Math 5621 Financial Math II
Spring 2011
Final Exam
April 29 to May 2, 2011

This is an open book take-home exam. You may use any books, notes, websites or other printed material that you wish but do not consult with any other person. Put your name on all papers submitted and please show all of your work so that I can see your reasoning. The four questions will be equally weighted in the grading. Please return the completed exams by 5 PM Monday, May 2 to my mailbox in the department office, under my office door MSB408, or by email.

1. A binomial pricing model is built using the following assumptions: $r_f = .02$, $\sigma = .20$, $T = 2$, $N = 4$, $S_0 = 20$

								35.213
							30.569	
					26.538			26.538
			23.038				23.038	
20.000					20.000			20.000
			17.362				17.362	
					15.073			15.073
							13.085	
								11.359

There is something unique about this particular binomial pricing model. What is unique about it?

The model is used to price an American Put option on S with strike price 25 expiring at $T = 2$, producing a value of 5.288 for the put option, as follows, where **bold** entries indicate early exercise:

								0
							0	
					1.225			0
			3.024				2.475	
5.288					4.883			5
			7.331				7.389	
			7.638	9.679		**7.638**		9.927
				9.927		11.667		
						11.915		13.641

There is an error in the calculation. Where is the error and what is the correct value for the put option?

2. An investor's entire portfolio consists of 25% in the risk free investment, with a return of .03, and the balance invested in two stocks S_1 and S_2 where $r_1 = .08$, $r_2 = .12$, $\sigma_1^2 = .04$, $\sigma_2^2 = .09$, and $\rho_{12} = .6$. What is the expected return r_P and the variance of return σ_P^2 on the investor's entire portfolio?

3. Assume that markets are as efficient as they can be in the practical world. Describe the expected abnormal return that can be earned by arbitrageurs, such as some hedge funds, who seek to profit by finding and exploiting inefficiencies in the market.

4. A company has net assets with a market value of $5,000,000$ and a financial structure involving 50% debt. The company believes that it has too much debt relative to the risks in its operations. The company is considering a new project that requires an investment of $1,250,000$. Taking on the project will leave the company's overall operating risk exactly where it is today. The company plans to finance the project 100% with new equity, believing that this new equity will leave it with a financial structure exactly compatible with its operating risks. If the company's after tax $WACC$ is 15%, its marginal cost of new debt is 6% before tax, and its marginal tax rate is 40%, then what after tax rate of return does the project need to earn in order to to be acceptable?