American Home Products Analysis

American Home Products (AHP) is a capital structure case. For the purpose of this analysis it is assumed that AHP currently has no debt. In other words it is an "unlevered" company. The focus of this case is that with the retirement of AHP's CEO there is an opportunity to change the capital structure of the firm by adding some debt. The issue is should debt be added and, if so, how much debt should be added. Four options will be analyzed: 0%, 30%, 50%, and 70%.

Currently, due to the lack of debt, this firm only faces *operating risk* as opposed to *financial risk*. AHP has a solid five year compound annual growth rate in both earnings and dividends per share of 12.4% and 13.6% respectively. This compares favorably to a proxy company, Warner-Lambert, where the five year compound annual growth rate in both earnings and dividends per share was 3.0% and 8.0% respectively. Overall, the unlevered AHP has a history of solid returns, good growth and in general low business risk.

Since we are dealing with accounting numbers in this case, certain assumptions were made for this analysis. First, since AHP has high quality earnings it is assumed that the cash and accounting numbers will be close over the long term. Second, the level of debt taken on in these scenarios is going to go into perpetuity, getting replaced as it matures. Also the risk level of future tax shields is the same as the risk level of the debt of the firm. Finally it is assumed that the firm can borrow in all three scenarios at 14%.

The analysis compares AHP issuing debt and retiring equity in three scenarios: 30%, 50%, and 70%. As depicted in Figure 1, Appendix A, the unlevered value of the firm (V_U) is $4665.0 million. The required return, r_u, was calculated using the constant dividend growth model where the dividends/share of $1.90 divided by a current stock price of $30/share *plus* an average dividend increase since 1973 of 12.12% per year yielding an $r_u = 18.45\%$.

The following table lists the tax shield and growth effects that the current shareholders capture when issuing debt and retiring equity in each of the following scenarios. Multiplying the debt by the 48% tax rate yields:

Scenario	PV Tax Shield ($ millions)	Value of Firm ($ millions)
0%	N/A	4665.0
30%	180.5	4845.5
50%	300.9	4965.9
70%	421.2	5086.2

When debt occurs in each scenario the market price of the firm also changes. Figure 1 in Appendix A depicts the new stock price/share for each proposed level of debt. The current price of $30/share would increase to $31.58/share for 30%, $32.21 for 50%, and $33.16/share for 50%. These new values were calculated using the current dividend ratio (unlevered stock price/share divided by the current dividend) of $30/$1.90 = 15.79. This ratio was then multiplied by the *dividends per share* for each of the scenarios resulting in the above stock prices.

To calculate the *weighted average cost of capital* (WACC) for each of the debt scenario we need to know the *cost of debt* and the *cost of equity*. The before-tax cost of debt is given in the case as 14%. To calculate the cost of equity, we can again turn to the constant growth model where $r = (D_1/P_0 + g) = \$2.13/\$30 + 12.12\% = 19.22\%$ for the unlevered firm where D_1 is the expected dividend in 1982, P_0 is the current stock price, and 12.12% is the average % increase in dividends year-over-year. The results for the cost of equity at each debt level are listed in Appendix A, figure 1: 18.86%, 18.73%, and 18.54% for the 30%, 50%, and 70% scenarios respectively.

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Using the above values for cost of equity and debt, along with debt and equity values given in this case the WACC can now be calculated resulting in 19.22%, 17.40%, 16.36%, and 15.36% for the 0%, 30%, 50%, and 70% scenarios respectively. If the firm is able to earn simply its WACC (NPV = 0), the value of the firm is going to increase by the investment amount. If the firm earns more than its WACC, then the value of the firm should increase by the investment amount plus the amount captured by the shareholders in the positive NPV resulting in a higher market price. Of course, if the NPV is negative the value of the firm goes up less than the value of the investment.

The interest expenses given in this case are a return on the debt. As discussed in class, when calculating *return on assets* (ROA) we can not simply divide net income by assets if a firm is using debt financing because there is a downward bias due to the interest expense. ROA determines profitability of the assets. We need to add the interest expense times (1-tax rate) to the net income before dividing by assets resulting in an ROA of 18.81% for the unlevered scenario and 20.21% for each of our debt scenarios. Comparing firm ROA against WACC for each debt scenario shows we are earning more than WACC in each case, which is good. We are <u>not</u> destroying shareholder value in any of these cases.

ROA is the same across the scenarios since the operating risk and performance are all the same. However, ROE is not the same. The levered firm is able to earn favorable financial leverage (a.k.a. "trading on the equity"). ROE is listed in Figure 1 and in the case of the levered firm ROE > ROA because the firm is able to earn more of those funds than the after-tax cost of debt. There is favorable financial leverage in all proposed scenarios.

To determine where there is favorable versus unfavorable leverage we can perform an *earnings before interest and taxes* (EBIT) profitability analysis. Figure 2 in Appendix B lists the calculated EBIT indifference levels with each scenario compared against one another and Figure 3 plots the unlevered firm against each proposed debt case. For expected EBIT < $130.4 million we have unfavorable leverage for all debt scenarios. Whereas for any value of EBIT > ~$175 million we have favorable financial leverage with the 70% scenario. **The optimal capital structure is the point where the value of the firm is maximized and WACC is minimized**. Adding too much debt will decrease the value of the firm due to agency and expense costs.

Finally, we can compare the proposed capital structures by calculating ROA and ROE for the EBIT indifference levels. The table in Appendix C, Figure 4 lists the previously calculated indifference levels along with the new calculations for ROA and ROE at these levels. Since this comparison is limited to comparing a capital structure with debt versus an all-equity structure, ROA=ROE=after-tax cost of debt at the EBIT indifference levels. Figure 5 shows that for EBIT levels < ~$130 million, the best choice is 0% debt. For EBIT levels between ~$130 and ~$152 million, the best choice is 30% debt. Between ~$152 and ~$165 million, the best option is 50% debt. And for EBIT above $165 million, the best choice is 70% debt.

In summary, AHP should implement a more aggressive capital structure by leveraging the company to 70% debt since EBIT will be substantially above $165 million. I believe the capital markets would favor AHP adopting my proposed capital structure since the resulting ROE increases would show more profitability and the stock price would increase. There would be a higher degree of operating risk but given the firm's outstanding past performance, solid growth, and expected future earnings this should not pose a problem.

Appendix A – Exhibit 3 Analysis

		Pro Forma 1981 for		
	Actual 1981	30% Debt to Total Capital	50% Debt to Total Capital	70% Debt to Total Capital
Beginning of Year		Beginning of Year after Recapitalization		
Cash and equivalents	$593.3	$360.3	$360.3	$360.3
Total debt	0.0	376.1	626.8	877.6
# shares bought back (Million)		19.80	28.20	36.60
Dividend Savings		$40	$58	$77
Cost of Capital		$52.7	$87.8	$122.9
Interest Rate:		14.00%	14.00%	14.00%
Net worth - Equity	$1,472.8	$877.6	$626.9	$376.1
Beginning Assets	$2,370.3	$2,370.3	$2,370.3	$2,370.3
Interest Costs	$0.0	$52.7	$87.8	$122.9
Common stock price (dividend meth.)	$30	$31.58	$32.21	$33.16
Aggregate market				
Aggregate Market Value of Common Stock	$4,665.0			
Tax Rate:	0	0.48	0.48	0.48
PV of Tax Savings (PVTS):		180.528	300.864	421.248
Value of Firm ($V_L = V_U + T_C B$)	$2,691.2	$2,871.8	$2,992.1	$3,112.5
Adjusted Asset Values		$2,550.8	$2,671.2	$2,791.5
D/E:	0.00	0.43	1.00	2.33
ROE	30.28%	51.52%	69.21%	110.50%
ROA	18.81%	20.21%	20.21%	20.21%
Cost of Equity ($r = D_1/P_0 + g$)	19.22%	18.86%	18.73%	18.54%
Debt Cost (before tax):	14.00%	14.00%	14.00%	14.00%
Debt-to-Captial Ratio:	0.0	0.3	0.5	0.7
Debt Financing Portion (W_d):	0.0%	12.73%	18.14%	23.54%
Equity Financing Portion (W_e):	100.0%	87.27%	81.86%	76.46%
WACC:	19.22%	17.40%	16.36%	15.36%
DFL:	1.00	1.06	1.11	1.15

Figure 1 - Spreadsheet Analysis of AHP

Appendix B – EBIT Profitability Analysis

0% v. 30%	0% v. 50%	0% v. 70%	30% v. 50%	30% v. 70%	50% v. 70%
130.40	152.87	165.05	175.57	175.55	175.54

Figure 2 - EBIT Indifference Levels

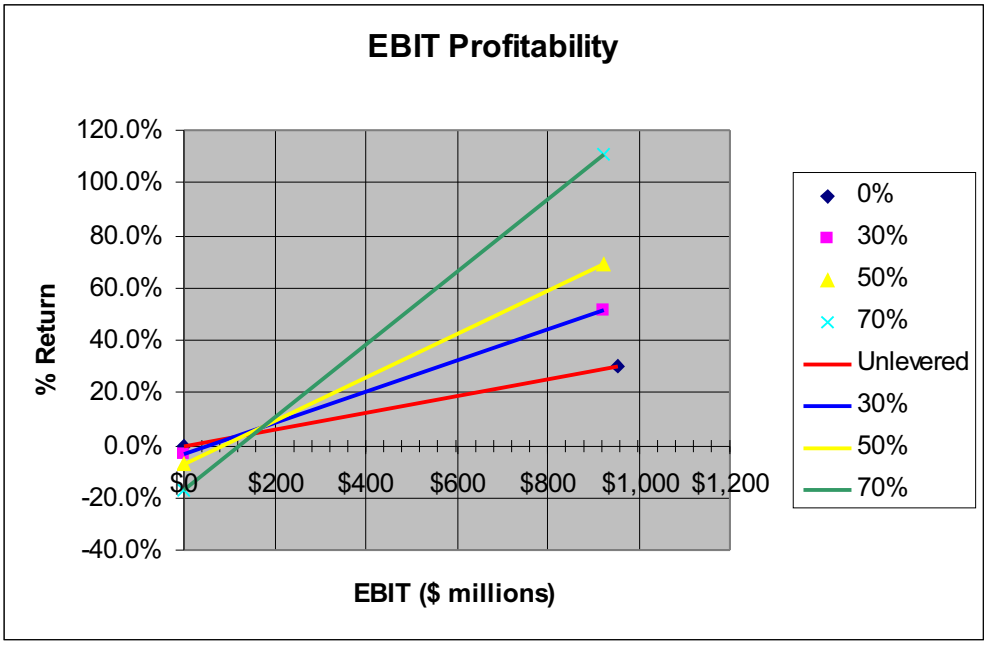

Figure 3 - EBIT Profitability Analysis

Appendix C – Capital Cost Structure Comparisons

Capital Cost Structure Comparisons						
	0% v. 30%		0% v. 50%		0% v. 70%	
EBIT:	130.4	130.4	152.9	152.9	165.1	165.1
Interest:	0.0	52.7	0.0	87.8	0.0	122.9
EBT:	130	78	153	65	165	42
Taxes:	62	37	73	31	79	20
Net Income:	68	41	80	34	86	22
Debt:	0.0	376.1	0.0	626.8	0.0	877.6
Equity:	1472.8	$877.6	1472.8	$626.9	1472.8	$376.0
ROA:	2.9%	2.9%	3.4%	3.4%	3.6%	3.6%
ROE:	4.6%	4.7%	5.4%	5.4%	5.8%	5.9%

Figure 4 - Capital Cost Structure Comparisons

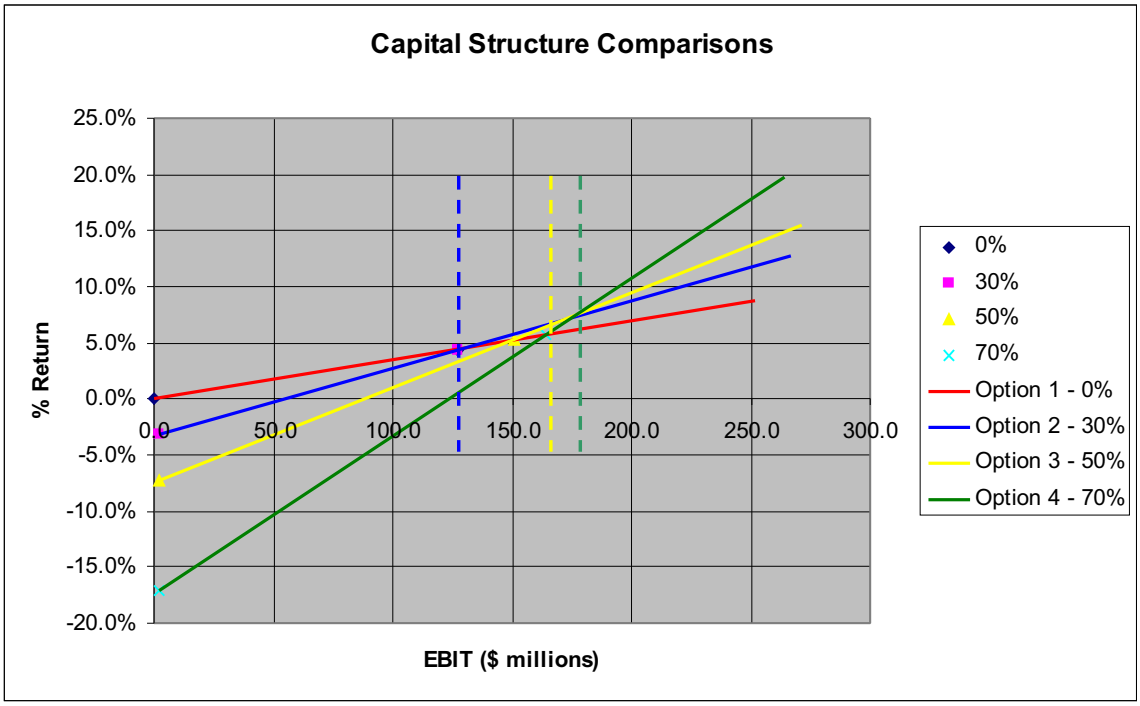

Figure 5 - EBIT Versus % Return