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## **CAPITAL STRUCTURE**

**Abstract.** This paper aims to analyze the current capital structure of Lufthansa in order to increase market value for the company. Based on data for 2012 and several assumptions about future company's performance, the cost of debt and cost of equity are calculated to get the current WACC, which is compared to the optimal. As a conclusion, analysis suggests reduction of debt level, but considers other facts that might influence final decision.

**Keywords:** capital, capital structure, WACC, EBIT.

### **1. Introduction**

The Lufthansa Group, founded in 1953 and commenced in 1955, is a prestigious aviation group with global operations. With more than 400 subsidiaries and associated companies in total, Lufthansa Group operates its service to around 18 domestic destinations as well as 197 international destinations in 78 countries. Nowadays, having been equipped with a fleet of more than 280 aircraft, Lufthansa Group is among the largest airline companies over the world.

Five business segments make up the Lufthansa Group: Passenger Airline Group, Logistics, MRO, Catering and IT Services. Having occupied a leading position in their respective sectors, these five segments all play a vital role in the global airline market.

### **2. Background Information**

#### **2.1 Capital Structure**

The most common way for a company to finance its assets is to use debt and equity, thus the capital structure refers to the mixture of equity and debt. As the cost of financing by debt or equity is different, the capital structure of a company will have direct influence on its weighted average cost of capital, namely WACC.

#### **2.2 WACC**

WACC is a simple average between the cost of equity and the cost of debt. At the early stage, as the savings on taxes could offset the risk of bankruptcy, WACC decreases with the increase of gearing ratio. Then, when the gearing ratio reaches a relatively high level that the money saved on taxes cannot compensate the risk of bankruptcy, WACC begins to rise. Therefore, it is of great importance to search for the optimal capital structure, which can minimize WACC thus maximizing the value of the company. However, every structure has its advantages and disadvantages (table 1).

Table 1

## ADVANTAGES AND DISADVANTAGES OF GEARING

Advantages	Disadvantages
<i>For companies with high debt:</i>	
1. Only need to pay fixed interest	1. Increase the financial risk
2. Enjoy tax advantages	2. Lead to bankruptcy costs
3. Cash flows are predictable	3. Lead to agency costs
4. Higher in the creditor hierarchy	4. Security is required
<i>For companies with high equity:</i>	
1. Lower risky for small businesses	1. Result in high returns
2. Cash flow increases	2. Suffer the dilution of control
3. The company's credibility increases	3. Suffer high-level issuing costs
4. No repayments	4. Pricing becomes difficult

### **3. Modeling Assumptions**

#### **3.1. Industry & Company Data**

Lufthansa is included into the Air Transport industry with proportions of debt and equity amounted to 37,1 % and 62,9 % respectively, a tax rate of 23,5 %, thus giving an unlevered beta of 1,03 (Damodaran, December 2012).

Regarding the risk free rate and market return, in this model the 10 years Treasury Bills rate was used, based on the assumption that Lufthansa's average fleet life cycle is estimated at about 10 years.

Given from Lufthansa's annual report the amount of EBIT in 2012 is €1,357m. In terms of the tax rate, during the recent years, Lufthansa's percentage of tax payment was 25 %. In order to ensure that this tax rate will be constant at least in the short future, a comparison with the previous year's rate was made. Finally, there was a reduction in the corporation tax rate, due to the Tax Reform Act 2008, which came into effect in 2007 and until today, the company uses the same percentage, which is assumed it will remain stable at 25 %.

Looking into Lufthansa's financial statements the number of shares at the closing date December 31<sup>st</sup> 2012, was 459,947,000 with a share price valued to €14,42/share. Based on these data, the company's market value of equity at the specific date amounted to €6,549,645,280.

#### **3.2. Cost of Equity**

There are generally 2 different methods for calculating the cost of equity and in order to give some essence and to show the importance between the different leverage, this model includes both methods separately.

##### *CAPM:*

According to the company's levered beta of 1,26 %, based on its proportions of capital structure and the industry's unlevered beta, the market risk

free rate of 2,97 % and premium of 5,3 %, the cost of equity represented by the CAPM is estimated to be 9,69 %.

*Dividend Yield Model:*

As the returns the company pays out to its shareholders are usually given in the form of dividends, the cost of these returns gives the cost of equity, based on the empirical values readily available from the selected company.

However, dividend valuation model is based on the historical growth rate of the company's dividends, and the available data about Lufthansa's dividends are limited, estimates were made by using the last 10 years measures and expectations. Those measures are based on the company's policy to depreciate its assets on the period of 10 years and to avoid any huge fluctuations. As a result of the financial crisis period, which may have an important impact on the company's values.

Based on the company's average retention rate of 1,41 %, which has an important role for future growth and rise in values, the dividends paid and that are expected to be paid and the current share price, the value of cost of equity in this case is equal to 5,51 %.

**3.3. Debt**

According to Lufthansa's annual report, it finances its assets not only by issuing bonds but also by borrowing a significant amount of money from banks, which is approximately twice the total market value of bonds. However, Lufthansa's part of debt includes two general bonds, a convertible bond, and bank loans (table 2).

Table 2

LUFTHANSA'S BONDS STRUCTURE

	Par Value	Settlement Date	Maturity Date	Coupon (%)	Yield (%)
Bond 1	\$750,000,000	1-Jul-09	7-Jul-16	6,75	6,573
Bond 2	\$850,000,000	17-Mar-09	24-Mar-14	6,5	6,858
Convertible Bond	\$234,400,000	5-Apr-12	5-Apr-17	0,75	Unknown

According to the table above and the bonds' given yields, the market values are estimated as below,

*MV of bond 1 = 741,670,470*

*MV of bond 2 = 836,614,173*

Since total bonds market value is 2,312,000,000, the market value of convertible bond is:

*MV of Convertible Bond=733,715,357*

Thus,

*Yield of convertible bond= 0,240 %*

When it comes to loans, although further details on loans such as the type, the maturity date and interest rates are not publicly available, it can be assumed that the company will not acquire loans with higher costs than issuing bonds. Therefore, the total debt is regarded as a whole and, according to each bond's weight based their par value as a proportion of the bond's total book value, total value of debt was divided into three parts. Each part is assumed to be a New Price of Bond (Appendix 2).

*New Price of Bond1 = \$2,828,854,121*

*New Price of Bond2 = \$3,206,034,671*

*New Price of Convertible Bond = \$884,111,208*

However, if the convertible bond is excluded from consideration, its value will be separated into the other 2 bonds, creating a new price for Bond1 and Bond2, based on their weights in total value of debt.

Also, in order to make the convertible bond more comparable with the others, in this case it can be assumed that its yield is the average of the other two bonds yields amounted to 6,7 %.

### **3.4. Cost of debt**

Generally, yield describes the amount in cash that returns to the owners of a bond. So it can be used to describe the cost of debt. Since there are three different bonds issued by Lufthansa, the cost of debt should be a weighted average of the yields of three bonds.

If the convertible bond is included into consideration, based on the new price of each bond, the weights are as follow:

*Bond 1 = 41 %*

*Bond 2 = 46 %*

*Convertible Bond = 13 %*

*Based on the above weights and the bonds yields, the cost of debt is therefore 5,90 %*

However, if the convertible bond is excluded from consideration, the new price of bond1 and bond2 as well as their weights will change accordingly (table 3).

*New price of bond1 = \$3,243,281,250*

*New price of bond2 = \$3,675,718,750*

*Weights: Bond 1 = 47 %*

*Bond 2 = 53 %*

*Thus:*

*Cost of debt = 6,72 %*

Table 3

#### LUFTHANSA'S COST OF DEBT

Scenario	Cost of debt
Convertible bond included	5,90 %
Convertible bond excluded	6,72 %

## **4. Scenarios**

### **4.1. Convertible bond**

Based on the analysis in 3,4, the convertible bond of Lufthansa can be dealt with by using three scenarios and the yield of the convertible bond varies with the scenario used.

The 1st scenario is to include the convertible bond into analysis and treat it as a common bond. Therefore, as mentioned before, the actual yield of convertible bond is 0,24 %.

The 2nd scenario is to exclude the convertible bond from the analysis and obviously its yield falls to 0 %.

The 3rd scenario is to include the convertible bond into analysis but assume that it has a yield of 6,7 %, equal to the average of the other two bonds' yields.

These three scenarios are represented as ON, OFF and AVERAGE in the excel spreadsheet. From this point, convertible bond has been included in further calculations as it is a huge part of the total debt and cannot be ignored, giving more reliable results.

### **4.2. EBIT**

The EBIT of Lufthansa in 2012 is 1,357 million Euros, which increases 84,9 % comparing with the one in 2011 and is much higher than the EBITs of previous years. To make our model reasonable for the future calculation, we used the Lufthansa's 10-year average EBIT that is representative for the company.

The goal is by using different scenarios choose relatively optimal one for our future calculation by comparing their pros and cons.

## **5. Current WACC. Dividend Growth Model VS CAPM**

### **5.1. Differences on cost of Debt between the two methods**

Assuming that convertible bond is included at its current yield of 0,24 %, thus giving a cost of debt amounted to 5,9 % and the cost of equity is 5,51 %, using the Dividend Yield Model, Lufthansa's current WACC for 2012 is estimated at 4,95 %. On the other hand, using CAPM instead of Dividend Yield Model, when the cost of equity is 9,69 %, the current WACC in this case is 6,98 %.

### **5.2. Dividend Valuation Model or CAPM?**

At this stage, we need to consider which method gives the most accurate and reliable measure of both current and optimal WACC by comparing their differences. Using the Dividend Growth Model, the cost of equity remains constant regardless the increase in the Debt proportion, while the CAPM takes into account the level of risk and gives better estimates for the costs. Also, cost of equity cannot be altered by changing the dividend payments as the Dividend Growth Model supports, but is mainly based on other

returns available in the economy, as the risk free, the market returns, and the level of risk, the company's beta values. Based on these important points, and the fact that the market is not efficient, it is been found that CAPM is most relevant, as it provides more reliable estimates. Therefore, from this point, the CAPM is used to compare the current with the optimal WACC, showing the changes on the level of Debt and their impact on the cost of capital.

## ***6. Optimal WACC – CAPM***

### ***6.1. WACC components and levered beta changes***

For the calculation of the optimal WACC the use of the market economy's risk free rate and premium, the industry's (Air Transports) unlevered beta and Lufthansa's tax rate of 25 % was necessary (See paragraph 3.2).

Using this data and the strategy of financial risk increase as Debt rises, there is now a new levered beta for every percentage of Debt from 0 % to 99 % and a new cost of equity (See Appendix 3).

### ***6.2. Cost of Debt based on different levels of Debt***

It is also important to note that when capital structure changes, with different proportions of Debt and Equity, not only the level of risk and cost of equity are changed, but also the cost of Debt, as we have new credit ratings based on the interest coverage ratio, bond rating and spread. As Debt increases, the amount of interest the company has to pay rises and therefore reduces the interest coverage ratio, which means different ratings and cost of debt. In this case, there is a credit rating at 0 % Debt of AAA until the credit rating of CCC at 99 %.

### ***6.3. WACC calculations for each level of Debt and Optimal WACC***

Overall, the Appendix 3 shows the changes in the Debt level, and changes in the costs that give a different WACC in each case. The minimum, optimal WACC, which maximizes the value of the firm, including the change in the level of risk, it is been calculated at this stage at about 50 % Debt 50 % Equity, very close to the company's current proportions of capital structure.

## ***7. Results***

### ***7.1. Change in WACC & Total Savings***

According to the current scenario combination with cost of equity calculated with CAPM model, convertible bond turned on and average EBIT level used, our final WACC is 6,25 %, which is 0,73 % less than the current one. As a result, managing weighted average, company can save up to 98,2 million Euros on costs, associated with debt and equity. With the current WACC estimates, company pays around 940 million Euros which might be reduced down to the around 842 million Euros and allow Lufthansa to invest those savings in better projects or any other investment.

## **7.2. Change in share price & Total MV**

On average, if convertible bond is excluded, one can get higher market share price and higher amount of savings. For example, if convertible bond will be included, final change in share price will be 0,31 EU. However, with the reduction of WACC and 98,2 million of savings, Lufthansa's share price will increase by 0,21 EU from 14,24 to 14,45 EU per share. As a result, cost of equity will change from 9,69 % to 9,53 %, cost of debt from 6,72 % to 3 % and total market value of a company will increase from 6,549 to 6,691 billion Euros (See Appendix 4)

## **8. Conclusions**

### **8.1. Restructuring. Advantages and disadvantages**

To get optimal capital structure with optimal WACC of 6,3 % and get total savings of 98,2 million EU, company has to change its capital structure by reducing debt for 6 % from 56 % to 50 %. As a result, this change of 6 % will result in reduction of financial risk and change in credit rating from BBB to A-. Moreover, it will reduce the amount of interest payments from, on average of 321 million to 267 million Euros. Cost of debt will also be reduced for 3,72 % and total MV (see 7,2) will increase to 6,691 million. Besides that, such a small reduction of debt will not have any unpredicted negative consequences that might happen with huge restructuring. However, company loses its tax shield and will have to pay higher taxes.

### **8.2. Comparison to competitors**

While researching, Lufthansa's new D/E ratio, which equals to one, was compared to 11 airline industry competitors, which, on average, have D/E ratio of 1,27. It means, that our financial model might not include all necessary assumptions that other competitors have, that is why, when making restructuring decision; this issue should be thoroughly considered.

### **8.3. Final Conclusion**

Lufthansa's capital structure is close to optimal, however, slight changes in debt will help company to increase its total market value and increase credit rating. This model includes many assumptions, such as it is assumed that capital structure will not be changed dramatically for the nearest 10 years and corporate tax rate will remain the same. Moreover, this model may not include some information about the market that may be relevant, when making estimations on costs of capital structure, which is proved by higher D/E ratio of other competitors. Moreover, company may have additional inside information, which makes their decision be more relevant than decision based on current model.

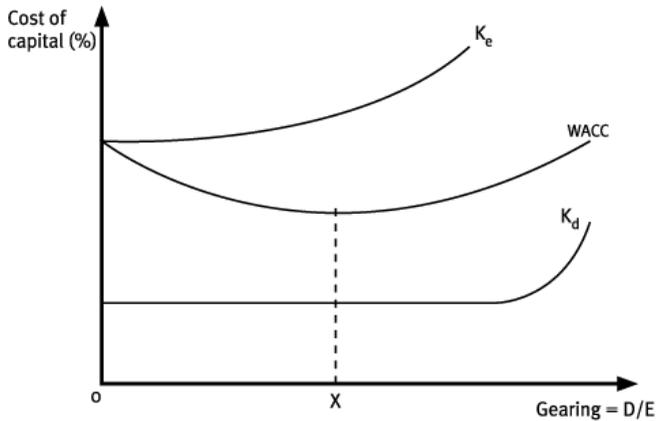
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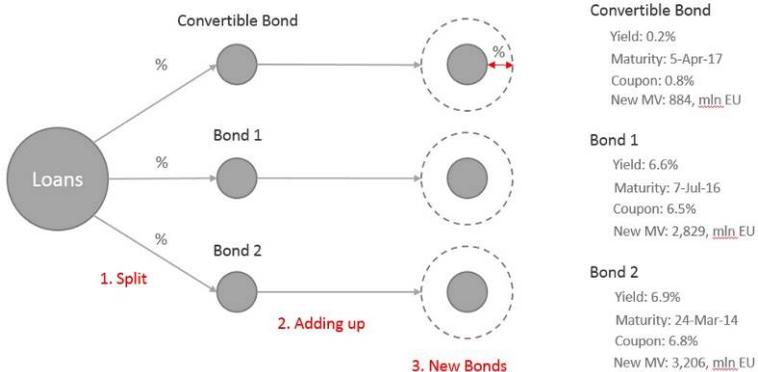
## APPENDIX 1

### WACC

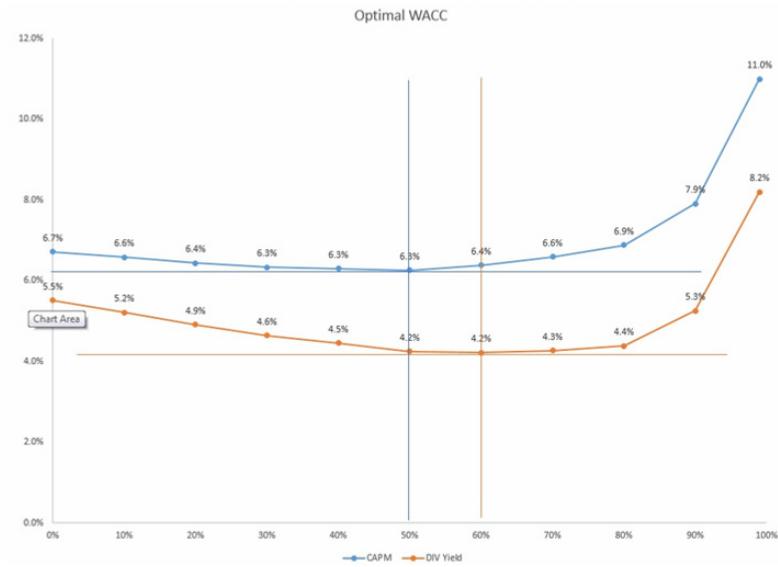


## APPENDIX 2

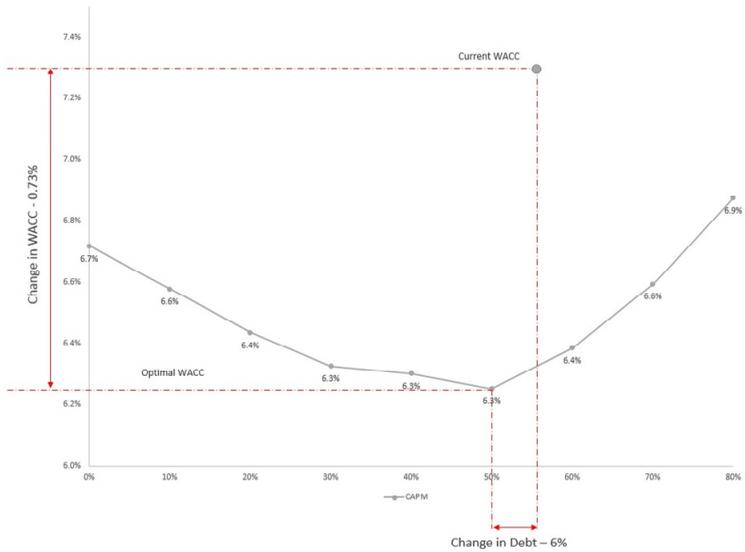
### BONDS STRUCTURE AND LOANS SPLIT



OPTIMAL WACC STRUCTURE



CAPITAL RESTRUCTURING



## SCENARIO MANAGER

<b>Scenario Manager</b>		
<b>Cost of Equity Model</b>		<b>9.7%</b>
CAPM	1	9.7%
Dividend Yield	0	5.5%
<b>Convertible Bond</b>		<b>0.2%</b>
On	1	0.2%
Off	0	0.0%
Average	0	6.7%
<b>EBIT</b>		<b>936,300,000</b>
Average	1	936,300,000
Real	0	1,357,000,000