Professor Crocker H. Liu Revised: June 14, 2003
Financial Management

# Optimal Capital Structure
## (Playing "House" with Bed Bath & Beyond)

**Objective**: The objective of this assignment is to further apply the concepts learned regarding the cost of equity, cost of debt, and weighted average cost of capital in deriving the optimal capital structure for a firm.

**Company**: Bed, Bath & Beyond (NASDAQ: BBY, http://www.bedbathandbeyond.com/). Bed Bath & Beyond is in the Standard and Poor's 500 and NASDAQ 100 Index.


Bed Bath and Beyond, Inc. is the #1 house and home superstore retailer in the U.S. selling better-quality domestics merchandise and home furnishings. The Company's over 500 stores principally range in size from 30,000 to 50,000 square feet, with some stores exceeding 80,000 square feet. The firm has historically achieved high sales and earnings increases through the organic growth of its store base, good execution, and has consistently outperformed its competition. Its successful merchandising strategy and decentralized management structure have enabled Bed Bath & Beyond to generate above-average operating margins of more than 20% and strong return on capital at about 22% during the past three years. More specifically, the retailer's decentralized organizational structure allows store managers to have more control than their peers at other retailers (and the company has less manager turnover).[1] Bed Bath & Beyond cuts costs by locating its stores in strip shopping centers, freestanding buildings, and off-price malls, rather than in pricier regional malls. To cut costs further the company's vendors ship merchandise directly to the stores, eliminating the expense of a central distribution center and reducing warehousing costs.

Bed Bath & Beyond is a solid cash generator and has funded its store expansion with internally generated cash. It also relies on its cash flow from operations and cash balance for liquidity. Although the company has no funded debt outstanding, lease adjusted debt is substantial[2]. The lack of a committed credit facility also limits Bed Bath & Beyond's financial flexibility to some extent. However, Bed Bath & Beyond's relatively stable cash flow generation and existing cash balance. are expected to be sufficient to fund working

[1]One example often cited by the company is the case of a manager who decided to sell glasses by the piece instead of in sets. Sales increased 30%, and the whole chain incorporated the practice.
[2]at about $1.6 billion, resulting in total debt to capital of about 53%

capital and capital expenditure requirements over the intermediate term despite the lack of a committed credit facility. On April 30, 2003, Standard & Poor's Ratings Services raised its corporate credit rating on Bed Bath & Beyond (BBBY ) to 'BBB' from 'BBB-'. The upgrade reflects Bed Bath & Beyond's consistent operating performance, and improving profitability and other credit protection measures.

Recently (April 2, 2003) Bed Bath & Beyond announced that Steven H. Temares, President and Chief Operating Officer of the Company, will assume the additional title of Chief Executive Officer. Warren Eisenberg and Leonard Feinstein, who co-founded Bed Bath & Beyond in 1971, will continue in their capacity as full-time Co-Chairmen. These changes to the management structure are consistent with new standards for corporate governance, which endorse the separation of the positions of Chairman and Chief Executive Officer. Founders Warren Eisenberg and Leonard Feinstein (who operate from separate locations) have slowly reduced their holdings in Bed Bath & Beyond.

**Publicly Traded Competitors:** Bombay Company (BBA), Cost Plus (CPWM), Linen's and Things (LIN), Pier 1 Imports (PIR), and Williams Sonoma (WSM). Other competitors include Euromarket Designs (aka Crate & Barrel-Private), IKEA (Private), and the Container Store (Private).

**Assumptions**:

| Item | Assumption |
|---|---|
| Shares outstanding | See spreadsheet; use latest number given in the 10Q. |
| Beta | Use 5 years of monthly data. Regress the return on the appropriate stock against the return on the S&P500. All returns are provided in the worksheet labeled "Returns". In re-leveraging BBBY's beta, be sure to include the PV of Operating Leases as part of total debt. |
| Risk premium ($R_M$ - $r_F$) | 5.5% |
| Current $r_F$ | Use the current yield on a 10-year Treasury Bond in "Treasury Rates" worksheet. |
| Bond Spread | See the "Bond Spreads" worksheet for a given rating and maturity. Assume that the ***bond spread*** for a CC rated bond is 21.31%, C rated bond is 25.56%, and D rated bond is 33.64%. |
| Imputed Bond rating using Altman model | Take the average between 2 Z-scores as the cut-off point. For example since the Z-Score for an AAA = 8.15 and the Z-Score for an AA+ = 7.6, the average is (8.15+7.6)/2 = 7.875. If the calculated Z-score is equal to or above 8.875, then set the imputed rating = AAA. If it is below 7.875 but above 7.6 then set the rating = AA+. |
| Debt | Assume that the book value of debt represents a good proxy for the market value of debt. For all bond-rating calculations, assume a 10-year maturity. Also assume that existing debt is refinanced at the "new rate" associated with the applicable bond rating. |
| PV of Operating Leases | In calculating the number of years remaining on the operating lease, please round to the nearest whole number. For example, if Thereafter Rents ÷ Average Operating Lease Rent = 3.6 then the number of year remaining is 4 years. |
| Marginal tax rate | Use the calculated marginal tax rate for the trailing twelve months of 38.5%. |
| NA | Set NA = 0 in the Financial Statements (Disclosure spreadsheet) |

**Assignment**: Download the Bed, Bath & Beyond data from my website and use the downloaded spreadsheet to answer the following questions based on the preceding assumptions. All work should be done on this spreadsheet.

1. Cost of Debt (15 points): Using BBBY's 10Q, 10K, and information contained in the "Treasury Rates" and "Bond Spreads" worksheets, please answer the following questions. What is Bed, Bath, and Beyond's historical implied bond rating using the Altman EM score model? What is BBBY's current cost of debt based on the last twelve months (LTM) of available data from the 10Q based on the Altman EM score model and alternatively based on Standard and Poor's (S&P's) current bonding rating? Please use the worksheet template labeled "1. Cost of Debt" in answering this question and fill in the portion that is highlighted in yellow.

2. Value of Operating Leases (15 points): Using the appropriate cost of debt based on the Altman model and alternately based on S&P's current bond rating, for each set of rental/lease payments, calculate the present value of the operating leases. In doing the calculations, assume that the cost of debt for the period remains constant over time. Since the year 2003 was not yet finished at the time of this case (the case was completed on June 14, 2003), you will need to discount the lease payments associated with 2003. Do not make any adjustments for the half-year since the amount given for 2003 represents the remaining lease payment that has not yet been paid in 2003. Please use the worksheet template labeled "2. Calc PV of OpLease" in answering this question and fill in the portion that is highlighted in yellow.

3. Capital Structure (10 points): Using the "3. LTM Capital Structure" template in your workbook, calculate the current last twelve months (LTM) capital structure of Bed, Bath & Beyond from a book value and alternatively a market value perspective by filling in the appropriate cells that are highlighted in yellow. Does it make a difference whether the BBBY's capital structure is based on the Altman model and alternately based on S&P's current bond rating (do you obtain the same results using either method)? In doing your calculations, be sure to examine the role that off-balance sheet financing can have by first excluding it and then including it as part of debt. Does it make a difference whether the present value of operating leases is included in the capital structure? In other words, is off-balance sheet financing an important part of Bed, Bath, and Beyond's capital structure? Please explain.

4. Imputed Beta and Cost of Equity (20 points): Using the "4. Cost of Equity" template, together with the information contained in the worksheets labeled "Recent Stock Prices", "Returns", and the corresponding 10Qs on Bed, Bath & Beyond's competitors, calculate the built-up beta for BBBY. Also calculate Bed, Bath & Beyond's historical beta using BBBY's returns for the last 60 months (5 years) e.g., from 6/98 through 5/2003. Note: In calculating the debt to equity ratio for competitors, you do NOT include and are also not provided with information on operating leases for competitors. Point: We exclude the PV of Operating leases in your debt to equity ratios for the competitors since our goal is to obtain an unlevered beta (a beta that has No debt). However, BBBY's debt to equity ratio *should* include the PV of Operating Leases and is in terms

of *market value*. After calculating BBBY's built-up beta, calculate its LTM cost of equity using the "Treasury Rates" worksheet.

5. Weighted Average Cost of Capital (10 points): Using the "5. BBBY WACC" template in addition to your answers to the preceding questions calculate Bed, Bath & Beyond's weighted average cost of capital for the last twelve months (LTM) using the imputed bond rating from the Altman model and alternately the current bond rating from S&P.. What impact does recognizing the present value of operating leases (rental payments) as debt have on the book value and market value WACC? Does it matter whether one uses a built-up beta or the historical beta in calculating the various WACCs?

6. Optimal Capital Structure (30 points): Using the "6. Optimal Cap Structure" template, derive what the optimal capital structure (capital structure that results in the lowest WACC) should be for Bed, Bath & Beyond. To determine this, please proceed as follows:

a. Step 1: Using the built-up levered beta for BBBY that you obtained earlier, calculate the levered beta ($\beta_L$) and the corresponding cost of equity for Bed, Bath & Beyond at the various debt to total capital ratios (debt/(debt + equity)): 0%, 10%, 20%, …., 70%, and 80%. (*Hint: you first need to unlever the beta and then relever it given the various debt to equity ratios*)

b. Step 2: Calculate the corresponding after-tax cost of debt for Bed, Bath & Beyond at the various debt to total capital ratios. Total capital is assumed to remain constant at the LTM level and includes the present value of operating leases calculated using the current bond rating from S&P.. Only the composition of the total capital varies e.g. the portion that is equity and the portion that is debt changes for various D/(D+E) levels. I have provided to you the pre-tax interest coverage at the various Debt/(Debt+Equity) levels. Use the "Ratings (Int Coverage)" worksheet to obtain the implied bond rating corresponding to a particular interest coverage ratio. [3] Notice that the effective tax rate changes as more debt is used because interest is tax deductible.

c. Step 3: Calculate the after-tax weighted average cost of capital at the various debt to total capital ratios. Is Bed, Bath & Beyond currently at or near its optimal capital structure? If it isn't at it optimum capital structure, does BBBY need to increase or decrease its level of debt? What is the likely debt rating of Bed, Bath & Beyond's debt (based on the interest coverage ratio imputed bond rating method) at its optimal capital structure?

Please turn in a hard copy of your work together with your disk. This is an individual assignment. Anyone caught cheating will receive an automatic F on this assignment.

[3] I have provided the interest coverage ratio since a circular reference exists. Essentially, the interest rate depends on the rating and the rating depends on the interest coverage ratio, which in turn depends on the interest rate. If time permits, I will show you how to model this using Excel if time permits.