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FROZEN FOOD PRODUCTS: COST OF CAPITAL

Maria D'souza planned to expand her business by introducing a new product line of frozen foods. Her firm was manufacturing tropical fruit pulp-purees and concentrates as per customer requirements. The firm had been founded by her father in the early 1980s as a privately owned company. The expansion plan was intended to double the business potential of her company. D'souza wanted to estimate the attractiveness of the new expansion by estimating Net Present Value (NPV) of the expected cash flows. As a first step to value the project, D'souza prepared projected earnings for the coming five years. She also prepared projected balance and estimated free cash flows. Although the growth rate over the five-year forecast period was high, she felt that the growth would stabilize at 5 per cent per year after the initial high growth phase. Her main concern was to find a suitable discount rate to be applied to cash flows to ascertain the NPV of the project.

She called on one of her friends, who was a local financial consultant, and posed the problem to him:

> How can I estimate cost of capital of our firm to evaluate the new expansion plan? Ours is a private firm and other than meeting our personal expenses, all profits are reinvested in the business. This was the reason for the steady growth of our business over the years. Can you find a way out to ascertain cost of capital of our company?

Her consultant friend asked her to analyze the cost of capital for similar companies operating in the same industry. The basic principle is that firms in the same industry have similar customers, operations and assets; therefore, they bear similar risks and should have similar costs of capital. However, companies' total risk also includes risk due to financial leverage. If risk due to financial leverage can be isolated, the business risk of comparable companies should not vary too much. D'souza's consultant suggested examining the unlevered cost of equity for comparable companies operating in the food processing industry.

OPERATIONS OF THE FIRM

The firm sourced fruits and vegetables from its orchards and nearby farms. The firm had always maintained strong and long-standing ties with the agricultural community in the nearby areas, which made it possible for an uninterrupted supply of fresh fruits and vegetables.

Fruit extracts had to be handled with extreme care before the thermal processing and stored at controlled temperature. To add preservative value, the fruit juices were pasteurized by heating to nearly 100ºC, followed by rapid cooling. The company used both canning processing and aseptic processing to add preservative value of fruit juice.

In the canning process, hot juice at 70ºC to 80ºC is poured into containers (cans or jars) and the containers are sealed and heated at 100ºC to 105ºC for up to 10 minutes and then cooled immediately. The heating and cooling should be done as fast as possible as slow heating and cooling would spoil the quality of the product.

In aseptic processing, the product is packaged in a container and heated between 91° to 146°C by a flash-heating process to achieve sterility. This method permits processed food to be stored for longer periods without the addition of preservatives. The products are packed in soft packages, typically a mix of paper (70 per cent), polyethylene (LDPE) (24per cent), and aluminum (6 per cent), with an inside layer of polyethylene film. This type of packaging forms a tight seal against microbiological organisms, contaminants and degradation, eliminating the need for refrigeration. Another advantage of aseptic packs is its adaptability to different sized containers from single serving 200 ml pouches to bulk packs.

EXPANSION PLAN

The demand for processed foods was growing in India and there was a lot of potential for exports. However, the company could not realize its hidden potential as investment in capital expenses over the last few years was not adequate. D'souza felt new equipment needed to be installed on a priority basis and capital expenditures had to be continued to sustain the growth of the firm.

D'souza planned to introduce a new processing line for frozen foods using individual quick freezing (IQF) technology. In this freezing method, raw fruit and vegetables can be stored for more than a year, by preserving the colour, flavour and texture of the products in farm-fresh conditions. This method of preservation enabled the availability of certain seasonal fruits and vegetables throughout the year.

Another advantage of the process is that the fruit and vegetable pieces are frozen individually using a fluidization technique that uses a blast of cold air directed on the food products to rapidly freeze them. Rapid freezing improves texture of the food pieces and prevent lump formation to keep the product free flowing. The user of the frozen product need not thaw or defrost the whole package. As product pieces remain separate, the required quantity can be taken out from the packaging for immediate consumption and the remaining portion can be kept frozen until required again.

MARKET FOR THE FROZEN PRODUCTS

India was one of the world's largest food producers and food production would continue to increase in the next decade. This created a large opportunity for investment in food and food processing technologies in the country.

The major market segments were retail outlets for direct consumption: hotels, restaurants, caterers, eateries and other industries that use fruits and vegetables as raw material. Frozen fruits and vegetables also had an enormous demand in neighbouring countries and offered attractive export potential. Rapid growth of the fast food industry in the sub-continent also enlarged business opportunities for frozen foods.

FINANCIAL EVALUATIONS

The company was established in 1980 as a small private company and had steadily increased its operations. The frozen food plant was conceived as a wholly owned subsidiary of the parent firm; however, D'souza wanted to maintain separate accounts for the new project so that performance of the new expansion could be monitored independently. The projected income statements of the frozen food plant for the next five years can be found in Exhibit 1. Though the debt component of the parent company was negligible, the new project was proposed to be financed with debt to equity ratio of 1:3. Accordingly, projected balance sheets for the next five years were prepared and can be found in Exhibit 2.

To estimate profitability of the new project, D'souza could easily estimate free cash flow to the firm for next five years from the projected financial statements. Though the operations were expected to grow at a high rate during the next five years, D'souza felt that such high growth may not be sustainable in the long run and considered a perpetual growth rate of 5 per cent per year in cash flows beyond the initial five years. The main problem was to find a suitable discounting rate for the company. As the company was not listed in any stock exchanges, the project beta and riskiness of cash flows could not be ascertained.

According to the consultant's suggestion, D'souza should evaluate the riskiness of a similar food processing company listed in the market and estimate the cost of capital of that company using publicly available information. As it was very difficult to identify a single company whose risk profile would exactly match the frozen food project, it was decided to review the cost of capital of all major food processing companies operating in the country. Since many frozen food companies were managed privately, the comparison was limited to companies listed in the stock exchanges. The following companies were classified under the Food and Food Processing category in the S&P CNX 500 index and D'souza decided to use the business risk of these companies as her reference point.

- Advanta India Ltd.
- Britannia Industries Ltd.
- GlaxoSmithkline Consumer Healthcare Ltd.
- Jubilant Foodworks Ltd.
- Kwality Dairy (India) Ltd.
- Rei Agro Ltd.
- Venky's (India) Ltd.
- Zydus Wellness Ltd.

These companies were operating in the same business domain and should have broadly similar business risks, and hence should have similar cost of capital. The relevant financials of these companies are compiled in Exhibit 3. To arrive at the cost of equity of these companies using Capital Asset Pricing Model (CAPM), D'souza required measures of equity beta, risk free rate and expected market rate of return.

The beta (β) of a stock measures the correlated volatility of an equity stock in relation to the volatility of the benchmark asset. A stock market index is generally used as benchmark.

The formula for estimating the equity beta of a firm is:

$$\beta_{equity} = \frac{Cov(r_{equity}, r_{market\,index})}{Var(r_{market\,index})}$$

Where

r_{equity} = the rate of return from the equity,

$r_{market\ index}$ = the rate of return of the market portfolio, and

$Cov(r_{equity}, r_{market\ index})$ = the covariance between the two rates of return.

Beta can also be estimated by regressing the return series of the stock against a stock market index. The equity betas of these companies were calculated using the daily stock prices of these companies and the value of a popular stock market index (BSE Sensex 30).

Historically, from 1998 until 2012, the 10-year India Government Bond yielded on an average 8.0 per cent return. The return varied from an all-time high of 12.3 per cent in February 1999 to the low of 5.0 per cent in October of 2003. The last reported benchmark interest rate was at 8.00 per cent. In India, interest rate decisions are taken by the Reserve Bank of India's Central Board of Directors. The benchmark repurchase rate can be considered as the official interest rate. Considering these factors, D'souza decided to take the risk free rate at 8 per cent per year. This rate also closely matched the discounting rate of long maturity treasury bills.

Estimating expected market premium was too confusing for Maria. She decided to use a recent survey report where market risk premium of several countries were compiled. Fernandez et al[1] carried out a survey to measure the Market Risk Premium (MRP) used to calculate the required return to equity in different countries. As per the study, the market risk premium of India was 8 per cent. The corresponding premium for Canada and the United States were 5.4 per cent and 5.5 per cent, respectively.

THE TASK AHEAD

D'souza was confident these inputs were adequate to ascertain cost of capital of her firm. To keep the analysis simple, she assumed a uniform tax rate of these companies at 30 per cent. Further, debts of these companies including her company were considered risk free and an identical cost of debt of 8 per cent was taken for the valuation of the expansion plan.

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[1] *Fernandez Pablo, Aguirreamalloa, Javier and Avendaño, Luis Corres, "Market Risk Premium Used in 82 Countries in 2012: A Survey with 7,192 Answers," June 13, 2012, http://ssrn.com/abstract=2084213 or http://dx.doi.org/10.2139/ssrn.2084213, accessed August 31, 2012.*

Exhibit 1

PROJECTED INCOME STATEMENT
('000)

Year	**1**	**2**	**3**	**4**	**5**
Revenue	4400	4900	5400	5900	6400
Expenses	2400	2700	3000	3300	3600
EBITDA	2000	2200	2400	2600	2800
Interest Payments @ 8%	165	175	185	194	202
Depreciation @ 15%	900	945	983	1016	1043
Profit Before Tax	**935**	**1080**	**1232**	**1390**	**1554**
Tax @ 30%	281	324	370	417	466
Profit After Tax	**655**	**756**	**862**	**973**	**1088**

Source: Compiled by author.

Exhibit 2

PROJECTED BALANCE SHEET
('000)

Year	**0**	**1**	**2**	**3**	**4**	**5**
Equity	6000	6375	6754	7104	7429	7734
Debt	2000	2125	2251	2368	2476	2578
Total Liabilities	8000	8500	9005	9472	9906	10313

Gross Fixed Assets	6000	7200	8400	9600	10800	12000
Less Accumulated Depreciation	0	900	1845	2828	3844	4887
Net Fixed Assets	6000	6300	6555	6772	6956	7113
Working Capital	2000	2200	2450	2700	2950	3200
Total Assets	**8000**	**8500**	**9005**	**9472**	**9906**	**10313**

Source: Compiled by author.

Exhibit 3

PARTICULARS OF FOOD AND FOOD PROCESSING COMPANIES IN S&P CNX 500 INDEX

Company	Year Ending	Face Value (Rs.)[2]	Book Value (Rs.)	M Cap[3] (Rs. million)	Net Income (Rs. million)	Equity[4] (Rs. million)	Debt[5] (Rs. million)	Equity Beta[6]
Advanta India Ltd.	Dec-11	10	222.1	8,704.0	142.2	3,744.2	5,738.3	0.5472
Britannia Industries Ltd.	Mar-12	2	43.5	58,237.8	1678.7	5,200.4	281.5	0.2638
GlaxoSmithkline Consumer Healthcare Ltd.	Dec-11	10	272	121,160.1	3,552	11,441.8	0	0.0959
Jubilant Foodworks Ltd.	Mar-12	10	46	74,938.8	1073.4	2,995.5	0	0.9856
Kwality Dairy (India) Ltd.	Mar-12	1	8.9	6,116.3	909.9	910.5	4,248	0.6357
Rei Agro Ltd.	Mar-12	1	26.6	8,966.9	2,347.4	23,611.8	38,540.5	0.5393
Venky's (India) Ltd.	Mar-12	10	336.3	4,669.2	351.6	3,157.9	985.7	0.669
Zydus Wellness Ltd.	Mar-12	10	47.8	15,336.9	676.5	1,868.6	0	0.5372

Source: Compiled by author.

[2] *Rupee (Rs.) is the currency of India; US$1 = Rs55 approximately.*
[3] *Market Capitalization of Equity as on August 30, 2012.*
[4] *Book value of equity capital taken from Balance Sheet.*
[5] *Book value of outstanding debt.*
[6] *Equity beta was estimated using daily closing value of stock and BSE Sensitive Index (SENSEX-30) for past one year.*