Boeing 7e7 essay

What is an appropriate required rate of return against which to evaluate the prospective IRRs from the Boeing 7E7? a. Please use the capital asset pricing model to estimate the cost of equity. b.

Which equity market risk premium (EMRP) did you use? Why? c. What Beta did you use and how did you derive it? d. Which risk-free rate did you use? Why? e. Which capital-structure weights did you use? Why? 2.

Judged against your WACC, how attractive is the Boeing 7E7 project? f. Under what circumstances is the project economically attractive? g. What does sensitivity analysis (your own and/or that shown in the case) reveal about the nature of Boeing's gamble on the 7E7? 3. Should the board approve the 7E7? Management Summary The analysis identifies both risks and benefits associated with undertaking the 7E7 project.

Giving a calculated WAAC of 15. 44% for the commercial division of Boeing, the project is feasible and profitable. As you will find, the financial calculations provided in this report show that the project will increase the wealth of the shareholders, also identifying the associated risks and how those could be minimized. Assuming the development costs are correctly estimated and the market response is properly gauged, the reasons to go forward with the project outweigh those against it.

The market competition corroborated with the unfavorable economic conditions prompt a swift and decisive answer from Boeing. The new 7E7 will have lower operating costs due to increased cargo space and increased fuel economy due to new engine design, would also be versatile and suitable for both short and long flight routes. Ensuring the development and

manufacturing costs are kept down by employing decades of engineering expertise and already proven technologies and solutions, it is recommended that Boeing undertakes the 7E7 project. Cost of Equity The 7E7 Project is a risky project.

With a beta of 2. 540738, which is substantially higher than the stock market average company, volatility is expected in this investment. However, with risk comes a reward. The 7E7 project would need to provide returns of 22.

7009% in order to be considered a sound investment. E(Ri) = . 0456+ 2. 40738 [.

117 – . 0456] E(Ri) = . 0456+ 2. 540738 [.

0714] E = 22. 7009% Equity Market Risk Premium The equity market risk premium should equal the return expected by investors on a market portfolio relative to riskless assets. We have decided to use the 30-Year Treasury Bond as the risk free return because it most closely mimics the time horizon of the 7E7 project. The expected rate of return of a market portfolio of stocks is estimated at 11. 7%.

This is the estimate used by Brealey and Meyers, and is comprised of total market returns from 1900-2006. Therefore the equity market risk premium is equal to 7. 14%. (11. 7% – 4. 56% = 7.

14%) Beta Risk is inherent in the economy and equity markets and the 60 trading day Boeing BetaEquity calculated against the S& P 500 Index would be a most accurate predictor of future risk. Due to the length of the Boeing project, at first glance it would appear a beta calculated using a longer

regression period would estimate future returns best. The 60 month beta regression period began June 16, 1998. The 21 month beta period began September 17, 2001.

Both ended June 16, 2003. This data is highly skewed due to the events of September 11, 2001 and the subsequent deterioration of the airline industry. In this case, the extended length of the regression period is a detriment to the calculation of future risk. Due to the large beta, investors should expect greater returns than the stock market is providing.

See Appendix A. Risk Free Rate US government debt is considered risk free as there is a miniscule chance, very near zero, that the US government will become insolvent. This is therefore the risk free rate that we will use for our calculations. The case gives us the rates of the 3-month Treasury Bill and the 30 year Treasury Bond at 0. 85% and 4.

56% respectively, in June 2003. Since this project has a time horizon on the order of 20-30 years it would be very reasonable to use the 30-year Treasury Bond as the value for the risk free interest rate. Capital Structure Weights The following formula will be used for calculating WACC WACC = (Wdebt)(rd) (1-tc) + (Wequity)(re) * rd – pretax cost of capital, it is considered to be the Yield to Maturity rate for the outstanding 30 years bond that matures 2/15/2033, that being 5. 50%. The cost of equity capital will be calculated using CAPM Risk free rate + Equity Beta * (Expected return on market – Risk free rate) E(Ri) = Rf + ? i[E(Rm) – Rf] * Expected return on market rate Rm is provided at page 175 in Myers and it is the average nominal return on stocks for the last century, the value is 11.

7% * The debt/equity ratio for Boeing is provided in exhibit 10, 0. 525, from where we can infer the weights of both debt and equity. * The Equity beta for the whole company and for the commercial division is calculated in the appendix. Most of the corporations calculate WACC for giving investors an estimate on profitability and for being able to weight future projects.

We are presented with Boeing current bonds, which constitute the long term debt portion of capital, and with Boeing's assets which constitute the equity portion of capital. No other weighted entities (such as preferred shares) are considered. The debt/equity ratio would help with the calculation of weights. Boeing would need to earn at least 15. 443% return on its investments (including the 7E7 project) in order to maintain the actual share price.

Also calculated WACC for the commercial division only, using the equity beta found in appendix. The debt/equity ratio for the commercial division was obtained considering the 46% weight of the defense division, the 0. 41 debt/equity ratio for the defense division from Lockheed and the overall 0. 525 debt ratio for the Boeing portfolio. As expected, the WACC for the commercial division is much higher due to the riskier aspect of this investment that impacts the cost of equity capital. Boeing 7E7 Project Evaluation Circumstances for an economically attractive projectThe project would be economically attractive if Boeing could sell enough planes in a given time period above a certain price.

The hurdle rate, or the internal rate of return that gives the project an NPV of zero is 15. 4% according to our calculations. This means that Boeing would have to sell at least 2, 500 airliners in the first 20 years at 0% price premium

or greater for this project to increase the wealth of shareholders Market Demand The United States has had some of the lowest passenger numbers in recent history. A reverse of this trend is crucial to reach some of the projected sales numbers that Boeing is counting on.

There are several factors to these lower numbers. A decrease in business travel has occurred due to cost and the advance of conferencing technologies. And lastly, the weak economy has vacationers thinking of local destinations instead of traveling abroad. Market Share Boeing's fiercest competitor is Airbus. It is crucial that the new 7E7 delivers on its promise of lower operating cost.

This will help command a larger share of the market. This becomes even more important if the economy doesn't recover as quickly as we hope. The other aspect of the 7E7's success is the engineering of an expandable wing. Adding this versatility will give the 7E7 owner more options for travel routes.

Sensitivity Analysis The following is the sensitivity analysis of the Boeing project which gives optimistic and pessimistic estimates for the underlying variables of volume and cost of sales. The purpose of the sensitivity analysis is to express cash flows in terms of the variables of this project. Boeing had to determine what the decide what the underlying variables were which in this case happen to be development costs and the per-copy costs to build the 7E7. Based on the above sensitivity analysis it reveals that the nature of Boeing's gamble on the 7E7 is high.

Given the information in the case, they forecast that the development costs would be $8M with a base case assumption of 80% as the percentage of

costs of goods sold to sales. This would earn a IRR of 15. 7%, however, if costs were $10M with an 84% assumption this would have an IRR of 8. % or a net change of 7. 1 Therefore, the gamble is high because the development costs not only swing $4M but the IRR also has a great variance of 12. 7 given the best case IRR of 21.

30% and worst case of 8. 6%. Optimistic Best case scenario includes a cost of capital that is lower than expected. We used the rate of 5. 85%.

However, if yield to maturity rates are lower than expected, we can lower the WACC. For example, a rate of 3. 393% would give us a WACC of 14. 83% instead of 15. 44%.

Or, let's say that the riskiness of this project was over calculated. A beta of 2 instead of 2. 54 would give us a WACC of 13. 07% Expected market rate is also another area that may be lower because of the economy. If the market expectations underperform, we can also lower our estimates of cost of capital. For example, we used a market expectation of 11.

7%. A 10% rate gives us a WACC of 12. 78% So, as you can see with some of the above scenarios, the outlook may be better than expected Pessimistic Of course, the flip side is that things don't go as well as predicted. Let's say that yield to maturity rates are higher than expected.

A 6. 37% rate increases our WACC to 15. 57% Or, riskiness of the project is even higher than expected. A beta of 3 instead of 2.

54 would result in a WACC of 17. 46% Or, if the market outperforms expectations, we could also have a higher cost of capital. Instead of the 11. 7% expected market rate, let's use 15%.

That ups our costs to 20. 61%. The below table summarizes these optimistic and pessimistic views | Yield to Maturity| Beta| Expected Market| WACC| Standard WACC| 5. 85%| 2. 54| 11.

7%| 15. 44%| Optimistic| | | | | Low YTM| 3. 393%| 2. 54| 11.

7%| 14. 83%| Less Risk| 5. 5%| 2| 11. 7%| 13. 07%| Weak Market | 5. 85%| 2.

54| 10%| 12. 78| Pessimistic| | | | | High YTM| 6. 337%| 2. 54| 11. 7%| 15.

57%| More risk| 5. 85%| 3| 11. 7%| 17. 46%| Strong Market| 5.

85%| 2. 54| 15%| 20. 61%| Conclusion Board approval for the project? After carefully considering the risks and benefits of the 7E7project, we recommend that the Board of Directors approve the project. There are, however, inherent risks in this project resulting from the design and materials used.

The 7E7 is the first plane to use a carbon body construction and employ wingtip extenders. This will add risk to the project since they have never been used on such a large scale project. The supply chain is very large and spread over the globe. This will lead to challenges managing this network of contractors. There are many part of the plane that are being fully constructed in other countries and then shipped by sea to Boeing's Seattle facility for final assembly.

This will add to the inherent risk of the project if any of these contractors fail to deliver on time. Airbus is a close competitor. They will be coming to market with their new A380 in 2005. This plane will be a formidable competitor to the 7E7. If Boeing falls behind regarding innovation, fuel efficiency and all the other attributes of a long haul airliner they will lose their market share. In order for Boeing to compete in the aviation industry, they must take on some risk and develop this new plane.

With the economy so volatile, airlines will be looking for options that reduce their operating costs. The 7E7 will carry more passengers per flight in a fuel efficient manner allowing the airline companies to justify purchasing the plane. The success of the expandable wing will also give the plane attractive versatility. For the project to increase shareholder wealth, Boeing would have to sell at least 2, 500 aircraft over a 20-year period while keeping development costs at or below $8 Billion dollars and COGS as a percent of sales at or below 80%.

If there are cost overruns then the COGS as a percent of sales must stay at 78% or lower (see Exhibit 9). The equity market risk premium should equal the excess return expected by investors on the market portfolio. In this case it was calculated to be 7. 14%. The weighted average cost of capital (WACC) was calculated to be 15.

443%. Since the projected revenues listed in Exhibit 8 are " well behaved" we can trust the IRR tables in Exhibit 9. For the project to increase shareholder wealth, the IRR of the project should at least equal the WACC. To

achieve this Boeing would have to sell at least 2500 airliners in a 20-year period.

Boeing is expecting to reach this unit goal The financial calculations provided in this report show that there is a very good chance that the project will increase the wealth of the shareholders. There are other risks mentioned above that must be considered but on balance the reasons to go forward with the project outweigh those against it. Appendices Appendix A BetaAssetBoeing = WBdd * BetaAssetBdd + WBcad * BetaAssetBcad S& P 500 60 trading day estimated BetaEquityBoeing = 1. 45 Market- value debt/equity ratio = 0. 525 BetaAssetBoeing = 1.

45/(1+0. 5252) = 0. 950695 The comparison to Lockheed Martin is the most responsible since we are given the Equity Betas and percentage of revenues derived from government (defense and space). Boeing was awarded $16.

6B in contracts, second only to Lckheed Marin with $17B (case page 235-236). Lockheed Martin is the closest competitor to being a pure Defense contractor, Exhibit 10 indicates 93%, which will help access the best estimate for Beta AssetBdd. Boeing Rev from Defense (WBdd) = 0. 46 Boeing Rev from Commercial Sales (WBcad) = 0. 54 S& P 500 60 trading day BetaEquityLM for Lockheed Martin = 0. 34 Debt/equity for Lockheed Martin = 0.

410 BetaAssetBdd = 0. 34/(1+0. 410) = 0. 241135 0. 950695 = (0. 46 X 0.

241135) + 0. 54x 0. 950695 = 0. 051024 +0. 54x 0. 899671 = 0.

54x BetaAssetBcad = 1. 666057 Beta EquityBcad = BetaAssetBcad * (1 +

d/e) Beta EquityBcad = 1. 66057 * (1. 525) Beta EquityBcad = 2. 540738