Thinking Like an Economist

1

Learning Outcomes based on the SACE Economics Teaching and Learning Framework

- Students develop an understanding that economic systems are viewed through different social and political lenses and that these perspectives determine the decisions of stakeholders.
- Students develop economic thinking by using economic inquiry skills and economic concepts, principles, and models in different scenarios.
- Students apply economic concepts, including scarcity, choice, opportunity cost, and cause and effect of economic decisions, in a variety of economic contexts.
- Students apply principles, models, and terminology appropriately in a variety of economic contexts.

Topic 1: Introduction to Economics

There has been much written on the definition of economics and views vary as to whether Economics is a method (Posner & Keynes) describing rational decision making around choices or a topic made up of a series of questions (Marshall) which focus on finding out how people make choices.

In more recent times definitions have become more informal viewing Economics as a study with a focus on three aspects; production, consumption, and distribution (Viner) or at the most general level as being all about how people make choices (Duesenberry).

The commonality amongst these views centers on the notion of studying choices and as such the following course is viewed through the lens of "Making Choices" allowing a constant context for basing understanding.

Key Definition:

Economics is a social science that focuses on the production, distribution, and consumption of goods and services, and analyses the impacts and reasons for choices that individuals, businesses, governments, and nations make to allocate scarce resources.

https://www.investopedia.com/terms/e/economics.asp

1.1 The Economic Problem

The problem of choice which presents in many of the definitions of economics finds its origin in the basic underlying principle of Economic Scarcity. Scarcity in economics is a relative concept rather than an absolute and is a reference to resource availability compared to societal wants. Whilst not equal between individuals, communities, regions, or countries, it is universal and thus at an individual and society level, everyone faces the economic problem.

"How to satisfy unlimited wants with limited or scarce resources"

Understanding this problem requires breaking down the terminology, particularly the terms Wants, Resources and Goods and Services.

Key Point:

Scarcity in economics is a relative concept rather than an absolute.

Key Definition:

Economic Problem the problem of satisfying unlimited wants with scarce (limited) resources.

Wants

Wants are human material desires. These can be individual or collective and are classified as being essential (needs) or non-essential (desires). Wants are satisfied via the direct consumption of goods or services and are unlimited, due in part to their recurring and ever-changing nature.

Resources

Resources are inputs used to produce the goods and services wanted by society. They are often referred to as factors of production. They are split into 4 broad recognised categories: Land, Labour, Capital, and Entrepreneurship

- Land (N) – Land resources include all naturally occurring resources. These consist of agriculture, mining and forestry and fishing.
- Labour (L) – Represents all human effort placed into production.
- Capital (K) – All manufactured items that are used to produce something else. Known as Physical Capital these items remain at the end of a production process and thus differ to intermediate goods which are altered or used up in production.
- Entrepreneurship (E) – The process of combining land, labour, and capital in the production of a good or provision of a service.
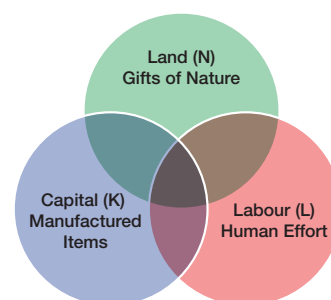

Figure 1.1.1: Resource types

Goods and Services

Goods and services are produced using resources and serve the purpose of being consumed to satisfy wants. When referring to goods economist use two broad terms, economic goods, and free goods. The distinction being that economic goods use scarce resources in their production, whilst free goods which include air and sunlight do not use scarce resources. This means that a price can in most cases be charged for the usage of economic goods. There are a number of differing types of economic goods including those shown in Table 1.1.1.

Table 1.1.1: Classifications of economic goods.

> **Key Point:**
>
> The classification of economic goods is context dependent. A good such as flour can be an intermediate good or a final good, whilst a car could be a capital good or consumer good.

Classification	Definition	Examples
Consumer Goods (Final Goods)	Goods purchased by consumers that directly satisfy wants.	Food, Electronics, Household Appliances, Vehicles, Accommodation
Capital Goods	Goods that are used to produce something else. These goods satisfy wants indirectly through assisting in making consumer goods	Machinery, Equipment, Tools
Intermediate Goods	Goods that are used up in a production process having been refined or altered in producing a final good.	Flour in Bread, Nail in building
Public Goods	Goods that are both non-rivalrous and non-excludable and hence can generally not have a price charged for their provision.	Roads, Lighthouse, Parks

RESOURCES	PRODUCE →	GOODS and SERVICES	SATISFY →	WANTS
SCARCE (LIMITED)		MAKE CHOICES		UNLIMITED

Figure 1.1.2: Summary of the economic problem.

1.2 The three fundamental questions (choices)

> **Key Point:**
>
> There are three fundamental economic questions that must be answered by all economies:
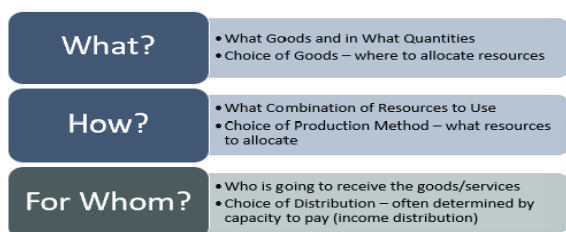>
> **What? How? and For Whom?**

The existence of the economic problem requires society to answer three fundamental economic questions, WHAT, HOW and FOR WHOM?

The **What** question is a choice of What goods to produce and in What quantities, The **How** to Produce is a choice of resources and the combination of these to use in production.

The **For Whom** question is a choice of end consumer and relates to Who is going to receive the final goods and services.

These questions tie closely to our definition of economics which centered around choices associated with production, distribution, and consumption.

These decisions can be divided into two areas:

What?	• What Goods and in What Quantities • Choice of Goods – where to allocate resources
How?	• What Combination of Resources to Use • Choice of Production Method – what resources to allocate
For Whom?	• Who is going to receive the goods/services • Choice of Distribution – often determined by capacity to pay (income distribution)

• ***Questions of Resource Allocation***

What to Produce and in What Quantities?

How to Produce?

• ***Questions of Output and Income Distribution***

For Whom to Produce?

Figure 1.2.1: Three fundamental economic questions

Exercise 1.1 The Fundamental Economic Questions

Identify which fundamental question each of the following newspaper headlines is most associated with.

Newspaper headline	Fundamental economic question
"Economists Weigh In on the Benefits and Challenges of Diversifying Production in a Global Market"	
"Infrastructure Improvements: A Catalyst for Economic Expansion"	
"Experts Debate Best Strategies for Allocating Resources in an Ever-Changing Economy"	
"Ensuring Access to Essential Goods and Services for All"	
"Innovations in Technology and Manufacturing Driving Economic Growth"	
"Empowering Women in the Workforce: A Path to Economic Equity"	

1.3 The problem of choice – Opportunity cost

Individuals or societies attempts to address the economic problem.

The universal nature of Scarcity means that at any moment in time resources used in the production or provision of one good or service cannot simultaneously be used in the provision or production of another. Therefore, whether at an individual or collective level, when answering the three fundamental questions, each decision made leads to an alternative forgone.

In economics this is referred to as an opportunity cost, simplistically it is what we give up to gain something else, measured in terms of the next best alternative forgone.

Key Definition:

Opportunity cost is the benefit forgone or opportunity lost, of using something in a particular activity rather than for its next best alternative.

1.4 Economic systems

In its attempts to answer these questions all countries will adopt an economic system, a method or means by which society is able to organise, allocate and distribute resources, services, and goods across geographical locations. Economic systems encompass many institutions, agencies, entities, decision-making processes and patterns of consumption, (CFI Nov 2022) (https://corporatefinanceinstitute.com/resources/economics/economic-system/) however they can be often defined, classified or distinguishing by two characteristics, Resource Ownership and the Decision-Making Process.

Resources can be owned collectively by the state or government, or they can be owned privately by individuals. This gives rise to the terms Socialism and Capitalism. Where resources are privately owned, we have a capitalist system and when they are owned or controlled by the government, we have a Socialist System. No economic system is a pure form of either of these instead it better to view each system as a point along a continuum with varying degrees of state and private ownership of resources.

Decision-Making is characterised by two elements:

1. Who makes the decisions and 2. How the decisions are made (the Rationing mechanism). Where decisions are made by individuals (consumers and producers) and are coordinated by the price mechanism we have a market system. However, where decision making is made by government and coordinated by government the system is view as a planned or command system. Like resources ownership no economic system is a pure form of either of these instead it is again at a point on a continuum with varying degrees of government and private individual decision-making.

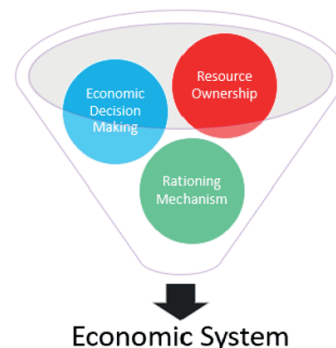**Key Definition:**

Economic System a method or means by which society is able to organise, allocate and distribute resources, services, and goods across geographical locations.

Figure 1.4.1: Characteristics that classify an economic system

Figure 1.4.2: The 4 broad economic systems

Whilst systems change and evolve over time and thus are perpetually moving within and between the quadrants in Figure 1.4.2, historically the most common systems found are Market Capitalist and Planned Socialist. The characteristics of these two systems result in fundamental differences in the way they answer the, **what, how and or whom** questions. These are summarised in Table 1.4.1.

Table 1.4.1: Summary of how economic systems attempt to answer three fundamental economic questions.

System	What to Produce	How to Produce	For Whom to Produce
Market Capitalist	Decided by consumer sovereignty where consumers cast dollar votes (demand) and producers respond by producing the products for which there are enough dollar votes.	Decided by producers who through their profit motivation will use the least cost principle. Choosing the combination of resources which results in the lowest cost of production.	Decided by capacity to pay, where allocation of scarce goods will be dictated by those who can pay the most. This question is therefore ultimately answered by income distribution.
Planned Socialist	Decided by government (or appointed authority) who set production targets (1 to 5 years) and prioritise products deemed most beneficial to society.	Decided by government (or appointed authority) who attempt to use resources in the process of maximising output.	Output is rationed according to social needs and priorities. Distribution requires a non-price rationing mechanism such as coupons or ration cards.

Key Definition:

Mixed Economic System
an economic system that combines elements of Socialism and Capitalism, and Market and Planned economies.

Key Point:

All economic systems are mixed systems, consisting of elements of government ownership, planning and decision making, as well as private ownership, individual decision-making and the use of the market mechanism.

Because all economic systems exist along a continuum all systems are in fact Mixed Systems and approach the choices of production, distribution, and consumption with a combination of the approaches displayed in Table 1.4.1. There is much debate between economist on which system is the most effective, but since the 1990s there has been a trend (Transition) towards Market Capitalism. However, debate remains about the role that government should play in these systems with issues of equity played off against efficiency.

Real World Considerations: The Process of Transition

The transition of the Soviet Union from a planned socialist economy to market-oriented capitalist economies, was a complex and challenging process that took place in the early 1990s. The inefficiencies of the Soviet economy and the declaration of independence by many former Soviet states acted as the stimuli for transition, as post-soviet states attempted to create more competitive and dynamic economies that would allow them to meet the demands of a rapidly changing world. The transition involved the liberalisation of prices (removal of price controls), the privatisation of state-owned enterprises, the removal of State support and the creation of legal frameworks to support private property and market transactions. It was a complex process that has become known today as "shock therapy" where the former Communist States were suddenly subject to the process of change towards a market system. The process led to increases in economic growth in some regions and improved living standards in parts of these countries, but the benefits were not evenly distributed and in many newly formed countries inequality widened significantly. Evidence of this still apparent today in the Oligarchical dominance of Russia. Beyond the creation of severe inequality and poverty in some regions, transition also brought challenges including inflation, unemployment and during this period many residents questioned whether the process to remove inefficiencies from the economy was worth the impact on their individual well-being.

Discussion Points

What changes are necessary to transition from Planned Socialism to Market Capitalism?

Why would a country go through a process of transition?

Does transition always result in desirable outcomes?

Exercise 1.2 How differing systems impact What, How and For Whom

1. Complete the table below by identifying and justifying which economic system (market capitalism or planned socialism) more effectively attains the outcome listed?

Outcome	System that most effectively attains it	Justification
Productive efficiency		
Allocative efficiency		
Economic growth		
Full employment		
Price stability		
Equality		

2. In relation to the market for healthcare answer the following questions?

   (a) Explain how resources would be allocated to goods and services within the healthcare market in a market capitalist system.

   ....

   ....

   ....

   ....

   ....

   ....

   (b) Explain how a planned socialist system would allocate resources within the healthcare market.

   ....

   ....

   ....

   ....

   ....

   ....

   (c) Outline the economic system that the country in which you live uses to allocate resources within the healthcare market.

   ....

   ....

   ....

   ....

3. Evaluate whether governments should intervene in markets to answer the, what, how or for whom questions.

   ....

   ....

   ....

   ....

   ....

   ....

1.5 Modelling the Economic Problem

Introduction to the Production Possibility Curve (Frontier)

Key Definition:

Production Possibility Frontier the maximum possible combinations of goods and services which can be produced from a given quantity of available resources at a given level of technology.

Economic models are used extensively in economics to study proposed theories in a hypothetical environment. These environments represent simplifications of the real world and are based on assumptions that are necessary to work out how a theory applies in a precisely known context. Assumptions are always stated so that the limitations of the analysis can be clearly seen.

The Production Possibility Curve or Frontier (PPC or PPF) is the first of the models introduced in this course. It is primarily a visual representation of the concepts of relative scarcity and the problem of choice, however, in addition it can be used to illustrates the concepts of:

- economic efficiency and inefficiency
- potential and actual production
- employment or unemployment of resources
- economic growth.

Key Point:

The PPC is a simplification of the real world and is based on the flowing assumptions:

1. Only two types of products are produced.
2. The quantity of available resources are fixed.
3. Resources can be transferred between the production of the two products.
4. The state of technology is constant.

The curve (Frontier) of the model (Figure 1.5.1) represents all the maximum possible combinations of goods and services which can be produced from a given quantity of available resources at a given level of technology. An economy can operate in two basic positions:

1. On the curve such as points A or B where all resources are fully utilised in production. This implies productive efficiency where there is no wastage of resources.
2. Somewhere inside the curve such as point C where there are unemployed (idle) resources, and the economy is not attaining productive efficiency.

Point D on the model represents a level of production that is unattainable as there are not enough resources to produce at this point. It reflects the concept of economic scarcity.
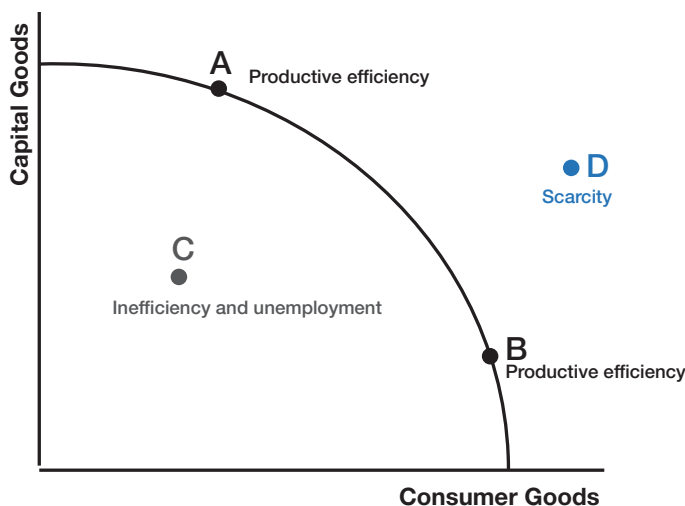

Figure 1.5.1: The Production Possibility Curve.

Using the PPC to demonstrate Opportunity Cost

In a market system the combination of production reflects demand and therefore the point will only shift if there is a change in preferences (demand) towards the alternate product.

If an economy is productively efficient and thus is operating on its PPC, any increase in the production of one good must result in resources being transferred from the production of the other good and hence a lower level of production of that good. If an economy was for example (Figure 1.5.2) to move from point A to Point B and thus increase the production of consumer goods it must transfer resources from the production of capital goods to do this and therefore capital goods production must fall.

Key Point:

The combination of production reflects demand and thus shifts when there is more demand for a good.

Key Point:

When resources are fully utilised a change in the composition of production results in an opportunity cost.

Model explanation:

A movement in production from point A to point B (caused by increased demand for consumer goods) will increase the production of consumer goods. However, resources must be transferred from Capital goods production and hence there will be a decrease in the production of Capital goods This is the opportunity cost of increasing consumer goods production.

Figure 1.5.2: Illustrating Opportunity Cost.

Factors that Shift the PPC

If assumptions (2 and 4) of the model are relaxed the PPC model moves from being a static model to a dynamic model. This implies that rather than just showing changes in combinations of production the PPC can model changes in resources, and technology and thus the concepts of Potential Economic Growth and Productivity.

In a dynamic model the PPC shifts if there is any change in the productive capacity of the economy. At a simplified level an economies productive capacity is impacted upon by three components:

Key Definition:

Productive Capacity an economies maximum possible production using all resources to their full potential.

- The quantity of resources
- The quality of resources
- Technological change.

Some economists will simplify this further by say that anything that alters the quantity of resources or impacts on productivity will cause a shift in the PPC. Productivity is defined as output per unit of input and reflects the amount of a product that can be produced with a given quantity of resources. Changes in productivity are caused by quality changes in the three factors of production and much of this quality improvement is due to technology change that allows the same number of resources to produce more. The recognition of the fact that both quality and quantity of resources impact production volumes has led to the terms Human Capital, Natural Capital and Physical Capital being used to reflect both dimensions of factors of productions.

Key Definition:

Productivity an increase in output per unit of productive resource.

When there is an increase in Human, Physical or Natural capital which relate to the production of both goods the whole PPC shifts outwards to the right. This is represented in Figure 1.5.3. However, if resources are specific to the production of one good, then the curve only expands its maximum output potential for that product. (Figure 1.5.4)

Model explanation:

A shift of the PPC outward to the right as a result of an increase in the quantity or quality of resources relating to the production of both consumer and capital goods. This could be immigration of skilled labour, advancements in education and training, new technology improvements, or infrastructure development. Increases in productive capacity to not result in an automatic change to actual output hence the economies level of production remains at point B.
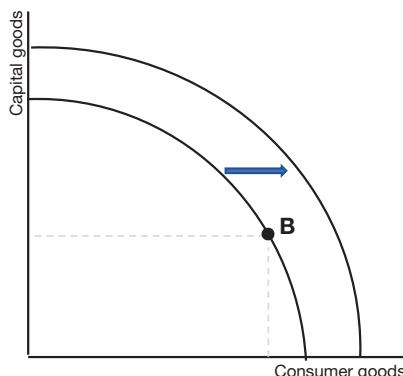

Figure 1.5.3: Illustrating increased productive capacity.

Model explanation:

A shift of the PPC outward to the right for consumer goods as a result of an increase in the quantity or quality of resources relating specifically to the production of consumer goods
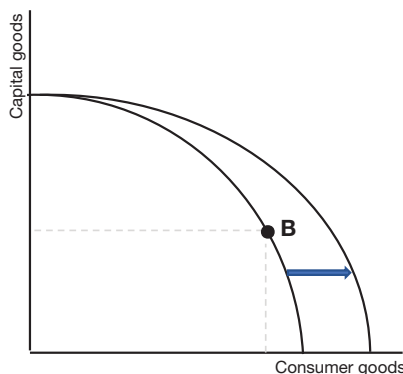

Figure 1.5.4: Illustrating increased productive capacity for one good.

A movement of the PPC outward to the right represents increased potential production, however unless the demand for goods changes simultaneously the level of production (point B) will not alter. This is why the movement of the PPC reflects potential growth, as an economy has the capacity for future output increases but does not have actual growth as output remains constant.

It is important to note that in economies productive resources can also decrease. natural disasters, human made disasters, disease can all impact on the quantity or quality of resources in negative ways and thus reduce the productive capacities of nations. When this occurs the PPC moves inward to the left and there may also be a change in actual production as it cannot occur beyond the new PPC. (Figure 1.5.5)

Model explanation:

A shift of the PPC inward to the left as a result of a decrease in the quantity or quality of resources relating to the production of both consumer and capital goods. This could be natural disasters such as floods, drought, earthquakes, fires, or human made disasters such as war. Disease that reduces labour quality or quantity could also be responsible. There must also be a decrease in actual output in this instance from B to B_1 as point B would now be beyond the new PPC.
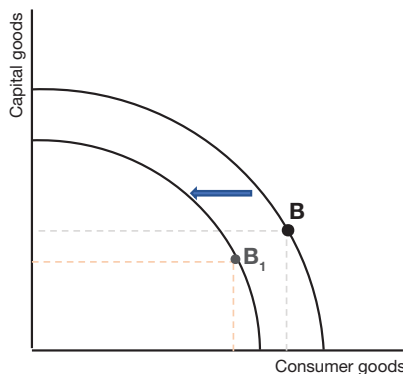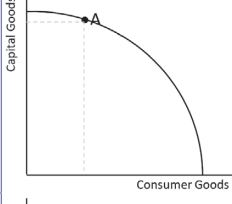

Figure 1.5.5: Illustrating decreased productive capacity.

1

Exercise 1.3 Using PPC's to model Economic Concepts and Change

1. Complete the table below by using the PPC model to illustrate and assist in explaining the identified concept.

Concept	Illustrate on PPC	Explanation
Opportunity Cost		
Scarcity		
Productivity Increase		
Economic Growth		
Economic Efficiency		

2. The PPC's below represent Country A which can produce only food or fuel. Illustrate on the PPC's the impact of the individual identified change in Country A.
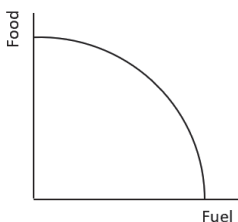
Canola crops destroyed by cyclone, impacts both industries
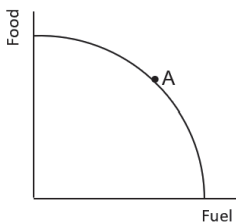
Consumer demand for Food rises significantly
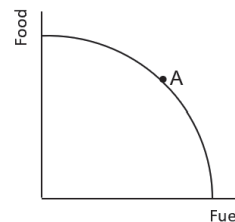
Net migration into Country A
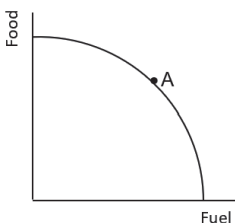
Infrastructure essential for fuel production is destroyed by fire
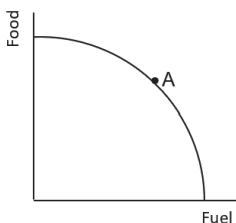
Increasing unemployment in the fuel industry
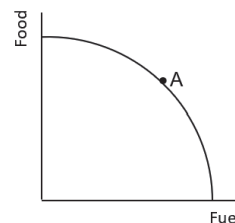
Excellent growing conditions increase food yields.

Real World Considerations: War the PPC and Opportunity Cost

Economic Impact of War (Extract)

24 February 2022 by Tejvan Pettinger

Putting aside the very real human cost, war has also serious economic costs – damage to infrastructure, a decline in the working population, inflation, shortages, uncertainty, a rise in debt and disruption to normal economic activity. From some perspectives though, war can appear to be beneficial, especially in terms of creating demand, employment, innovation, and profits for business (especially when the war occurs in other countries.) However, when we talk about the 'economic benefits' of war we must be aware of the 'broken window fallacy' – when we spend money on war, this creates demand, but it also represents a huge opportunity cost – rather than building bombs and rebuilding destroyed towns, we could have used this money to improve education or health care. For example, the opportunity cost of the Iraq war (1990s) was estimated at $860 billion by end of 2009 (source: NY Times).

Diagram centred on "Economic impact of war" with branches: Lost GDP – unless war takes place in another country; Decline in working population; Creates employment; Innovation /new technology; Damage to buildings/infrastructure; Psychological costs; Opportunity cost e.g. decline in health care; Inflation; Rise in national debt/ higher taxes in future.

Source: https://www.economicshelp.org/blog/2180/economics/economic-impact-of-war/#:~:text=Putting%20aside%20the%20very%20real,disruption%20to%20normal%20economic%20activity.

Discussion Points

Model and describe the impacts of war on the PPC's of the countries involved.

Assess whether there are any real economic benefits of war.
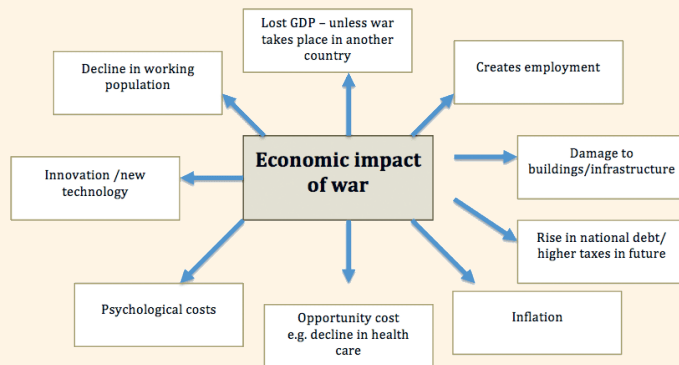
Topic 2: Data analysis in Economics

Learning Outcomes based on the SACE Economics Teaching and Learning Framework

- Students develop an understanding of a range of qualitative and quantitative economic data.
- Students use data to understand economic activity, and the behaviour of people, businesses, markets, and governments.
- Students analyse data, identify patterns, and propose decisions, based on data contained in tables and graphs.
- Students explore the difference between causality and correlation.
- Students use appropriate graphs, diagrams, and tables to display results and make recommendations based on their data analysis.
- Students understand the use of (but are not required to calculate) the following statistical measures to analyse data:
    - mean
    - median
    - quantiles
    - variance
- Students develop a basic understanding of how to interpret linear regressions as an introduction to economic modelling. (Note: students are not required to calculate the coefficient of determination (R^2), or linear equations.)

2.1 Using data in economic decision making

Data and Data Analysis are critical to Economics because ultimately all decision-making in modern economies, at individual, local or national levels is based on data. Data (statistical) analysis provides an objective mechanism to assess a situation or project, or the impacts of differing decisions and it aids decision makers by making them more informed. However, despite its integral nature not all data is useful and consequently the quality of data is a fundamental consideration. An old saying goes "garbage in, garbage out". So, no matter how good the process of using data, poor data will result in poor decision making.

Data is a collection of facts, this could be in the form of numbers, words, measurements, or observations. Data can be either quantitative or qualitative, with the key distinction being that quantifiable data is numerical in nature, whereas qualitative data represents descriptive information. The presentation of data is critical in allowing effective analysis and as such considerable time goes into determining the most effective way to present it. Whilst much of the data used in this course can be presented in table format, students also need to be able to analyse and interpret graphs, charts, and other forms of visual data.

Key Definition:

Data a collection of facts, which can be in the form of numbers, words, measurements, or observations.

2.2 Using graphs and charts to visualise data

Much of the quantitative data in the field of economics is presented in the form of graphs and charts, as these are effective in presenting information quickly and simplistically. Data can on many occasions be better understood when presented by a graph as it can reveal visually a trend or comparison that is not naturally identifiable in table format. Graphs are therefore a critical tool for displaying the relationship between variables or alternately showing the dispersion of a given variable.

Key Point:

Graphs are often used to present data as they can assist in easily identifying trends or making comparisons.

2.3 Using statistical measures to analyse data

There are multitudes of statistical measures that aid the analysis of data, but this course requires familiarity with the concepts of Mean, Median, Quantiles and Variance and the application of these in data analysis in a variety of differing contexts.

The first two statistical measures (Mean and Median) aim to summarise a dataset of a population or sample (group) with a single number that represent a 'typical' data point, they are measures of central tendency.

Mean

Often referred to as the Arithmetic Mean, the mean is one measure of the average of a set of numbers. It is essentially a calculated "central" value of a set of numbers and is arguably the most widely used measure of a central tendency. It is derived by taking the sum of a group of numbers, then dividing that sum by the count of the numbers used in the series. Understanding the calculation method is important as it provides insights into the advantages and disadvantages of the mean as a measure of a 'central' or 'typical' value.

The mean is useful because it allows you to estimate what the whole population is doing and is likely to be a more reliable estimate of an average or 'typical' value. A mean minimises the error of predicting any one value in a data set, that is, it is a value that produces the lowest amount of error from all other values. It is also particularly useful if tracking changes in a singular population overtime because any change in a singular value within the population will impact the value of the mean.

Using the mean as a measure of what is 'typical' can however, be problematic, especially when datasets are skewed or have outliers. This is perhaps why the mean is rarely or never used to represent housing prices for areas. If data is skewed the mean loses its ability to provide the best central location or typical value.

Median

Key Definition:

Median the middle score in a dataset which has been arranged in order of magnitude.

The median is an alternative measure of the 'central' point and is the "middle" of a sorted list of numbers. The median is a quantile (see below) placed (in a probability distribution) so that exactly half of the data is lower than the median and half of the data is above the median. The median cuts a distribution (numerically sequential dataset) into two equal areas. (https://www.statisticshowto.com/quantile-definition-find-easy-steps/)

The median is very useful for describing datasets where large or small data points (outliers) can distort the mean. It is therefore a better way of describing data sets with significant outliers and it is a better representative of the 'typical' value when there are large skews in data.

Using Mean or Median - The Importance of Data Skew

Key Point:

With normal distribution where the data is perfectly symmetrical, the mean and median are identical, and both equally represent the 'typical' or best central location. Skewed distribution however drags the mean towards the skew and thus the Median is a better indicator of central tendency.

Skewed data occurs where a dataset has a 'tail' and is not symmetrical (a normal distribution exists if data is perfectly symmetrical). Skewed data can have a negative (or left) skew or a positive (or right) skew. Skews are named after the direction of the tail, with a negative skew the tail points towards the negative values on the horizontal axis (or to the left) whilst with a positive skew the tail points towards the positive values on the horizontal axis (or right). (Figure 2.3.1)

Understanding skewness helps when deciding whether the Mean or Median should be used to represent the 'typical' value. The rule of thumb is where data has a skew the median should be used as the measure, as the mean will be distorted in the direction of the skew.

Model explanation:

A negative or left skew results in the mean being less than the median. In this case the very small numbers distort the mean and lower it compared to the median.

Model explanation:

In a normal distribution the mean and median are the same.
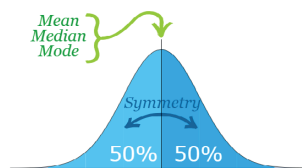
Model explanation:

A positive or right skew results in the mean being greater than the median. In this case the very large numbers distort the mean and raise it compared to the median.

Figure 2.3.1: Skews in Datasets

Real World Considerations: Impact of data skew

The following table highlights the estimated median and mean house prices for the USA over 5 decades.

Year	Median House Price US$	Mean House Price US$
1980	63,700	74,200
1990	123,900	151,100
2000	165,300	209,700
2010	222,900	333,900
2020	329,000	441,700

Discussion Points

Describe the trend between Median and Mean house prices in the US as indicated in the above data.

Analyse the implications of the trend identified in the above data. Refer to skew in your answer.

Discuss whether it is better to use the mean or median house price as an indicator of US house prices.

Exercise 2.1 Mean, median and trends in data

1. The following graph indicates the actual and projected trends in Electrical Vehicle (EV) Sales in the US.

US EVs (BEV & PHEV) Sales & Sales Share Forecast: 2021-2030

Historical Sales Data: GoodCarBadCar.net, InsideEVs, IHS Markit / Auto Manufacturers Alliance, Advanced Technology Sales Dashboard | Research & Chart: Loren McDonald/EVAdoption
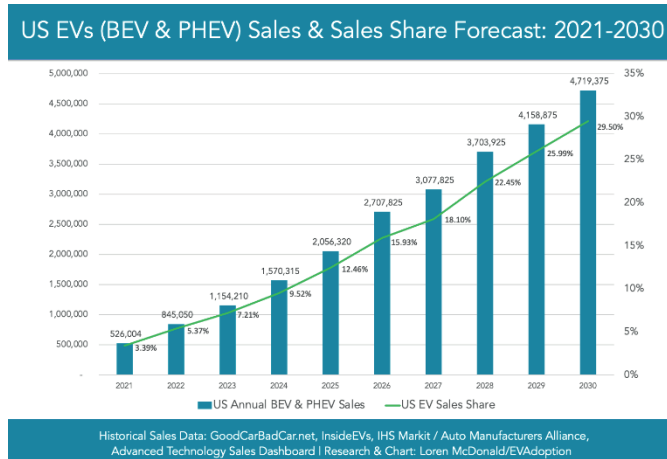
(a) Describe what the above data suggests about the vehicle market in the USA.

....

....

....

....

(b) Outline how the trend in the above data could be used by car manufacturers in the USA.

....

....

....

....

....

(c) Identify how the trend in the above data would impact two other businesses.

....
....
....
....
....
....
....

(d) State how future consumers of vehicles may react to the trend in the above data.

....
....
....

2. The following graph indicates the proportion of households (%) that have solar panels connected to their homes by Australian State.

Graph 1 – Proportion of households that used solar electricity

Australian Bureau of Statistics
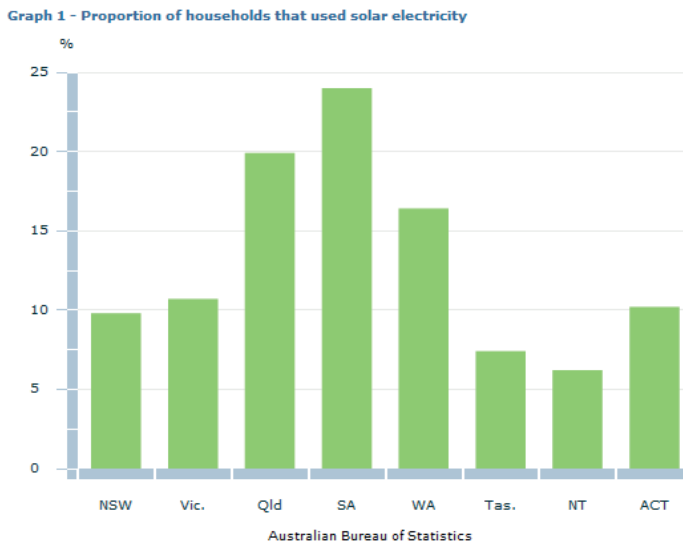
(a) Estimate the mean and median proportion of household across Australia that used solar electricity.

....
....

(b) Outline which of these measures is a better reflection of solar electricity use by Australian households.

....
....
....

(c) Outline how Australia's Federal government may use the information to encourage solar panel installation in homes.

....
....
....