

OMGT3223 – Quiz #2

Please show all formulae, notation, calculations, definitions, assumptions, etc. Please include a brief explanation of your answer to receive full credit. Feel free to use additional sheets of paper to complete your work and attach them to this quiz when you turn it in.

1. Table 1.1 depicts three investment alternatives, two different states, and probabilities associated with those states. Please show your work.

Table 1.1

Decisions	States	
	Boom	Bust
Growth Stock	100	-50
AAA Bonds	7	12
Saving Account	16	6
Probability	0.4	0.6

- Which decision would you make using the Maximax criterion?
- Which decision would you make using the Maximin criterion?
- Which decision would you make using the Minimax Regret criterion?
- Find the expected value of each decision and comment on which you would choose (Hint: Think about the three areas of sensitivity analysis)?

a) **MAXIMAX**
 GS is best choice
 GS 100
 AAA 12
 SA 16
 CHOOSE GS

b) **MAXIMIN**
 GS -50
 AAA 7
 SA 6
 MIN of MAX of MIN'S
 CHOOSE AAA

c) **MINIMAX Regret**

	Boom Regret	Bust Regret	Max Regret
GS	$100 - 100 = 0$	$12 - (-50) = 62$	62
AAA	$100 - 7 = 93$	$12 - 12 = 0$	93
SA	$100 - 16 = 84$	$12 - 6 = 6$	84

Minimum of Maximum

So CHOOSE GS AS IT HAS lowest max Regret

d) **Expected Value**

$$E(GS) = 100 * 0.4 + (-50) * 0.6 = 40 - 30 = 10$$

$$E(AAA) = 7 * 0.4 + 12 * 0.6 = 2.8 + 7.2 = 10$$

$$E(SA) = 16 * 0.4 + 6 * 0.6 = 6.4 + 3.6 = 10$$

All are equal to 10 so you could pick any BUT GS HAS Higher Hi & lower = MORE RISK

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2. Alan Fang has a decision to make. He can invest in one of three different real estate projects: State and Main, Hillcrest II, or Fort Street IV. He knows three things can happen after he invests: the market could boom, the market could hold steady, or the market could tank. He also knows his \$ returns from State and Main could be \$1000k in a boom, \$375k in a steady market, and -\$500k if the market tanks. On the other hand Hillcrest II offers \$800k in a boom, \$300k during steady conditions, and \$250k if the market tanks. Finally, Fort Street IV offers \$2000k in a boom, \$125k if things are steady, and -\$4000k if things tank.
- Create a payoff table for the real estate decision problem.
 - Which real estate choice would you make using the Equal Likelihood criterion?
 - If the probability of future events follows the distribution in Table 3.1, find the expected value of each of the real estate choices. Which real estate project do you prefer and why (Hint: remember to discuss with regards to sensitivity analysis)?

a)

	All in (000's)		
	Boom	Steady	Bust
StM	1000	375	-500
Hillcrest	800	300	250
FSIV	2000	125	-4000

Future State of Market	p(Future State of Market)
Boom	0.72
Steady	0.08
Tank	0.20

b) Equal Likelihood \rightarrow All $p(x) = \frac{1}{3}$

$$E(\text{StM}) = 1000 \cdot \frac{1}{3} + 375 \cdot \frac{1}{3} + (-500) \cdot \frac{1}{3} \approx 292$$

$$E(\text{Hillcrest}) = 800 \cdot \frac{1}{3} + 300 \cdot \frac{1}{3} + 250 \cdot \frac{1}{3} \approx 450$$

$$E(\text{FSIV}) = 2000 \cdot \frac{1}{3} + 125 \cdot \frac{1}{3} + (-4000) \cdot \frac{1}{3} \approx -625$$

450 is highest value \rightarrow CHOOSE Hillcrest

c) Expected Value

$$E(\text{StM}) = 1000 \cdot 0.72 + 375 \cdot 0.08 + (-500) \cdot 0.2 \approx 650$$

$$E(\text{Hillcrest}) = 800 \cdot 0.72 + 300 \cdot 0.08 + 250 \cdot 0.2 \approx 650$$

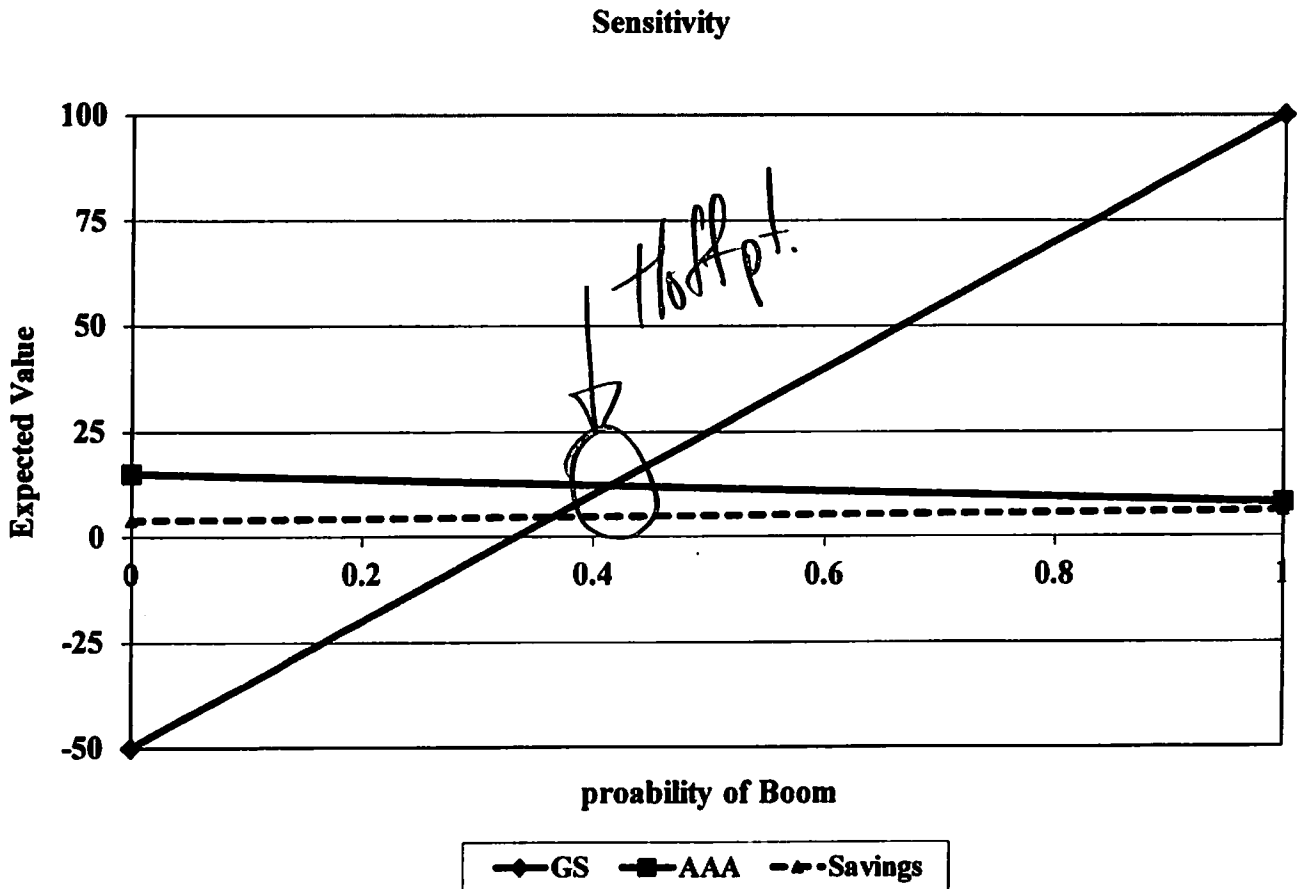
$$E(\text{FSIV}) = 2000 \cdot 0.72 + 125 \cdot 0.08 + (-4000) \cdot 0.2 \approx 650$$

All $E(x)$ values are equal \rightarrow you could pick any of the 3 but FSIV HAS High Risk (Hi vs Low) + Hillcrest is Very Steady

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3. Given the following diagram comment with regard to 1) dominance, 2) trade-offs, and 3) risks. Also, explain which decision you would prefer and why. NOTE: This problem is not related to problem 1 in any way. Answer this problem as a stand-alone problem.



- 1) **DOMINANCE**: THERE IS NO STRICT DOMINANCE. NO ONE ALTERNATIVE IS ALWAYS THE BEST
- 2) **Trade-offs**: PER THE GRAPH (MARKED AS Hoff pt) ONE CAN SEE THE MAIN Trade-off is BETWEEN AAA + GS @ $\approx 41\%$ P(BOOM)
- 3) **RISK**: RISK CAN BE DEFINED AS DIFFERENCE BETWEEN Hi & Low. GS HAS HIGHER RELATIVE RISK AS IT MOVES FROM -50 UP TO 100. AAA + Savings ARE MUCH MORE CONSISTENT w/ Hi's & Low's THAT ARE CLOSER.