

ECO251 QBA1
THIRD EXAM
 Apr 25, 2005
TAKE HOME SECTION

Name: _____ Computer Solution _____
 Student Number: _____

Throughout this exam **show your work!** Please indicate clearly what sections of the problem you are answering and what formulas you are using.

Part III. Do all the Following (19+ Points) Show your work! Neatness counts!

1. Ben Horim and Levy present the following actual returns for stock in Republic Steel and General Foods over a ten year period.

Year	R1	R2
1	22.5	-23.7
2	9.3	8.6
3	-18.6	4.3
4	48.1	-52.2
5	44.4	62.4
6	56.0	61.4
7	-20.1	9.8
8	-11.0	52.6
9	17.1	17.1
10	22.3	11.7

Before you start, personalize the data below as follows. Take the third to last digit of your student number and subtract it from -52.2 in the R2 column. This will make the results for year 4 even more disappointing than they actually were. (Example: Seymour Butz's student number is 123450. He subtracts the 4 from -52.2 getting -56.2) .

- Find the sample mean, variance and coefficient of variation for R2. Use computational formulas. The results must look as if you calculated them by hand, although it is perfectly reasonable to check the results using a computer or a calculator. (2.5)
- Find the sample covariance and correlation between R1 and R2. (3)
- Using a conventional measure of risk, explain which stock is riskier. (1). [6.5]
- Make a table showing 11 portfolios. Start with a portfolio with all your money invested in stock 1 ($P_1 = 1, P_2 = 0$), then move to a portfolio with 90% in stock 1 and 10% in stock 2 ($P_1 = .90, P_2 = .10$), and move by tenths until you get a portfolio that is all stock 2. (5). The table should look

as follows with much wider columns.	<table style="border-collapse: collapse; margin: auto;"> <thead> <tr> <th style="border: 1px solid black; padding: 2px;">P_1</th> <th style="border: 1px solid black; padding: 2px;">\bar{R}</th> <th style="border: 1px solid black; padding: 2px;">s</th> <th style="border: 1px solid black; padding: 2px;">C</th> </tr> </thead> <tbody> <tr><td style="border: 1px solid black; padding: 2px;">1</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.9</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.8</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.7</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.6</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.5</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.4</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.3</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.2</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">.1</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> <tr><td style="border: 1px solid black; padding: 2px;">0</td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td><td style="border: 1px solid black; padding: 2px;"> </td></tr> </tbody> </table>	P_1	\bar{R}	s	C	1				.9				.8				.7				.6				.5				.4				.3				.2				.1				0				Here \bar{R} is the weighted
P_1	\bar{R}	s	C																																															
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average return, S is the standard deviation of the portfolio return, and C is the coefficient of variation. [11.5]

- e) Make a graph . Put the mean return on the y axis and the standard deviation on the x axis. (3)
Connect your points in a curve. The C-like curve you will probably get illustrates the tradeoffs between return and risk and is called an investment opportunities frontier.
- f) Looking at the graph and the coefficients, are there stock portfolios that you would never recommend? Why? What portfolio would you recommend to an 80-year old widow? Why? What portfolio would you pick for yourself? Why? (1.5) [16]

2. It's time for a jorcillator problem! As everyone knows a jorcillator has two components, a Phillinx and a Flubberall.

The life of a Phillinx, X , is described by a continuous uniform distribution between $c = 0 + h_5$ and $d = 30 - h_6$, where h_5 and h_6 are the last two digits of your student number .

The life of a Flubberall, Y , is described by a Normal distribution with a mean of $\mu = 20 + h_5$ and a standard deviation of $\sigma = 5.10$.

(Example: Seymour Butz's student number is 123450. $c = 0 + 5 = 5$, $d = 30 - 0 = 30$ and $\mu = 20 + 5 = 25$).

- a) Find the following probabilities for the Phillinx: (i) $P(PH_1) = P(0 \leq x \leq 10)$, the probability that it dies before the end of the tenth year, (ii) $P(PH_2) = P(10 \leq x \leq 20)$, the probability that it dies between the end of the tenth and the end of the twentieth year and (iii) $P(PH_3) = P(x \geq 20)$, the probability that it lasts beyond the twentieth year. (1.5)
- b) Find the following probabilities for the Flubberall: (i) $P(F_1) = P(0 \leq y \leq 10)$, the probability that it dies before the end of the tenth year, (ii) $P(F_2) = P(10 \leq y \leq 20)$, the probability that it dies between the end of the tenth and the end of the twentieth year and (iii) $P(F_3) = P(y \geq 20)$, the probability that it lasts beyond the twentieth year. (3)
- c) Make a joint probability table using the 6 events described above. Assume independence. (1)
- d) Assume that the Jorcillator will fail only if both components fail. Find the following probabilities for the Jorcillator: (i) $P(J_1)$, the probability that it dies before the end of the tenth year, (ii) $P(J_2)$, the probability that it dies between the end of the tenth and the end of the twentieth year and (iii) $P(J_3)$, the probability that it lasts beyond the twentieth year. (3) [23.5]
- e) (Extra credit) Find the following conditional probabilities: : (i) $P(J_3|F_1)$, (ii) $P(J_3|F_2)$ (iii) $P(J_1|F_3)$, $P(F_1|J_2)$ (2).

Computations for the portfolio problem and probabilities for the uniform and Normal distribution follow.

Computations for the Portfolio Problem

Version 0

Descriptive Statistics: R1

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3
R1	10	0	17.00	8.68	27.46	-20.10	-12.90	19.70	45.33

Variable	Maximum
R1	56.00

Descriptive Statistics: R2

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
R2	10	0	15.2	11.6	36.6	-52.2	-2.7	10.8	54.8	62.4

Data Display

Row	X	xsq	y	ysq	xy
1	22.5	506.25	-23.7	561.69	-533.25
2	9.3	86.49	8.6	73.96	79.98
3	-18.6	345.96	4.3	18.49	-79.98
4	48.1	2313.61	-52.2	2724.84	-2510.82
5	44.4	1971.36	62.4	3893.76	2770.56
6	56.0	3136.00	61.4	3769.96	3438.40
7	-20.1	404.01	9.8	96.04	-196.98
8	-11.0	121.00	52.6	2766.76	-578.60
9	17.1	292.41	17.1	292.41	292.41
10	22.3	497.29	11.7	136.89	260.91

Data Display

sumx	170.000
sumx2	9674.38
sumy	152.000
sumy2	14334.8
sumxy	2942.63
n	10.0000
xbar	17.0000
ybar	15.2000
svarx	753.820
svary	1336.04
scovxy	39.8478
sx	27.4558
sy	36.5519
rxxy	0.0397063
rxxy2	0.00157659

Data Display

R1mean	17.0000
R1stdv	27.4558
R2mean	15.2000
R2stdv	36.5519
corr	0.0397063

Data Display

Row	Pi	Pmean	Pstdv	CofV
1	0.0	15.20	36.5519	2.40473
2	0.1	15.38	33.1196	2.15342
3	0.2	15.56	29.9662	1.92585
4	0.3	15.74	27.1890	1.72738
5	0.4	15.92	24.9141	1.56496
6	0.5	16.10	23.2893	1.44654
7	0.6	16.28	22.4559	1.37936
8	0.7	16.46	22.5023	1.36709
9	0.8	16.64	23.4230	1.40763