Estimating Beta for Cost of Capital – Is It Fair to Apply Short Term Volatility for Long Term Investors?

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Abstract
This case deals primarily with the beta estimates for the cost of capital in updating fair value of investments on a regular basis such as financial reporting. The fair value of investments is highly sensitive to the changes in the cost of capital, given the fundamentals of underlying business do not substantially fluctuate over a short period of time. The cost of capital, in turn, is highly subject to the beta, which represents a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market. This raises a basic question of updating fair value of long term investments using the cost of capital which is vulnerable to the short term volatility of stock price movements. This case study is prepared for senior and the first year MBA students to learn the practical method of estimating beta and adjusting for financial leverage and non-operating assets such as cash. Finally, they will learn how to apply the adjusted beta to update the fair value of long term investment in practice.
Keywords: capital asset pricing model, cost of capital, beta, adjusted beta, fair value, financial reporting

Introduction
Harry Smith is a head of the financial and accounting department of SuperCo, a public company listed on Kenya Stock Exchange (KSE). He is preparing for the financial statements for the financial year ended 31 December 2016, and in the process of finalizing the Company's equity investment account on the book. Last quarter, the Company acquired a minority interest of a private company in Morocco, which operates a network of hypermarket and supermarket stores across Morocco. For the last quarterly report, the Company recorded the acquisition of minority interest at fair value to be compliant with International Financial Reporting Standards (IFRS). It requires that investment in unquoted equity instruments that constitute a non-controlling interest in a private company be measured at fair value, in accordance with the principles set out in IFRS 13 *Fair Value Measurement*.

Last quarter, Harry used the dividend discount model (DDM) to estimate the fair value of investment because he had done a fair amount of work through the due diligence process to project future cash flows of the investee company and expected dividend income over the next five years. To discount the future dividend income, he used the cost of equity derived from the capital asset pricing model (CAPM), based on the risk free rate, equity risk premium and beta estimates using the comparable listed peers. For the annual reporting, he thought that fair value of investment would be simply a mechanical update of a few inputs, and asked Suzy, a financial associate and an MBA graduate, to update the numbers and finalize the process. Three days later, Suzy called him to update the final numbers in preparation for the discussion with the auditors next day, and he was shocked by the result that fair value has dropped by more than 9% in just one quarter. He planned to meet with the auditors next day for the preliminary review of annual accounts, but all of sudden, he got unpleasantly surprised by this last minute outcome.

What went wrong in just one quarter, seriously?
To understand what went wrong, Harry decided to revisit the valuation methodology and key inputs. He knows that there was no material update on the cash flow projection since the

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business went well over the last quarter in line with the forecasts. He also did not update the perpetuity growth rate as there have been no material issues with regards to the macroeconomic environment and industry outlook. Then he noticed that discount rate has increased as compared to the last quarter. He summoned Suzy and asked what happened.

"Suzy. I've asked you to update the discount rate a couple of days ago, and you came up with this surprising result with no heads up?"

"Yes I updated the numbers exactly as you requested, and the discount rate was just an outcome. I couldn't do anything other than just reporting as it was"

Harry reviewed what Suzy had done for the calculation of cost of equity, and indeed, there was no mistake or error. She rightfully updated all the numbers based on observable inputs in the market – risk free rate, equity risk premium and beta estimates. There seemed to have little room for her to make any arbitrary decision or subjective judgment through the calculation. Having taken a closer look, Harry found out that all the variables remain quite consistent with those in the last quarter, except for the beta which has sharply increased resulting in a higher cost of equity. To ensure the correct estimation of beta, Harry decided to reiterate the process all over again.

Estimating Beta Coefficient

Since the investee company is a private company, Harry used a sample of comparable foods retailing companies in Africa. Given the size and format of the grocery chains, Harry believes that Shurfersal Ltd is the most closest comparable to the investee company. Therefore, he decided to use the weighted average of comparable companies, instead of using simple average or median.

Beta is generally estimated by regression of stock price movement against the market index. In practice, beta is downloadable from Bloomberg terminal. Harry switched on the Bloomberg terminal and typed in "beta" function to find out beta estimates of each comparable companies. Looking at the screen, he tried to remind himself of key inputs he had used in the last quarter – what kind of market index did I use? Was it a local index or regional index? How many years had I tracked back for trading data? Was it quarterly data or monthly data? He managed to remember that he had used five years of quarterly historical trading data in the last quarter, and summarized the beta as shown in the exhibit below.

No	Company Name	Weight	Using Local Indices[1]		Using Regional Index[2]	
			Raw Beta	Adjusted Beta	Raw Beta	Adjusted Beta
1	Shufersal Ltd	40%	0.744	0.829	-0.047	0.302
2	Rami Levi Chain Stores	15%	1.198	1.132	0.420	0.614
3	Choppies Enterprises	15%	2.565	2.043	0.375	0.583
4	Sultan Center Food	15%	0.692	0.795	0.514	0.676
5	Societe Magasin General	15%	0.834	0.889	0.408	0.605
	Weighted Average	**100%**	**1.091**	**1.060**	**0.239**	**0.493**

Notes:

1) Local indices used – Tel Aviv Stock Exchange 125 Index (Shufersal / Rami Levi), Botswana Gaborone Index (Choppies); Kuwait Stock Exchange Index (Sultan); Tunisia Stock Exchange Index (SGM)

2) Regional index used – MSCI Emerging Market Africa (excluding South Africa) Index

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To decide which beta should be used for computation, Harry reminded himself of his previous discussion with Jack Rich, a CEO of SuperCo. Jack said the investee company has established extensive supermarket outlet network across Morocco, and recently acquired a majority stake of hypermarket chain operator based in Cote d'Iviore for regional expansion. Therefore, he highlighted that our investment could be a strategic milestone to build up a regional foods retail and distribution network across Africa (excluding South Africa which has been already developed by major local players). On the other hand, Harry understood that African capital markets are still far from integration, and it is extremely difficult for local players to tap into foreign capital markets in the region. As a result, equity investors would typically have a strong preference towards domestic assets, despite the wider benefits of diversification.

Discussion 1: *Explain the difference between the raw beta and adjusted beta from the Bloomberg. Suggest which beta should be used and provide your rationale.*

Adjusting Beta Estimates
After deciding which beta to be used, Harry moved on to consider other factors which might have influenced the beta estimation. Harry asked Suzy to summarize latest key financial data of each comparable companies to identify the differences as shown in the exhibit below.

	Comparable Companies – Listed Foods Retailers in Africa					Investee Company
	Shufersal	**Rami Levi**	**Choppies**	**Sultan CFP**	**SMG**	
Currency	ILS	ILS	BWP	KWD	TND	MAD
Country of Headquarter	Israel	Israel	Botswana	Kuwait	Tunisia	Morocco
Financial Year Ended	31-Dec-15	31-Dec-15	30-Jun-15	31-Dec-15	31-Dec-15	31-Dec-15
Revenue	**11,505**	**3,982**	**5,945**	**284**	**943**	**6,732**
Cost of Goods Sold	8,716	3,200	4,653	233	813	5,622
Total Assets	**7,230**	**1,160**	**2,419**	**288**	**532**	**6,851**
o/w: Cash and cash equivalent	746	170	344	5	10	355
Short term investment	280	5	8.2	0	26	31
Long term investments	84	2	0	117	0	98
Accounts receivable	1,145	367	110	91	33	1,010
Inventory	643	235	536	26	179	1,064
Total Liabilities	**6,060**	**828**	**967**	**247**	**529**	**5,475**
o/w: Short term debt (incl. overdraft)	0	30	63	0	66	120
Long term debt (incl. current portion)	3,137	0	353	130	196	2,106
Accounts payable	1,814	666	424	91	138	2,544
Shareholders' Equity	**1,161**	**332**	**1,449**	**41**	**1**	**1,366**
Minority Interest	9	0	2	1	2	9
Current market cap	**3,028**	**1,911**	**3,939**	**32**	**317**	**N/A**
Pension and post-retirement benefits	0	18	0	0	0	0
Operating lease obligation	(184)	667	1,249	14	31	557
Leasehold improvements	1,561	277	0	0	0	0
Marginal Tax Rate	25%	25%	22%	15%	25%	31%

Source: Company Filings; Capital IQ

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Harry noticed that the comparable companies have substantially different capital structures. Given the nature of retail business, he understands that the companies typically require substantive working capital. Liquidity management policies vary by company, but he thinks that foods retailers need to maintain minimum cash balance of any excess of accounts payable less accounts receivables during a particular period. He also noticed that there are other debt-like items such as pension obligation, operating lease and leasehold improvements. After adjusting all the necessary variables, Harry found out the weighted average beta of the comparable companies. Finally, he also calculated the beta of the investee company.

Discussion 2: *Compute the adjusted beta for each of the comparable companies as shown in the exhibit below and calculate the fully adjusted equity beta of the investee company.*

	Beta coefficient	Weighted Average of Comparables	Remarks
1	Levered (equity) beta	[•]	Equity beta from Bloomberg
2	Unlevered (asset) beta	[•]	Adjustments for financial leverage
3	Operating beta	[•]	Adjustments for non-operating assets (excess cash)

Applying Beta Estimates to a Real World
Throughout the reiterative process, Harry figured out that the increase in beta resulted from the combined effects of various factors. First, levered (equity) beta has risen due to a seasonal factor. The year-end sales and promotion has diverged stock price of the comparable companies against the general market indices, leading to a greater variance of beta estimates. Second, financial leverage of comparable companies has increased due to additional working capital facility drawdown for the purchase of stocks during the holiday sales promotion. Last, operating leverage has also increased since credit sales increased during the last month of year end, which in turn reduced the excess cash balance of comparable companies. These factors amplified the beta adjustments and fully adjusted beta has subsequently increased to generate a higher cost of equity at year end.

Understanding what happened, Harry asked himself whether it would be fair to apply the short term volatility factors (such as seasonality and transient movement of financial and operating leverages) to the beta estimation, resulting in a subsequent fluctuation of cost of equity over a short period of time. In particular, he knows that neither fundamental of the investee company nor our expected return of this investment has not materially changed during the last quarter. The meeting with the auditors was pinned down on the next day, and Harry urgently needed insightful advices.

Discussion 3: *If you advise Harry, how would you recommend and what would be the supporting rationale to convince the auditors?*

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