

# **The Six Spreadsheet Exercises for Curwin and Slater, *Introducing Quantitative Methods: A Short Course* Web Site**

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It is very important before attempting any of the following six spreadsheet exercises that the data analysis pack is loaded into Excel. You can check to see it is loaded by looking at the **T**ools menu on the menu bar of Excel. If the data analysis pack is loaded you will see the words **D**ata **A**nalysis at the bottom of the Tools menu. If you click on this you will then see **Anova: Single Factor** followed by **Anova: Two Factor with Replication** on this sub menu. If this is the case, simply continue; if not load the Data Analysis pack by clicking on **A**dd-Ins and the clicking on **A**nalysis **T**oolPak, then finally click **OK** to load it.

The following six exercises have been designed to test your knowledge and understanding of the topics covered in Curwin and Slater, *Quantitative Methods: A Short Course*. If you are new to, or would like to brush up your knowledge of, Excel before starting these exercises you should read the section at the back of Curwin and Slater on Excel. For all of the exercises there is a spreadsheet set up on the web site for you to download. These are named CS-1.XLS to CS-6.XLS. These files contain the data you will need to use to start each of the exercises. We would recommend you print out this file to have by the side of you when you attempt each question. We would also strongly recommend you read the appropriate chapters of the book before attempting each exercise. The chapters of the book each question refers are shown in bold at the start of the exercise.

Also on the web site are eight model answers in files CS-1m.XLS to CS-6m.XLS. Once you have tried to do the exercise you can look at the model answer

to check you have completed the exercise correctly. Good luck and we hope you enjoy using these exercises to test and enhance your knowledge of the subject.

**Exercise One - Averages, Dispersion and Graphs**  
**This exercise covers work discussed in chapters 3, 4 and 5 of the book.**

1. 'Pay through the Nozzle Oil Company plc' needs to calculate the total amount it has to pay the oil refinery company for the barrels of oil it has purchased over the last year. The price of a barrel of oil and the number of barrels purchased are shown below.

Month	Purchase price (\$) per barrel	Number of barrels of oil purchased (000s)
Jan	29.01	12
Feb	32.06	16
Mar	33.19	15
Apr	34.11	14
May	33.45	13
Jun	31.25	19
Jul	29.75	21
Aug	28.47	20
Sep	25.33	25
Oct	24.45	26
Nov	23.12	21
Dec	22.74	22

- i) Calculate the average purchase price of a barrel of oil and the average number of barrels purchased.
- ii) Calculate the total number of barrels of oil purchased by the refinery.
- iii) Calculate in a new column, the total amount paid by the refinery each month to the supplier, and the total for the year.
- iv) Calculate the standard deviation for both the purchase price of oil and number of barrels purchased.

- v) Given that each barrel of oil contains 160 litres, calculate a new column for the total number of litres 'Pay through the Nozzle' refines per month, assuming no waste.
- vi) If each litre of refined oil is sold for \$0.68 (net of tax), calculate the total amount sales revenue per month for 'Pay through the Nozzle'.
- vii) If tax of 12% is imposed on top of the \$0.68, calculate in a new column the amount of tax revenue paid to the government each month.
- vii) Draw the following graphs for 'Pay through the Nozzle'.
- a line graph of oil prices against time
  - a pie chart of sales revenue paid per month
  - a bar chart of total revenues earned per month against time

### Exercise Two - Index numbers

**This exercise covers work discussed in chapter 7 of the book.**

2. The following data has been collected for the years 1, 2, 3 and 4 for the three products bread, butter and jam, and is shown in the table below. Calculate the Laspeyres and Paasche price index for the year 1, 2, 3 and 4 and the Laspeyres and Paasche quantity index for the year 1, 2, 3 and 4.

P = price in pounds

Q = quantity in millions

V = value in millions of pounds

Year		1			2			3			4			5	
	P	Q	V	P	Q	V	P	Q	V	P	Q	V	P	Q	V
Bread	0.50	27	13.5	0.53	28	14.8	0.54	27	14.6	0.57	30	17.1	0.59	31	18.3
Butter	1.05	20	21.0	1.06	20	21.2	1.10	21	23.1	1.15	22	25.3	1.16	23	26.7
Jam	0.79	30	23.7	0.82	31	25.4	0.84	29	24.4	1.01	32	32.3	1.02	33	33.7
			58.2			61.4			62.1			74.7			79.1

**Exercise Three - Regression and Correlation****This exercise covers work discussed in chapter 8 of the book.**

3. 'The Real Cornish Cream Company Ltd' sells clotted cream both by mail order and in their shops. The managing director thinks the number of visitors to Cornwall (in thousands) could be related to the level of sales of this company. To test this idea he has collected the turnover figures for his company over the last ten years and the number of visitors to Cornwall also over the last ten years, as shown in the table below.

Year	Turnover (£m)	Number of visitors in millions
1	0.56	2.700
2	0.60	2.790
3	0.77	3.030
4	0.73	3.040
5	0.88	3.080
6	1.00	3.250
7	0.72	2.870
8	0.63	2.880
9	0.57	2.700
10	0.55	2.690

Use Excel to calculate a correlation between turnover and number of visitors, using both the function (CORREL) and the table method. Finally use Excel to calculate the regression equation (i.e. the intercept a and the slope term b) for turnover against the number of visitors.

**Exercise Four - Time Series****This exercise covers work discussed in chapter 9 of the book.**

4. 'International Wine Plc' imports wines from all over Europe which are then sold to wine merchants in every part of the UK. Sales of wine from its bonded warehouse in London for the last four years are shown in the follow table in millions of pounds monthly.

Year 1	Sales (£m)	Year 2	Sales (£m)	Year 3	Sales (£m)	Year 4	Sales (£m)
Jan	10.5	Jan	11.2	Jan	12.2	Jan	13.4
Feb	11.6	Feb	12.1	Feb	13.1	Feb	14.3
Mar	10.2	Mar	10.4	Mar	11.4	Mar	12.6
Apr	12.7	Apr	13.8	Apr	14.8	Apr	16.0
May	13.2	May	13.7	May	14.7	May	15.9
Jun	13.7	Jun	15.2	Jun	16.2	Jun	17.4
Jul	14.1	Jul	14.5	Jul	15.5	Jul	16.7
Aug	15.8	Aug	18.2	Aug	19.2	Aug	20.1
Sep	15.2	Sep	18.2	Sep	19.3	Sep	20.3
Oct	15.7	Oct	19.0	Oct	20.0	Oct	21.2
Nov	16.6	Nov	20.8	Nov	21.8	Nov	23.0
Dec	16.7	Dec	19.0	Dec	20.0	Dec	22.7

- Use Excel to calculate a third period moving average.
- Estimate the trend in sales, and then predict what the trend model would predict for the first 3 months (Jan, Feb and Mar) of year 5.

#### Exercise Five – Investment

**This exercise covers work discussed in chapter 10 of the book.**

- ‘The Real Jigsaw Company’ makes wooden jigsaws that are sold worldwide.

At the moment the company are considering investing in a new laser jigsaw cutting table to improve production. The cutting table costs £4,999 to buy and install in the factory. It is thought the machine will last 6 years before it would need to be scrapped. The marketing manager has estimated the additional level of sales from this new machine, as shown below. The retail cost of each jigsaw is £13.99 and the cost to produce it is £11.31, use Excel to calculate the NPV if the discount rate is 4.5%. Finally, calculate the payback period and the internal rate of return for this project.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Estimated units sold	1,345	1,250	900	568	243	166

Now compare the above project, using NPV analysis, to a fixed rate bond of 3%, if £5,000 was invested for six years.

**Exercise Six – Binomial Distribution****This exercise covers work discussed in chapter 11 of the book.**

6. a) A salesperson on average has an 8% chance of making a sale. Calculate the matrix of probabilities for 0, 1, 2, 3, 4 and 5 sales if he contacted on different days 20, 21, 23 and 25 people.
- b) The government of a small country is considering starting a national lottery, but is unsure how many numbered balls to use. You have been asked to calculate the probability of winning the national lottery (that is matching six balls), if the number of balls used in the lottery was 47, 48, 49, 50 or 51.