Real Option Analysis – A Case Study of a Private Equity Investment

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Abstract

The thesis deals with the buyout of Chrysler Corporation LLC from Daimler Chrysler AG executed by Cerberus Capital Management LP. The question of how high the value on which the investment decision was made is answered. Then the influence of the leverage of the investment sum contributed from Cerberus is examined. The methods used are the NPV approach and the real option analysis for the first topic and only the real option analysis for the second topic. The results were that the value of the investment was sufficient to make a go decision and that the second leverage adds in value.

Executive Summary

On August 3, 2007 Cerberus Capital Management bought the Chrysler division of Daimler-Chrysler AG out of the conglomerate and held it private to restructure it. Chrysler was a turn-around candidate at that time and DaimlerChrysler failed to bring the company back on track. The whole deal had a value of $ 7.4 billion.[1] Almost two years later Chrysler has to seek protection from its creditors after Chapter 11 and Cerberus lost a big part of its investment.[2]

This thesis will examine the investment decision made. The question how high Chrysler's possible value was at the moment the deal was closed will be answered. The answer to this question is challenging to give since the company was held privately after the closing and had no obligation to show any financial statements. In addition there were not many details about the transaction published. All this made it complicated to create reliable data.

But the missing information offered also the possibility to examine the effect of leveraging the initial purchasing price. It was not determined if the amount came completely from the fund's investors or if further debts were taken.[3] This leveraging effect on the equity value will be examined in the last part of the thesis.

The technique used will be a standard DCF valuation for the determination of the NPV. In addition the real option analysis will be applied to support the investment decision. These two methods of capital budgeting alone are used to find an answer to the question if the investment should have been taken.

In the second chapter the theoretical background for the real option analysis is given. Next to a theoretical part, which links this method with the DCF approach, the differences to the financial options will be explained. This is done since financial options are familiar to most readers and it is easier to understand real options by drawing parallels. This chapter is supplemented with the explanation of the binomial tree method and the Black-Scholes model. Only the relevant information needed for solving this case study is taken from these two techniques. To complete this chapter the different real options that apply in practice are explained. All possible alternative actions of a project can be valued with them.

The third chapter deals with the term private equity, the definition of the word and its use in this thesis is given. The importance of this industry is also shown with different statistical returns. The second subchapter explains how a private equity firm works in general resp. what its typical structure is. Common techniques through which the buyout fund creates value in its

[1] See Cerberus Capital Management 2007a, p. 1.
[2] See Meier 2009, p. 21.
[3] See Cerberus Capital Management 2007a, p. 1.

portfolio companies are also explained. This part is completed with a brief description of the role of the fund's management team. The last section is dedicated to a typical buyout investment process. It begins with the selection of potential targets and shows their analysis up to the final due diligence. Then the final negotiation and the monitoring of the investment are briefly described. The last part is about the possible exit strategies of a buyout fund.

With these two chapters the basis is made to apply the terms and techniques to the valuation. In the fourth chapter the NPV calculation is made. First the protagonists of the transaction, namely Chrysler and Cerberus, are described. Then based on a typical transaction structure and financial statements, the estimation of Chrysler's balance sheet is done. After that the cash flows are estimated. These are the revenues, the costs, the depreciations, the tax rate and the two positions needed to determine the free cash flows, the investment in tangible assets and in the net working capital.

The free cash flows are then discounted with the tax adjusted weighted average cost of capital which is derived in the following section. First the cost of equity is estimated by drawing a regression of the beta based on DaimlerChrysler's stock prices. After un-leveraging this beta the one for Chrysler results. With the capital asset pricing model the demanded rate of the investors is calculated. To this rate a premium for the illiquidity of the shares is added.

After the total cost rate is set, the debts are to be assumed. Based on a typical transaction structure on which the whole balance sheet was taken as the total transaction amount, the interest rates are derived for the different kinds of debts. This is done by using the Black-Scholes model. The reason for doing this is that the debts are considered as short put options on the company's value. All this leads to a DCF valuation from which the purchasing price for the car manufacturing industry of Chrysler has to be deduced to get a relevant NPV for Cerberus.

In addition to this technique a project is evaluated with the real option analysis in the fifth chapter. It is the possibility to negotiate new terms for the health care expanses of Chrysler's employees. This is done by using a growth option and estimating the variables for the binomial tree and the Black-Scholes model. This chapter ends with a conclusion about the NPV estimation and the real option.

The sixth chapter deals then with the possibility to add a second cascade of debts to leverage the transaction further. For this a typical transaction structure is applied to the official purchasing price to gain a value for the possibility mentioned above. To do this the real option analysis is used. The value of Chrysler's equity is modeled as a growth option. In a first step the option is priced without debts. Then the amount of total debts to take is estimated. This is

done by simulating the option's value for various sums. The optimal amount is the one that maximizes the option's value. For this process the interest rate of the total debts is estimated with the same technique that was used to determine the cost of debt for the $WACC_t$.

The seventh chapter compares the NPV with the growth option to the valuation of the equity stake as a real option.

The results of this thesis are that the investment decision can be made when the influence of the economic downturn of 2008 is ignored. The NPV was designed to be balanced since the revenues growth rate had to be estimated subjectively and therefore no sincere value could be found. To correct this problem a growth option was added that priced the possibility of the project in a sufficient high. This was enough reason for Cerberus to invest.

The approach taken in the sixth chapter compared to the one from the chapter four and five lead to a value of the investment that was smaller. This may have been caused through measurement errors since the volatility might have risen with a higher leverage. It is also possible that this technique needs further research. This approach showed that a second cascade of debts taken can add value.