University of Lisbon

ISEG

GESTÃO FINANCEIRA II

Problem Set 2

Licenciatura – Undergraduate Course

1ˢᵗ Semester 2017 - 2018

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PROBLEM SET 2 | Chapter 17 & 18 – Financing Policy

Your report must be written using a word processor as handwritten answers may not be considered. On Aquila you can find a template with the frontpage to answer the problem set. Its usage is mandatory.

The CV-Blockchain, Ltd (also CV-B) is a company created by two College friends. Its purpose is to develop the distributed ledger technology for academic *curriculum vitae* and sell it to universities and companies in the EU.

A distributed ledger is a database that is consensually shared and synchronized across network and spread across multiple sites, institutions or geographies. It allows transactions to have public "witnesses," thereby making a fraud or a *cyberattack more difficult. The participant at each node of the network can access the recordings shared across that network and can own an identical copy of it. Further, any changes or additions made to the ledger are reflected and copied to all participants in a matter of seconds or minutes. Underlying the distributed ledger technology is the blockchain* (Investopedia).

The CV-B expects the following free cash flows:

Table 1 (€):

Year / Time	0	1	2	3	4	5	6	7
FCFF	-50,000	-41,005	-1,759	29,213	51,970	70,494	77,398	78,945

After the sixth year, the CV-B managers expect a constant growth rate for the free cash flows.

The managers are considering the pros and cons of the financing mix for the Company:

- Scenario 1, consists in creating an all equity company. It implies issuing 75.000 shares with a book value per share equal to €1. The CV-B expected market value would be €650.000.
- Scenario 2, consists in using debt as the main source of funding CV-B, and maintaining an outstanding balance on the loan. In this case, the Company will only need to have an equity of €7.500 (i.e. 7.500 shares with a book value per share equal to €1). However, a very large proportion of debt will lead the Company's debt to be rated as speculative. The market consensus averages the junk bond spread over risk free bonds with equivalent maturity, at 550 basis points. The estimated costs of financial distress are 25% of the unlevered market value of a company.
- Scenario 3, consists in maximizing the difference between the advantages and the disadvantages of debt. It usually means to find out the optimal debt ratio. In this case, assume the CV-B can borrow at 5.75%.

Economic data shows that the medium term average risk free rate is 2.00% and the expected market risk premium is 6.75%. Some researchers have been using, for this type of activity, a weighted average beta of 1.45 with a benchmark debt-to-equity ratio of 35.00%. They also assume that debt betas are generally close to zero, and simplify it to be 0.000. The corporate tax rate is 21%.

Questions about Scenario 1 (if necessary, make reasonable assumptions):

a) What is the CV-B equity cost of capital?
b) What is the CV-B value per share?
c) What are the advantages of a full equity financed CV-B?

Questions about Scenario 2 (if necessary, make reasonable assumptions):

d) What is the CV-B interest tax shield present value?
e) Assume the personal taxes are 28% on interest and 8.86% on equity return. What is the tax advantage in the presence of personal taxes? Explain.
f) What is the CV-B value if the risk of default is absent from your analysis?
g) What is the CV-B cost of financial distress present value?
h) What is the CV-B value if the cost of financial distress present value is factored in your analysis?
i) What is the CV-B equity value per share?
j) What is the CV-B equity cost of capital if the risk of default is not absent from your analysis?
k) What is the CV-B weighted average cost of capital if the risk of default is not absent from your analysis?

Questions about Scenario 3 (if necessary, make reasonable assumptions):

l) The text above states the software house business has an average debt-to-equity ratio of 35.00%. What do you think about such level of debt-to-equity ratio for the software industry? Explain.
m) If CV-B follows its economic sector financing mix, what would be its value?
n) What is the CV-B equity per share?

Topics to respond –

#)		Year / Time	0	1	2	3	4	5	6	7
		FCFF	-50,000	-41,005	-1,759	29,213	51,970	70,494	77,398	78,945
		Δ FCFF		-17.99%	-95.71%	-1760.61%	77.90%	35.64%	9.79%	2.00%
							Liquidation Value Y6	1,029,618		
							PV (Liquidation Value Y6)	591,848		
		Year / Time	0	1	2	3	4	5	6	7
		PV (FCFF)	-50,000	-37,391	-1,463	22,148	35,929	44,439	44,490	
	PV (Liquidation Value Y6)								591,848	
		CV-B Asset Value (Y0)	650,000							

a)		CAPM_U_Scenario E	9.67%
		Rf	2.00%
		Equity-Beta_U	1.136
		Rm-Rf	6.75%
		Equity-Beta_L_economic sector	1.450
		Debt-to-Equity_economic sector	0.35
		Debt-Beta_simplification	0.000
		Tax (t)	21%
		Equity-Beta_U	1.136

b)		Value per share (Y0)	8.67
		Number of shares	75,000

c) At the least, the CV-B will be less exposed to economic downturns and keeps financial flexibility to borrow in the future.

d)		PV (Interest tax shield)	14.175
	Debt (_t0 = Assets of €75.000 - Equity of €7.500)		67.500
		Tax (t)	21%
		Rf	2,00%
	Junk bonds risk spread		5,50%
	R_junkbond (Rf+spread)		7,50%

e)		Tax shield advantage w/ personal taxes (%)	0,99999	.Personal tax on interest and
		Corporate tax	21%	the "right" tax on equity
		Personal interest tax	28%	returns, neutralize the tax
		Personal equity return tax	8,86%	asymmetry among returns.

f)		CV-B Global Value w/ no risk	664.175
		CV-B Asset Value_U	650.000
		PV (Interest tax shield)	14.175

g)	PV (Costs of financial distress)	162.500			
	CV-B Asset Value_U	650.000			
	Costs of financial distress	25,00%			
h)	CV-B Asset Value_U + PV(its) - PV (cfdistress)	501.675			
i) Value per share [CV-B Asset Value + PV(its) - PV (cfdistress)-CV-B Value of Debt]		57,89			
j)	CAPM_L_Scenario D	10,61%			
	Rf	2,00%			
	Equity-Beta_L_Scenario D	1,28			
	Rm-Rf	6,75%			
	Equity-Beta_L_Scenario D	1,28			
	Debt (€)	67.500	.Debt target is to maintain an outstanding		
	Equity (€)	434.175	balance on the loan. Equity incrementals to be		
	Debt-to-Equity_economic sector	0,16	paid as a dividend.		
	Debt-Beta (simplification)	0			
	Corporate tax	21%			
k)	WACC_L_Scenario D	9,98%			
	Equity	434.175			
	Debt	67.500			
	Junk bonds risk spread	5,50%			
	Rf	2,00%			
	R_junkbond (Rf+spread)	7,50%			
	Corporate tax	21%			

l) Recent data shows that the average market debt-to-equity is close to 56%. This implies that this industry is less levered than the market, implying less financial risk to compensate an eventual higher level of business risk. Indeed, market risk is a combination of business/operational risk and financial risk. Sources of both types of risk are balanced to keep acceptable global risk levels. In this specific industry, firms have low levels of tangible assets that can be used as collateral. Thus, software houses prefer smaller levels of debt to avoid unsurmountable levels of risk.

m)	CV-B Asset Value_L_economic sector	687.427
	CV-B Asset Value_U	650.000
	Debt-to-Equity_economic sector	0,35
	Equity	509.205
	Debt	178.222
	Corporate tax	21%

$$\begin{cases} V_L = V_U + t_c D \\ V_L = E + D \\ \dfrac{D}{E} = 0.35 \end{cases} \Leftrightarrow \begin{cases} V_L = 650,000 + 0.21 \times 0.35E \\ V_L = E + 0.35E \\ D = 0.35E \end{cases} \Leftrightarrow \begin{cases} 1.35E = 650,000 + 0.0735E \\ V_L = 1.35E \\ D = 0.35E \end{cases} \Leftrightarrow \begin{cases} E = \dfrac{650,000}{1.2765} = 509,205 \\ V_L = 1.35 \times 509,205 = 687,427 \\ D = 0.35 \times 509,205 = 178,222 \end{cases}$$

n)	CV-B Equity Value_L_economic sector	67,89	
	Number of shares	7.500	Assumption
	CV-B Asset Value_L_economic sector	687.427	
	Equity value	509.205	
	Debt value	178.222	