

Wacc = % of debt r_d + (1 - t_c) + % of equity r_e case study examples

[Business](#), [Company](#)



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In early 2003, Boeing aeronautical company announced its plan to build a 'Super efficient' airframe known as the 7e7, which was subsequently dubbed the 'Dreamliner'. Michael Blair the team leader of the project announced in June 2003 that the 7e7 Boeing project was making excellent progress though amidst an unfriendly working environment. The technological superiority of the new airplane and the fact that the project had to penetrate an already rapidly growing market were the major arguments for the approval of the project. In addition, the idea of the airframe project came shortly after news of a six-month depressed airline market which had been attributed to the US war against Iraq, shocking news of global terrorism and the emergence of a deadly diseases known as SARS. Nevertheless, Michael Blair still sought a firm commitment from the Board of directors of the company and claimed that if the project is approved, Boeing will immediately start receiving orders from various airline companies and by the year 2008 passengers would start flying using the new jet.

The task of this paper is to assess the 7e7 project against a financial standard with a greater focus on the investors required returns. Therefore, I

will analyze the Internal Rates of Returns (IRR) of this project under the base-case and alternative estimation. In addition, i will use the estimated weighted -average cost of capital (WACC) for the Boeing's segment dealing with commercial airplanes in order to be able to evaluate the Internal Rates of Returns. Consequently, we will identify the key drivers for this project and distinguish on a qualitative basis, the options that Boeing has in regard to the 7e7project.

The need to estimate the company's weighted -average cost of capital (WACC) for a given segment draws out our ability to critique the different beta estimates and be able to manipulate the levered-beta formulae.

However, Boeing faces stiff competition in both the commercial airplane segment and the Defense segment. Therefore, deriving the most appropriate benchmark weighted -average cost of capital for the project may involve isolating the commercial segment component from the overall company's WACC.

- What is an appropriate required rate of return against which to evaluate the prospective IRRs from the Boeing 7E7?

An appropriate rate of return is that which is determined by calculating the Weighted Average Cost of Capital (WACC) and exceeds it so as to maintain the company's actual share price. Most corporations calculate their WACC when they want to prove to their probable investors that the project that they want to invest in is viable. It can be determined by considering five different factors in their percentages, debt (W_d), cost of equity (R_s). Cost of debt (R_d) and tax rate, % of equity (W_s)

After calculations, the rate of return was found to be 15.7%, which shows that the project is achievable, and would lead to an increasing the shareholders wealth if everything works out as planned.

Basing my analysis on the above exhibit on the previous sales by this company on their products 757 and 767, I can predict that once the project is working out as planned by the team members, the sales will hit and go beyond the previous high of 8.8% since Boeing would be enjoying a relatively higher competitive advantage over its competitors.

- Use the capital asset pricing model to estimate the cost of equity

Analysts pointed out that the defense section of Boeing business was more stable than the volatile Commercial segment, in fact, it was the defense segment which was maintaining the company during the September 11th Attacks. Thus raising the question of the appropriateness cost of equity being used as a benchmark for the required rate of return. With a commercial beta of 2.72, the Boeing's 7e7 project is clearly a risky project. However, this risk must translate to a 23.7% in returns so as to be regarded as a sound investment. This is illustrated in the commercial cost of equity calculations. In addition, the cost of equity is derived using the capital asset model (CAPM) which is formed by risk free rates(r_f), Beta equity(B_{equity}) and also the Market Risk Premium ($R_m - R_f$).

$$r_{equity} = r_f + B(r_m - r_f)$$

(b) Which equity market risk premium (EMRP) did you use? Why?

The 30-year T Bond risk free rate and a market risk premium of 0.85% and 8.4% were used respectively in this case. The reason behind using the 30-year T Bond was because the length of the entire project as well as all of

the company's projections resembles the length of the bond.

(c) What Beta did you use and how did you derive it?

The appropriate Beta value is derived if we first consider the Bequity the company. If we used the value line estimate, since the Boeing project is a long term project which takes 20years and takes risks into account. It is calculated while utilizing the period under which the airline business was hard hit because of the 9/11, SARS and the war in Iraq. To achieve this a relationship between the unlevered Beta (Asset Beta, B_u) and the Levered Beta (equity Beta, B_l)

$$B_u = B_l(1 - t_c D/E)$$

The portfolio Beta is calculated $B_u = 0.983$. In addition, because Lock head Martin has a 93% of their revenues from the defense sector, it is then assumed that the Beta for Lock head martin is equal to that of Boeings defense segment shares. When calculated, this would add up to $B_{u\text{defense}} = 0.258$ this beta is illustrated in the Exhibit above against its competitors. Using the values above, we get the cost of equity for the given commercial segment to be $R_e = 13.65\%$. Finally, the weighted Average Cost (WACC) can be calculated as follows since we clearly know the relationship between debt and Equity.

$$D/E = 0.525$$

$$D (\text{Debt}) = 34.4\% \text{ while the } E (\text{Equity}) = 65.6\%$$

After the calculations, the WACC is approximated to be 15.7%

(d) Which risk-free rate did you use? Why?

I settled on using the US government debts as my risk free rate since it is

assumed that it is very unlikely that the government of US would become insolvent and therefore the its debts are risk free. This is in regard to the 30 year T-Bond is more reasonable since it takes almost the same time as the 7e7 project intends to take.

(e) Which capital-structure weights did you use? Why?

The capital structure weights used were determined by the already provided equity to debt ratio of 0. 525. In the quest to find the capital structure weight, the weight of the equity can be assumed to be 65. 6%and the total debt weight to be 34. 4%

Conclusions

(2) Judged against your WACC, how attractive is the Boeing 7E7 project?

(a) Under what circumstances is the project economically attractive?

With a WACC of 15. 7% the project can be considered viable and its objectives realistic. If everything works out as expected, Boeing would be put in a good position above its competitors. Though the project involves high levels of risks, it still remains an essential project for the existence and future growth of Boeing aeronautical company. For the project to be considered economically viable, it must produce between 2500-3000 airplane for the next 20 years so as to be able to maintain their share prices.

- What does sensitivity analysis reveal about the nature of Boeing's gamble on the 7E7?

The Sensitivity analysis can be approached by looking at four key factors namely, project volume, (forecast), development costs, price premium and the COGS. After calculating the require rate of return of 15. 7%, the project

therefore faces few scenarios that would cause the IRR to fall below that threshold. Being the first airplane of its kind, the 7e7 project board has to understand that this is a wonderful salesman's dream but an engineer's nightmare' and has to analyze the IRR based on the values generated by the sales force and those driven by R&D (COGS and Development costs).

If you look at the price premiums and the forecasts one can get a high level of confidence that if the project bears fruit, the ' Dreamliner' would drive the sales of Boeing beyond their targets. However, a risk also exists in equal measure since the company is developing a plane with technologies that have not been existence in the marketplace. This alone poses a great risk to the company. The R& D team estimates that the development costs might end up reaching highs of 10billion and probably the COGS settling at around 83% or 85%. This having been said, the project 7e7 is still achievable both in terms of IRR and NPV.

(3) Should the board approve the 7E7?

Given that Airbus has been posing a lot of competition to Boeing, which may threaten its existence, Boeing should by all means try to remove itself from its current innovation slump. Therefore, at financial analyst's perspective, I would recommend that the 7e7 project be approved. The final figures of this analysis clearly show that despite the numerous risks involved, this is a great opportunity for Boeing to increase the shareholder's wealth since the reasons to proceed with project outweigh the reasons against it.

Assumptions made

However, there are some assumptions that I have made in order come up with my conclusion. These assumptions are essential for the success of the intended project. I have assumed that the Market premium risk must be equal to the excess returns that is being expected by the investors. It is also my assumption that for the project to be considered a success and be rewarding to the shareholders, the IRR of the whole project should be equal to the company's WACC and for this target to be achieved, Boeing has to be able to sell at least 2500 airplanes in the next 20 years

Works Cited

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