

LASTNAME :

STUDENT Id :

FIRSTNAME :

Final Exam

Form A

Friday 16 January 2009

Indications

Please follow these indications:

1. The exam lasts 3 hours.
2. Please verify that your document contains exactly 8 pages.
3. There are 20 questions plus 3 bonus questions.
4. Each question is worth one point.
5. Please write your first name and last name on the first page.
6. Good work!!!

Problems

P1 Asset pricing

You are a small investor, who has only access to two assets, a risk-free asset and a Credit Default Swap on the debt of Company A. The economy is limited to one year and in one year the economy can be in two states, either a “bad” state or a “not so bad” state. The risk free rate is equal to 5%, the cash flows of the credit default swap are 0 in case of “not so bad” state and 0.6 in case of “bad” state, the market price of the CDS is 0.3 and the CDS is not subject to counterparty risk. You also know that company A defaults only in the “bad” state, and does not default in case of “not so bad state”.

- Q1** If the price of the company A debt is 0.7 (for a nominal value of 1 and a promised interest of 5%), what are the cash flows of company A' debt?
- Q2** If the cash flow of the company A' stock is equal to 2 in case “of not so bad” state what is the price of this stock today?
- Q3** What is the risk neutral default probability of company A?

- Q4** Based on the simple setting used in this exercise (two states, one period, zero coupon debt,..), can you explain carefully why the cost of equity is higher when the company takes more debt.

P2 Cost of capital

We are in 2008, Matt, a good friend of you wants to sell the company he set up at the end of his studies at the SBS-EM. Knowing that your scores in the finance courses were always better than his, he asks you to help him find a value for its company and give you the following data:

CF statement (K euros)	2009	2010	2011
Debt (Market value)	250	300	350
EBITDA	100	150	200
Depreciation	50	100	100
Δ WCR	0	0	0
Investment CF	-400	0	0

Cost of capital data	
Interest on Debt	8%
Tax rate	40%
Ka	12%
Kd	8%

For the years 2012 $\rightarrow \infty$, the only thing he is able to tell you is that the growth rate of the unlevered free cash flows is 5%. To find the total value of the company in 2008, he asks you to take things step by step:

- Q5** First, he tried to use the MM, ME and HP WACC to compute the value of the company for the period going from 2009 to 2011, but no one seems to give consistent results, can you explain why and propose a solution?
- Q6** Secondly, compute the value in 2008 based on the first three years (2009 – 2011) with the method you advocate in Q5.
- Q7** Thirdly, compute the value of the company for the remaining years (2012 $\rightarrow \infty$), knowing that from 2012 onwards the value of the debt will be equal to 10% of the total value of the company (rebalanced each year).
- Q8** Compute the total value of the company. If you don't have a result for the previous question, please use a value of 0 for the first three years and a value of 2 500 (in 2011) for the cash-flows going from 2012 $\rightarrow \infty$.
- Q9** You just finished your computations for the value of the company and your friend come to you very sorry, telling you that he forgot to mention that buying this company will allow the buyer to launch another product line over the next 3 years (2010) which cost is estimated to be 100 Keuros, and which estimated cash flows are 70 Keuros (2008). If the new product estimated cash-flows have a variance of 0.05 and if the risk-free rate is 6%, compute the amount to add in the project valuation.
- Q10** If the interest on debt is different from the cost of debt, how will your computations of the terminal value be affected?

- Q11** If the unlevered free cash flows stream in the future is constant until infinity, do you think that is more correct to use the HP WACC or the MM WACC? Do you think that the amount of debt will be equal in the two cases?

P3 Binomial trees, risky debt and financing the corporation...

You have just been appointed CFO of Ford (the Motor Company), due to the “subprimes” crisis and years of bad management you are in a very sensitive situation. To finance its WCR, Ford needs some fresh money, the bond market being very cold today, you decide to call on the federal government of the USA asking a federal loan of 300 M Euros for 1 year (zero coupon loan with an interest of 6%). The government accepts to lend you this amount provided their debt will be reimbursed prior to every other debt. The market value of Ford’s assets is 1000 M Euros today, and the company’s current debt is a zero coupon with face value of 800 maturing in one year. The volatility of the assets of the company is 40%. The risk free rate is 5%.

- Q12** Compute the relative distance to default of Ford (without the new debt).
- Q13** Will the old debtholders accept the new loan (answer using a binomial tree)? Is the interest rate of the state’s loan fair? Comment.
- Q14** Based on your answer question 13, compute the credit spread on the old debtholders debt and the expected loss given default of the two loans. If you don’t have a result for the previous question, please use a value of 620 for the old debt.
- Q15** Seeing the anger of the old debtholders, the state accepts to lend to Ford and to pay half of loss given default beared by the old debtholders in case of default. Will the old debtholders agree now (answer using a binomial tree)?
- Q16** If the state does not want to lend to Ford, the management has a rescue plan: invest massively in electrical cars, this project has a net present value of -50 but will increase the volatility of Ford assets to 60%. Will they launch the new project (answer using a binomial tree)?
- Q17 (Bonus)** Compute the value of the implicit CDS (and its delta) the state grants to the old shareholders.
- Q18 (Bonus)** Can you link your answer to question 15 to a theory seen during the course?
- Q19 (Bonus)** How can the debtholders prevent this kind of behaviour? Comment deeply.

P4 Capital structure (empirical study)

The following problem is based on the article : “Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure”, by MICHAEL L. LEMMON, MICHAEL R. ROBERTS, and JAIME F. ZENDER, THE JOURNAL OF FINANCE • VOL. LXIII, NO. 4 • AUGUST 2008.

Table II
The Effect of Initial Leverage on Future Leverage

The sample consists of all nonfinancial firms in the Compustat database from 1965 to 2003. The table presents parameter estimates, scaled by the standard deviation of the underlying variable, from panel OLS regressions of book and market leverage on several different specifications. The interpretation of each measure is the change in leverage associated with a one-standard deviation change in the determinant. For example, in the first column, a one-standard deviation change in initial leverage is associated with a 7% change in book leverage. Panel A presents results using the entire sample (All Firms). Panel B presents results using a subsample of firms required to survive for at least 20 years (Survivors). All variables are trimmed at the upper and lower 0.5-percentiles. Variable definitions are provided in the Appendix. Year Fixed Effects denote whether calendar year fixed effects are included in the specification. The *t*-statistics are computed using standard errors robust to both clustering (i.e., dependence) at the firm level and heteroskedasticity.

Panel A: All Firms						
Variable	Book Leverage			Market Leverage		
Initial leverage	0.07 (41.57)	0.06 (38.1)	0.04 (28.63)	0.11 (52.27)	0.09 (43.16)	0.07 (33.15)
Log(Sales)		0.02 (11.58)	0.03 (16.89)		0.02 (13.73)	0.03 (18.09)
Market-to-book		-0.02 (-20.31)	-0.01 (-12.11)		-0.06 (-40.49)	-0.04 (-35.68)
Profitability		-0.03 (-22.88)	-0.03 (-23.78)		-0.05 (-30.89)	-0.04 (-30.03)
Tangibility		0.04 (27.7)	0.03 (17.94)		0.04 (24.55)	0.03 (15.92)
Industry median lev.			0.06 (42.63)			0.08 (46.27)
Cash flow vol.			0.00 (-1.81)			0.00 (-3.35)
Dividend payer			-0.03 (-24.16)			-0.05 (-29.82)
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Adj. R^2	0.13	0.21	0.30	0.20	0.34	0.42
Obs.	117,914	117,914	117,914	117,300	117,300	117,300

Table II—Continued

Panel B: Survivors						
Variable	Book Leverage			Market Leverage		
Initial leverage	0.07 (28.56)	0.05 (24.13)	0.04 (18.55)	0.10 (30.86)	0.07 (25.25)	0.05 (19.19)
Log(Sales)		0.02 (9.13)	0.02 (11.45)		0.03 (11.78)	0.03 (12.47)
Market-to-book		-0.02 (-10.75)	-0.01 (-6.21)		-0.06 (-26.22)	-0.04 (-22.83)
Profitability		-0.03 (-14.91)	-0.03 (-15.64)		-0.06 (-19.8)	-0.05 (-20.12)
Tangibility		0.03 (17.3)	0.02 (10.59)		0.05 (18.86)	0.02 (10.65)
Industry median lev.			0.05 (26.52)			0.08 (32.65)
Cash flow vol.			-0.01 (-3.34)			-0.01 (-3.75)
Dividend payer			-0.03 (-15.53)			-0.04 (-18.84)
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Adj. R^2	0.15	0.23	0.32	0.17	0.37	0.45
Obs.	68,736	68,736	68,736	68,224	68,224	68,224

Q20 Please analyse the results in Table II – Panel A. Can you explain some of the results thanks to the theories presented in the course on the definition of the optimal capital structure? Please make yourself self-explanatory.

Q21 Can you deduce anything else from Table II – Panel B? Comment.

P5 Readings

Q22 According to Malkiel (2003) what is “the most direct and most convincing tests of market efficiency”?

Q23 Can you summarize what is Malkiel (2003) telling about the “seasonal and day-of- the-week patterns”?

N(x) & N(-x)=1-N(x)

H. Pirotte - SBS/ULB - FinMetrics SA - Juin 2007

	0.000	0.005	0.010	0.015	0.020	0.025	0.030	0.035	0.040	0.045	0.050	0.055	0.060	0.065	0.070	0.075	0.080	0.085	0.090	0.095
0.0	0.5000	0.5020	0.5040	0.5060	0.5080	0.5100	0.5120	0.5140	0.5160	0.5179	0.5199	0.5219	0.5239	0.5259	0.5279	0.5299	0.5319	0.5339	0.5359	0.5378
0.1	0.5398	0.5418	0.5438	0.5458	0.5478	0.5497	0.5517	0.5537	0.5557	0.5576	0.5596	0.5616	0.5636	0.5655	0.5675	0.5695	0.5714	0.5734	0.5753	0.5773
0.2	0.5793	0.5812	0.5832	0.5851	0.5871	0.5890	0.5910	0.5929	0.5948	0.5968	0.5987	0.6006	0.6026	0.6045	0.6064	0.6083	0.6103	0.6122	0.6141	0.6160
0.3	0.6179	0.6198	0.6217	0.6236	0.6255	0.6274	0.6293	0.6312	0.6331	0.6350	0.6368	0.6387	0.6406	0.6424	0.6443	0.6462	0.6480	0.6499	0.6517	0.6536
0.4	0.6554	0.6573	0.6591	0.6609	0.6628	0.6646	0.6664	0.6682	0.6700	0.6718	0.6736	0.6754	0.6772	0.6790	0.6808	0.6826	0.6844	0.6862	0.6879	0.6897
0.5	0.6915	0.6932	0.6950	0.6967	0.6985	0.7002	0.7019	0.7037	0.7054	0.7071	0.7088	0.7106	0.7123	0.7140	0.7157	0.7174	0.7190	0.7207	0.7224	0.7241
0.6	0.7257	0.7274	0.7291	0.7307	0.7324	0.7340	0.7357	0.7373	0.7389	0.7405	0.7422	0.7438	0.7454	0.7470	0.7486	0.7502	0.7517	0.7533	0.7549	0.7565
0.7	0.7580	0.7596	0.7611	0.7627	0.7642	0.7658	0.7673	0.7688	0.7704	0.7719	0.7734	0.7749	0.7764	0.7779	0.7794	0.7808	0.7823	0.7838	0.7852	0.7867
0.8	0.7881	0.7896	0.7910	0.7925	0.7939	0.7953	0.7967	0.7981	0.7995	0.8009	0.8023	0.8037	0.8051	0.8065	0.8078	0.8092	0.8106	0.8119	0.8133	0.8146
0.9	0.8159	0.8173	0.8186	0.8199	0.8212	0.8225	0.8238	0.8251	0.8264	0.8277	0.8289	0.8302	0.8315	0.8327	0.8340	0.8352	0.8365	0.8377	0.8389	0.8401
1.0	0.8413	0.8426	0.8438	0.8449	0.8461	0.8473	0.8485	0.8497	0.8508	0.8520	0.8531	0.8543	0.8554	0.8566	0.8577	0.8588	0.8599	0.8610	0.8621	0.8632
1.1	0.8643	0.8654	0.8665	0.8676	0.8686	0.8697	0.8708	0.8718	0.8729	0.8739	0.8749	0.8760	0.8770	0.8780	0.8790	0.8800	0.8810	0.8820	0.8830	0.8840
1.2	0.8849	0.8859	0.8869	0.8878	0.8888	0.8897	0.8907	0.8916	0.8925	0.8934	0.8944	0.8953	0.8962	0.8971	0.8980	0.8988	0.8997	0.9006	0.9015	0.9023
1.3	0.9032	0.9041	0.9049	0.9057	0.9066	0.9074	0.9082	0.9091	0.9099	0.9107	0.9115	0.9123	0.9131	0.9139	0.9147	0.9154	0.9162	0.9170	0.9177	0.9185
1.4	0.9192	0.9200	0.9207	0.9215	0.9222	0.9229	0.9236	0.9244	0.9251	0.9258	0.9265	0.9272	0.9279	0.9285	0.9292	0.9299	0.9306	0.9312	0.9319	0.9325
1.5	0.9332	0.9338	0.9345	0.9351	0.9357	0.9364	0.9370	0.9376	0.9382	0.9388	0.9394	0.9400	0.9406	0.9412	0.9418	0.9424	0.9429	0.9435	0.9441	0.9446
1.6	0.9452	0.9458	0.9463	0.9468	0.9474	0.9479	0.9484	0.9490	0.9495	0.9500	0.9505	0.9510	0.9515	0.9520	0.9525	0.9530	0.9535	0.9540	0.9545	0.9550
1.7	0.9554	0.9559	0.9564	0.9568	0.9573	0.9577	0.9582	0.9586	0.9591	0.9595	0.9599	0.9604	0.9608	0.9612	0.9616	0.9621	0.9625	0.9629	0.9633	0.9637
1.8	0.9641	0.9645	0.9649	0.9652	0.9656	0.9660	0.9664	0.9667	0.9671	0.9675	0.9678	0.9682	0.9686	0.9689	0.9693	0.9696	0.9699	0.9703	0.9706	0.9710
1.9	0.9713	0.9716	0.9719	0.9723	0.9726	0.9729	0.9732	0.9735	0.9738	0.9741	0.9744	0.9747	0.9750	0.9753	0.9756	0.9759	0.9761	0.9764	0.9767	0.9770
2.0	0.9772	0.9775	0.9778	0.9780	0.9783	0.9786	0.9788	0.9791	0.9793	0.9796	0.9798	0.9801	0.9803	0.9805	0.9808	0.9810	0.9812	0.9815	0.9817	0.9819
2.1	0.9821	0.9824	0.9826	0.9828	0.9830	0.9832	0.9834	0.9836	0.9838	0.9840	0.9842	0.9844	0.9846	0.9848	0.9850	0.9852	0.9854	0.9856	0.9857	0.9859
2.2	0.9861	0.9863	0.9864	0.9866	0.9868	0.9870	0.9871	0.9873	0.9875	0.9876	0.9878	0.9879	0.9881	0.9882	0.9884	0.9885	0.9887	0.9888	0.9890	0.9891
2.3	0.9893	0.9894	0.9896	0.9897	0.9898	0.9900	0.9901	0.9902	0.9904	0.9905	0.9906	0.9907	0.9909	0.9910	0.9911	0.9912	0.9913	0.9915	0.9916	0.9917
2.4	0.9918	0.9919	0.9920	0.9921	0.9922	0.9923	0.9925	0.9926	0.9927	0.9928	0.9929	0.9930	0.9931	0.9932	0.9933	0.9934	0.9935	0.9936	0.9937	0.9937
2.5	0.9938	0.9939	0.9940	0.9940	0.9941	0.9942	0.9943	0.9944	0.9945	0.9945	0.9946	0.9947	0.9948	0.9948	0.9949	0.9950	0.9951	0.9951	0.9952	0.9953
2.6	0.9953	0.9954	0.9955	0.9955	0.9956	0.9957	0.9957	0.9958	0.9959	0.9959	0.9960	0.9960	0.9961	0.9962	0.9962	0.9963	0.9963	0.9964	0.9964	0.9965
2.7	0.9965	0.9966	0.9966	0.9967	0.9967	0.9968	0.9968	0.9969	0.9969	0.9970	0.9970	0.9971	0.9971	0.9972	0.9972	0.9973	0.9973	0.9974	0.9974	0.9975
2.8	0.9974	0.9975	0.9975	0.9976	0.9976	0.9976	0.9977	0.9977	0.9977	0.9978	0.9978	0.9978	0.9979	0.9979	0.9979	0.9980	0.9980	0.9980	0.9981	0.9981
2.9	0.9981	0.9982	0.9982	0.9982	0.9982	0.9983	0.9983	0.9983	0.9984	0.9984	0.9984	0.9984	0.9985	0.9985	0.9985	0.9985	0.9986	0.9986	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9987	0.9987	0.9988	0.9988	0.9988	0.9988	0.9988	0.9988	0.9989	0.9989	0.9989	0.9989	0.9989	0.9990	0.9990	0.9990	0.9990
3.1	0.9990	0.9990	0.9991	0.9991	0.9991	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993	0.9993	0.9993	0.9993
3.2	0.9993	0.9993	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998	0.9998	0.9998
3.5	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998	0.9998
3.6	0.9998	0.9998	0.9998	0.9998	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.7	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999
3.8	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	0.9999	1.0000
3.9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

