Understanding economic data

Chapter 1: Using and analysing data

SACE Subject Outline – Summary

Students collect and analyse data in order to explain economic activity. They use appropriate graphs, diagrams and tables to display results that support their arguments.

In Stage 1 Economics you will be asked to both construct graphs and to analyse the results. Using data helps predict market trends and measure the outcomes of the behaviour of consumers, firms and the government. Data helps you make informed decisions. Development of the relevant skills require practices, and we should consider some key relevant factors.

Constructing tables

When you are collecting data, it may first be useful to organise your findings in table format. You should provide

- An appropriate title
- A heading for each column, including showing in brackets such features as % or $US for instance, if numerical data is being collected
- It may be useful to number your findings as Figure 1, Figure 2, etc. This enables ease of reference if writing a report referring to a number of findings.

An example follows.

Table 1.1: Employment status of males in the Australian labour force, 2003–2017

Year	Employed full time (%)	Employed part time (%)
2002	69.1	11.5
2007	71.5	11.3
2012	68.9	13.7
2017	68.1	13.7

Sample male employment data. Source: HILDA survey, 2019

Note

Don't expect the percentage males working part time, plus those working full time, to total 100%, because there are many males of working age who are not working.

Constructing graphs

While collecting data and compiling a table is useful as a starting point, constructing a **line graph** to show trends over time provides an effective visual impression.

You need to provide a heading, label each axis, and choose a scale to maximise use of the space provided and to allow ease of interpretation.

You may be showing more than one feature on your graph, for instance both full-time and part-time male employment compiled from our table above. To differentiate your two groups, use different colours for each category, or perhaps one unbroken, and another broken line to assist in interpretation. If differentiating using symbols, you may need to include a key to identify how you differentiated the two categories.

An example follows.

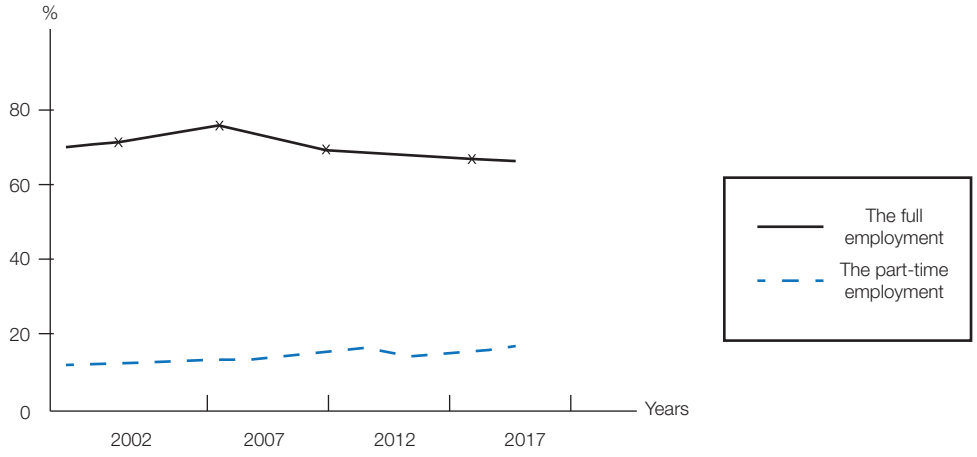

Figure 1.1: Employment status of males in the Australian labour force, 2003–2017

Some data is very effective when shown in **bar graph** form. For instance, you write a report stating that China is the source of 40% of Australia's online purchases, followed by USA with 22% and then a number of other countries such as the UK, Hong Kong and New Zealand. How much more impact that information has when conveyed visually, as below, possibly also making interpretation of that information easier, too.

Source Countries of Recent International Purchases (by Australians)

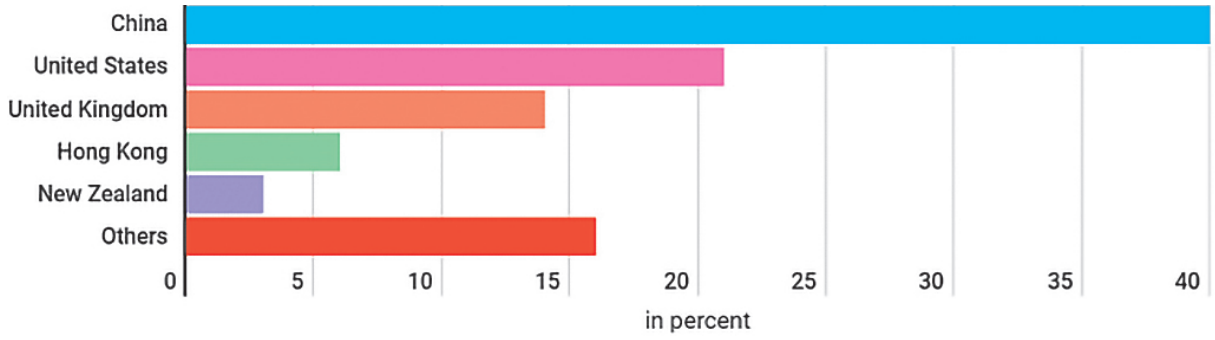

Figure 1.2: Source of 2019 online purchases

The data above regarding online purchases, also lends itself to effective representation as a **pie graph (or pie chart)**, as the components can be shown as a part of 100%.

Consider the following table.

Table 1.2: Percentage share of total Australian supermarket income in 2019

Supermarket	Market share (%)
Woolworths	38
Coles	31
Independents	12
Aldi	10
IGA	7
Others	2

The power of the two majors, Woolworths and Coles, is instantly apparent when shown in pie graph format.

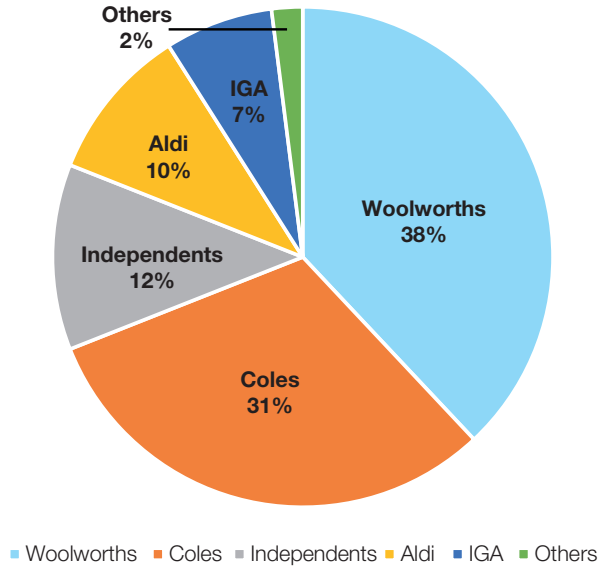

Figure 1.3: Market share (%) of leading Australian supermarkets, 2019

Hints for reading graphs

Collecting data and constructing a graph are necessary first steps when trying to explain what has happened in a scenario. It is necessary to use economic knowledge and understanding, plus further research to provide credible rationale for occurrences, before considering possible suggestions for improvement.

Identifying a particular period

Many students have trouble reading graphs when asked to identify a certain year, month or quarter. Remember that the financial year is of importance to economists, and years will sometimes be labelled through a financial year (July 1 – June 30).

Sometimes it is useful to go back to the origin of the 'x' axis and read forward from there when trying to separate years or months. It might help to separate the relevant periods with a red pen so that you can identify a year, month or quarter more readily.

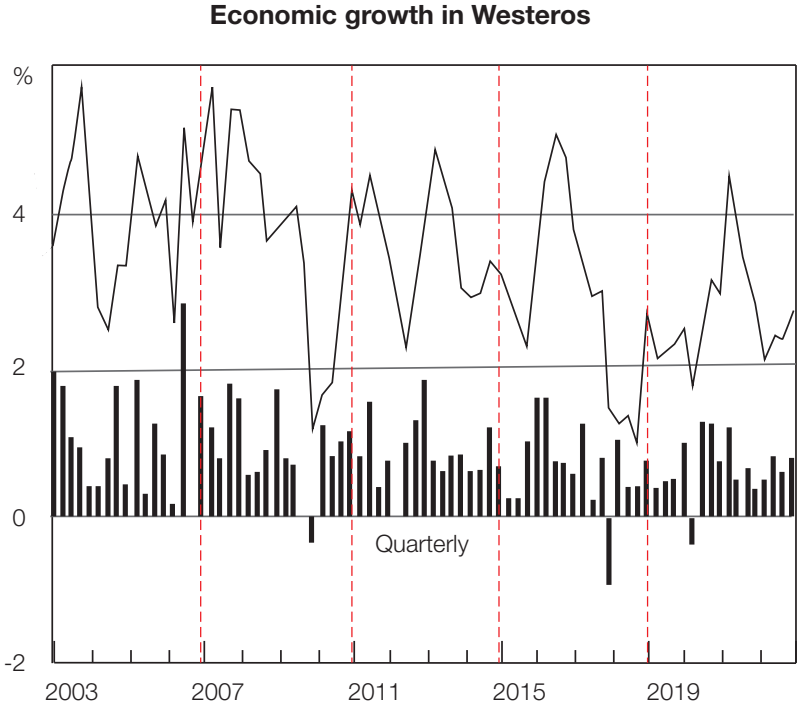

Figure 1.4: Economic growth in Westeros

Knowing the quarters of the year

Much economic data is measured at quarterly intervals. The measures of inflation and economic growth are two such important indicators. Published results may name quarters as the first, second, third or fourth quarters of the year. We name the quarters for the month in which they end. There are three months in each quarters of a year, so the first quarter is known as the March quarter, the second is June, the third September, and the fourth quarter of the year is the December quarter. You can see the measurements in economic growth in Figure 1.4.

Considering the trend

Able to be mathematically constructed, at its simplest, the trendline shows the general direction over time and is widely used in economics. Whilst outliers will appear on some graphs, the general pattern of values should be followed when considering trends, as can be seen below.

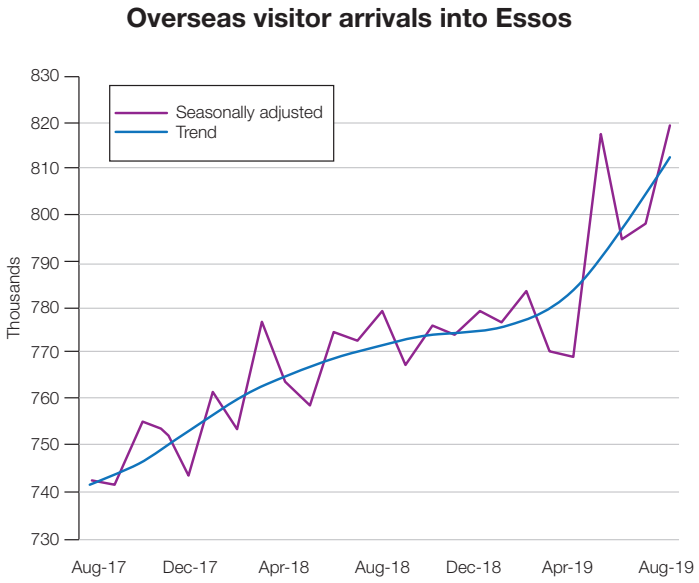

Figure 1.5 Overseas visitor arrivals into Essos

Identifying relationships between graphs, or lines on a graph

It is useful to recognise and understand the existence of patterns which may appear on graphs. For instance, it could be suggested that if economic growth, as shown by gross domestic product, is increasing, there could be more jobs around, and more people participating in the workforce. If the economist finds that both economic growth and the participation rate are both increasing, we say that there is a **direct relationship** between these two indicators. If economic growth was falling, and the unemployment rate increasing, the relationship is **inverse, or indirect**. You can see that in the graph which follows.

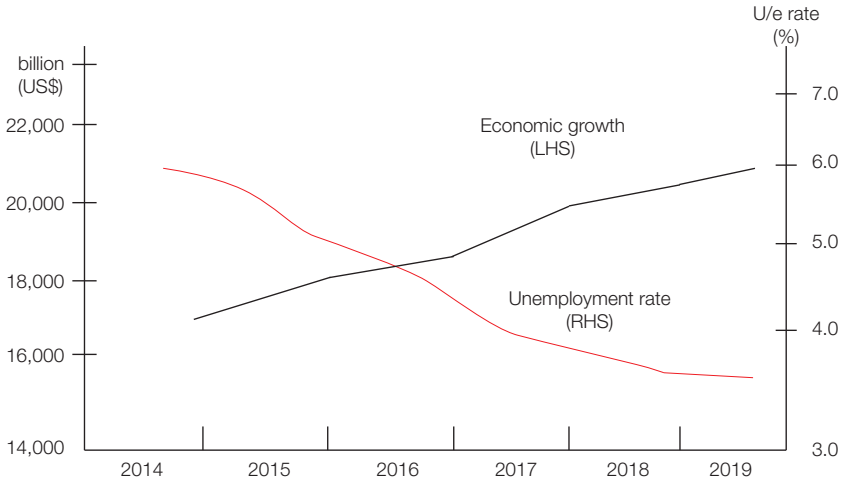

Figure 1.6: Economic growth and unemployment in the USA

Take a closer look at Figure 1.6. To analyse this graph, the scale for the unemployment rate percentages is shown on the right-hand side (RHS) of the vertical axis, while the economic growth figures are shown on the left-hand side (LHS).

Knowing the language of your subject

As you progress through this course you will be exposed to many terms which are new to you, or have a slightly different meaning to the word which you are familiar with. It is useful to keep a glossary of economic terminology so that you have a solid foundation which will help you build your knowledge and understanding of economics.

Interpreting a graph correctly

Be careful when explaining trends from a graph. Take note of what the graph is actually showing. For instance, if asked to comment on the trend during the global financial crisis (GFC) of 2008-9, many students would say private sector 'wages fell'. But look at the heading. It shows 'wages growth'. So wages actually grew, but at a diminishing rate. It would be correct to say that 'wages **growth** fell'.

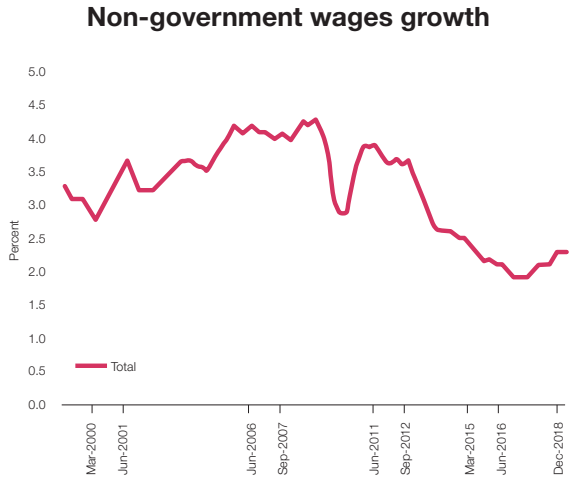

Figure 1.7: Private sector wages growth in Australia

Understanding seasonal adjustment

Some useful measures related to the economy have expected upturns and downturns throughout the year. One example would be retail sales, which would generally be expected to peak just before Christmas. Without seasonal adjustment, it would appear that the increase in retail sales could be a sign of a strengthening economy, and policy actions may be taken to this effect. This then, could be a misleading signal. There is a statistical method for calculating seasonal adjustment, but for our purposes let us say that the calendar-related change is not omitted altogether, but is averaged out over the entire period. There are many activities which have seasonal peaks or troughs, for instance in relation to agriculture and food sales relating to certain products. Consider reasons for the trend relative to airline travel in the USA in the activities which follow this chapter.

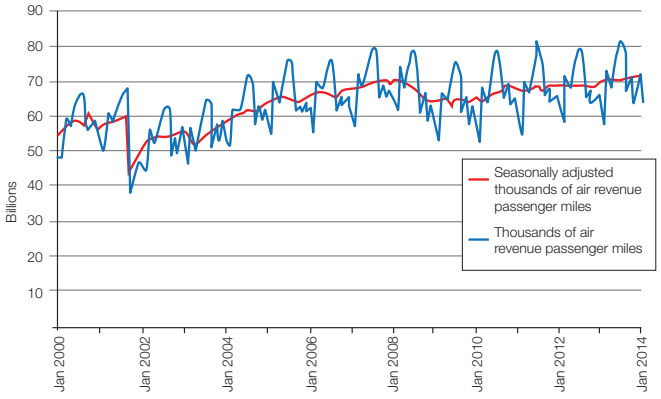

Figure 1.8: Passenger miles, USA

Analysing graphs

A major role of the economist is in the interpretation of data. You will be expected to make suggestions regarding what could have caused changes. Of course, you should research possible reasons, but you will also be expected to draw on your life experience and asked to make a sensible suggestion. Economics was described by one my students as 'organised common sense'. Don't imagine that you cannot make a suggestion if you are new to the subject. You can. Technological change, for instance, has had a huge impact on some employment sectors, social change regarding the growth of women being in the workforce is another. The growth of renewable sources of energy, and the desire for university education after secondary school are also significant changes in our society. You know about all of these issues. There are often a variety of possible answers, and maybe none of them may be 'wrong', just perhaps less likely than another factor. So, when asked to make a suggestion, have a try!

Be creative

The line, bar and pie charts referred to here are just a starting point. When doing a PP presentation, for instance, the visual impact of your material is important, so be creative in the way you make connections and display your findings.

Helpful online resources

Investigate the range of graphs and displays at:

www.gapminder.org

Be careful

Don't be misled by numbers. A large number isn't necessarily good. The banknote below, the largest unit of currency printed by Zimbabwe at the height of its hyperinflation in the first decade of the 21st century, was actually equal to US$10!

Activities

1. (a).

Female employment status of the Australian labour force, 2003–2017

Year	Employed full time (%)	Employed part time (%)
2002	34.6	29.9
2007	38.7	31.1
2012	36.5	32.0
2017	39.2	32.0

Construct a line graph showing female labour force employment status. Take note of the previous suggestions relating to scale and labelling features of your graph.

(b) Compare the graph which you have drawn, with the graph showing male employment status on page 3 of this chapter.

(i) Suggest a reason for the differences relating to male and female part-time employment.

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(ii) Male full time employment fell slightly from 2002 to 2017, while male part-time employment rose. Suggest a possible reason for this trend.

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(iii) Provide two reasons why males or females of working age may not be employed in either a full or part-time capacity.

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(iv) Discuss the trend for male full-time employment between 2002 and 2017, compared with the trend for female full-time employment over this time.

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Activities

2. Refer to the graph showing economic growth in Westeros (page 4).

   (a) In which year did economic growth most recently peak in Westeros?

   (b) Identify the most recent prolonged period when economic growth was weakest.

   (c) Suggest a major reason which could contribute to economic growth falling (the value of production of goods and services).

3. (a) Provide an economic reason for the upward trend in overseas visitor arrivals into Essos (page 5).

   (b) Provide both a potential advantage and disadvantage of this trend.

4. (a) Describe and explain the relationship which exists between economic growth and unemployment in the USA, as shown in the graph on (page 5).

   (b) Do a web search and provide possible reasons for the trend prior to 2019.

   (c) Now go one step further and suggest how that trend over time might affect individuals, firms and the government.

   (d) If you were in government, would you be more likely to vote to raise or lower taxes in 2014 to deal with the economic state of the nation? Explain your choice.

Activities

5. (a) Consider the graph showing passenger miles in the USA, on page 6.

You can see that in the unadjusted passenger miles, there seems to be a peak at a similar time of each year. When is it? Provide a suggestion as to why this occurs.

(b) Would you expect the same seasonal pattern in Australia? Why?

(c) 'The expected, seasonal change in passenger miles is ignored so that misleading impressions of growth are not created.' Comment on this statement.

6. Display this table in the graphical form which you think is most appropriate for maximum visual impact and for ease of interpretation.

Number of Australians by income tax bracket

Taxable income	2016–17
$18,200 or less	2,700,000*
$18,201 – $37,000	3,100,000
$37,001 – $80,000	5,600,000
$80,001 – $180,000	2,000,000
$180,001 or more	500,000
Total	**13,900,000**

**Number of Australians rounded to the nearest 100,000*

Activities

(a) Refer to the table below.

Tax scales for an Australian resident in 2019 – 20

Taxable income	Tax on this income
$18,200 or less	Nil
$18,201 – $37,000	19c for each $1 over $18,200
$37,001 – $87,000	$3572 plus 32.5c for each $1 over $37,000
$87,001 – $180,000	$19,822 plus 37c for each $1 over $87,000
$180,001 and over	$54,232 plus 45c for each $1 over $180,000

Use the information in the table above to help you calculate the amount of tax due by an individual employee with a taxable income of:

(i) $50,000 pa

(ii) $100,000 pa

(iii) $200,000 pa

(b) Investigate why it is that on double the taxable income you are due to pay double the tax.

(c) 'In 2016–17 over 2,000,000 citizens earned $18,200 or less. Extreme poverty is widespread in Australia.' Comment on this statement.

7. Georgia did an excellent job of steadily reducing COVID-19 cases even while loosening their restrictions faster than many other states'.

   Comment on this statement after closely observing the graph. (The employee who produced this graph for the Georgia Health Department lost their job.)