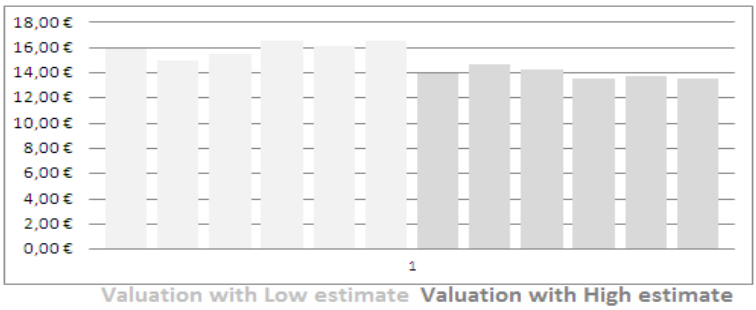
DCF Analysis		Sensitivity Analysis			
Variable	**Base case estimate**	**Low estimate**	**High estimate**	**Valuation with Low estimate**	**Valuation with High estimate**
Beta	0,85	0,8	0,9	15,93 €	13,98 €
Risk free rate	7%	6%	8%	15,00 €	14,65 €
Equity risk premium	4,36%	3,71%	5,00%	15,52 €	14,26 €
FCFE perpetuity growth rate	0,5%	0,0%	1,0%	16,55 €	13,55 €
FCFE 1st stage growth	1,0%	0,5%	1,5%	16,16 €	13,78 €
FCFE 2nd stage perpetuity growth	1,5%	1,0%	2,0%	16,59 €	13,54 €
Cost of Equity	**10,7%**				

The table shows the base case and the highest and lowest reasonable alternative estimates. The column "Valuation with Low Estimate" gives the estimated value of Coca Cola Hellenic based on the low estimate for the variable on the same row of the first column and the base–case estimates for the remaining variables. "Valuation with High Estimate" performs a similar exercise based on the high estimate for the variable at issue.

As the following chart of sensitivity analysis shows, the value per share of Coca Cola Hellenic is very sensitive to the inputs. Of the five variables presented, the stock valuation is least sensitive to the range of estimates for the equity risk premium and beta.

The range of estimates for these variables produces the smallest ranges of stock values (from € 14,26 to € 15,52 for the equity risk premium and € 13,98 to € 15,93 for beta). The stock value is most sensitive to the extreme values for the risk-free rate and the FCFE growth rate.

Chart of Sensitivity Analysis for Coca Cola Hellenic



6. Summary and Results

In this paper, I combined the concepts of equity valuation, constant and two-stage growth FCFE growth models, required rate of return on equity, and growth to determine the value of Coca Cola Hellenic's stock. The value of the equity of a firm is defined as the present value of all future cash flows from the firm to the stockholders. Free Cash Flows to Equity are defined as Net Income minus Equity Cash Flows associated with Capital Expenditure Needs minus Equity Cash Flows associated with Working Capital Needs. Finally, the value of Coca-Cola Hellenic was calculated regarding the sum of 3 anticipations of Free Cash Flows to Equity plus the terminal value of the firm at t=3 discounted at the required rate of return on equity. As the sum-of-the-parts approach analysis shows, the majority of CCHBC's value comes from Established Markets (West European operations). Dividing the total value of Coca-Cola Hellenic by the number of outstanding shares gives the value of its stock. As the sensitivity analysis shows, the value per share of Coca Cola Hellenic is very sensitive to the inputs. In this paper I have used CAMP model in order to calculate rate of return demanded by stockholders. Appendix Table 1 and 2 show the data used in this analysis.

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