RAFFLES INSTITUTION

YEAR 5 H2 ECONOMICS 2025

MICROECONOMIC OBJECTIVES AND POLICIES

ECONOMICS

CONTENTS:

This series of lectures examines the sources of market failure, its causes and possible policy remedies. The theme explores why markets may fail to allocate resources efficiently and the methods of dealing with market failure, together with an evaluation of the effectiveness of these methods.

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A. MARKET FAILURE

1 AN OVERVIEW OF ECONOMIC SYSTEMS (RECAP)

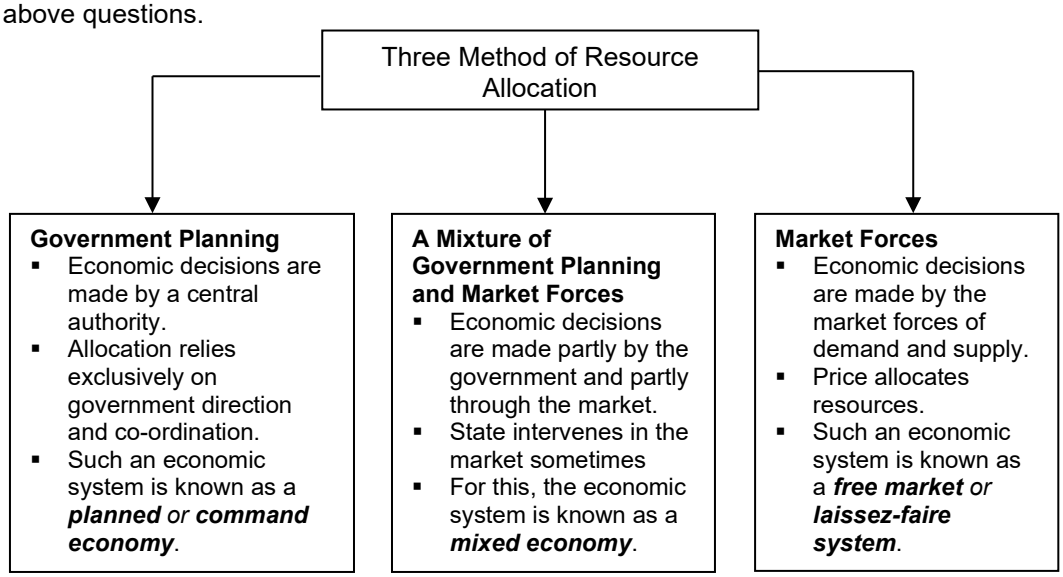
The fundamental problem that all economies face is the problem of scarcity, meaning that the limited available resources cannot meet all of society's unlimited wants. It is therefore important that these scarce resources are allocated efficiently such that the welfare of the society is maximised.

In the attempt to accomplish the aim of maximising social welfare, all economies have to address these three fundamental questions:

- What and how much to produce?
- How to produce?
- For whom to produce?

Recall:
The overall theme of the study of microeconomics is the efficient allocation of resources.

There are three distinct allocation mechanisms that societies can use to answer the above questions.



Think:
Where do you think Singapore stands?

Most economies in the world tend are mixed economies operating under a market economy with some form of government intervention.

2 MICROECONOMIC PROBLEMS & OBJECTIVES

Markets do many things well, but they do not do everything well. The rationing, incentive and signalling functions of prices allocate resources and coordinate the decisions of buyers and sellers in a free market economy. The price mechanism is the way in which the basic economic problem is resolved and resources are allocated efficiently in a market economy. However, a market may fail to achieve efficiency due to various reasons. In this series of lectures, we will identify and explain the microeconomic problems that call for government intervention in markets.

Governments' microeconomic objectives are **efficiency** and **equity**. The free market may lead to microeconomic problems and the need for government intervention generally fall into two broad categories:

a. **Inefficiency in resource allocation**:
- **i**. Allocative inefficiency and productive inefficiency lead to resource misallocation. This is known as **market failure**.

ii. Government intervention is needed so that society's scarce resources can be used efficiently i.e. to maximise the net benefit to society by getting markets to produce the level of output that is at the **social optimum level**.

b. **Inequitable distribution of income**.

i. A market may be efficient in terms of the production of a maximum output from a given amount of resources but the distribution of this output to individuals in society may not be equitable or fair.

ii. In a market economy, an individual's ability to consume goods and services depends upon their income and wealth. Final goods and services produced by the society's resources will thus be distributed only to those with effective demand for them i.e. those individuals with higher income or the wealthy, while the lower income will not be able to afford some of these goods.

iii. **Equity** refers to the idea of fairness or justice in the distribution of essential goods and services.

iv. From the point of view of society's sense of justice and fairness, the free market's distribution may not be fair, and some members of society may argue for some degree of state intervention to mitigate or to bring about a fairer distribution of income and create a more **inclusive society**.

Note:
What is the difference between equality and equity?

3 MARKET FAILURE & EFFICIENCY

Market failure occurs whenever the workings of a market lead to a misallocation of resources. This happens when individual households and firms make decisions that lead to inefficiency in resource allocation.

Market failure is defined as the failure of the free market to achieve an efficient allocation of resources that maximises the society's welfare.

EFFICIENCY CONCEPTS RE-VISITED

In order to understand how the market results in the inefficient allocation of resources, we first need to revise the various concepts of efficiency.

Static Efficiency

Static efficiency refers to efficiency at a given point in time. It focuses on how much output can be produced from a given stock of resources at a given point in time, assuming constant technology. When there is an efficient allocation of resources, it implies that both allocative efficiency and productive efficiency are achieved.

(a) Allocative Efficiency

Allocative efficiency is the situation in which the society produces and consumes a combination of goods and services that maximises its welfare. It is achieved when goods and services wanted by the economy are produced in the right quantities. Allocative efficiency is achieved when:

- Society produces at a particular point that maximises its social welfare on the production possibility curve (PPC)
- The sum of consumer surplus and producer surplus is maximised
- Price equals marginal cost of production (P=MC), where the society's valuation of the last unit of output produced and consumed is equal to the opportunity cost of producing it

Note:
Under various economic frameworks, there are different ways of illustrating the same efficiency concepts.

- Marginal Social Benefits equals Marginal Social Costs (MSB = MSC), where the additional benefits the society gets from the last unit of good produced and consumed is equal to the additional opportunity costs that the society incurs from producing it

(b) Productive Efficiency

Productive efficiency is achieved when all resources are fully and efficiently utilized and/or the cost of producing any given level of output is minimized. It is achieved when

- Society produces at any point on the PPC
- Firms produce at any point on their long run average cost (LRAC) curve (Firm's point of view)
- Firms produce at a scale of output levels where LRAC is at its minimum (Society's point of view)

Economic efficiency is attained by achieving both **productive and allocative efficiency.**

Dynamic Efficiency

Dynamic efficiency results from improvements in technology that occur over time. For instance, is new technology being developed and adopted at the best rate? Are firms reducing costs over time? Dynamic efficiency can be boosted by

- Research & Development (R&D) spending that leads to improvements in products and the production process
- Investment in the human capital of the workforce, leading to gains in productivity and in product quality, which is vital in high value-adding knowledge-based sectors
- Greater competitive pressures in markets and the transfer of knowledge and ideas across sectors/countries

A dynamically efficient economy is proficient in improving methods of producing existing products, and developing completely new products which increases consumers' choice and variety.

3.1 HOW THE FREE MARKET MAY LEAD TO EFFICIENT ALLOCATION OF RESOURCES

Productive Efficiency

Competition between firms keeps costs down. In the pursuit of self-interest, firms aim to maximise profits. The more cost efficient they are, the higher their profits would be, ceteris paribus. Hence, the profit motive incentivises firms to be productively efficient, that is, to minimise wastage and to keep unit costs of production as low as possible.

Recap:
You have learnt under 'Price mechanism and its Applications' on how free market allocates resources efficiently under the assumption of absence of any market imperfections and externalities.

Allocative Efficiency

(1) Demand and Supply Framework:

The free market economy allocates scarce resources according to the forces of market demand and supply. Assuming perfect competition and absence of sources of market failure, the equilibrium quantity where supply equals demand typically represents the allocatively efficient level of output. At this output, the 'right' amount of resources is allocated to the production and consumption of the good from society's point of view. To use Adam Smith's famous metaphor, the "invisible hand" leads buyers and sellers

in a market, each pursuing self-interest, to maximise the net benefit that society derives from that market.

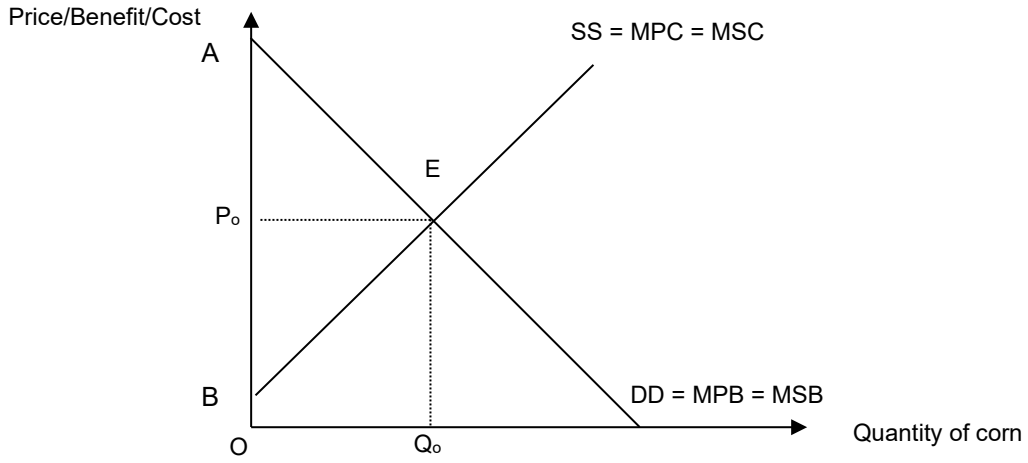


Figure 1: Market for Corn

Figure 1 reflects the market for corn. The demand and supply curves contain important information about benefits and costs. The demand curve for corn (DD) reflects the consumers' valuation of corns, as measured by the maximum prices they are willing and able to pay at any quantity. Hence, it reflects the consumers' additional utility or marginal private benefits (MPB) derived from purchasing the last unit of corn. At any quantity, the height of the demand curve shows the maximum willingness and ability to pay of the marginal consumer. In the pursuit of self-interests, the utility-maximising consumers will only consider their own MPB of consuming corn and the price of corn, P_o. Consumers will consume an additional unit of corn so long as the MPB from consumption exceeds the price Po that they actually have to pay for that unit. They will consume up to the point when the MPB from consumption equals the price P_o at Q_o. Consumer surplus (area P_oAE) is maximised at Q_o.

Recap:
The rational decision making by consumers using the Marginalist Principle.

Similarly, the supply curve (SS) reflects the marginal costs (MC) of producing the additional unit of corn. At any quantity, the height of the supply curve shows the cost to the marginal seller. In other words, the SS curve shows the additional opportunity cost to producers in terms of resources used in producing that last unit of corn as well as the minimum price accepted by the producers for selling it. In the pursuit of self-interests, the profit-maximising producers will only consider the marginal private costs (MPC) of production and the price P_o that they actually receive from the sale of corn. Producers will produce an additional unit of corn so long as the MPC from production is less than the price Po that they actually receive. Producers will produce up to the point when the MPC from production equals the price that they actually receive P_o at Q_o. Producer surplus (area P_oEB) is maximised at Q_o.

Allocative efficiency is achieved when the sum of consumer surplus and producer surplus is maximised. In the absence of sources of market failure, the free market mechanism will eliminate shortages and surpluses and allocate resources in a way that maximises society's net benefits (reflected by area AEB). Society's net benefits refer to the total value to the consumers who buy and use corn (area $OAEQ_o$) minus the total costs to the producers who make and sell corn (area $OBEQ_o$) up to the equilibrium quantity of Q_o. The market equilibrium at P_o and Q_o is efficient since it maximises the sum of consumer surplus (area P_0EA) and producer surplus (area P_0EB).

Put in another way, in the absence of sources of market failure, allocative efficiency is achieved when price (P_o) equals marginal cost (MC) of production.

Note: P=MC could also be illustrated via the PC <u>firm</u> analysis.

When demand curve intersects supply curve, at the market-clearing equilibrium of P_0 and Q_0, the marginal private benefit of consuming the last unit of corn as reflected by

the price (MPB=P) that consumers are willing and able to pay equals the marginal cost incurred by producers in producing that last unit of corn (MC).

P = MC

Allocative efficiency is achieved when **the value society places on the last unit of the good (P) is equal to the opportunity cost in terms of resources used in producing that last unit (MC)**. It is a situation when goods and services that are wanted by the economy are produced in the right quantities.

(2) Marginal Social Benefit / Marginal Social Cost (MSB/MSC) Framework:

In the absence of sources of market failure, consumers' marginal private benefit (MPB) represents society's marginal social benefit (MSB) of consuming corn and producers' marginal private cost (MPC) represents society's marginal cost (MSC) of producing corn, and **allocative efficiency is achieved at the production and consumption level where:**

MSB = MSC

Refer to Section 3.2 for the application of MSB/MSC framework.

3.2 MARKET FAILURE: WHY MARKETS MAY NOT LEAD TO ALLOCATIVE EFFICIENCY

Market failure is defined as the failure of the unregulated market system to allocate resources in an optimal and efficient manner and/or to achieve social goals like equity.

There are five main sources of market failure that result in inefficient allocation of resources. They include:

(1) Externalities (third-party effects ignored due to the pursuit of self-interest)
(2) Information failure (due to imperfect information and asymmetric information)
(3) Zero Provision of Public goods (due to the non-excludable and non-rivalrous nature of these goods)
(4) Market Dominance
(5) Immobility of factors of production

3.2.1 EXTERNALITIES (third-party effects ignored due to the pursuit of self-interest)

An externality occurs when some of the costs or benefits associated with the production or consumption of a good 'spills over' onto third parties, i.e. parties other than the immediate buyer and seller of the good. These third party costs or benefits are called external costs or benefits.

The presence of externalities thus creates a divergence between private and social costs or benefits. Producers and consumers of a good, in their pursuit of self-interests, will only consider their own private costs and benefits. These private decision makers will not take into account any external costs and/or benefits on third parties.

There can be positive or negative externalities that arise from either the production or consumption of a good or service.

TERMINOLOGY

Marginal Private cost (MPC): costs to producers of producing one more unit of a good or service.

Marginal External cost (MEC): costs that are imposed on third parties who are not directly involved in the production or consumption of a good or service.

Marginal Social cost (MSC): costs to society of producing one more unit of a good or service, i.e. to *all* individuals in the society, including private decision-makers and third parties

Marginal Social Cost = Marginal Private Cost + Marginal External Cost
Social Cost = Private Cost + External Cost

Marginal Private benefit (MPB): the satisfaction or benefits to consumers from consuming one more unit of a good or service.

Marginal External benefit (MEB): benefits that are enjoyed by third parties who are not directly involved in the consumption or production of a good or service.

Marginal Social benefit (MSB): the benefits to society from the consuming one more unit of a good or service i.e. includes the gains private decision-makers and third parties.

Marginal Social Benefit = Marginal Private Benefit + Marginal External Benefit
Social Benefit = Private Benefit + External Benefit

Important:
You are required to know the definitions of these terms.

NEGATIVE EXTERNALITIES

(i) Negative Externalities from Production

Negative production externality occurs when external costs are imposed on third parties from the production of a good or service by firms.

An example that generates negative production externalities is in the production of petrochemicals. Assume that petrochemical factories pollute rivers, and that the quantity of pollutants rises with output. The pollution arising from petrochemical production could impose external costs on third parties.

Suppose that there are processed food companies located downstream which use the river water as an factor input in making sauce for their products such as canned baked beans. There may also be fishermen who rely on the river for their daily catch.

The petrochemical producers, in the pursuit of their self-interests, would only consider their own private costs of production (e.g. electricity and manpower costs) and private benefits (e.g. the free market price they receive for the sale of their product). They will ignore the external costs imposed on the fishermen and baked bean companies (e.g. loss of income to these third parties due to lower quality products or fewer catches, and higher costs incurred by downstream companies when they install expensive purification plants to purify the polluted water). These **external costs (MEC > 0) create a divergence between the marginal private costs (MPC) and marginal social costs (MSC)** of producing the petrolchemicals.

MSC = MPC + MEC
When MEC > 0, then **MSC > MPC**

Note:
It is important to explain how and why the presence of externalities will result in allocative inefficiency and market failure.

Note:
Give real life examples of private or external costs to substantiate your explanations.

Figure 2 shows the market for petrochemicals. The supply curve reflects the MPC of producing petrochemicals to the private producers. The production of petrochemicals generates negative externalities. Hence, the presence of marginal external costs (MEC > 0) in production leads to a divergence between MPC and MSC curves, where MSC is higher than MPC.

Note:
Negative production externalities causes a divergence between MPC and MSC.

The demand curve for petrochemicals is represented by the marginal private benefit curve (MPB) to petrochemical consumers. It shows the additional satisfaction consumers gain from each additional unit of petro-chemicals consumed. Here, we assume that it is also the marginal social benefit (MSB) curve for the society, i.e. MPB = MSB, meaning that we assume there is no externality from the consumption of chemicals.

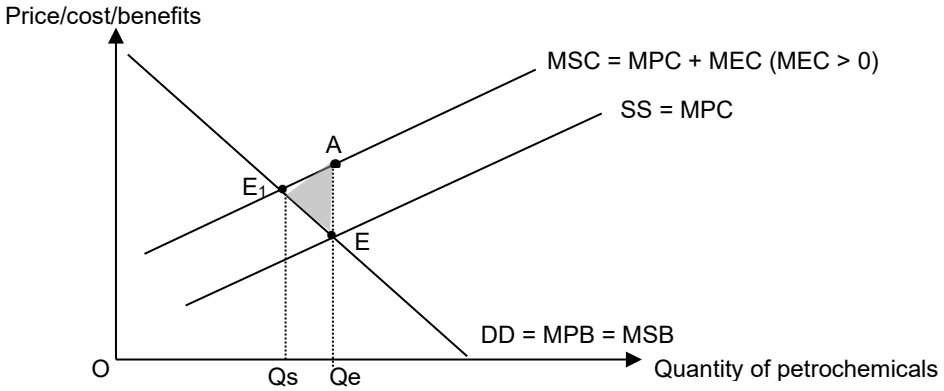


Figure 2: Negative Production Externality

Assuming perfect competition, the free market equilibrium output of the industry is Q_e units where MPC of production (or supply curve) = MPB of consumption (or demand curve). However, at this Q_e level of output, MSC for producing the chemicals (AQ_e) exceeds MSB for consuming them (EQ_e), meaning that the opportunity costs to society of producing the Q_e-th unit is higher than the benefits that society gains from consuming this unit. The society welfare would increase if fewer units are produced. Thus, output Q_e is **allocatively inefficient**.

The socially optimal output level is at Q_s units, where MSC of production = MSB of consumption. Market failure arises as the free market equilibrium results in an **overproduction** of the chemicals by Q_eQ_s units. The welfare loss to society, also known as the deadweight loss (measured in monetary terms), equals the sum of the excess of MSC over MSB for the overproduced units Q_eQ_s. The deadweight loss (DWL) is represented by area AEE_1. From the society's point of view, the opportunity costs of the resources used to produce the additional Q_eQ_s units exceed the societal gain in benefits from consuming Q_eQ_s units.

Monetary value of societal benefits derived from output QeQs = Area E_1EQeQs
Monetary value of resources used in producing output QeQs = Area E_1AQeQs
DWL in producing output QeQs = Area E_1AQeQs - Area E_1EQeQs = Area AEE_1

Important:
Another common example of **negative externalities from production** is in the production of car journeys by car owners. Are you able to illustrate this? Refer to Section 8 for detailed analysis.

The free market equilibrium is thus not allocatively efficient when externalities are present. In this case, society will be better off if it reduces the output of petrochemicals produced to Q_s because it will reduce social costs more than the fall in social benefits.

Self-interested petrochemical producers will not voluntarily reduce their profit-maximising output. Hence, there is a need for the government to intervene using policies like indirect taxes and legislation/regulation on goods that generate negative production externalities.

(ii) Negative Externalities from Consumption

Negative consumption externalities occur when external costs are imposed on third parties from the consumption of a good or service by private individuals. For example, when consumers smoke in public places, there are external costs to non-smokers from second-hand smoke.

Figure 3 shows the market demand and supply curves of cigarettes. The supply curve is the MPC of producing cigarettes to cigarette companies. Assume that there are no externalities generated in the production of cigarettes, the MPC of producing cigarettes is equal to the MSC of producing cigarettes (MPC = MSC)

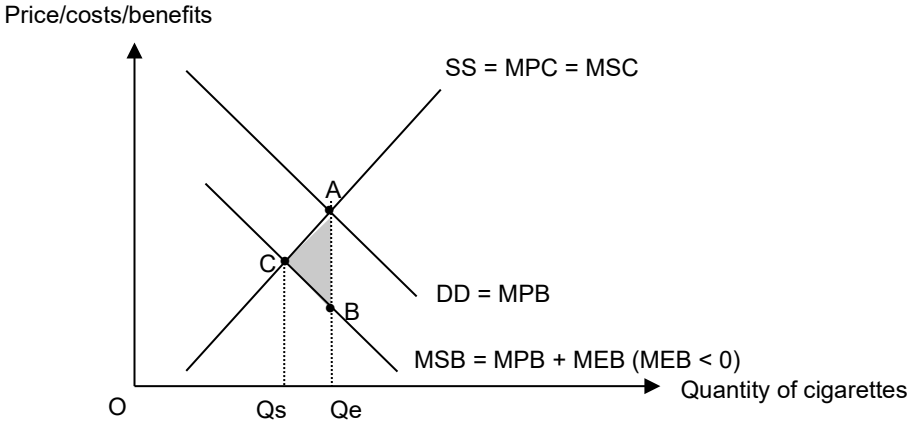


Figure 3: Negative Consumption Externality

The demand curve is the MPB derived from consuming cigarettes to smokers. MPB includes the satisfaction the smokers derived from consuming the cigarettes (e.g. they could benefit from reduced stress level). However, non-smokers (third parties) around the smokers inhale the second-hand smoke which is toxic. These second-hand smokers may fall sick and incur medical bills which are not compensated by the smokers, thus causing external costs where MEC > 0, **OR** negative external benefits where MEB < 0.

Note:
Negative externalities in production causes a divergence between MPC and MSC (cost curves) whereas negative externalities in consumption causes a divergence between MPB and MSB (benefit curves).

When there is a consumption externality, the marginal private benefit (demand) curve does not reflect social benefits. The **negative externalities arising from consuming cigarettes creates a divergence between MPB and MSB** where the MPB enjoyed by the private consumers is higher than the MSB to the society. In other words, the valuation of the private benefits of smoking cigarettes (MPB) by the smokers is greater than the society's valuation of the benefit (MSB). This is because others near the smokers inhaling the second-hand smoke will eventually pay some of the costs of smoking (e.g. incurring higher medical costs or taxes for government health programmes). This cost to third parties reduces the overall benefit to society.

If left to free market forces, self-interested, utility-maximising smokers will consume Q_e units of cigarettes where MPB = MPC. On the other hand, the socially optimal level of consumption of cigarettes is lower at Q_s units where MSB = MSC. Thus, too many cigarettes are consumed and produced in the free market, relative to the socially optimal output, resulting in allocative inefficiency. Market failure arises due to the **over-consumption** of cigarettes and too many scarce resources are allocated to the production and consumption of cigarettes.

Note:
Other markets that commonly generate negative consumption externalities include market for alcohol, market for narcotic drugs etc.

A DWL of area ABC is incurred in the over-consumption of cigarettes. This is because the sum of opportunity costs incurred by society for resources used to produce Q_sQ_e units of cigarettes (area CAQeQs) is higher than the total societal benefits gained from consuming these units (area CBQeQs). Hence, the government needs to intervene

through the adoption of policies like indirect taxes and regulation to reduce the consumption of cigarettes.

POSITIVE EXTERNALITIES

(iii) Positive Externalities from Consumption

Positive consumption externality occurs when external benefits are enjoyed by third parties from the consumption of a good or service by private individuals.

The same economic framework from above can be used to analyse the welfare loss arising from the presence of positive externalities. An example of a market that generates positive consumption externalities is the market for education services.

Assume the market for education services is under perfect competition. Figure 4 shows the market demand and market supply curves for education. The supply curve reflects the MPC of producing education services to the private producers (e.g., costs of hiring teachers and buying school supplies). Assuming no production externalities, the MPC of producing education services is the same as the MSC (i.e., MPC=MSC).

The demand curve reflects the MPB of consuming education services. It shows the additional satisfaction or benefit the private consumers gain from each additional unit of education consumed. In the pursuit of self-interest, utility maximising consumers only consider their own private benefits (e.g., better career prospects and higher future earnings, as well as the satisfaction from attaining knowledge, etc.) and private costs of education (e.g. the free market price they actually pay for attending school).

However, these private consumers **ignore the external benefits or positive externalities** generated for the rest of society. For instance, a more highly educated workforce leads to improved labour productivity and faster economic growth and in turn, greater ability for the government to collect taxes to help subsidise disadvantaged families.

The presence of **positive marginal external benefits (MEB > 0) from consumption creates a divergence between the MPB and MSB from consuming education services**. The MSB arising from individuals' consumption of the good is higher than the MPB by the amount of the MEB.

MSB = MPB + MEB
When MEB > 0, then **MSB > MPB**

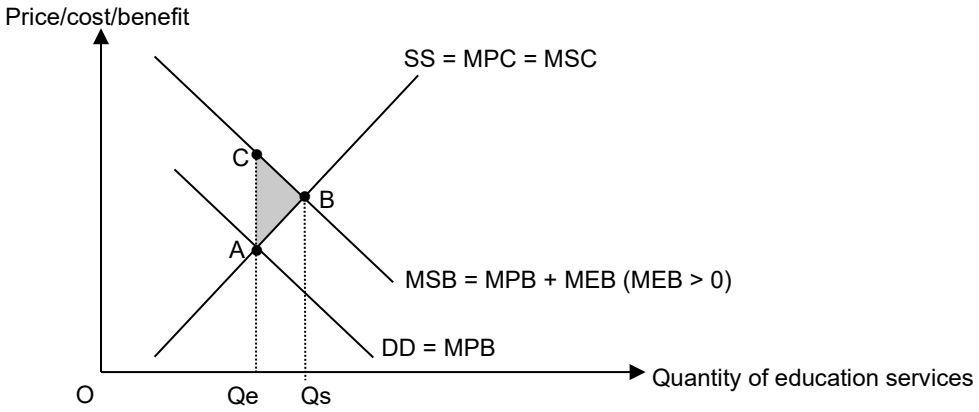


Figure 4: Positive Consumption Externality

Think:
What are some other examples of markets with positive externalities in consumption? E.g. consumption of Covid-19 vaccines, etc.

According to Figure 4, the free market equilibrium is at Qe units of output, where MPB=MPC. On the other hand, the socially desired output level is higher at Qs units, where MSB=MSC. There is an **under-consumption** of education services by QeQs. At the free market output level Qe, MSB exceeds the MSC of education. **DWL to society is represented by area ABC** as the loss in social benefits from not consuming QeQs units exceeds the value of the resources saved by not producing QeQs units from society's point of view.

Monetary value of societal benefits derived from output QeQs = Area QeCBQs
Monetary value of resources used in producing output QeQs = Area QeABQs
Deadweight loss in not consuming output QeQs = Area ABC

The free market equilibrium output Qe is thus **allocatively inefficient**, due to the under-consumption of education services from society's point of view. Too little resources are channelled to the consumption and production of education services. By increasing the output, society would be better off, and it would gain more in social benefits than it would incur in social costs.

(iv) Positive Externalities from Production

Positive production externality occurs when external benefits are enjoyed by third parties from the production of a good or service by private firms.

An example of this is the production of research and development (R&D) projects by firms. When one firm engages in R&D ventures, its private benefits include the potentially higher profits that can be earned (e.g., due to successful R&D projects that lead to more cost-efficient production process or better quality products invented, etc.).

If other firms gain access to the results of the research, there are external benefits because not only the firm but also society benefits from widespread adoption of the new technology. The benefits of the research (e.g. increased profits) extend beyond the firms that finance it. These external benefits represented as negative external costs, MEC < 0, could also include higher economic growth for the whole economy as a result of increased productivity due to the widespread adoption of the new technology.

However, the private firms that engage in R&D are not compensated by the third parties for financing the R&D projects and generating these external benefits. To the private firms, the MPC (i.e. the opportunity costs of the resources used in R&D projects incurred by themselves) is higher than the MSC (i.e. what the society values as the opportunity costs of the resources used). **This creates a divergence between the MPC of financing R&D projects by the private firms and the MSC of R&D by society as a whole**, where MPC is higher than the MSC.

Note:
Positive externalities in consumption causes a divergence between MPB and MSB whereas positive externalities in production causes a divergence between MPC and MSC.

Figure 5 shows the market supply and demand for R&D projects. The supply curve or the MPC curve lies above the MSC curve. The divergence between the two curves is the value of external benefits from R&D. Assuming no consumption externalities, MPB = MSB.

Under perfect competition, the free-market equilibrium output of the market is at Q_e units where MPC=MPB. The socially optimal output level is, however, higher at Q_s units, where MSC = MSB. Thus, there is an **under-production** of R&D projects by Q_eQ_s. The free market output at Q_e is thus **allocatively inefficient** and there is an under-allocation of scarce resources to R&D projects, resulting in a DWL of AEE_1 to society.

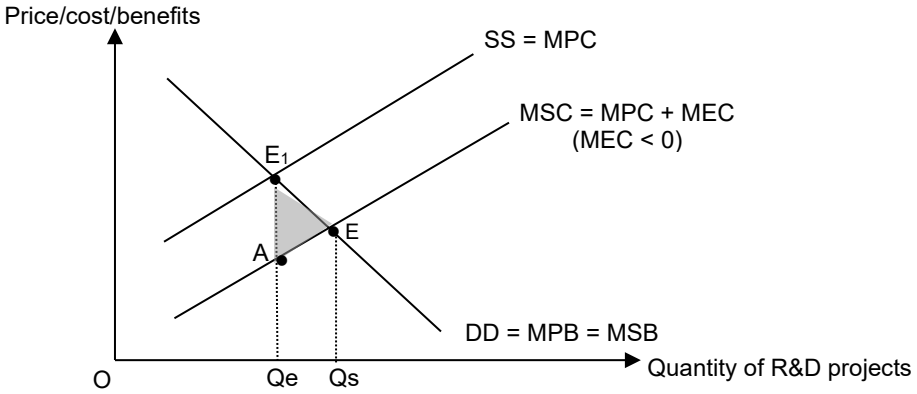


Figure 5: Positive Production Externality

Seven steps for explaining externalities:

1. Identify the market (i.e market for education, market for healthcare services etc) and define externalities
2. Explain private costs and benefits (MPC and MPB) with examples
3. Explain the presence of external costs (or benefits, i.e. MEC or MEB) of production or consumption
4. Illustrate divergence between MPC and MSC (or between MPB and MSB) with a diagram, due to the presence of externalities
5. Identify free market equilibrium output (MPB = MPC) vs society's optimal level of output (MSB = MSC)
6. Identify over (or under) production or consumption and area of deadweight loss (i.e. net welfare loss to society)
7. Explain deadweight loss to society as a result of over (or under) production

What can governments do?

As a result of the presence of externalities, scarce resources are not allocated efficiently by the free market. Governments may adopt measures such as subsidies/ taxation, legislation/ government regulation, education campaigns and direct government provision to tackle the market failure. Detailed policy prescriptions in correcting market failure from negative and positive externalities will be covered under Section 5.

3.2.2 INFORMATION FAILURE

An important element of a competitive market is perfect information. **By perfect information we mean anything that may impact a buyer's or seller's decision-making process is known.** However, markets may not operate competitively and in the real world, missing or incorrect information either on the buyer or seller side may lead to decisions that cause over or under allocation of resources for certain goods or services, leading to market failure.

WHAT IS INFORMATION FAILURE?

Information failure occurs when people have inaccurate, incomplete, uncertain or misunderstood data and hence make potentially 'wrong' or suboptimal choices about their behaviour. As a result, individual decision making will result in an over or under consumption of a good or service. The wrong choice made by individuals may mean that the government has to take on a paternalistic role and intervene to mitigate and/or correct the market failure. Paternalism here refers to the interference with liberty or autonomy of individuals by the state or government without their consent with the aim or intention of promoting good or preventing harm to that individual. The government thinks that consumers are likely to overestimate / underestimate their satisfaction or private benefits from consuming certain goods and thus steps in to reduce / increase their consumption.

Note:
It is important to learn the definition of information failure.

(a) IMPERFECT INFORMATION

(i) Over-allocation of Resources due to imperfect information

For example, in a competitive market for sugar-sweetened beverages (SSBs) like Coca Cola and Pepsi, individuals would have full information on the benefits and costs of consuming them and would consume an amount that maximises their own net benefits. However, in reality, many individuals are **unaware of the true private cost or benefit arising from consuming such goods because they have incorrect or incomplete information.**

Note:
These goods that are over-consumed due to imperfect information are sometimes known as demerit goods.

Demerit goods can be defined as goods or services that are deemed socially undesirable by the government and are over-consumed when left to the free market.

In the case of SSBs, consumers **may not be fully aware of all the ill effects** of regular consumption of high sugar drinks on their own health (e.g. obesity, diabetes, high blood pressure and other related diseases). As a result of this information failure, **consumers overestimate** their own **private benefits** from SSB consumption and hence **over-value the good**. If left to free market forces, consumers' demand for SSBs under imperfect information will be **higher than** their demand under perfect information.

Figure 6 below shows the demand for and supply curves of SSBs. From the diagram, the free-market equilibrium where DD_0 with imperfect information = SS occurs at output $0Q_e$. However, the socially optimal level of consumption and production is at output $0Q_s$ where DD_1 with perfect information (of the true or full informational value of consumption) = SS. Hence, SSBs will be over-consumed in the free market and too much scarce resources will be allocated to the production and consumption of SSBs, and hence, allocative inefficiency. This over-consumption will result in a **welfare loss** to society represented by **area ABC** as the social benefits gained from consuming Q_sQ_e units of such high sugar drinks is less than the costs of the resources that the society uses in producing Q_sQ_e units of these high sugar drinks.

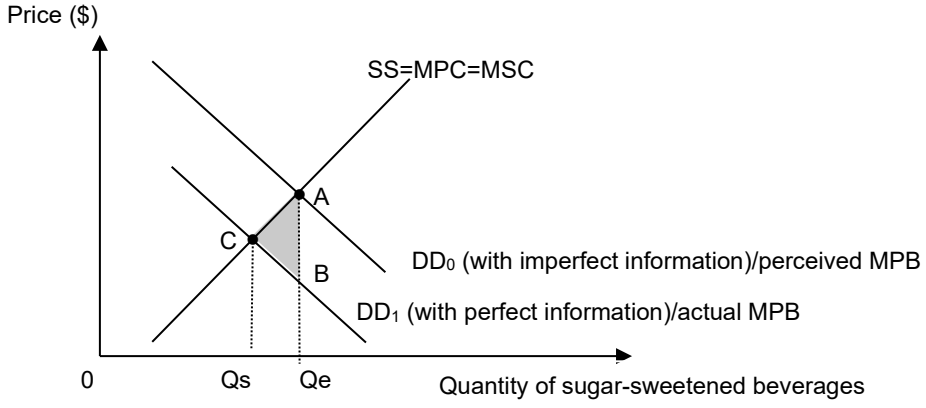


Figure 6: Market for Sugar-Sweetened Beverages (Imperfect Information)

Supplier-induced demand can also result in higher demand for SSBs than what is efficient. Firms like Coca Cola and Pepsi spend millions per year to advertise and strengthen their brands to increase demand through influencing tastes and preferences and hence the market share of their products. Individuals may thus buy and consume more SSBs than optimal due to the "false" information from the frequent and intensive advertisements they have been bombarded with. Therefore, when consumers make decisions over whether to purchase a good, they will be influenced by how the good is portrayed by the suppliers.

Many other examples of over-consumption of goods and hence over-allocation of resources due to information failure can be seen in various markets. These include fast food, cigarettes, alcohol and certain services like the weight loss industry, etc.

(ii) Under-allocation of Resources due to imperfect information

Imperfect information about the private benefits arising from consuming a good or service can also lead consumers to **undervalue** the full benefits of these goods or services and hence consume too little in the eyes of the government.

Note:
These goods that are under-consumed due to imperfect information are sometimes known as merit goods.

Merit goods can be defined as goods or services that are deemed socially desirable by the government and are under-consumed when left to the free market.

Take the example of health screening. Health screening can help individuals detect illnesses even though there may be no clear or visible symptoms or signs. Such early detection of illnesses generally allows for early and appropriate treatment with more favourable outcomes. However, many individuals are **not fully aware of all the benefits** of health screening **on themselves**, causing them to **underestimate and hence undervalue their private benefits** from consuming such a service. Many will choose not to go for such health screening regularly. If left wholly to the private sector, it is likely that the demand for health screening at DD_0 due to imperfect information is **lower than** the demand DD_1 under perfect information in Figure 7.

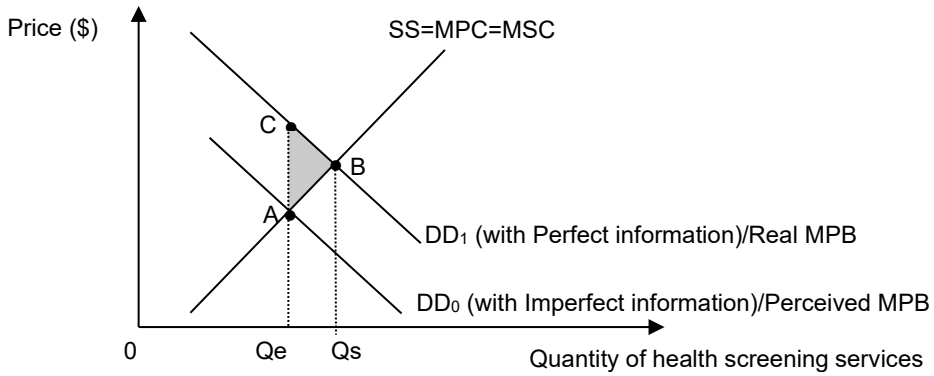


Figure 7: Market for health screening (information failure)

The free market equilibrium under imperfect information occurs at output $0Q_e$ where DD_0=SS. However, the socially optimal level of consumption and production is at output $0Q_s$ where DD_1=SS. Hence, with imperfect information, health screening is under-consumed by Q_eQ_s units and too little resources will be diverted to the consumption and production of it. The free market fails to achieve allocative efficiency. A welfare loss represented by area ABC arises from imperfect information will be incurred by the society as the social benefits lost in not consuming Q_eQ_s units of health screening exceeds the cost of resources saved by the society in not producing Q_eQ_s units of health screening.

Other examples of under-consumption due to information failure include exercise, healthy eating and education in less developed countries. The argument concerning imperfect information to account for the low literacy rate among females in poor countries, for example, is an important one. Parents with relatively poor educational qualifications may be unaware of all the long-term benefits that their daughters might

derive from a proper education, including better job prospects, ability to raise children with better skills, etc. Because the knowledge of these private benefits is an ongoing learning process, parents in poor countries will tend to underestimate and undervalue the long-term private gains from receiving a proper education.

Hence, like health screening, when left to the free market, such goods or services will be under-consumed and under-provided from society's point of view. And too little resources are allocated to the production and consumption of such goods/services. Market failure results as there is allocative inefficiency under an unregulated market system. Government intervention may be necessary to bring about allocative efficiency.

(b) ASYMMETRIC INFORMATION

Asymmetric information occurs when one party involved in a trade has more or better information compared to another when making decisions and transactions. Asymmetric information would lead to market failure if the more well-informed party in the trade utilises their superior information to benefit themselves at the expense of others. Adverse selection and moral hazard are two common problems that can lead to market failure due to the presence of asymmetric information.

(i) Adverse Selection

Adverse selection can come about when the profit-seeking seller knows more about the attributes of the good sold than the buyer. As a result, the buyer runs the risk of being sold a good of low quality. A classic example of adverse selection occurs in the market for used cars. Sellers of used cars have more information about their vehicles' quality than the buyers and have incentive to conceal information about any defects their vehicles have, in the pursuit of profits. Buyers, knowing the sellers' tendency to conceal information, would likely offer a lower price for all the vehicles in the market because they cannot tell good quality cars apart from bad ones. This low price in turn discourages sellers of higher quality cars to offer their cars for sale in the market. Consequently, this gives rise to a market for 'lemons', in which only low-quality products ('lemons') are offered for sale in the market while good cars ('peaches') drop out from the market. The market ends up adversely selecting against the higher quality products in favour of the lower quality ones.

Adverse selection can also come about when buyers have superior information about themselves than the sellers, for instance, in the market for private insurance. Buyers of health insurance know more about their own health conditions than insurance companies. Self-interest, utility-maximising insurance buyers might not divulge accurate and sufficient information about their full health conditions to insurance companies because any pre-existing health problems disclosed may result in higher insurance premiums that they need to pay. As such, people with greater health risks such as smokers, heavy drinkers or those with underlying health issues will have incentive to conceal information about their health. Knowing this, insurance companies, which are unable to adequately know and monitor the health conditions of those who seek insurance coverage, will thus raise the average price of insurance premiums. This, in turn, would discourage healthy individuals to buy insurance because the premium is too high for them to justify the coverage. The consequence would be that the insurance company would be left with an ever-riskier (adverse) pool of insurance buyers, because only people with more underlying health problems would find the high premiums worth paying for.

Adverse selection arises because of the incentive of sellers or buyers to conceal information from the other party involve in the trade, resulting in either the buyer not being able to distinguish between products of different qualities, or the seller not being able to distinguish between consumers of different qualities. Whichever the case, the consequence is the same: low quality products or high-risk buyers crowd out high-quality products or low-risk buyers. Adverse selection leads to market failure because

it will result in 'good' products and 'good' consumers being under-represented, while 'bad' products and 'bad' consumers are over-represented in the free market leading to outcomes like high prices e.g. market of health insurance. In the long run, if the market may no longer be able to effectively function, this could lead to a 'missing market' where these parties do not get to buy or sell the good even though it may be beneficial for them to do so, exacerbating the extent of market failure.

(ii) Moral Hazard

Moral hazard is a situation in which economic agents take greater risks than they normally would, because the costs that result from their riskier behaviours would not be solely borne by themselves. It is the tendency for people to change their behaviour and act less responsibly when they are protected from the harmful consequences of their behaviour. In general, moral hazard tends to arise when the party with more superior information in a transaction has both the incentive and the ability to shift costs onto the other party.

Moral hazard often occurs in the context of insurance market. Unlike adverse selection which occurs *before* the insurance is sold, moral hazard problem typically arises *after* insurance is sold. Insurance company usually lacks adequate information about whether and how the insured would change their behaviour when they are protected by the insurance. For example, if your bicycle is insured against theft, you may be less bothered to chain up your bicycle carefully each time you leave it. If the bicycle is indeed stolen, the costs of your lax behaviour will not be borne by you but by the insurance company and indirectly, others who purchased the same insurance. Individuals who are insured against loss generally will take less care to prevent that loss than they would in the absence of insurance.

In another example, suppose you are away from home and realise you may have forgotten to lock your front door. Without theft insurance, you would think about the full value of what you could lose if you were robbed. You might go through considerable trouble to return home and check the lock. But if you have theft insurance, you might only consider part of the loss (the part that insurance does not cover and that you would incur). The rest of the cost, covered by your insurance company, would not matter much to you. You would thus be less likely to return home to check the lock. The purchase of theft insurance makes you more likely to be lax in your behavior and shift any costs due to theft to the insurance company. In this way, theft insurance leads to fewer locked doors, a greater incidence of theft and higher insurance costs for everyone.

Note:
Moral hazard can also occur in the context of provision of professional services, e.g., medicine, etc., in the form of "supplier-induced demand". Refer to Appendix 1 for more information.

The socially beneficial purpose of insurance is to permit people to share given risks, not to increase the aggregate size of risk. But in the above two examples, the behaviour described does increase aggregate risk because individuals insured against private loss may take on more risks than they otherwise would. This riskier behaviour increases the social cost and use of scare resources, which leads to a misallocation of resources (and thus market failure). It could also exacerbate adverse selection and cause under-consumption of the good as low risk consumers are priced out of the market.

What can governments do?

In cases of information failure, governments may intervene through providing information, regulation and through licensure. The detailed policy prescriptions in correcting market failure from information failure will be covered under Section 5.

3.2.3 ZERO PROVISION OF PUBLIC GOODS

Free market find it difficult to provide public goods commercially in the marketplace because it is impossible or extremely costly to exclude non-paying consumers from enjoying the good once it is produced. This is because public goods are goods that possess two defining features: **non-rivalry in consumption AND non-excludability**. Due to these features, public goods will typically not be supplied by free market.

A good is **non-excludable** when it is impossible or very costly to exclude non-payers from consuming and benefitting from the good once it is provided. Since those who do not pay cannot be excluded from benefiting, no one has much incentive to pay for such goods. This is called the **'free rider' problem**. Suppliers will find it difficult, if not impossible, to collect revenue for the goods they provide. When a large number of consumers become free riders, the free market will usually NOT provide public goods.

For example, national defence. Although many citizens might value defence highly, it will typically still not be supplied by the private sector. This is because nobody will have incentive to voluntarily pay for defence services because non-payers cannot be stopped from benefitting from it once it is provided. People would become free riders and private producers will not be able to collect revenue. This lack of profitability leads to non-provision of national defence by the profit-maximising private firms in the free market, resulting in a missing market for public goods like national defence.

A good is **non-rivalrous in consumption** when the consumption of the good by one person does not reduce the amount or benefits available to others.

For instance, once defence services are provided, it can be consumed by everyone within the national border. If an additional person enters the border, this person's consumption of the defence services **does not reduce** the amount of protection or security available to other residents. In other words, the supply of a public good, once provided, is not depleted by an additional user. Thus, the **marginal cost of providing for and allowing an additional user to share in the usage of the defence services is zero**.

To achieve an allocatively efficient provision of a public good, consumers should pay a price equal to the marginal cost of serving an additional user (P = MC). Since the marginal cost of serving an additional user is zero ($0), for allocative efficiency to be achieved, a public good that is already produced should be made available free of charge (P = $0) to all individuals to achieve an efficient allocation and optimal consumption level.

However, private market with profit-maximising firms will never provide goods at a price of zero. Thus, any non-zero price charged for goods that are non-rivalrous in consumption would discourage some users from enjoying the public good, resulting in allocative inefficiency since one more person's consumption of the good costs society nothing.

Public goods also exhibit the characteristic of **non-rejectability.** The collective supply of a public good for all means that it cannot be rejected by beneficiaries once the good is provided. Thus, **non-rejectability** can be defined as the inability of consumers to refuse the consumption of a good once it has been produced. For example, when a certain level of deterrence to external threats is created by the provision of national defence, a person residing in that country will not be able to reject national defence even if he does not want national defence.

Other examples of public goods include a national defence system, flood prevention projects, street-lighting, etc.

Important:

Two key characteristics of public goods: non-excludability and non-rivalry result in the zero provision of these goods in the free market.

The zero provision of public goods results in market failure because these goods are desirable and its provision will contribute to society's welfare.

Note:
The third characteristic of non-rejectability does not result in market failure.

It could, however, be used to consider the limitations of government provision of public goods where those who do not value the good may still need to pay for it via taxes.

What can governments do?

For public goods, governments often intervene to directly provide them (direct provision) because typically, public goods will not be provided through the free market. However, since the benefit of producing these goods can be high, entrepreneurs will attempt to find innovative ways to overcome the free rider problem. For example, radio broadcasts which have both of the public good characteristics are still produced by the private sector. The free rider problem was overcome through the use of advertising (which generates indirect revenue from listeners), rather than directly charging listeners. Detailed policy prescription in correcting market failure from zero provision of public goods will be covered under Section 5.

3.2.4 MARKET DOMINANCE

Market imperfections arise when the market structure departs from perfect competition. If barriers to entry become stronger, market dominance would result, allowing the firm within the industry to possess greater price-setting ability. In the earlier topic on 'Firms and Decisions', you have learnt that market dominance can have adverse impact with regards to allocative and productive inefficiency. Thus, market dominance is a source of market failure.

Refer to 'Firms and Decisions' lecture notes for detailed explanation on how market dominance leads to inefficiency and inequity.

Allocative Inefficiency

The assumption of perfect competition ensures that the free-market forces lead to allocative efficiency in resource allocation. Unfortunately, perfect competition rarely exists in reality. Under imperfect competition/imperfect market structures, the price-setting firm's profit-maximising output level is allocatively inefficient.

Referring to Figure 8, using the example of a monopoly, the allocatively efficient output level in the society is at Q_1 where P_1=MC. This is the output level where consumer and producer surplus is maximized (which is also the output level of the PC market). At Q_1, the value that consumers place on the benefits derived from the consumption of the last unit of the good (which is given by the price that they are willing to pay for that unit = P_1) is exactly equal to the cost of using society's resources to produce that unit. Society's welfare is maximised at Q_1.

Recall:
Why P = MC is an indicator of allocative efficiency?

Profit-maximising firms under imperfect market structures, however, have some price-setting abilities. They will produce at output level Q_2 where their marginal revenue equals marginal cost (MR=MC) at a price of P_2 to maximise their profits. At Q_2, the price P_2 is above the marginal cost (MC_1) of producing the last unit of output, meaning that the value of the benefit that the consumers get from the last unit of the output produced is higher than the cost of using the society's resources to produce that unit. Society can be better off if more units of the good are produced.

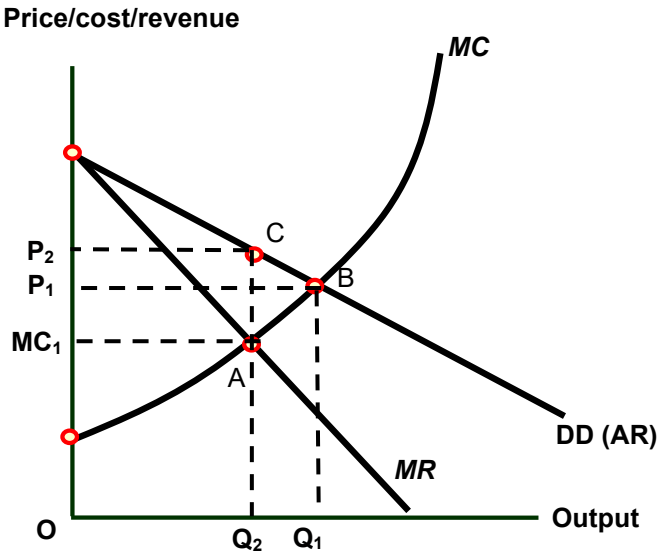


Figure 8: Market Failure from Imperfect Markets

Note: DWL is a market level concept, thus area ABC as a dead weight loss should only be used when comparing PC and Monopoly

If output is increased to Q_1, every additional unit (from Q_2 to Q_1) consumed will yield a net social benefit as the price is higher than the cost of using society's resources to produce that unit. By restricting output to Q_2 where the firm's profit is maximised, the sum of consumer surplus and producer surplus will fall by the area ABC. This loss in consumer and producer surplus is also known as the deadweight loss to society. Assuming the same cost conditions, the firms in the imperfect market structure with some market dominance is thus allocatively inefficient, where there is under-production and consumption of the good.

Productive Inefficiency

Firms in monopolistic and oligopolistic markets may be productively inefficient from the firm's point of view. With the ability to make supernormal profits in the long run due to strong barriers to entry, these firms can be X-inefficient due to complacency and may operate at a point above the LRAC curve (that is, they are not maximising their profits). These firms are productively inefficient because they are not incurring the lowest possible long run average cost for any given output level produced, resulting in wastage of scarce resources.

Dynamic Inefficiency

Firms in monopolistic and oligopolistic markets (collusive oligopoly) with its high barriers to entry may not have the incentive to engage in R&D. This could lead to dynamic inefficiency where product quality falls over time.

What can governments do?

In the case of imperfect markets, governments may intervene through taxes or subsidies, price regulations, legislation and nationalisation. The detailed policy prescriptions in correcting market failure from market dominance will be covered under Section 5.

3.2.5 IMMOBILITY OF FACTORS OF PRODUCTION

Given changes in demand or supply of a good, when factors are immobile, the factor inputs may be very slow to respond in their respective resource markets. Thus. supply and demand imbalances occur, and suboptimal production levels could result in market failure.

Also, as a result of this factor immobility, goods and services producers may make production decisions that do not lead to the most efficient outcomes (such as employing inefficient labour-capital combinations). Thus, factor immobility could result in productive inefficiency and allocative inefficiency, and hence market failure.

Occupational Immobility

Occupational immobility occurs when there are barriers to moving factors of production between different sectors of the economy, resulting in some of these factors remaining unemployed, or being used in ways that are not productively efficient.

Labour often experiences occupational immobility because occupation-specific skills may not be easily transferrable to other jobs. For instance, workers made redundant in the sunset electronics industry may find it difficult to gain re-employment. They may have job-specific skills that are not needed in growing industries. This implies that there is a mismatch between the skills offered by the unemployed and the skills required by employers looking for workers, giving rise to structural unemployment. This explains why there is a core of workers in Singapore who find it difficult to find paid work after they are retrenched as our economy continuously undergoes structural changes to meet dynamic changes in global demand. Unemployment or underemployment of resources represents a waste of scarce resources and hence, market failure.

Some capital inputs are occupationally mobile. A computer can be put to use in many different industries. Commercial buildings can be altered to provide a base for many businesses. However, some capital inputs are specific to the industry they have been designed for. If the demand for goods provided by these industries falls, these units of capital inputs will be left un-utilised or under-utilised, representing a waste of scarce resources and hence, market failure.

Geographical Immobility

Labour may also experience geographical immobility – meaning that there are barriers to them moving from one area to another to find work. The reasons why geographical immobility might exist include (i) family and other social ties, (ii) financial costs involved in moving home including the costs of selling a house, moving expenses and other associated expenditure (iii) huge regional variations in house prices and (iv) differences in the general cost of living between regions.

Geographical immobility discourages labour from moving into areas where there are shortages of labour while perpetuating high unemployment rates in other areas. Unemployment represents a loss in output as actual output is below potential output. In addition, the longer people remain unemployed, the less likely they will retain their skills, thereby reducing potential as well as actual income. Hence, unemployment tends to represent a waste of resources.

What can governments do?

In the case of factor immobility, governments may intervene through investment in training, subsidies, and immigration policies. The policy prescriptions in correcting market failure from factor immobility will be covered in Section 5.

Sectional Summary:

- The presence of externalities, information failure, zero provision of public goods, market dominance, and factor immobility are sources of market failure.
- Positive / negative externalities will lead to under-production/consumption or over-production/consumption of the good in the free market.
- Information failure could cause the under/over-consumption of goods or services, and the decisions made by economic agents might lead to problems of adverse selection and moral hazard.
- There will be zero provision of public goods in the free market which results in complete market failure.
- Market dominance will cause under-production of goods in the free market.
- Factor immobility will cause under-utilisation of scarce resources as well as inefficient input-combination resulting in market failure.

4 INEQUITY AND INCOME INEQUALITY

Under the free market system, goods and services are allocated according to effective demand. To address the central problem of scarcity, the basic economic question of "for whom to produce" is generally answered based on dollar votes. As a result, society tends to allocate resources to produce goods for those with the greater ability to pay. The ability to pay for goods and services depends on the wage rates that the individuals receive, the assets that they possess and other institutional factors. *Excessive* income inequality is the main cause of inequitable distribution of goods and services in the society.

Recall from Section 2 that a government's microeconomic objectives are (i) efficiency and (ii) equity.

4.1 INEQUITABLE DISTRIBUTION OF ESSENTIAL GOODS/SERVICES

Equity occurs when there is fairness in the distribution of essential goods and services that are necessary for survival, as well as merit goods. Inequity could thus be discussed from the perspective of whether individuals in a society can afford and have access to goods and services such as food, housing, transportation, utilities, basic education and healthcare services.

Note:
The concept of equity is a normative one and requires value judgment.

It is important to note that **equitable** distribution is not the same as an **equal** distribution. Different people have different views on what is equitable, while equality can be easily represented through indicators such as the Gini-coefficient.

CAUSES OF INEQUITABLE DISTRIBUTION

There are **2 main causes** of inequitable distribution of essential goods and services:

Refer to: Section 4.2 on the concept of income inequality and 'Price Mechanism and its Applications' notes for demand and supply factors that could cause rise in prices in these markets.

(i) **Excessive income inequality** - where there is an unequal distribution of income that is not considered to be fair and just.

Given that the free market allocates resources based on effective demand, excessive income inequality cause the market to channel more scarce resources to providing normal and luxurious goods and services which are good-to-have yet non-essential due to the rich's higher ability to pay, while producing less quantities of essential goods due to the lack of effective demand by the lower income households. While the price mechanism could lead to an efficient allocation of resources based on dollar votes, it may not result in equitable outcomes.

(ii) **High prices of essential goods and services in the free market** - such that people who have lower income levels are unable to afford and gain access to these goods.

You have learnt under 'Price Mechanism and its Applications' that both demand and supply changes will affect prices of goods and services. When there are supply side shocks due to global conflicts between countries and/or a global pandemic (Covid), prices of food and utilities rises in a free market. This could price out lower income earners who will not be able to gain access to these essential goods.

What can governments do?

In the case of inequitable outcomes, governments may intervene through indirect subsidies to lower prices in markets, or direct subsidies to increase accessibility to essential goods. Governments could also carry out transfers of income and wealth from higher to lower income households to reduce the extent of income inequality in a country. The policy prescriptions in achieving more equitable outcomes will be covered in Section 5.

4.2 INCOME INEQUALITY

Inequality is one of the most contentious issues in every society. The need to redistribute income from the rich to the poor is well accepted as a necessary economic policy but governments and countries differ on the extent to which this redistribution must be done.

Some people have incomes far in excess of what they need to enjoy a comfortable, if not luxurious, lifestyle while others struggle to purchase even the most basic daily necessities. This is clearly an indication of excessive inequality.

Inequality can be examined by looking at the distribution of income and wealth. *Wealth* is the accumulated value of both physical and financial assets of an individual. It is a *stock concept* as it is the accumulated value measured at a particular point in time. An individual's wealth may comprise the following:

Asset	**Value**
House	$600,000
Shares and Bonds	$50,000
Cash in the Bank	$10,000
Other assets such as car	$55,000
Total wealth	**$715,000**

On the other hand, *income* is the amount of money an individual receives per period of time, e.g. per week, per month or per year. It is a *flow concept* as it is the amount received per period of time. For example, a cleaner gets $60 per day, a secretary is paid $2,500 per month, and a CEO of a bank is paid $2.6m per year.

Income can be categorized into wage income and non-wage income. Wage refers to the income an individual earns from his labour services while non-wage income includes dividends, interest, capital gains, rent and royalties.

REPRESENTATIONS OF INEQUALITY

(a) Lorenz Curve

The Lorenz Curve is a graphical representation of income distribution in a country. It shows the degree of inequality that exists in the country and is often used to illustrate the extent that income is distributed unequally in a particular society.

Note:
There is no need for you to know how to illustrate the Lorenz curve.

In Figure 9, the horizontal axis indicates the ranking of households in society in ascending order of income levels. The vertical axis indicates the cumulative share of total income going to different groups of households. The 45-degree line is the line of perfect equality and it reflects a perfectly equal income distribution where everyone has the same income in society. For example, point V shows that the poorest 25% of society's households earn exactly 25% of the total income while at point W, 50% of the households earn 50% of the total income.

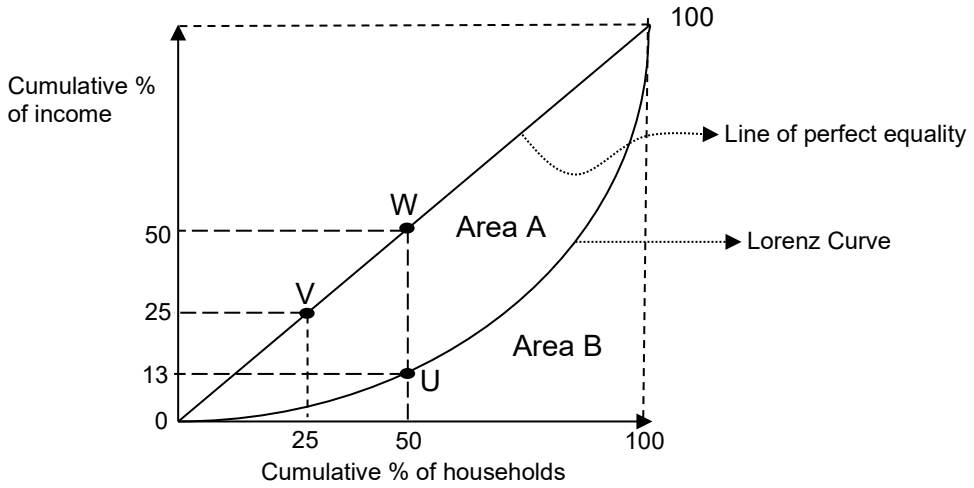


Figure 9: The Lorenz Curve

The Lorenz Curve, as shown in Figure 9, plots the actual income distribution in a society based on the calculated share of total income earned by different percentiles of households. The further it deviates from the line of perfect equality, the greater the income inequality. Point U indicates that the poorest (or bottom) 50% of the households in this society only get approximately 13% of total income, showing some inequality.

(b) Gini Coefficient

Gini coefficient is used universally as a numerical representation of income inequality in a given country. It is a summary measure based on the Lorenz Curve and is given by the ratio Area A / Area (A+B) in Figure 9. The greater the deviation of Lorenz Curve from the line of perfect equality, the larger the Gini coefficient and the higher the income inequality. The Gini coefficient ranges from **zero to one**. In a country where each person receives exactly the same income, the coefficient is zero (perfectly equal income distribution). However, for a country where only one person receives all the income and the rest receive nothing, the coefficient is equal to one (maximum income inequality). Hence, the higher the coefficient, the more unequal the income distribution.

Based on World Bank data on Gini coefficients, the world's best instances of income distribution are in countries like Norway (0.276), Finland (0.273), Netherlands (0.281) and Denmark (0.282). On the opposite extreme, some countries have much worse income inequality problems. For instance, South Africa (0.63), Namibia (0.591), and Brazil (0.534).

Figure 10 shows the trend of Gini coefficient in Singapore since 2014. Our Gini index (before accounting for government redistribution) was high at 0.464 in 2014, it then hovered at around 0.45 before falling to about 0.435 in 2024. Government redistribution through transfers and taxes generally lead to a lower Gini coefficient than before.

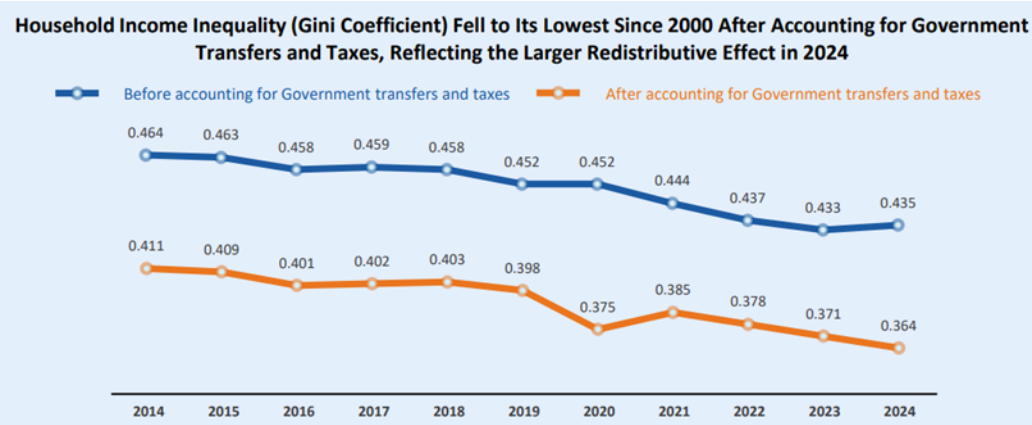


Figure 10: Trend of Gini coefficient in Singapore
(Source: Department of Statistics, 2024)

Gini coefficient is a very powerful tool, but its validity depends directly on the quality of the statistical data used to calculate it. Unfortunately, there is a lack of international standards for such data. This means that Gini coefficients in a country can sometimes be manipulated to a certain extent by left wing analysts who could seek to decry extreme inequalities or by conservative right wingers who might wish to demonstrate that inequality is at a minimum. Care should therefore be taken to make sure of the objectivity of the source of each Gini coefficient before drawing hasty conclusions.

CAUSES OF INEQUALITY

This section looks at the causes of wage and income inequality as well as the justifications for some degree of income inequality (or the lack of it).

Causes Of Wage Inequality

Wages can differ from industry to industry and from firm to firm, even for the same job done. In a competitive labour market, the demand for and supply of labour can be used to explain why wage inequality exists and persists. Generally, those who receive higher wages tend to be those whose labour services are high in demand relative to supply. On the demand side, more productive workers who generate higher returns to the company are high in demand. On the supply side, workers who are more educated and skillful and who possess some innate talent that is in demand by society also tend to earn higher wages because their supply can be more limited than their less educated, less skillful and less talented counterparts.

Note:
Refer to 'Price mechanism and its Applications' notes for detailed analysis of wage determination and reasons for wage differentials.

Generally, a healthy degree of wage inequality can be equitable for society because it fairly compensates and rewards more educated, productive and skillful labour with higher wages and encourages the labour force to invest in better education.

Causes Of Income Inequality

Wage inequality can only explain part of the income inequality in a society. In addition, the presence of unequal factor endowment means that the free market mechanism can yield very large non-wage incomes (like interest, rents and profits) to those who possess (or are endowed with) valuable financial assets (such as stocks and bonds) and physical assets (such as land). These individuals may receive very high non-wage incomes due to luck of having acquired such assets at the right time or through inheritance. The owners of such assets are thus able to obtain an income other than wages earned from their own labour efforts.

Note:
Factor endowment means the amount of factors of production (like land and capital) that one possesses and can be exploited to earn income.

It is important to note that high wage inequality can aggravate the degree of non-wage income inequality. Individuals receiving low wages and not having much endowed assets also tend to be those with lower non-wage incomes and little ability to save. The lack of financial resources (or wealth) makes it more difficult for these people to accumulate the forementioned financial and physical assets to earn non-wage incomes. The aged, the handicapped and the sick as well as other minority group that is discriminated against by society usually fall within this category. Generally, the greater the wealth inequality, the greater the inequality of income is likely to be.

4.3 EFFECTS OF EXCESSIVE INCOME INEQUALITY AND INEQUITY

While some degree of income inequality is justified and can be healthy for a society, excessive income inequality can lead to inequitable outcomes in society. This section looks at some effects of excessive income inequality.

(a) Inequitable Distribution of Resources

Excessive income inequality will lead to unfair and/or unjust allocation of resources where the poor are not able to afford essential goods and services such as basic housing, sanitisation, education and healthcare services necessary for survival. When there are people in society who are unable to afford basic needs, it can offend our inherent sense of fairness (which we should all have).

Note:
As mentioned at the earlier section, one of the main causes of inequity is excessive income inequality.

(b) Unequal access to opportunities

Excessive income inequality can also lead to unequal access of opportunities. According to research findings, countries with very high income inequality tend to have lower levels of social mobility. In the absence of government intervention, rich people can better afford high quality education, social networks and living environment which could then translate into better future job security and income for them. As income inequality rises in one generation, it influences the level of inequality in subsequent generations too and social mobility is reduced. As the income gap between the rich and the poor widens, the lower to middle income will be disadvantaged in health, education, job security among other aspects. Such inequality may persist over many generations of people due to lack of social mobility, which goes on to perpetuate income inequality.

(c) Other Effects

Excessive income inequality and inequity can lead to social and political instability and eventually affect the sustainability of the economic performance and prosperity of a country.

We will analyse how income inequality affects the standard of living in a country, as well as the importance of achieving inclusive economic growth under the study of 'Macroeconomics'.

When income distribution is very unequal, it imposes very real costs on society. In their 2009 book *The Spirit Level*, Wilkinson and Pickett showed that rising income inequality has adverse effects on individuals' and societies' health and mental well-being. They suggested that man is a social animal whose self-respect is tied with status as "what matters is where we stand in relation to others in our own society." The feeling of losing out or an inability to fund a desired lifestyle can cause stress, anxiety and depression and lead to the adoption of behaviours such as overeating, drug abuse and crime.

Excessive income inequality reduces social cohesion by weakening community life and reducing trust. High inequalities "produce problems associated with social differences and the divisive class prejudices that go with them" (Wilkinson and Pickett, 2009). It is "a powerful social divider, perhaps because we all tend to use differences in living standards as markers of status differences. We tend to choose our friends from among our near equals and have little to do with those much richer or much poorer. Our position in the social hierarchy affects who we see as part of the in-group and part of the out-group – us and them – thus affecting our ability to identify and empathise with other people" (Wilkinson and Pickett, 2009).

Point to ponder:

Is income inequality always undesirable?

What can governments do?

Refer to Section 5 on policies to reduce the extent and effects of excessive income inequality.

Views about what constitutes a fair distribution of income and wealth, what is considered a necessity or what constitutes a minimum standard of living are diverse, and they are often a source of economic and political debate. The answers to such questions depend on society's goal of fairness and justice as well as its attitudes towards inequality. This requires value judgement. In addition, the extent to which the poor, the needy and the disadvantaged are provided for is a reflection of the attitudes and mindsets of the people in the society which in turn affects how much wage and income inequality they can tolerate.

Important point:
Value judgments are important in deciding which goods and services are deemed necessary and essential in society, and the extent of income inequality it can tolerate.

Sectional Summary

- Inequitable distribution of goods and services is caused by excessive income inequality and high prices.
- Income comprises of wage and non-wage income. Generally, there is a high correlation between wage and non-wage income. Wage disparity can be explained by the forces of demand and supply of different types of labour.
- If income inequality is excessive, the 'dollar votes' system in a free market will prompt more goods and services to be produced in favour of those with greater purchasing power, and the lack of ability to pay by the lower income household will result in inequitable outcomes.

In conclusion, the workings of the free market may cause inefficient and inequitable outcomes. The economic role of government is thus pivotal. The government sets the rules of the game. Its performance with regards to protecting property rights and establishing stable monetary environment affects the efficiency of market. Governments may also contribute positively by intervening in markets subjected to market failures. However, "it does not follow that whenever laissez-faire falls short, government interference is expedient, since the inevitable drawbacks of the latter may be worse than the shortcomings of private enterprise" (Harry Sidgwick, 1887).

B. POLICIES TO ADDRESS MARKET FAILURE

1 RATIONALE FOR GOVERNMENT INTERVENTION

Governments intervene in the free market to achieve various economic goals. These goals include the microeconomic goals of efficiency in resource allocation (productive and allocative efficiency) and equity in the distribution of a nation's income and wealth, as well as macroeconomic goals.

With respect to its microeconomic goals, governments seek to correct the distortions that exist in the free market which result in inefficient resource allocation i.e. to correct market failure. Governments also aim to achieve equity.

When circumstances exist to distort the efficient allocation of resources to maximize society's welfare, government intervention is sometimes required. There are many different types of policies that can be used to address the many varied sources of market failure. These policies seek to modify the behaviour of consumers and producers by creating incentives to produce a desired behaviour.

The process of rational decision-making requires every economic agent to deliberate on the various choices that are made available to them, and the same principle holds true for the government. This process takes into account various considerations, including benefits, costs, constraints, perspectives, information intended and unintended consequences.

Figure 11: The Decision-Making Approach

Table 1 shows the approach to rational decision making. This approach can help a government to decide whether to provide a public good, subsidise a new healthcare programme and so on.

Table 1: Rational Decision Making by a Government

	Concepts to Cover
Objective(s)	• The government's overall objective is to maximise society's welfare. It may have both microeconomic and macroeconomic objectives. • E.g., the government may aim to achieve allocative efficiency. Alternatively, intervention might aim to achieve more equitable distribution of income or resources. • A rational decision should maximise total net social benefits.

Constraints	• Due to the fundamental economic problem of scarcity, choices have to be made. Hence, the government needs to consider the constraints it is currently experiencing e.g. its budget, to determine the choices available. Based on these choices, it will decide on the best-ranked choice that enables it to maximise society's welfare.
Information	• To make sound decisions, the government gathers information, both quantitative and qualitative, on the potential costs and benefits of their decision.
Perspectives	• When a decision is made, its outcome is likely to affect others. Hence, when making a decision, the government needs to consider the impact on and reaction of others. This may in turn affect the intended outcomes of the decision. The government considers the perspectives of stakeholders (households and firms) in its policy decisions.
Benefits	• Monetary vs non-monetary social benefits • Short run vs long run social benefits • Externalities
Costs	• Opportunity costs including explicit & implicit costs • Short run vs long run social costs • Externalities

Decision making	• If making decision at the margin (whether to do the additional activity):
	  • Weigh MSB against MSC
	• OR whether to do the activity or not:
	  • Weigh total social benefits against total social costs
	• OR Which activity to do, choose the one that yields the highest total net social benefits

Intended consequences of the decision	• After a decision is made and action taken, the intended consequences are those that were planned for.
Unintended consequences of the decision	• Unintended consequences refer to the outcomes that were not intended or anticipated in the economic decision. • This might occur due to a range of reasons, including where the government may not have made their decisions under perfect information conditions, when economic conditions change, or due to the presence of cognitive biases.
Changes	• Evaluate outcomes of decision and continue or change decision. The aims, constraints, costs, benefits, information and perspectives of the government can change over time. When changes occur, the economic decision undertaken may no longer be optimal, calling for a revisit of the decision-making process to ensure that the intended outcomes can be achieved.

In order to maximise society's welfare, the government has to take into account a variety of factors. Critically, decision making involves cost-benefit analysis, i.e., weighing all the possible relevant benefits and costs to different stakeholders in the short run and long run in assessing the desirability of a policy.

The ability of the government is important in collecting accurate and up to date information before and after implementation of the policy. There is a risk that government failure may arise. Government failure is a situation where government intervention in the market leads to a worse outcome in terms of greater inefficiency and greater misallocation of resources (to be covered in Section 6). One aspect of government failure is the occurrence of unresolved unintended consequences resulting from the policy that has been implemented and the failure to make revisions to the policy in the light of such unanticipated effects. The government must thus regularly evaluate the policy after it has been implemented because whenever negative unintended consequences arise from the policy, the government has to decide whether to continue with the policy, refine it or discard it.

Government failure refers to the situation when intervention leads to a **worse** outcome than before.
What are the factors that might contribute to this?

The success of the intervention depends on the government's ability to accurately assess both the benefits and costs of intervention. Where potential trade-offs between economic objectives arise, the government must decide based on their priorities.

2 FORMS OF GOVERNMENT INTERVENTION

2.1 TAXES AND SUBSIDIES (MARKET-BASED POLICIES)

Note: In using such market-based measures, the government is harnessing the power of the market to correct for market failure.

The government uses financial disincentives or incentives in the form of taxes (compulsory payment to the government) or subsidies (cash transfer from the government to the producer or consumer) to influence the behavior of producers and consumers. This is because incentives matter – people respond to incentives.

2.1.1 TAXES ON GOODS THAT GENERATE NEGATIVE EXTERNALITIES

(i) Negative Production Externalities

In the case of negative production externalities, the government can levy a per unit production tax equivalent to the monetary value of the marginal external cost at the socially optimal output level. This is a monetary valuation of the harm imposed on society due to the negative externality from production of output produced by the firms. Through this tax on per unit production, the government attempts to compel the polluting firm to internalize the external costs.

With reference to Figure 12 below, the free-market output and price levels are Qe and P_0 respectively, where MPB=MPC. A specific tax of E_1B which is equal to the marginal external cost (MEC) at the socially optimal output level (Qs) will raise the firm's marginal private cost of production, shifting it upwards from MPC to MPC + unit production tax, i.e. MSC.

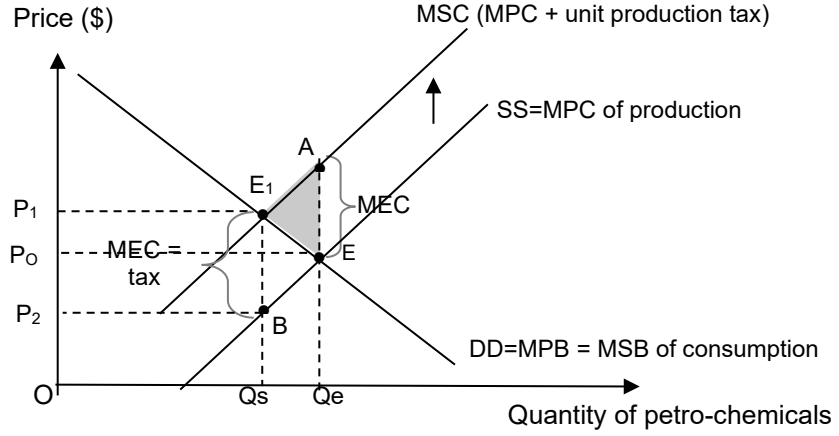


Figure 12: Correcting Overproduction from Negative Production Externality

This will cause a rise in the market price of the good, resulting in consumers to reduce quantity demanded from Qe to Qs. The production tax causes the net price for producers to fall from P_0 to P_2, causing producers to reduce quantity supplied from Qe to Qs. This results in a reduction in quantity from the free-market output level, Qe where MPB=MPC, to the socially optimal level, Qs where MSB = MSC. Efficient allocation of resources is achieved and the deadweight loss (AE_1E) arising from overproduction prior to the imposition of the tax is eliminated.

Distinguishing between a tax on output and a tax on pollutants (emissions)

Both a tax per unit of output produced and a tax per unit of pollutants emitted appear to have the same result in that they can lead to lower pollution levels. However, they work quite differently.

A tax per unit of output, also known as an indirect tax, has the effect of increasing per unit cost of production, thereby incentivizing profit-maximising producers to reduce supply. Hence, via the price adjustment process, the over-allocation of resources to the good is corrected as the output produced and consumed decreases towards the optimal quantity OQs. Refer to Figure 12.

A tax per unit of pollutants, such as a carbon tax, on the other hand, is intended to work by creating incentives for the firm to pollute less (and use less fossil fuels) in order to pay less tax, and to switch to greener technologies (alternative energy sources). If the firm eventually pollutes less, the marginal external costs of producing each additional unit of output will fall, thereby reducing the divergence between the MSC and MPC curves. The MSC curve thus shifts downwards to MSC_1. With the fall in external costs, the social optimal quantity rises from Qs to Qs_1.

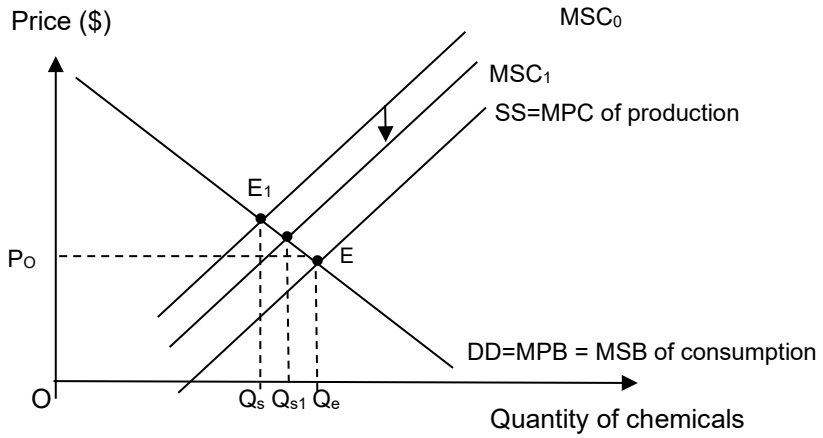


Figure 13: Tax on pollutants (emissions)

It is also conceivable that the tax on pollutants will increase the MPC of firms (not shown in the diagram) which need to comply with the environmental regulation. Hence, such a tax on pollutants spurs producers to adopt new technologies and facilities to solve the environmental pollution problem. The result is that the tax on pollutants can lead to lower pollution levels.

A tax on the output of the polluter does not have this effect of encouraging producers to adopt new technologies to solve the pollution problem; it only reduces the amount of output produced.

(ii) Negative Consumption Externalities

In the case of negative consumption externalities like alcohol and tobacco, governments can correct for negative consumption externalities based on the same principle. For example, the government can impose high taxes on these producers in order to deter consumption. In Figure 14 below, when a specific tax of E_1A, which is equal to the MEC at Qs, is imposed on the producer of such a good, it leads to an increase in the marginal private cost of production. This is reflected by an upward shift of the MPC curve from MPC to MPC + indirect tax. This will cause a rise in the market price of the good which will lead to a reduction in the quantity demanded from the free-market output level, Qe where MPB=MPC, to the socially optimal level, Qs where MSB = MSC. Hence efficient allocation of resources is achieved and the deadweight loss (AES) arising from overconsumption prior to the imposition of the tax is eliminated.

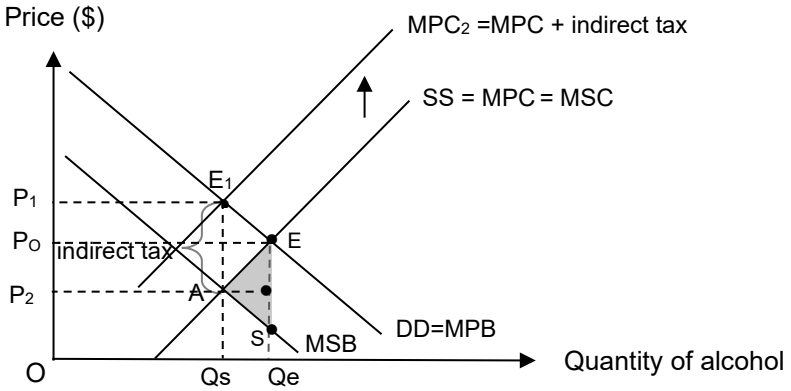


Figure 14: Correcting overconsumption from negative consumption externality

Advantages

- Taxation provides revenue which can be used for redistribution purposes. For instance, revenue from a tax on cigarettes can be used to fund a major health education program or go into subsidizing research to help smokers overcome their addiction safely.

- These market-based instruments provide flexibility and financial incentives for behavioural changes. The indirect tax allows the market to continue to operate according to market forces and reach a new state of equilibrium. Hence, consumer sovereignty is still present.

Consumer sovereignty refers to a situation where consumers have the power to determine what goods and services are produced. That is to say, they have the ability and freedom to choose from a range of different goods and services.

Disadvantages

- To achieve allocative efficiency, the government needs accurate and complete information on the size of the external costs, but it is difficult to measure and place an accurate monetary value on the externalities, especially when some of the effects of the externalities only appear after a long time (e.g. the impact on health from second-hand smoke). An over-valuation of external cost means that output is reduced to a level that is below social optimum. An under-valuation of external cost implies that although output is lowered by the tax, it is not enough to bring output down to the socially optimal level. With the lack of precision, society's welfare cannot be maximized.

- Indirect taxes are regressive and hence inequitable and undesirable. Regressive tax refers to a tax which takes a proportionally greater amount from those on lower incomes. For example, a tax on cigarettes would take up a larger proportion of a smoker with lower income than a smoker with higher income, assuming they smoke the same amount of cigarettes.

- Government intervention in markets may result in some unintended consequences. Unintended consequences refer to a set of results that may have effects that are unexpected.

    - Unintended consequences include perverse incentives. For instance, fuel tax designed to lower air pollution in Athens has created more, rather than lower air pollution. This is because the increase in fuel tax has doubled the price of home heating using crude oil in just a span of two years, causing people in Athens to choose relatively cheaper wood over the more expensive fuels to heat their homes in the grips of a continuing economic crisis. But burning wood emits much greater amount of pollutants.

    - Unintended consequences also include unexpected drawbacks. This was evident in the tax on junk food in Denmark which was implemented in 2011 and abandoned in 2013. Research showed that the tax drove the Danes across the border to nearby Germany or Sweden to get their favourite foods, adversely affecting businesses (both junk food and non-junk food) in Denmark and causing a rise in unemployment. The regressive tax also hurt citizens with low incomes disproportionately, affecting equity.

Perverse incentives encourage actions that has the opposite effect of what is intended.

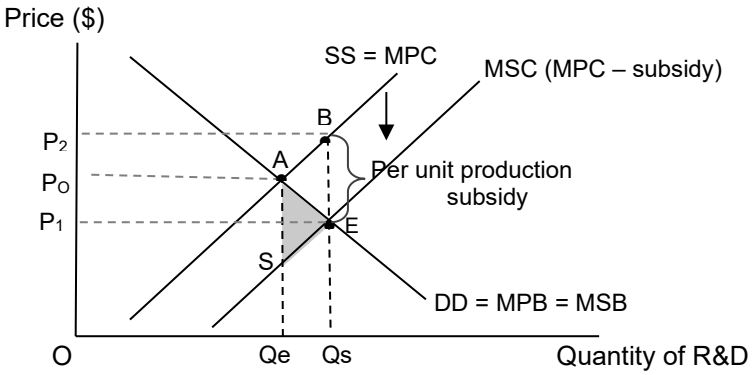
An **unexpected drawback** is one that is an unexpected detriment occurring in addition to the desired effect of the policy.

Note that unintended consequences can also be positive, but in the case of limitations of government intervention and government failure, the focus is on negative unintended consequences.

2.1.2 SUBSIDIES ON GOODS THAT GENERATE POSITIVE EXTERNALITIES

A subsidy is a negative tax. It is a payment made either to a firm or to a consumer when the firm produces or when the consumer buys a good or service. Subsidies are often used to incentivise private producers to increase their supply of goods that generate positive externalities.

(i) Positive Production Externalities – indirect subsidy



P_O is the free market price.

P_1 P_2 is the subsidy per unit at Qs.

Total subsidy for Qs units is **P_1P_2BE**.

Figure 15: Correcting underproduction arising from positive production externality

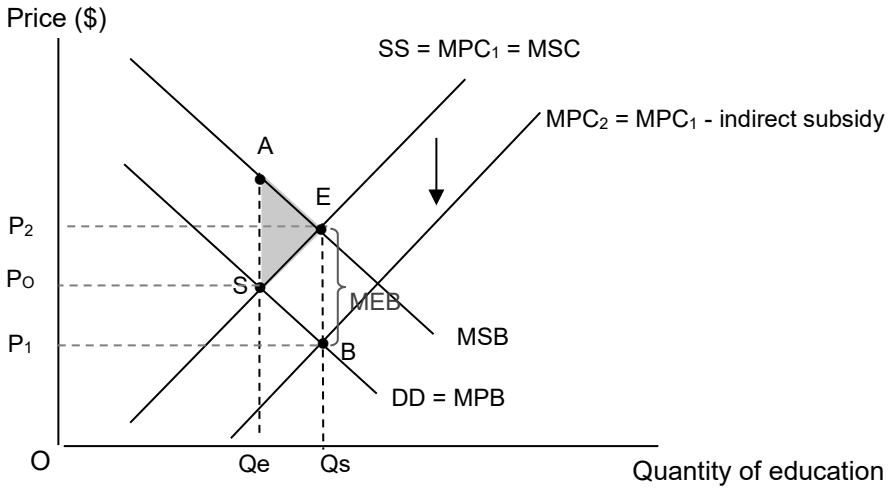
Figure 15 illustrates a case of a firm generating positive production externality from engaging in research and development. Its actions allow new technology to spread throughout the economy but in the pursuit of self-interest, the profit-maximising firm will disregard the positive production externality. Hence, the free market level of R&D is at Qe where MPB of consuming R&D equals MPC of producing R&D. This is lower than the socially optimal level of R&D at Qs where MSB of consuming R&D equals MSC of producing R&D.

To achieve the allocative efficient level Qs, the government can provide a subsidy of an amount equal to the positive production externality at Qs (i.e. P_1P_2 or BE per unit). This subsidy is given to the firm for each unit of the R&D produced. This will lower the MPC of production, which is reflected by a downward shift of the MPC curve from MPC to

MSC (or MPC – subsidy). By lowering the private cost of R&D, profit-maximising producers receive the higher post-subsidy price P_2, hence they are incentivised to increase quantity supplied to Qs because previously unprofitable R&D projects are now profitable. The subsidy thus increases output from Qe to the socially optimum level, Qs where MSC=MSB. The deadweight loss to society (AES) arising from underproduction of R&D is thus eliminated by the subsidy.

(ii) Positive Consumption Externality – indirect subsidy

Governments can also correct positive consumption externalities using an indirect subsidy to producers. For example, in this case, too little resources are allocated to the consumption and production of these goods if left to the free market. This is because in the pursuit of their self-interest, consumers disregard the positive consumption externalities generated.



P_O is the free market price.
P_1P_2 is the indirect subsidy per unit at Qs.

After subsidy, P_1 is the price actually paid by consumers.
P_2 is the actual price received and retained by producers.

Total subsidy for Q_S units is P_1P_2EB.

Figure 16: Correcting underconsumption arising from positive consumption externality

Providing indirect subsidies to the producers such as grants given to schools has the effect of reducing the marginal private cost of providing education services, which will thus result in lower education fees. Figure 16 shows that with an indirect subsidy of an amount equal to the MEB at Q_s (EB), the MPC curve shifts downwards from MPC_1 to MPC_1 – indirect subsidy. This causes the price that consumers pay to fall from P_O to P_1 and the post-subsidy price received by profit-maximising producers to increase from P_O to P_2. Under-consumption of education is corrected as the quantity of education demanded rises from Qe to Qs, which eliminates the deadweight loss to society (AES).

(iii) Positive Consumption Externality – direct subsidy

The government may also correct for under-consumption due to positive consumption externalities by providing a direct subsidy to the consumers.

In Figure 17, the free-market equilibrium level of consumption is at Qe where MPC = MPB. With government intervention, a direct subsidy to consumers equal to the MEB at Q_s of amount CD will shift the MPB curve from MPB to MSB because the direct subsidy increases consumers' ability to increase consumption, which leads to a higher effective demand, resulting in the socially optimal level, Qs where MSC = MSB. The under-allocation of resources would be corrected as the positive externality is said to have been 'internalised'. The deadweight loss to society (ABC) is thus eliminated.

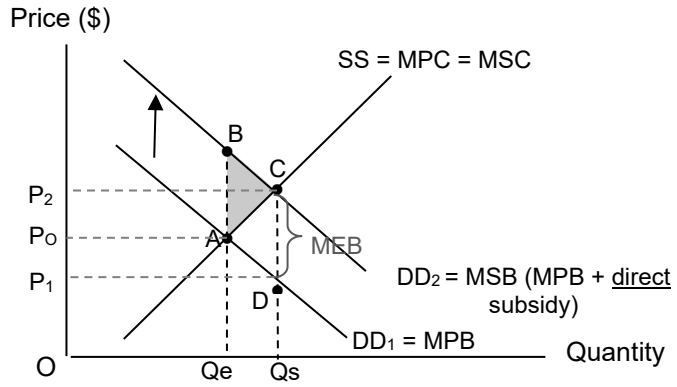


Figure 17: Direct subsidies to consumers

P_O is the free market price.

P_1P_2 is the direct subsidy per unit at Qs.

After subsidy, P_1 is the price actually paid by consumers. P_2 is the actual price received and retained by producers.

Total subsidy for Q_S units is P_1P_2CD.

An example of such a subsidy to consumers would be the Personal Edusave Account given to all Singaporean children who are enrolled in MOE-funded schools. The children will receive an annual Edusave contribution which they can tap on for education use. Another example of a direct subsidy would be the Baby Bonus Scheme, where the savings accounts of children are matched dollar-for-dollar by the government, in the attempt to defray the costs of healthcare and early childhood education associated with raising children. This would subsequently raise the demand for such goods and services.

Advantages

- A subsidy is popular and can be easily implemented to bring about an increase in production and consumption and is flexible enough to be adjusted according to the magnitude of the problem.

- Consumer sovereignty is still present since subsidies allow the market to operate (although distorted by the subsidy). Financial incentives are given to economic agents to *internalise the* positive externalities, resulting in a change in their behaviour.

Incentives to encourage electric vehicles in Singapore

Disadvantages

- To achieve allocative efficiency, accurate information on the size of the external benefits is required. The valuation of the external benefit is difficult to quantify.

- Subsidies can impose a huge burden on the government and taxpayers because huge financial resources are required to finance subsidies. The government may not have the ability to fund all merit goods and goods that generate positive externalities. They may have to set higher direct tax rates like personal income tax rates and corporate tax rates. However, raising direct tax rates can discourage work effort, savings, and investment in the country. It could also lead to the problem of brain drain in the country. Raising taxes are also politically unpopular which may reduce the chances of the government being re-elected into parliament. Alternatively, the government can borrow from the private sector or other countries, but this may result in unsustainable levels of government debt.

- Huge subsidies in one project, like in the health care sector, can result in large opportunity costs because there will be less government financial resources available for another developmental project which was the highest valued alternative forgone, e.g. education sector. In the presence of a budget constraint, all spending decisions will result in trade-offs.

2.2 GOVERNMENT LEGISLATION AND REGULATION

Government legislation and regulation is a powerful tool to correct market failures arising from the presence of significant production externalities and over / under-consumption of goods due to imperfect information (merit and demerit goods). The market provides the good but government regulation through laws and administrative rules provides the process of controlling its production or consumption activities.

US bans flavoured e-cigarettes

There are many different types of legislation that can be used. Some examples include setting a quota, safety standards and compulsory action by consumers, or even the ban of certain items. In Singapore, examples of such laws include restricting the consumption of cigarettes to designated areas, laws for compulsory primary school education and banning the sale of chewing gum.

2.2.1 LEGISLATION / LAWS (NEGATIVE CONSUMPTION EXTERNALITY)

Can you think of how legislation and regulation can also correct the over / under-consumption of goods / services due to imperfect information?

These regulations are used to prevent or limit consumer activities that impose cost on third parties. In Figure 18a, this has the effect of shifting the D_0 = MPB curve towards the D_1 = MSB, resulting in consumption at Qs. This would eliminate the deadweight loss of ABC due to the negative externality with consumption.

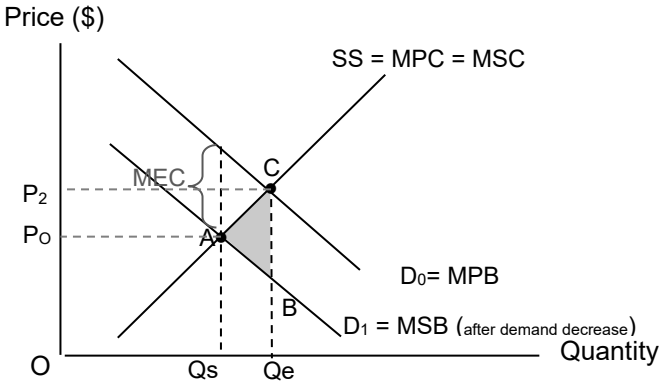


Figure 18a: Legislation in correcting negative consumption externalities

2.2.2 LEGISLATION / LAWS (POSITIVE CONSUMPTION EXTERNALITY)

Legislation can be used to promote greater consumption of goods with positive externalities or underconsumption due to imperfect information. For example, many countries (including Singapore) have made primary education compulsory. In this case, demand for education increases and demand DD=MPB shifts right to MSB in Figure 18b, where Qs is consumed, removing deadweight loss of ABC.

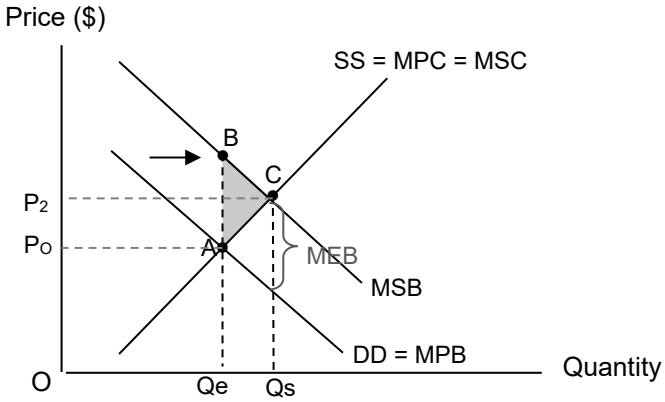


Figure 18b: Legislation in correcting positive consumption externalities

2.2.3 PRODUCTION QUOTA (NEGATIVE PRODUCTION EXTERNALITY)

A production quota is a limit on the quantity produced. It represents the right to supply a specified quantity of a good to the market. Assume that an industry produces chemicals and in its production of chemicals, generates negative externalities when it dumps wastes into the river. The free market equilibrium output level in Figure 19 is Qe where MPB=MPC. However, the production of chemicals generates negative externalities, causing a divergence between MPC and MSC by the amount MEC. The socially optimal output level is Qs where MSB=MSC. To achieve the allocatively efficient output level and eliminate the deadweight loss of ABC, the government can impose a production quota and limit the amount of chemicals produced to Qs.

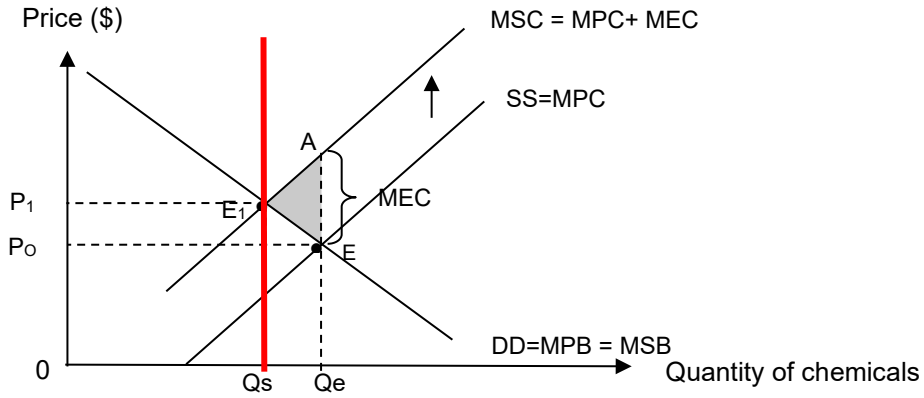


Figure 19: Quota to correct overproduction arising from negative production externality

Can you apply this to the case of a ban? What examples can you think of?

Advantages

- Legislation and regulation, such as a production quota, are simpler to implement compared to market-based measures such as taxes. The technical difficulties involved in formulating a pollution tax often make it easier to impose regulations that limit the quantity of output produced which in turn limit the amounts of pollution firms can emit.

- Legislation and regulation, like output quotas, result in greater certainty in achieving its targeted output level than taxes. For instance, a production quota compels producers to comply and reduce output and in turn, pollution levels to its targeted level, which taxes may not always do.

Disadvantages

- Regulations such as a production quota displaces the price mechanism, meaning that the output level is no longer responsive to changes in its price. In the absence of price signals, the onus lies on the government to predict as best as it can the socially desired level of output. However, the government suffers from similar limitations as market-based policies, like imperfect information. For example, in the case of environmental regulations, the government may dictate a maximum level of pollution that a factory may emit or the government may require that firms adopt a particular technology to reduce emissions. In all cases, in order to design good rules, the government needs to know the details about specific industries and about the alternative technologies that those industries could adopt. However technical information on the different types and amounts of pollutants emitted is often difficult to assess. Given these limitations, legislation and regulations can at best be only partially effective in reaching the socially optimal level.

Are you able to explain how these limitations apply to different contexts, such as smoking in Singapore?

- Another disadvantage with using legislation or regulation like an output quota is that enforcement of such laws may be difficult and expensive. Constant checking is needed and this can translate into high costs for the government. In addition, for the law to be effective, the penalties for breaking the law must be sufficiently harsh.

Given that there is a trade-off between the benefits from controlling externalities and the costs arising from implementing these controls, society can be said to benefit from such schemes only if the net effect is positive.

2.2.4 TRADEABLE PERMITS SYSTEM OR "CAP AND TRADE" (NEGATIVE PRODUCTION EXTERNALITY)

With a greater awareness of the need for sustainable development in the world, a relatively new and an increasingly popular policy option in dealing with pollution is the issuance of tradeable permits. Tradeable permits are permits to pollute that are issued to firms by a government or an international body and can be traded in a market.

In the case of greenhouse gas emissions, each firm is granted by the government a particular number of permits (or rights) to discharge a defined quantity of greenhouse gas into the atmosphere over a period of time. The permits to pollute can be bought and sold among interested firms, with the price of permits being determined by the market demand and supply (pollution permits). If a firm can produce its product by emitting a lower level of pollutants than the level set by permits issued to it, it can sell its unused permits in the market. If a firm needs to emit more pollutants than the level set by its permits, it can buy more permits in the market, failing which it will face heavy penalties.

In effect, this system penalises the buyer (of permits) for polluting and rewards the seller (of the permits) for having reduced emissions. There are currently several trading systems in place with the largest being in the European Union. The carbon market makes up the bulk of these and is growing in popularity.

The **carbon market** is a market where trade of carbon emission permits is done. The market aims to encourage companies to limit their emissions of carbon dioxide CO_2, the main greenhouse gas.

How does a tradeable permit system work?

Figure 20 shows a market for tradeable pollution permits. The government puts a cap on the total number of permits distributed to the firms, hence its supply is perfectly price inelastic. Together with the demand for permits, the equilibrium price of permits is determined. As the economy grows and the firms increase their production of goods and services, the demand for permits is likely to increase from D_1 to D_2. With supply fixed at Q_1, the price of these permits rises from P_1 to P_2.

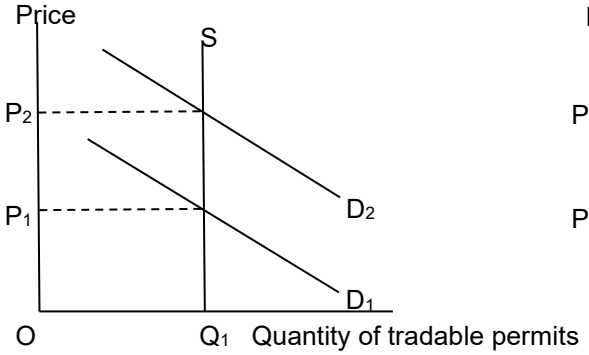


Figure 20: The Market for Tradable Permits

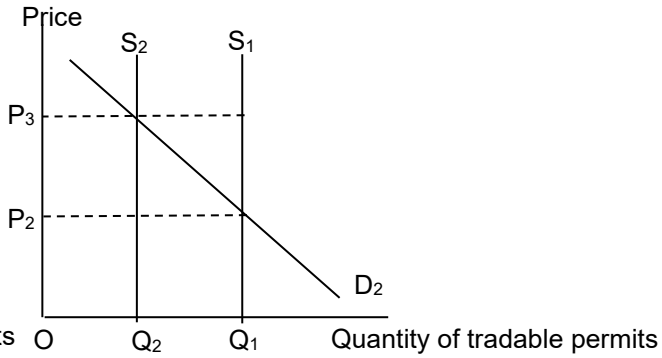


Figure 21: The Market for Tradable Permits

In the event that the socially optimal level of pollution falls in the future, the government can then reduce the quota for tradeable permits. Figure 21 shows a fall in the quota for tradeable permits, shifting S_1 curve leftwards to S_2 curve. The price of these permits rises from P_2 to P_3, ceteris paribus.

Advantages

- By setting a limit or a cap on the level of permissible pollution, a socially optimal level of emissions can be targeted and a reduction in overall pollution level is highly possible. The government can thus achieve its desired level with greater certainty than using taxes and subsidies. Every year, the government can progressively reduce or increase the number of permits issued according to the magnitude of the current pollution problem to bring about socially optimal outcomes.

- Tradeable Permits System is more cost-effective than regulation. If firms can cut back on their emissions at a relatively low cost, it is in its interests to do so and sell excess permits for a profit. Firms that can only reduce pollution at high cost will be forced to buy additional permits. In this way, most of the greenhouse gases are reduced by firms that can reduce emissions using relatively low-cost procedures. This allows pollution to be reduced at a lower cost to society than using regulation.

- The system encourages the promotion of cleaner and greener technology to reduce pollution as it provides firms with the incentives to reduce their emissions further since they can sell any of their excess permits for a price.

Why Emissions Trading is More Effective than Command and Control

Disadvantages

Tradeable permits, like pollution taxes, pose problems of implementation. Some of these involve technical difficulties, high costs in measuring pollution, and high costs in setting up a mechanism of monitoring and verifying actual emissions as noted below:

- Tradeable permits are subject to many technical difficulties. For instance, if the government is too generous in the number of permits issued, the desired level of emissions level will not be achieved. Tradeable permits also require the government to determine not only the amount of pollutants emitted but also to set a maximum level for each type of pollutant for which permits will be distributed to the polluting firms. The latter task involves having technical information on how much of each pollutant is acceptable from an environmental point of view, which is often debatable. Up to today, there is much controversy among scientists over the extent of harm done by each type of pollutant. It will also not lead to an efficient level of emissions unless the efficient level of total emissions is known to start with but it is difficult to measure the optimal level of emissions.

- Tradeable permits scheme can result in high administration costs because the greater the number of firms, the more difficult it is to enforce the policy, and hence the higher the number of regulators needed to be employed to enforce the policy. Fines for non-compliance will need to be high enough to ensure that firms do not try to cheat the system. Otherwise, firms may attempt to deceive the regulators rather than pay for the permits.

- A method must be found to distribute permits to polluting firms in a fair way. Issues of political favouritism may come into play as governments give preferential treatment to their supporters.

See how a "Climate Club" is the way to go

2.3 DIRECT PROVISION OF GOODS THAT ARE UNDER-CONSUMED / PRODUCED

Governments are frequently involved in the direct provision of goods and services with positive consumption externalities and those that may be under-consumed due to information failure. The most important examples include government provision of education and healthcare in all countries in the world. Education and healthcare are merit goods with external benefits so huge and important that it is widely believed that they must not be left to the private sector provision alone. In most countries where there

is government provision of healthcare and education, there is also private sector provision of these services (though to varying degrees).

2.3.1 JOINT PROVISION BY THE GOVERNMENT

Recall: What are the reasons for the under-provision of healthcare and education in the free market?

Joint provision of a merit good in this case involves the government supplementing what is being provided by the private sector. This is because even though the private sector has the incentive to produce/sell goods such as education and healthcare which are excludable and rivalrous in nature, the free market equilibrium output level of such goods is lower than the socially optimum level. The government, by choosing to act as a supplier of merit goods, seeks to achieve allocative efficiency and/or other social and ethical reasons in these markets. In the case of Singapore, there are plans to increase the percentage of government-supported pre-schools from current 65% to 80% as the government believes that a good pre-school education can help a child build a solid and strong foundation for life.

When the government supplements what is provided by the private sector, the market supply of the good increases from SS_0 to SS_1, which in turn leads to an increase in market output towards the socially desired output level from 0Qe to 0Qs via the price adjustment process (Figure 22). Allocative efficiency is achieved, eliminating deadweight loss of ABC to society. Additionally, the lower price of education or healthcare allows for low-income households to access such goods ensuring there is greater equity.

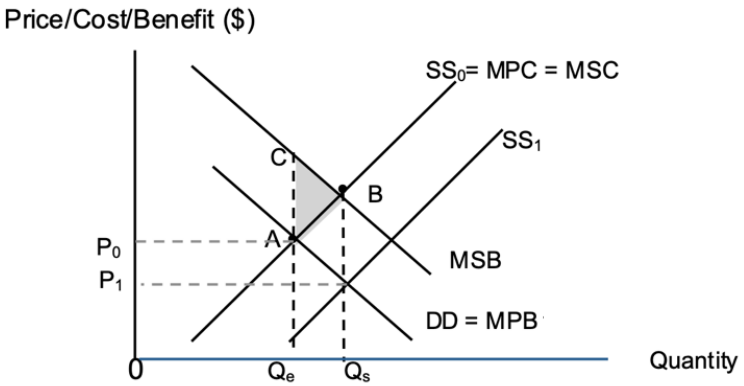


Figure 22: Government supplements the provision of education or healthcare

Sometimes to ensure equitable distribution when there is excessive income inequality or when there are significant positive externalities, the government may directly provide the good and make them available to its users at a zero price (with indirect subsidies).

An example would be the Singapore government providing free Covid-19 vaccination to all Singaporeans and long-term residents in Singapore. As the Covid-19 vaccine has high positive externality in consumption, there would be underconsumption at Qe, should the provision of Covid-19 vaccine be left to the provision of the private sector. In addition, low-income consumers may not be able to afford to pay for the vaccine which is inequitable.

According to Figure 23, when government sets price at zero, quantity demanded increases to Q_{foc}, which happens to coincide with the socially optimal level at $0Q_s$. Deadweight loss of ABC is eliminated, and allocative efficiency is achieved.

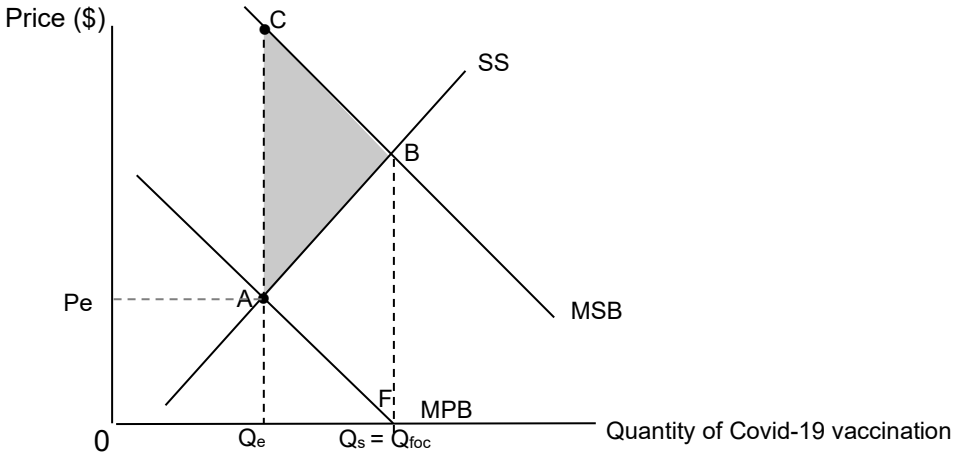


Figure 23: Free provision by the government for Covid-19 vaccination

Getting vaccinated against COVID-19 is one way to prevent the disease, minimise the risk of transmission, and prevent Singapore's healthcare system from being overwhelmed.

Advantages

- The advantage of direct provision is that the government has direct control over the supply of the good or service. By controlling the supply of these goods and services, the government can control not just their quantity, but also their affordability and quality.

Disadvantages

- In the real world, governments are unable to perfectly correct the under-consumption of goods. This is because in practice it is difficult to measure the size of external benefits and extent of underconsumption arising from imperfect information.

- The disadvantage of direct provision is that the production may be inefficient as employees of the state tend to have little or no incentive to keep costs at a minimum due to the lack of profit-motive.

- Direct government provision involves the use of government funds that rely on tax revenues. These funds have many alternative uses, each of which incurs an opportunity cost. Hence, it is not possible for the government to directly provide all types of goods and services which are under-consumed. Choices must be made.

- As the direct provider, the government needs to be aware of the costs of crowding out private sector activity. Where public sector bodies are engaged in mixed markets alongside private firms, it is important for the public bodies to ensure that they are not exploiting unfair advantages over the private sector and stifling innovation or improved efficiency that private firms may bring to the market.

Think!
Can you think of an example of a good which is directly provided by the government but is not free? Why do you think the government provides some goods for free but charges a price for others?

Section Summary:
- Externalities can be corrected by imposing tax rates equal to the size of marginal external costs and granting rates of subsidy equal to the marginal external benefits. However, it is difficult to set the right amount of tax/subsidy due to the lack of information.
- Regulatory bodies may be set up to monitor and control activities that generate externalities or are related to merit/demerit goods, but these are typically time consuming and expensive.
- The govt may directly provide a good to **supplement** what is insufficiently provided by the private sector.

2.4 DIRECT PROVISION OF PUBLIC GOODS

In correcting the market failure due to zero-provision of public goods (for example, national defence, street lighting, protection of Singapore against rising sea levels), the government's only feasible option is to provide these goods and services directly and fund them through taxes because public goods are non-excludable and non-rivalrous. Once provided for, public goods are non-rejectable.

New S$5 billion Coastal & Flood Protection Fund

In the Singapore context, the Singapore government provides national defence and street-lighting directly. The Ministry of Defence manages the army while the Singapore Land Transport Authority manages the streetlights along public roads since the free market often cannot provide such public goods. The Minister for Environment and Water Resources takes charge of preparing Singapore for rising sea levels using the S$5 billion Coastal and Flood Protection fund.

To decide whether or not it should go ahead with the direct provision of a particular public good, the government needs to weigh the total social benefits against the total social costs of providing a public good.

To decide whether or not it should undertake an additional activity, the government needs to weigh the expected MSB against the expected MSC of undertaking the additional activity. Efficient allocation of resources requires that the MSB from providing the public good to be equal to the MSC of doing so. (Refer to Section 7 for more details)

Advantages

- Without government intervention, public goods would not be provided. A missing market in this case may indicate a significant loss to society's welfare. For instance, street lighting will enhance security in urban areas and to improve the quality of life by artificially extending the hours in which it is light so that activities can continue to be carried out by the community. Street lighting also improves safety for drivers, riders, and pedestrians.

Disadvantages

- The benefits from and costs of providing public goods are often highly uncertain. For instance, it is in practice difficult to measure the size of the marginal private benefits generated from the provision of public goods because there is no effective demand or price signals for public goods due to the free rider problem. Putting a monetary value on benefits like safety and security is also difficult. Herein lies the major difficulty in calculating expected benefits, i.e. ascertaining the market price of the good as such a good has no price (which is a gauge of its value to consumers). Demand for such goods is thus estimated through surveys or votes, and this information is used in cost-benefit analysis. The efficient provision of public goods, however, depends on the ability to get people to reveal their true preferences. Yet the free rider problem incentivises consumers to conceal their willingness to pay. Hence allocative inefficiency tends not to be achieved for public goods.

How likely would government failure result from the provision of a public good such as flood control?

- Direct provision of public goods is financed through the taxes that the government collects. This means that there will be opportunity costs associated with acquiring these taxes, and society's welfare could be reduced.

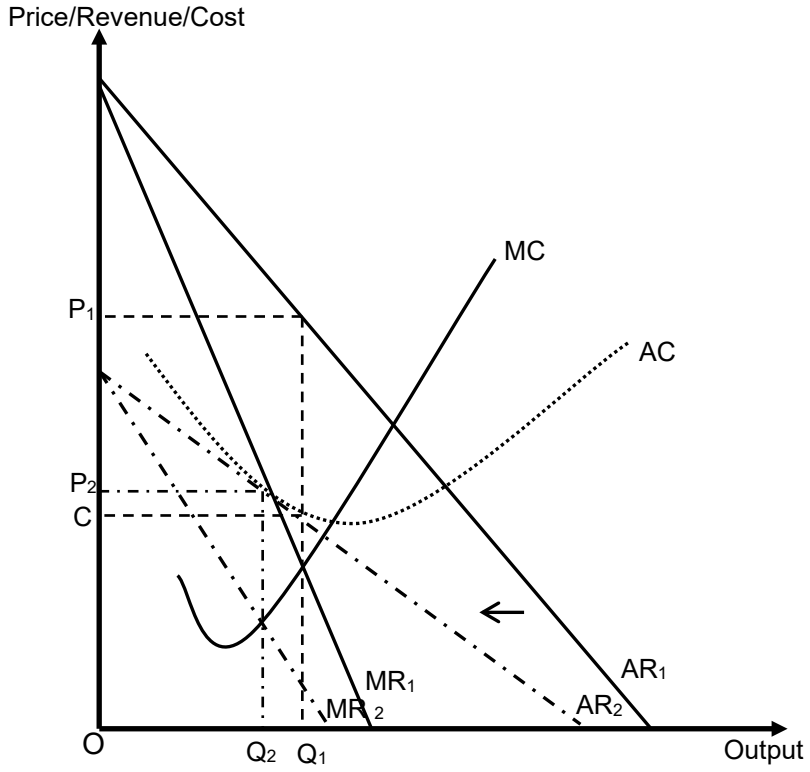
2.5 MEASURES TO REGULATE MARKET DOMINANCE

Firms with market power, namely, monopolistic and oligopolistic firms can restrict output to set a higher price at their profit-maximising equilibrium (compared to the perfectly competitive equilibrium). The under-production of goods results in allocative inefficiency. Moreover, the high price results in an appropriation of consumer surplus. Such inequity in distribution is further worsened by the concentration of supernormal profits in the hands of these select few firms.

2.5.1 REDUCING BARRIERS TO ENTRY

A range of possibilities exists here. Good examples can be found in the telecommunications industry where government's deregulation of access ensures that firms continue to compete among themselves. In Singapore, the telco industry used to be dominated by three key players, Singtel, Starhub and M1. In recent years, the government has lowered the entry barriers by issuing more licenses to other operators such as TPG and My Republic to operate in Singapore. This ensures greater competition and lower prices of telco services.

Assuming total market demand for the service/product remains unchanged, the entry of new firms will cause the <u>demand for the existing firm's product to fall</u>. At the same time, demand for the firm's product also becomes <u>relatively more price-elastic</u> as more substitutes are available, which is illustrated by the leftward shift of the firm's demand curve from AR_1 to AR_2 (Figure 24).



<u>Figure 24: Impact on consumers, firms and society due to lower BTE</u>

Advantages

- Increased competition results in a reduction in the difference between the existing firm's profit-maximising price and marginal cost. Hence, exploitation of consumers and allocative inefficiency are reduced. In addition, the fall in the existing firm's

profits will cause the firm to have less incentive to be X-inefficient. Income distribution will also be more equitable because profits will be spread among more firms.

Disadvantages

- Lower profits will affect the firm's ability to do research and development and innovate, hence quality and/or choices may stagnate in the future, adversely affecting dynamic efficiency.

2.5.2 ANTI-TRUST (ANTI-MONOPOLY) LAWS

Anti-trust or anti-monopoly laws seek to promote or maintain market competition by regulating anti-competitive conduct by companies. They were introduced to curb collusive behaviour and the growing concentration of economic power. It takes the view that protecting the interests of consumers (consumer welfare) and ensuring that entrepreneurs have an opportunity to compete in the market economy are important objectives.

Amazon marketplace seller fined for price fixing

These laws set limits on firms' behaviour by:

- Prohibiting certain kinds of anti-competitive or restrictive practices that tend to lead to a firm acquiring a dominant position in a market. Such practices include price fixing and predatory pricing where the firm deliberately sets its price below the cost of production. It does this in order to destroy competition as current rival firms are forced out of business or a potential new firm is dissuaded from entering the market, which thus maintains or strengthens the monopolist's position. In Singapore, the Competition and Consumer Commission of Singapore (CCCS) is empowered to check and take to task any firm found guilty of anti-competitive behaviour. In 2018, CCCS fined 4 electronic firms a total of $19.5m for price fixing behaviour. Fines are imposed if any firm is found guilty of anti-competitive behaviour.

- Supervising the mergers and acquisitions (M&A) of large corporations, including joint ventures. Transactions that are considered to threaten the competitive process can be prohibited altogether or approved subject to conditions such as an obligation to divest part of the merged business or to offer licenses or access to facilities to enable other businesses to continue competing. Courts are empowered not only to stop such practices but also to break up a monopoly firm into smaller independent units if it has become too powerful.

Disadvantages

- It is difficult, costly and time-consuming to prove that companies are engaging in anti-competitive behaviour. For instance, it is difficult to ascertain if the lower price is due to a fall in costs of production, fall in demand or predatory pricing. It is also difficult to tell if existing firms are exiting because they are inefficient or because of anti-competitive practices engaged by more dominant firms. These laws may also prevent the benefits of mergers to be enjoyed, where cost savings due to internal economies of scale could lead to lower prices for consumers.

  Perhaps the key issue is not whether selling below cost is harming competitors, but whether it harms consumers by leaving them with fewer choices, lower quality and higher prices.

2.5.3 REGULATIONS ON STANDARDS OF PROVISION

Laws on certain standards of provision try to ensure that there is a guaranteed quality of product or service provided in monopoly markets. In Singapore, the Land Transport Authority (LTA) governs the standards of public transportation. It penalises, with hefty fines, train operators, which fall short in their service standards through the frequency of train breakdowns.

M1, Starhub fined for internet service outages

Disadvantages

- The problem with using legislation and regulations is that enforcement of such laws or regulations may be difficult and expensive. Constant monitoring is needed and this can translate into high costs for the government. In addition, for the law to be effective, the penalties for breaking the law must be sufficiently harsh.

2.5.4 PRICE REGULATION (MC OR AC PRICING POLICY)

Governments can regulate a natural monopoly's pricing by requiring the firm to employ MC pricing, that is to set price at marginal cost or employ AC pricing, which is to set price at average cost.

MC pricing: Referring to Figure 25, with marginal cost pricing (P=MC), social optimum is achieved at 0Qs because the consumers' marginal benefit from the last unit sold is equal to the marginal cost of producing that last unit. However, at 0Qs, since AR is less than AC, the natural monopolist may have to face losses unless government subsidizes the producer.

AC pricing: By setting prices at average cost (P=AC), however, the monopolist will be able to break-even (lowest effective price), but the output level at $0Q_{AC}$ will still be less than the socially optimum output 0Qs.

Think! Which policies in the section do you think apply to a private monopoly? Can and should a government impose MC or AC pricing on a private monopoly?

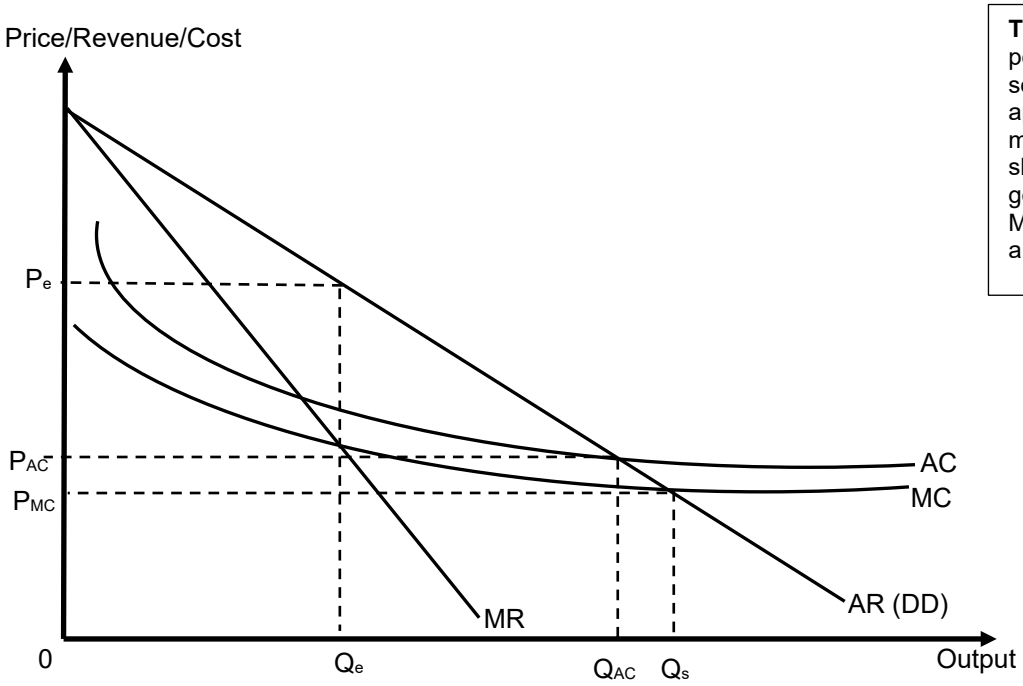


Figure 25: Regulating a natural monopoly

Advantages

- Compared to the unregulated profit-maximising price 0Pe, both average cost and marginal cost pricing reduce price and increase output, thus increasing consumer surplus, which is a measure of consumer welfare.

Disadvantages

- If the government chooses to use MC pricing, while the socially optimal level of output is produced, the natural monopoly makes subnormal profit and the government has to subsidise it, otherwise it will shut down. In this case, the government incurs the opportunity cost of such spending, and may risk the natural monopoly becoming complacent, in the absence of other forms of regulation and monitoring.

- If the government chooses AC pricing, the natural monopoly is able to make normal profits, but the socially optimal level of output is not reached. In this case, the government has to decide whether Q_{AC} is close enough to Q_s – i.e., the government must weigh the benefits and costs of such a policy.

- Another limitation is that revenue and cost curves can only be estimated by the government as the regulated firm may withhold or distort information by overstating its costs.

2.5.5 LUMP-SUM TAX TO REDUCE EXCESSIVE MONOPOLY PROFITS

A government wishing to tackle the problem of excessive monopoly profits can impose a lump-sum tax on the monopolist. As a lump sum tax is a fixed amount regardless of output level. It is thus a fixed cost to the firm. As illustrated in Figure 26, since the lump sum tax is a fixed cost, it will only shift the AC curve upwards, keeping the MC curve unchanged. Profits thus continue to be maximised where MC = MR, at the output level Q_1 and price level, OP. However, profits are reduced from area [1 + 2] to area 1 alone. Area 2 now represents the amount of tax paid to the government. If the lump-sum tax were large enough to shift the AC + lump-sum tax curve upwards such that it is tangent to the AR curve at point *a*, then all the supernormal profits of the monopolist would be taken as tax.

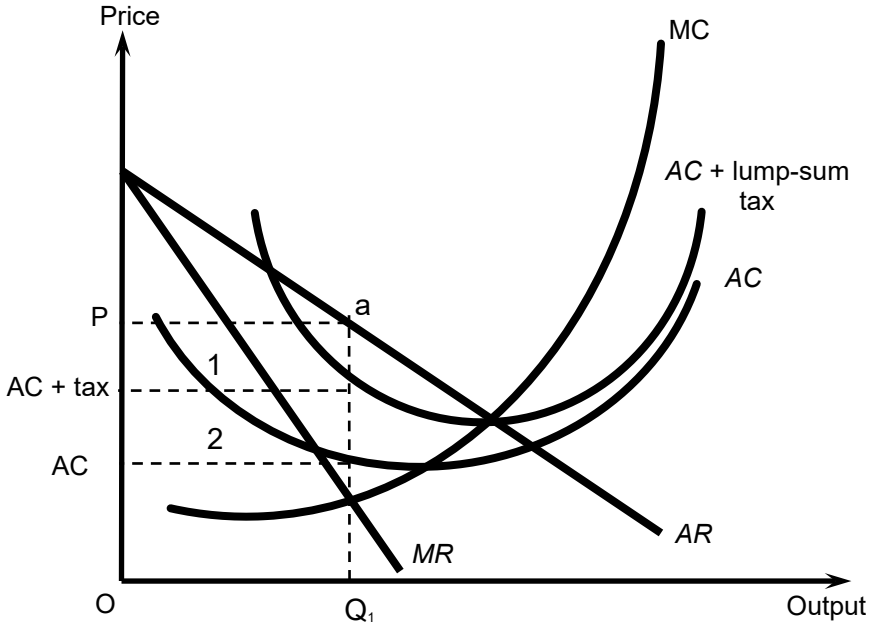


Figure 26: Lump sum tax to reduce monopoly profits

Disadvantages

- While supernormal profits may cause income inequality, it can be useful in providing the incentive and the means for research and development which can lead to dynamic efficiency for society. Thus, while a tax on monopoly profits reduces income inequality, it may conflict with other economic objectives such as economic growth and efficiency.

2.5.6 INDIRECT SUBSIDY TO INCREASE MONOPOLY'S OUTPUT TOWARDS ALLOCATIVE EFFICIENT LEVEL

To address the under-production of the monopoly's output, the government can use indirect subsidies to regulate the monopoly's output.

Referring to Figure 27, if the government wishes to increase the monopolist's output to the socially efficient level of Q_s, it could do this with a per-unit subsidy (which shifts both AC and MC curves downwards). The required level of subsidy will be that which shifts the MC curve downwards to the point where (MC – indirect subsidy) curve intersects MR at output Q_s. Hence, the socially efficient output level Qs is achieved.

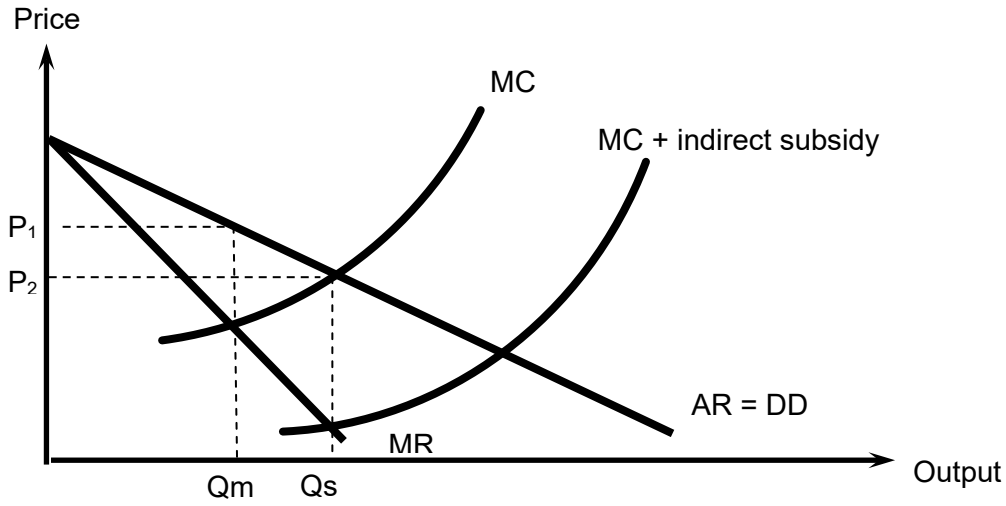


Figure 27: Indirect subsidy to increase monopoly's output

Disadvantages

- The main limitation is that such subsidies may further increase the supernormal profits of the monopoly and hence worsen income distribution. Thus, such a policy is unlikely to be implemented unless the good is of great importance to the society.

2.6 NATIONALISATION

Nationalisation refers to a transfer in ownership of a firm away from the private sector and towards government ownership. A nationalised firm is a government owned firm.

Advantages

- Nationalisation is particularly beneficial in the case of natural monopolies because the government can act in the interests of the public to promote equity, which is to ensure that prices are lower and output greater than that under an unregulated monopoly.

Could airlines be nationalized?

- Nationalisation may also result in higher investment than if they were under private ownership when government provides funds for investment purposes. For example, many governments invested heavily in the state-owned railway system. This resulted in fast, efficient transport services, with obvious benefits to commuters and the economy generally. A good case for discussion is the proposal by some economists to nationalise the MRT train services in Singapore, in view of how the under-investment in the maintenance of the rail system under private ownership has resulted in frequent breakdowns of the services in recent years.

- Nationalisation is often undertaken to protect strategic industries, such as the water industry.

Singapore Rail System

- Instead of nationalizing the entire MRT services, there was transfer of ownership of the rail assets previously held by SMRT to LTA under the New Rail Financing Framework (NRFF).
- It puts LTA in the driving seat to make timely investments in capacity expansion and the replacement and upgrading of operating assets.
- Without ownership responsibility, SMRT can better focus on the rail network's operations and maintenance.
- The shortened operating licence allows LTA to re-tender the operation of rail lines more often, making the industry more contestable;
- A new set of maintenance performance standards will improve maintenance performance and the reliability of the rail system.
- The NRFF provides for some risk and profit sharing to make the rail system more financially sustainable. This mitigates both the downside and upside for SMRT. The operator's Licence Charge will be increased if its profits are higher than expected; similarly, any under-performance will be subsidised by LTA.

Commuters are the main beneficiaries of the NRFF, says LTA. This is because rail services will be more responsive to increased ridership, because LTA decides on costly capacity expansion, not the operator. LTA will also be able to ensure more timely replacement and upgrading of the operating assets.

New Rail Financing Network

Disadvantages

- Nationalised industries tend to be more inefficient than privatised industries. Under nationalisation, other objectives tend to be more important than maximising profits. For example, a nationalised industry may be reluctant to get rid of surplus workers due to political reasons (bad publicity). The private firm, on the other hand, may be more willing to cut costs and improve efficiency because in the private sector, managers are accountable to shareholders, who will want a good return on their investment. Nationalised industries are also protected from competition; hence they tend to become increasingly X inefficient and dynamically inefficient.

- Nationalised industries are also prone to suffer from moral hazard, which occurs whenever individuals or organisations are insured against the negative consequences of their own inefficient behaviour. For instance, if a particular nationalised industry made operating losses, the government can cover those losses with subsidies. Knowing that the government would come to the rescue meant that the inefficient behaviour of the nationalised industry can continue.

Section Summary

- Laws and regulatory bodies can be used to control activities of monopolies and oligopolies which are against public interests.
- Legal controls are usually easier and simpler to operate than taxes. However, they tend to be a rather blunt measure.
- Taxes and subsidies can be used to affect monopoly price, output and profits. Subsidies can be used to persuade a monopolist to increase output to the socially efficient level. Lump sum taxes can be used to reduce monopoly profits without affecting price and output.
- Price control at MC and AC pricing forces the firms to produce at the optimum output level and to produce at the lowest effective price without losses respectively.
- Nationalisation is the most extreme form of government intervention and one that is usually avoided.

2.7 MEASURES TO MANAGE INFORMATION FAILURE

Information failure occurs when people have inaccurate, incomplete, or misunderstood data and so make potentially 'wrong' choices, resulting in underconsumption or overconsumption of goods and services from society's point of view.

The government may have a case for intervening in markets where information failure is a serious problem. Possible government responses to the problem of information failure are the provision of information through education and campaigns as well as regulation.

2.7.1 EDUCATION AND CAMPAIGNS

Governments influence the behaviour of consumers through public education and campaigns. It is hoped that through education and campaigns, private demand would move to the socially desirable levels, causing firms to produce at levels (the equilibrium output) that correspond with the socially optimal output.

Covid-19 vaccination campaign video

No Vaping Campaign Video

(A) The Case of Imperfect Information

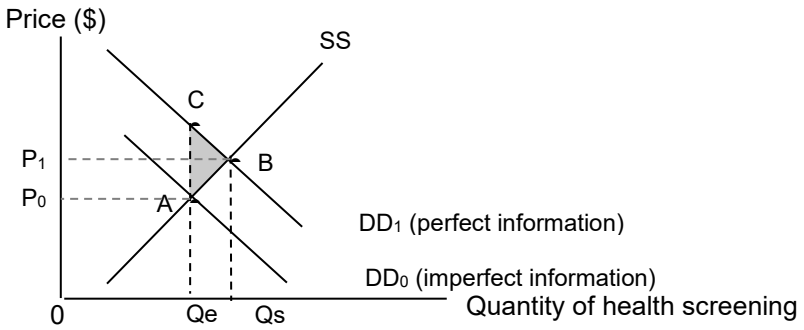


Figure 28: Encouraging consumption when there is imperfect information

Referring to Figure 28, when the government educates consumers via campaigns or supplying information directly to them about the full private benefits from consuming healthcare screening services or vaccination. In the case of Singapore, the government has produced a series of short films calling on citizens to take the Covid-19 vaccine.

Information about the benefits of Covid-19 vaccination was also disseminated online via the use of easy-to-understand infographics. Consumers who are more accurately informed will seek to maximise their self-interests by increasing their demand for these services from DD_0 to DD_1. Via the price adjustment process, the socially desired output level 0Qs will be achieved. Thus, with perfect information, consumers will not only maximise their own well-being, but also society's well-being.

Education / campaigns can also be applied to address over-consumption of goods due to information failure.

(B) The Case of Asymmetric Information

Recall that asymmetric information occurs when one party in a transaction or contract has more information on the characteristics or action taken than the other, which can result in adverse selection and/or moral hazard. For example:

- Sellers of used cars have information about vehicles' defects but are unlikely to reveal to them to potential buyers.
- Private doctors may prescribe treatments that are expensive or unnecessary to increase their income or profit.

HSA warns against 4 'weight-loss' products

Government agencies may respond to the above problems by directly supplying information to consumers through avenues such as posters, mass and/or social media campaigns, and road shows. This may include information on the quality of medical care by different providers and health hazards related to different products or substances. In some countries, e.g. in Singapore, the government provides fee schedules (such as the costs of common surgical procedures or consultations) and guidelines for services to ensure that consumers are aware of the various prices or availability of services. Education and campaigns seek to influence demand so that the socially desired output level will be achieved and the deadweight loss arising from underconsumption or overconsumption will be eliminated.

Advantages

- If information failure is the source of market failure, education and campaigns will effectively target the root cause of information asymmetry in the above cases.

Disadvantages

- There are difficulties involving the accurate collection and effective dissemination of all the necessary information to consumers.
- Public education and campaigns are costly and may drain government resources as these are normally done through roadshows, mass community events, media advertisements which tend to be large scale and pervasive.
- Public education and campaigns are ineffective in the short run as changing consumers' habits, values, attitudes, and mindset require a long time period to achieve the desired outcome.

Note: Legislation and regulation has been addressed under Section 5.2.2. Can you illustrate how the policies will work to address imperfect information?

2.7.2 LAWS TO ADDRESS CONSEQUENCES FROM ASYMMETRIC INFORMATION

(A) ADVERSE SELECTION IN THE GOODS MARKET

In order to prevent a missing market from arising or an over-representation of bad quality goods and an under-representation of good quality goods from arising in a market, the government can pass consumer protection laws, such as the "Lemon Law". The "Lemon law" is a law designed to protect consumers against defective goods that fail to conform to contract, or meet satisfactory quality or performance standards at the

Limits to Squeezing of Lemon Law

time of purchase, colloquially known as “lemons”. A consumer would be able to make a claim for the defective product sold to him/her within a few months of purchase. It is compulsory for a seller of a defective product to repair, replace, refund or reduce the price of the defective product (subject to certain conditions). The law corrects for any asymmetric information that the seller has but the buyer does not because the law reduces the incentive of the seller to lie about the quality of his or her product, hence targeting the adverse selection problem.

Disadvantage

- Sellers might opt not to sell their products in countries with “lemon laws” if they find the lemon law requirements prohibitive. Hence, consumers in the country could face a reduced range of goods, particularly at the lower end, if any regulations are framed too strictly.

(B) ADVERSE SELECTION IN THE HEALTH INSURANCE MARKET

In order to prevent a missing market from arising or an over-representation of unhealthy buyers and an under-representation of healthy buyers from arising in the health insurance market, the government has made it mandatory for Singaporeans to participate in MediShield Life, a social health insurance to provide lifelong coverage of medical care to Singaporeans. By making participation mandatory, adverse selection gaps found in voluntary and opt-out schemes can be avoided.

Medishield Life: Some Challenges to Consider

Consumers can also be required to provide accurate and complete information regarding the existing state of their health when buying products like health insurance, failing which they will not be eligible for their health insurance pay-out benefits. The MediShield Life Scheme Bill, introduced in Parliament in January 2015, gives the Singapore authorities wide-ranging powers to access the income and medical records of all Singaporeans and permanent residents to calculate the premiums and subsidies each individual is liable to pay or receive respectively.

Disadvantages

- The Medishield Life scheme can influence medical decisions and can lead to hospitals and doctors pressuring patients to opt for unnecessary medical care for certain diseases which can result in the moral hazard of healthcare overconsumption. If there are weak management and accountability systems, inefficiencies will probably be perpetuated because there is a tendency to spend more than necessary and pass the costs to the government to finance.

- The lack of privacy demanded by the 2015 MediShield Life Scheme Act appears onerous. Financial and health details are extremely personal matters, and few would want to make them available to others, except for a very good reason. In that light, the power by the taxman to check a person's income and his health status through medical records at hospitals, without his explicit consent, is not a negligible issue. Although there is a clause which would allow those who find the checks too intrusive to prohibit them, they would lose out on certain benefits of the scheme.

Avoiding Moral Hazard of MediShield Life

(C) MORAL HAZARD PROBLEM

To address the moral hazard problem, the government can make it compulsory for the buyer of insurance to pay for part of the cost of damages or make partial payment for healthcare bills compulsory (these payments are known as ‘out-of-pocket payments’ or co-payments). By making the buyer face the consequences of irresponsible or risky behaviour, the buyer will have less incentive to engage in irresponsible or risky behaviour.

2 Quick Fixes to Rein in Healthcare Costs

Disadvantages

- There are positive and negative consequences of the implementation of co-payments as a source of the healthcare financing. On the one hand, co-payments increase awareness of treatment costs which helps prevent overconsumption and burdening of the state. It also limits unnecessary use of healthcare services, reducing waiting times for everyone else. On the other hand, co-payments may prevent the sick and disadvantaged from accessing needed care. Some degree of co-payments is useful to reinforce responsible service utilisation and appreciation of the true costs of services, but co-payments cannot be so high as to deter consumers from seeking appropriate healthcare or to encourage them to 'cut corners'. Co-payments thus need to be affordable for the poor, otherwise differences in access to medical services across society will become apparent and healthcare systems will fail to respond equitably to everyone's needs.

Revisiting Co-payments

Section Summary

- The government may provide information in cases where the private sector fails to provide an adequate level and results in misallocation of resources.
- Legislation may also be used to make it compulsory for producers to release relevant information necessary for consumers to make informed choices, especially in the case of asymmetric information.

2.8 POLICIES TO DEAL WITH DIFFERENT FACTOR IMMOBILITY

Government policies to deal with the different types of factor immobility (or structural unemployment) will be touched upon briefly and will be explored in greater depth and evaluated in Year 6 under Macroeconomics.

2.8.1 POLICIES TO REDUCE OCCUPATIONAL IMMOBILITY

The government can invest in training schemes for the unemployed to boost their human capital by equipping them with new skills and skills that can be transferred from one occupation to another. Education and training can help to improve the skills and quality of the work force. Educational policies can be geared towards meeting the needs of the industries.

In addition, the government can subsidise the provision of vocational training by private firms to raise the skills level of the unemployed. Improved training opportunities, especially vocationally oriented education for those who have lost their jobs in an old industry, can improve the occupational mobility of workers in the economy too. This helps to reduce the problem of structural unemployment as well as the loss of potential output that can result from unemployment.

2.8.2 POLICIES TO REDUCE GEOGRAPHICAL IMMOBILITY

Policies to reduce geographical immobility include relaxing immigration policies and restrictions. In addition, increasing awareness and information on job situations, reforms to the housing market designed to improve the supply and reduce the cost of rented property as well as increase the supply of affordable property can help with managing geographical immobility.

To what extent do you think geographical immobility applies to Singapore?

Disadvantages

- Often, policies to invest in the training of an efficient labour force (through education) require a long time period and hence, can take a relatively long time for the effects to be seen. Outcomes of the policies may also be uncertain as they depend on the receptivity of the policies. For example, schemes involving the

training of workers may be met with initial resistance, especially by the older workers.

- These polices would also require significant government expenditure which may be restricted by the fiscal and reserves position of countries (to be covered in greater detail in Year 6 under Macroeconomics). For example, given the size of the government debt in nations like Greece in 2010, it is difficult to implement education or training programmes for its workers.

2.9 POLICIES TO ENSURE GREATER INCOME EQUALITY & EQUITY

The unequal distribution of income and wealth which leads to inequitable outcomes are often corrected with the following forms of government intervention:

2.9.1 MINIMUM WAGE LAW / PRICE FLOOR IMPLEMENTATION

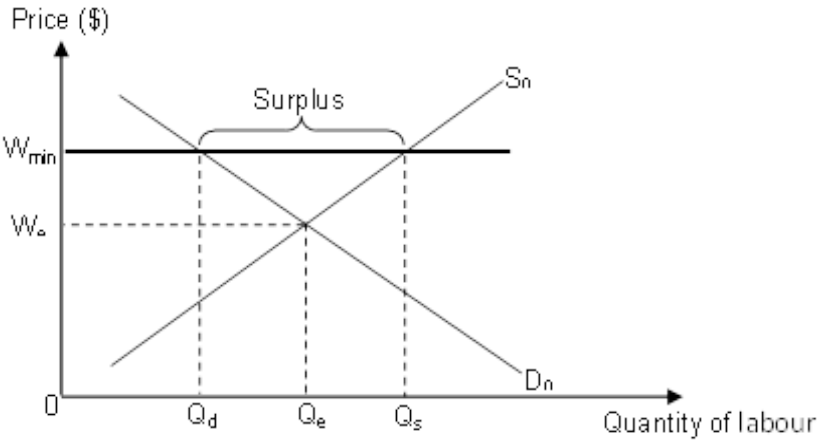


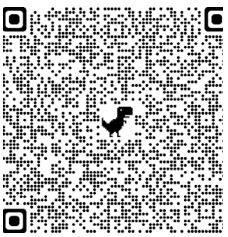
Figure 29: Minimum wage policy

With reference to Figure 29, a minimum wage (W_{min}) has to be set above the existing equilibrium wage rate (W_e) to be effective. This is implemented to help lower-income workers and reduce wage inequality. However, with the higher wage rate, employment falls as firms reduce their quantity demanded for labour from Q_e to Q_d. Unemployment of Q_s-Q_d results. There are workers who want to work at W_{min} but cannot find work. Therefore, a minimum wage can also be seen to lead to productive inefficiency since labour resource is not used to its maximum capacity. Such a measure benefits those workers who retain their jobs by guaranteeing them a higher wage, while those who are retrenched due to the higher minimum wage will be worse off.

2.9.2 MEASURES TO INCREASE PRODUCTIVITY OF WORKERS

Demand for high skilled workers is higher because these workers are more productive. Therefore, if low skilled workers are able to increase their productivity, they can find employment easily and at higher wage rates. For example, Singaporean workers are encouraged (through subsidies) to attend courses provided by the government under various programmes like SPUR (Skills Programme for Upgrading and Resilience, 2009) and Workfare Training Support (WTS) Scheme to upgrade their skills. The improvement in skills leading to an increase in labour productivity will increase the demand for labour, which in turn, will lead to increased wages.

2.9.3 MEASURES TO REDUCE SUPPLY OF LOW SKILLED WORKERS


Foreign Worker Levy, Budget 2019

A large supply of low skilled labour is likely to dampen wage rates in the market, especially in countries which rely heavily on foreign workers. The supply of low-skilled labour can be reduced by restricting the number of low skilled labour from overseas. For example, in Singapore, imposing higher levy on the employment of foreign workers and restricting the issue of work permits reduce the influx of low-skilled foreign labour and thus increase the wage rate. As the wage rates at the lower end of the income earners increase, it will prevent further widening of the income gap in society.

2.9.4 TAXES AND SUBSIDIES TO REDUCE INCOME INEQUALITY

A responsibility of the government is to modify rewards so that income inequality is reduced by taxes, subsidies or transfer payments.

(A) Taxes (Direct Taxes)

Traditionally, governments use taxes to achieve a more equitable distribution of income. A progressive tax system, based on the 'ability to pay principle' can have the effect of redistributing income and wealth from the rich to the poor.

A progressive tax structure is one where a higher tax rate is imposed on the higher income group and a lower tax rate on the lower income group.

(Tax structures will be further discussed in Year 6 under Fiscal Policy)

While income should be "fairly" distributed between the rich and poor, what is considered "fair" is highly controversial. The rich person's concept of fairness tends to be very different from the poor person's concept of fairness. Remember again that an equitable distribution of income is not the same as an equal distribution of income, and different people will have different views on what is equitable.

Disadvantages

- High income taxes reduce the reward to individuals for their work effort and savings, particularly among high-income earners, who are taxed more heavily. This has the effect of reducing the quantity of labour offered in the market, as well as the willingness to save.

- High administrative costs of running the redistribution program (the tax system).

(B) Subsidies (includes transfer payments and welfare benefits)

Distribution of income to the lower income group can also be achieved through many different types of subsidies, welfare benefits and transfer payments by the government. These may be divided into two main types - cash benefits and benefits in kind.

Cash benefits are seen as subsidies to a person's income. Some examples are child-care benefits, income supplement given to low-income families and old age pensions paid out to retirees.

Benefits in kind refer to goods and services which may be provided free or at a reduced price to low-income households. Examples of benefits in kind include subsidised health care at public clinics and hospitals, and free transportation and food vouchers given to lower income families.

Disadvantages:

- Subsidies and transfer payments are usually financed with tax revenue, and these can be a drain on government finances if the tax collection falls short.
- In the case of some western countries, the amount of subsidies and welfare benefits that a low-income individual receives can breed complacency and

reliance; where the individuals would rather collect welfare payments than find work. This results in a long-term burden on the government, while reducing the labour supply in the economy.

2.9.5 OTHER POLICIES

Other than implementing policies to reduce income inequality, the government can implement the following policies to improve inequity and the standard of living of the lower income households.

(A) PRICE CONTROLS IN THE MARKET FOR NECESSITIES

A government may implement controls on prices of necessities, for example accommodation, to ensure that the poor have access to these essentials. This could be done through rent controls which is to set a price ceiling on property rentals so that the poor can afford a roof over their head.

Recall the main causes of inequitable outcomes: income inequality and high prices.

However, a price ceiling such as rent controls to help the poor may not benefit them. On equity grounds, it is somewhat arbitrary as to who gets and who does not get housing at the lower rent. In the long run, landlords who keep their property available for rent may cut maintenance costs and let their property fall into disrepair.

Another example to help reduce income gap would be price supports on agricultural products, designed to help poor farmers sell their crops at a minimum price. However, this may bring little benefit to the poor farmers if large, wealthy farmers are the main producers and stand to gain most from the minimum price implemented.

(B) GOVERNMENT PROVISION

One cause of poverty is the lack of education or inadequate provision of health care services. Poor levels of education and health may be seen as preventing individuals from achieving satisfactory levels of incomes. If the government were to devote more resources to expenditure on education and health, then this would tackle some of the root causes of poverty and reduce the extent of income inequality.

In the long run, the most promising government anti-poverty policies are those that deal with the root causes of poverty rather than its symptoms. Polices to reduce the causes of poverty include reducing discrimination against minorities and subsidising investment in human capital, which would include both education and on-the-job training. Perhaps the key to reducing income inequality and poverty is for the economy to sustain a high level of employment. This will create income for those who work and tax revenue for the government to fund welfare schemes for those who face the greatest risk of poverty.

Section Summary

- To ensure greater income equality and equity in the economy, a government may use taxes, subsidies and implement legislation and regulation like minimum wage policy and other price controls. These serve to re-distribute income from the higher income groups to the lower income groups.
- Other policies to increase the skills level of the lower income group so that they can earn a higher wage rate is especially targeted to help them move up the income ladder.
- The most promising government anti-poverty policies are those that deal with the root causes of poverty rather than its symptoms.

3 APPLICATION TO THE SINGAPORE CONTEXT

This section highlights the different policies the Singapore government has currently adopted to address the various sources of market failure in Singapore. The economic analysis and framework to the various policies have been taught in detail in the previous sections. Please refer to the previous sections for the detailed economic framework.

3.1 SOLVING TRAFFIC CONGESTION & AIR POLLUTION

If left to the free market, the usage of cars will be higher than the socially desired level of usage. This is because car usage generates significant negative externalities. However, in the pursuit of self-interest, car users ignore the negative externalities that are generated. For instance, when people use their cars, not only do they incur private costs like the cost of petrol, oil, wear and tear and so on, they also cause third party effects. These negative externalities include pedestrians suffering from exhaust fumes, the delay to other road users caught in traffic congestion, noise pollution to homes located along congested roads etc. These negative externalities translate into external costs like higher medical costs and loss of productivity of third parties. In Singapore, due to her limited land space, rising income and increased population, traffic congestion is a growing problem.

The following analysis examines the problem of road congestion generated by commercial vehicles. This means that negative externalities generated by these car journeys are negative production externalities.

Referring to Figure 30, the number of car journeys produced (or car usage) under free market forces will be $0Q_e$ at $0P_1$ where MPB=MPC. On the other hand, the allocative efficient number of car journeys produced, or car usage level is $0Q_s$ where MSB=MSC. A deadweight loss of ABD is generated from allocating too many resources to car journeys if left to free market forces. Producers of car journeys (drivers) ignore the negative production externality thus allowing the free-market price to be lower than what it would be if such negative externality is considered. Hence, there is a need for the government to intervene using policies like Electronic Road Pricing (ERP), Certificates of Entitlement (COE) and Public Transportation.

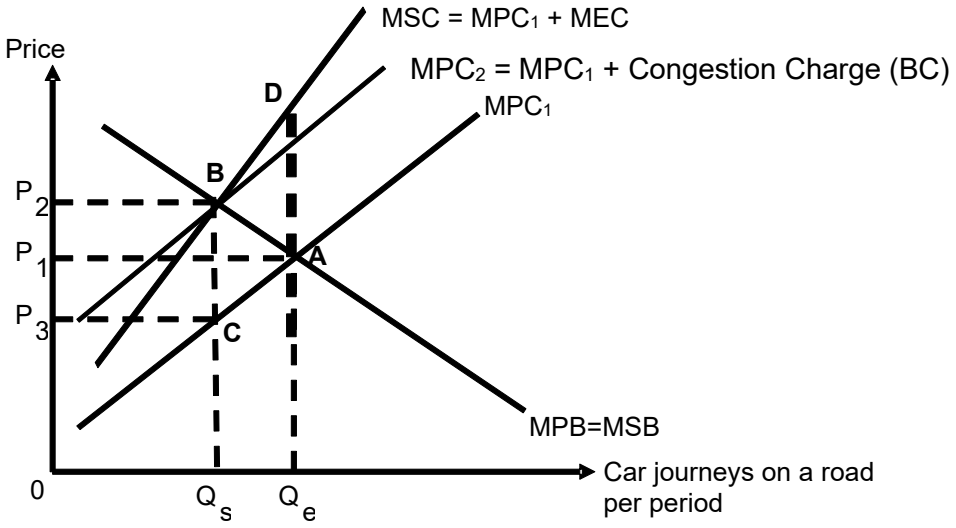


Figure 30: Negative externality in producing a car journey

(A) MANAGING CAR USAGE – CONGESTION CHARGES: ERP

Congestion charges work by requiring motorists to consider the cost of congestion borne by others as a result of their driving. The Electronic Road Pricing (ERP) system works like a tax which has the effect of increasing the marginal private cost of producing a car journey or car usage on the road. Under the ERP system, a congestion charge (P_2P_3) equivalent to the MEC at Q_s (BC) is deducted electronically whenever a vehicle uses a priced road. Motorists are encouraged to decide whether to drive, when to drive and where to drive. They may choose a different route, mode of transport, time of travel, or not travel at all. Those who choose to pay and stay on the road will enjoy a smoother ride. As a result of the ERP, the external costs would be internalised by the driver. The market is now allocatively efficient and the allocatively efficient level of 0Qs at $0P_2$ is achieved.

Application to Behavioural Economics:

The ERP system is such that each time a car passes under a gantry, a beep is heard. This increases the **saliency** of the policy – drivers are made more aware of the charge.

Advantages:

- Congestion charging is the most direct way of tackling congestion as it tackles car usage. ERP enables congestion to be managed in a more targeted way. Charges vary by time and location, based on traffic speeds on the roads. Through regular rate reviews, ERP charges are adjusted upwards or downwards to keep traffic flowing smoothly, while not underutilizing the roads.
- It is fair as charges are based on usage so those who contribute more to the congestion pay more. Those who use the roads less frequently or who travel during non-ERP hours will pay less or not need to pay at all.

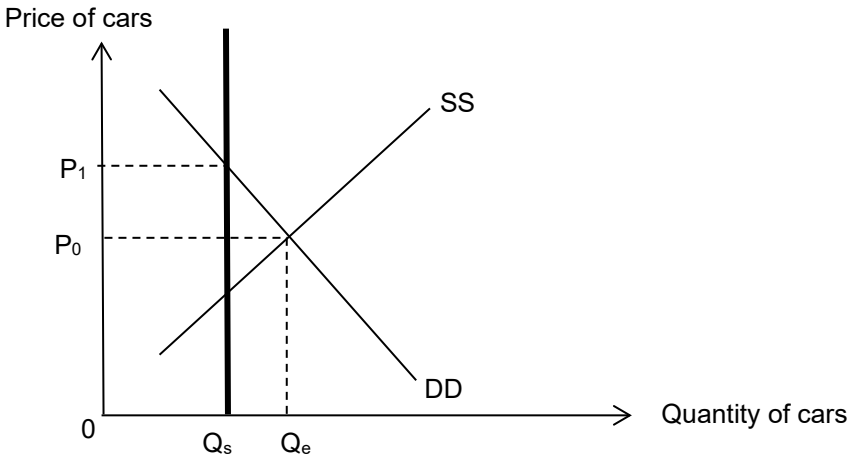
Disadvantages:

- Public acceptance is a key stumbling block to its widespread adoption internationally. This is because congestion pricing entails the pricing of a service – travel on urban roads – that was previously provided 'free'.
- The building of the ERP gantries also incurs a cost to the government.

(B) MANAGING CAR OWNERSHIP - QUOTAS: COE

A good example of output control or quota can be seen in Singapore's Certificate of Entitlement (COE) Scheme which limits car ownership and the number of cars on the road. To purchase a car, buyers have to purchase a COE from the government. Each COE is valid for a period usually for 10 years. The number of COEs released each year is determined by the targeted vehicle growth rate. This is aimed at reducing traffic congestion and air pollution (negative externalities).

Do you know what is Singapore's targeted vehicle growth rate? Find out!



COE trends & how it is determined

Figure 31: Imposition of a COE (Quota) in the car industry

Referring to Figure 31, the free market equilibrium output level is $0Q_e$. However, assuming that the allocative efficient number of cars is $0Q_s$, there is an overproduction and consumption of cars by Q_sQ_e. The COE (or the quota) can limit the maximum number of cars traded to $0Q_s$. This can help to mitigate traffic congestion indirectly by limiting the number of cars on the road.

Advantages:

- Limiting car ownership and hence number of cars on the roads can lead to reduction in air pollution and more efficient (less congested) transport network.
- Since COEs are provided by the government, the COE premiums collected goes to the government who uses the revenue collected for financing land transport and public transport development that benefit society at large.

Disadvantages:

- Congestion is due to car usage and not the mere possession of cars. Thus, ownership measures are a blunt instrument. Ownership controls cannot manage localized congestion unless car ownership is curbed to a very large extent.

- High car ownership costs may have the perverse effect of increasing car usage due to the sunk cost fallacy. In reality, motorists might not behave rationally by weighing the marginal benefits of car usage against the marginal costs. Instead, they consider the sunk cost expended on the COE premium. Once a car is bought, it is used very intensively to compensate for the loss incurred from the COE premium, which depreciates over a 10-year period. In addition, this will also reduce the price elasticity of demand for car usage, making drivers less responsive to a rise in ERP rates.

- The COE (or quota) causes the price of cars to increase from P_0 to P_1, leading to high price of car ownership. This can be a politically unpopular move. This is especially so in recent years, where the price of the COE has risen sharply (from roughly $10,000 in 2005 to more than $100,000 this year), often costing more than the car itself. This can be politically unpopular, since it is seen as pricing out the middle- to lower-income consumers, and increasingly being only a viable option for the rich.

- The COE displaces the price mechanism. This means that the output level is no longer responsive to changes in its price. In the absence of price signals, the onus lies on the government to predict as best as it can the socially desired level of output. However, the government also does not have perfect information. Given these limitations, legislation and regulations such as the COE policy can at best be only partially effective in reducing traffic congestion.

Application to Behavioural Economics:

Sunk Cost Fallacy is derived from the concept of a sunk cost i.e., an expenditure which cannot be recouped. The depreciation of the COE over a period of 10 years is viewed as a loss because it is a sunk cost.

(C) PROVIDING A QUALITY PUBLIC TRANSPORT SYSTEM

The government aims to provide an attractive public transport system to encourage people not to use their cars for work trips but to travel by public transport. By providing a public transport system that is fast, efficient, comfortable, affordable and convenient, this will help to improve the substitutability between public transport and cars and reduce the demand for cars, thereby minimising road congestion and pollution.

To achieve this, the government has to continue to expand Singapore's rail and bus network system, ensuring greater affordability, higher travel speed and greater predictability of arrival and departure times for the rail and bus network,

Disadvantages:

- Expensive
- Long time lag between building the infrastructure and realising the fruits of the policy

(D) PROVIDING A COMPREHENSIVE ROAD NETWORK AND MAXIMISING ITS CAPACITY

The government aims to continue to provide a comprehensive and efficient road network system that will ensure better connectivity between different parts of Singapore. Good connectivity will provide motorists a wider choice of routes and help distribute traffic flows and minimise road congestion, thus benefiting not only private transport, but also public transport such as buses. To serve the increased travel demand arising from economic development, new roads have been built while existing roads widened over the years (supply-side measures). Singapore has also tapped on the rapid advancement in computer, telecommunications and information technologies to make her road transport system safer and more efficient, thereby minimising road congestion and pollution.

For instance, the Expressway Monitoring Advisory System (EMAS), an intelligent incident management tool that manages traffic along Singapore's expressways. EMAS detects accidents, vehicle breakdown and other incidents promptly, ensuring fast response to restore normal traffic flow. It also provides travel time information on signboards before entering and along the expressways.

Intelligent Transport Systems

Disadvantages:

- Limited land space in Singapore and does not deal with the root causes of problem due to higher affluence and growing population
- Expensive
- Long time lag between building the infrastructure and realising the fruits of policy

Conclusion

Usage charges and high vehicle ownership controls in Singapore are different ways of accounting for the social costs of congestion. Over the years, the emphasis has shifted towards road usage, rather than ownership controls. By intervening in the market, the government has been able to manage traffic congestion via the use of price signals. In the area of public transport, the Singapore solution is a mix of government funding of infrastructure and private provision of public transport services.

Read more about our future policies

Satellite-based ERP

Singapore targets to halve peak emissions by 2050, achieve net zero emissions 'as soon as viable' in second half of century.

3.2 GOVERNMENT INTERVENTION IN EDUCATION IN SINGAPORE

(A) LEGISLATION: COMPULSORY EDUCATION

The Compulsory Education Act states that all Singapore Citizens born after 1 January 1996 and living in Singapore must attend a national primary school unless an exemption is granted. Parents that do not comply may be fined or jailed.

(B) DIRECT PROVISION WITH SUBSIDIES

Citizens enjoy heavily subsidised school fees at all government schools from primary school right up to university [1]:

Monthly fees for Singapore citizens (2025)	Primary school	Secondary school	Pre-university
School fees	Free	$5	$6
Miscellaneous fee*	$13	$20	$27
TOTAL	$13	$25	$33

*Same for all nationalities

To appreciate just how much education subsidies the government is giving Singaporeans, just compare this against how much PRs and foreign students need to pay to go to school here:

Monthly school fees (2025)	Primary school	Secondary school	Pre-university
Fees for Singapore citizens	$13	$25	$33
Fees for PRs	$305	$620	$700
Fees for international students (ASEAN)	$570	$1030	$1230
Fees for international students (non-ASEAN)	$985	$2050	$2400

[1] Autonomous school fees are higher, ranging from $3 to $18 a month, and independent schools charge anything from $300 a month.

(C) DIRECT SUBSIDIES - EDUSAVE

All Singaporean students will receive a yearly contribution in their Edusave accounts for their educational use. Each student receives an annual Edusave contribution of $230 at primary level and $290 at secondary level. The Edusave account can be used to pay for approved fees and enrichment programmes. Under exceptional circumstances, one-off grant may also be paid into the Edusave accounts of eligible students.

(D) ADDITIONAL SUBSIDIES FOR LOWER-INCOME STUDENTS - FAS

The Ministry of Education has the Financial Assistance Scheme (FAS) which provides financial assistance to needy Singapore Citizen students in government, government-aided schools, specialised schools, and institutes of Higher Learning so that all Singaporeans can benefit from the best opportunities in education. It also provides financial assistance to Singapore Citizen students from lower- and middle-income families in Independent Schools, except the Singapore Sports School and the School Of The Arts which have their own financial assistance schemes.

(E) OTHER POLICIES

- **Making preschools better and more affordable**

With the establishment of the Early Childhood Development Agency (ECDA) in 2013, the government has gradually increased the number of full-day preschool places from 90,000 to 180,000 and will grow to over 200,000 in the next few years with the opening of more government pre-schools. By around 2025, 8 in 10 children will have a place in a government-supported preschool.

The announcement of the Early Childhood Development Centres Bill in 2017 also provided a set of regulatory standards for preschools to adhere by.

Currently, all families with Singapore Citizen children attending childcare and infant care programmes receive a Basic Subsidy. Families also receive a means-tested Additional Subsidy. From 2024, the income ceiling to qualify for this additional subsidy is raised to $12,000 per month, up from $7,500. This will benefit around 30,000 more households.

Means-tested subsidies will also increase across all eligible income tiers, with lower income families receiving higher subsidies. Together with the fee cap for full-day childcare dropping by $40 a month to $640 at the five anchor operators (AOP), and $680 at 28 partner operators (POP), most families will pay between $3 and $441 a month for childcare. Over the longer term, these fee caps will be lowered further so that full-day childcare expenses will cost about the same as primary school fees plus after-school fees

- **Supporting low-income families**

<u>Preschool Outreach Programme</u>

Through a Preschool Outreach Programme, low-income families are encouraged to enrol their children in preschool. Outreach workers help families to search for an affordable preschool and assist in the preschool enrolment process. This includes guiding families with the registration process, preparing supporting documents for subsidy applications, and addressing other needs the family may have with regards to preschool enrolment.

3.3 GOVERNMENT INTERVENTION IN HEALTHCARE IN SINGAPORE

Quick Guide to Healthcare Schemes & Subsidies in Singapore

3.4 REDUCING INCOME INEQUALITY IN SINGAPORE

Progressive Wage Model (PWM)

The Progressive Wage Model (PWM) helps to increase wages of workers through upgrading skills and improving productivity. It is implemented via government levers in the cleaning, security, and landscape sectors. It sets wages for workers based on their skill levels. A worker starts at the base salary being paid to entry-level workers. As he undergoes training and becomes more skilled over time, wages will rise according to the scale set out by the framework.

Developed by tripartite committees consisting of unions, employers, and the government, the PWM helps to uplift low-wage workers in the cleaning, security and landscape sectors.

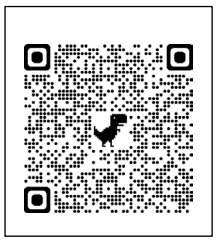
Wages in these sectors had stagnated due to widespread cheap sourcing. The low wages in turn resulted in high turnover and labour shortages.

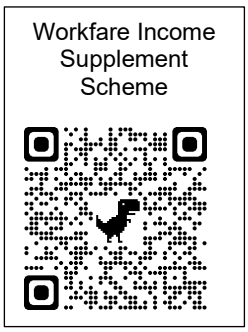
The PWM benefits workers by mapping out a clear career pathway for their wages to rise along with training and improvements in productivity and standards.

At the same time, higher productivity improves business profits for employers. Service buyers also enjoy better service standards and quality.

The PWM operates in tandem with the Workfare Income Supplement Scheme (WIS), in which the government supplements low-wage workers' incomes and CPF savings. There's also the Workfare Skills Support Scheme (WSS) which subsidises training programmes for people earning below a certain amount.

Commentary: Singapore's poorest earners will benefit from expansion of Progressive Wage Model but some conditions must be met





4 GOVERNMENT FAILURE

Government failure refers to situations where government intervention in the free-market increases market distortions and reduces economic efficiency and welfare and leads to worsening of the allocation of resources. Government failure could arise due the following reasons.

Why might a government fail to address the unintended consequences of a decision?

(i) Unintended consequences are not addressed

Unintended consequences can be positive or negative, but under government failure, the focus is to provide examples of negative unintended consequences. Some examples of unintended consequences had been explained in the earlier sections.

(ii) Imperfect information

The assumption in government intervention is that it knows best and that it has perfect information on everything in the market. However, this is not true in reality. Poor information on prices, weak valuation of goods/services, miscalculated long term benefits as well as behavioural changes can result in government implementing policies which do not result in an efficient outcome.

(iii) Bureaucracy and inefficiency of government intervention

Government intervention involves administrative costs. The more wide-reaching and detailed the intervention, the greater the number of people and material resources that will be involved. If the state employs too many resources or uses them inefficiently, economic welfare will be reduced.

(iv) Time lags

It takes time for a government to recognize that market failure is occurring, to draw up an appropriate policy measure and to implement it. By the time policy measures are introduced, the problems may have become acute, requiring more radical measures, or economic circumstances may have changed, necessitating different measures.

(v) Shifts in government policy

The economic efficiency of an industry may suffer if government intervention changes too frequently. It makes it difficult for firms to plan ahead and allocate their resources efficiently if they cannot predict tax rates, and subsidies.

(vi) Rent seeking

This occurs when corrupt government officials maximise their own self-interest e.g., receiving kickbacks from projects instead of aiming to maximise society's welfare. This often takes place when there is poor governance, weak institutions, or widespread corruption in the public service. It could also be due to the principal-agent problem i.e., those enacting policies are not in control of the actions of the officials implementing these policies on the ground.

5 APPLICATION OF BEHAVIOURAL ECONOMICS

The foregoing discussion has mostly assumed (implicitly) that economic agents are fully rational and are able to maximise their self-interest in their decision making. In reality, policymakers are aware that agents are not fully rational for various reasons and try to nudge agents to make better decisions for themselves and to maximise society's welfare. These nudges are adaptations of existing measures to improve their effectiveness.

(i) Increasing salience

The first method is to increase the salience of an existing policy by ensuring that it is more noticeable to economic agents. For example, the Health Promotion Board can increase the salience of a no smoking educational campaign, by displaying gory images of tumour infested organs on cigarette packages and posters. Such images will be imprinted in the minds of consumers and will be recalled with ease when they make the decision to smoke. Hence the campaign is likely to be more effective in reducing the demand for cigarettes. In the same way, a road tax such as the ERP can be made more salient by generating a beeping sound from the in-vehicle unit to remind motorists that they are paying for their road usage.

(ii) Ensuring convenience

To nudge consumers to choose the preferred option e.g., to get vaccinated, the government must ensure that the intended option is the most convenient one. For instance, during the Covid-19 pandemic, the Singapore government had created many satellite vaccination centres in the various constituencies, to ensure that it is convenient for consumers to get jabbed. Households with elderly members could also opt for a house visit for free. This was one way in which Singapore achieved one of the highest vaccination rates in the world. The policy of subsidizing vaccination would be less successful if it was inconvenient for individuals to visit the vaccination centre.

(iii) Appealing to loss aversion

Behavioural economics posits that the stick is more effective than the carrot when designing policy schemes due to loss aversion. Hence taxing sugary soft drinks and fat foods might be more effective than subsidizing healthier alternatives. This is because consumers place more value on the loss of a given amount of income than a gain of the same magnitude.

Limitations of behavioural approaches

Behavioural nudges build on existing policy measures and are not meant as a substitute for existing policy tools and so there will always be issues that nudging alone cannot solve. And that's fine - Because nudging was never designed to replace the platforms and tools governments are already using-- incentives, information, legislation. Nudges are meant to support, augment and inform on the specific implementation of the policies.

Section Summary

- Cognitive biases may reduce the effectiveness of current measures to address market failure. This is because economic agents are not perfectly rational and therefore will not respond to policies in the way that is idealized in traditional economic theories.
- With the knowledge of these biases, the government may apply measures which complements existing policies to nudge the behaviour of economic agents to achieve the intended outcomes.

APPENDIX 1: MORAL HAZARD AND SUPPLIER-INDUCED DEMAND

Asymmetric information is everywhere in our daily life and we often seek professional services or advice precisely because the professionals have better or more information on a situation than ourselves. For example, when we feel unwell, we visit the doctor's to seek their opinion on our health because we believe they know more about our health and have better information on how best to treat our potential illness. Similarly, when we need legal advice, we engage lawyers whom we believe can better assess the situation and offer us their professional advice. In short, in the provision of professional services, asymmetric information is the selling point that consumers seek.

While most professionals exercise their information advantage over consumers carefully without abusing it, some professionals may unfortunately use their superior information to advance their own profit motives and consequently levy unnecessary costs on consumers. Moral hazard arises and it often manifests in the form of supplier-induced demand.

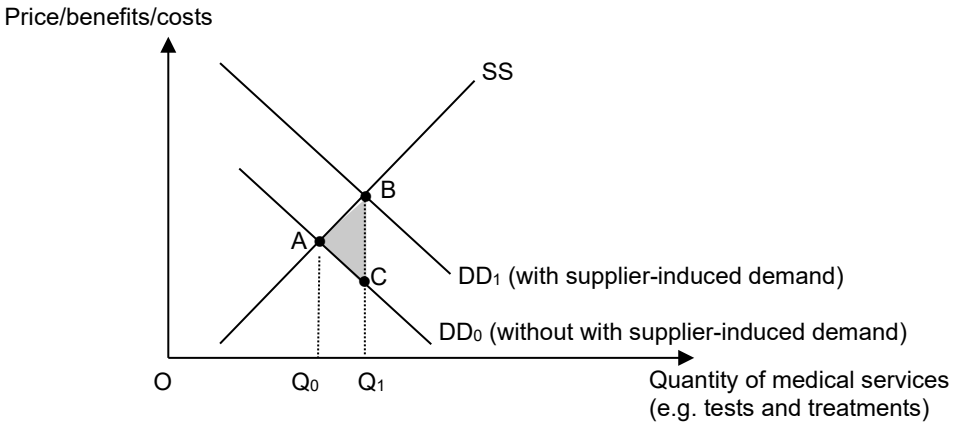


Figure A1: Market for Medical Services

Suppose you seek medical consultation for a health condition from a physician. The doctor knows more about your health condition and the appropriate tests or treatments you need. The doctor also knows that it is difficult for you to find out whether his advice is 'good' advice due to the professional nature of medical services. You need to rely on the doctor (or the supplier of the medical service) to provide you information on diagnosis and treatment. Thus, in pursuit of higher profits and financial gains for his own clinic, the doctor may prescribe more medical tests and use more expensive medicines than necessary for your treatment, inducing you to have a higher demand for the consumption of such non-essential tests or treatments than you otherwise would if you have perfect information about the situation. In Figure A1, your demand (with supplier-induced demand) at DD1 is higher than the demand (without) at DD0. With moral hazard from the doctor, you would over-consume the medical services at Q1 than the socially optimal level at Q0. A deadweight loss of Area ABC is incurred by the society as too much scarce resources are allocated to the medical services market due to supplier-induced demand and moral hazard. Hence, the market fails.

It is important to note that asymmetric information itself is not the issue here because it is the very nature of such professional services. What led to moral hazard and market failure is the professionals' profit-maximising motives and their behaviors to use their information advantage at the expense of the consumers. Thus, government would need to regularly monitor and audit the integrities of the professionals. The act of medicine students pledging to follow the Hippocratic Oath is also ways that the society nudges professionals to follow a certain ethical standard and code of conduct.

NOTES

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Section A: Case Study Questions

Question 1: Market Failures in the Vietnamese energy market

Extract 1: Global demand for coal falls in 2016 for second year in a row

The use of coal in energy production has the effect of generating extensive carbon emissions. Global demand for coal has fallen for the second consecutive year, according to a recent report, helped by the United States (US) and China burning less coal, the dirtiest of the fossil fuels. The United Kingdom (UK) was described as the most extreme example of the trend away from coal. Its use of the fuel has returned to levels not seen for around 200 years. The 1.7% fall in worldwide consumption in 2016 marks a striking reversal of fortune for coal, the demand for which grew faster than any other energy source until four years ago.

In the US, a boom in power generation from cheaper, cleaner gas produced using a technique called fracking has led to coal being replaced as a source of energy. In China coal consumption has now been declining since 2014. This is because its economic boom slowed, causing a decline in industries that use a lot of energy, such as iron, steel and cement. In addition, China has seen enormous investment in renewable energy. As a result renewable energy prices have been falling. China is now seen as a global leader in combating climate change.

In the UK, three major coal-fired power plants were closed down in 2015 as a carbon tax was introduced. Coal consumption in the UK fell by 52.5% in 2016 and the trend away from the fuel has continued this year. In addition the UK government introduced an effective minimum price for coal in 2015 that was increased in 2016. These two measures suggest that prices can work in influencing consumer and producer behaviour.

An analyst in the UK said the shift away from coal was striking. 'The US saw a 9% fall in demand, while Chinese demand for energy is being limited by moves to a more sustainable growth pathway and the rapid expansion of renewables, which spells even further trouble for coal in the years to come,' he said.

Demand for coal has also fallen globally in recent years as a result of the rapid growth of renewable power generation. Wind, solar and other renewable power sources grew faster than any other source at more than 14% in 2016. However, energy demand growth globally was weak. Nearly all the growth came from developing countries, with China and India accounting for around half of new demand. It is reported that, as a result, global carbon emissions are unchanged for the third year in a row.

Source: Adam Vaughan, *The Guardian*, 13 June 2017

Extract 2: Vietnamese government aims for competitive energy market

Vietnam's government has assigned the Ministry of Industry and Trade (MoIT) to create a competitive market for coal. The state would gradually remove its control in the market while ensuring supply and demand balance. This is part of the Vietnamese government's policy of opening markets to private enterprise. It also plans to sell a 34.7% stake in the state-owned power producer Vinacomin, worth about 3.3 trillion dong (US$145.4 million). The state, which owns 99.7% of Vinacomin, the country's state-owned monopoly coal producer, also plans to reduce its stake in this firm to 65%.

Hanoi has been striving to reduce its stake in a range of state-owned enterprises, many of which are inefficient and have low profitability, but the progress has been slow. Vietnam's reform drive, however, picked up pace after Nguyen Xuan Phuc became Prime Minister in April 2016.

Source: *Reuters*, 27 July 2017

Extract 3: Vietnam faces an energy dilemma

Vietnam plans to rely more heavily on coal-fired power plants by 2030. The country's current energy plan calls for more than 50% of its electricity production to come from coal by 2030, as compared with roughly a third in 2015. Unless this plan can be reversed, it is not only bad news for the Southeast Asian nation already suffering from severe air pollution but also for international efforts to battle climate change.

Only a few years ago, Vietnamese officials held out great hope for nuclear power plants that were to be built by the Russian state company Rosatom, but the Vietnamese government decided that the costs were too high. As a result, nuclear power seems out of reach. In addition, Vietnam's hydropower has now reached its maximum capacity with no room for further growth. The renewable energy sector remains undeveloped. These factors have led Vietnam to plan to use more coal-fired power to keep up with growing demand for energy.

Vietnam's Deputy Prime Minister has stated that coal-fired power will remain the country's main source of electricity until 2030 and possibly even longer. The Deputy Director of Electricity of Vietnam (EVN), the state-owned electricity company, said in the same report that coal-fired power plants' emissions will be 'minimised by the application of modern technology'. EVN, however, could be part of the problem. A former US diplomat and Vietnam expert has written that EVN has been at least until recently 'bloated and inefficient, dependent on old methods, and overly fond of yesterday's technology'. Long after Vietnam introduced economic reforms in other sectors, Soviet-style planning survived at EVN and also at state-owned Vinacomin, which is a powerful monopoly in the market for coal.

This raises questions about how the notoriously inefficient EVN would be able to handle an expansion of Vietnam's electricity infrastructure as it moves to accommodate increased power demands. EVN itself has reported that its productivity was only a tenth of Singapore's electricity industry, three quarters of Malaysia's, and less than half of Thailand's. It is predicting however that Vietnam's productivity can be boosted to the point where it will reach Malaysia's level by 2020.

It was noted in a scientific journal earlier this year that until now Vietnam has failed on a wide scale to enforce environmental protection laws. A recent study concluded that pollution from coal had led to some 4300 premature deaths in Vietnam in 2011. In the latest development, it was reported that Vietnam had cancelled a controversial plan to dump some one million cubic metres of a mix of sediment, silt, and sand from a power plant into the sea. The plan had been met with strong opposition from local residents and fishing industry workers, who argued that the waste would destroy coral reefs and fishing grounds.

On a potentially positive note, Hanoi, the capital city of Vietnam, has produced a plan to reduce another source of air pollution – an estimated five million motorbikes spewing so much gas into the air that breathing can often be difficult. Under the new plan, city residents would gradually switch to public transportation, with a ban on motorbikes coming into effect by 2030.

But Hanoi residents express doubts that the city can put into place a public transport system that would enable the switch away from motorbikes. In addition, some complain that the plan would be unfair to the majority who cannot afford to buy cars. Currently, Hanoi has limited bus transportation, with fewer than 10% of residents using buses, and there is no metro or underground system. An alternative policy is 'road pricing' where motorists would be charged to use busy roads at certain times.

Source: *Asia Times*, 17 August 2017

Questions

(a) With reference to Extract 1, identify a demand factor and explain how it has affected demand for coal in the US. [2]

(b) Using the evidence in Extract 1, explain whether the cross elasticity of demand in China between coal and renewable energy is positive or negative. [3]

(c) Using a diagram and Extract 1, explain how the UK government's change in the minimum price of coal in 2016 is likely to have affected the UK market for coal. [3]

(d) With the help of a diagram, explain how a rise in the demand for coal in Vietnam is likely to affect its social welfare. [4]

(e) Discuss whether the Vietnamese government's plan to ban motorbikes and switch travel to public transport is likely to be better than a policy of road pricing in improving air quality in Hanoi. [8]

(f) Discuss whether the Vietnamese government's plans to remove state monopolies and create more competitive markets in energy provision will, on balance, improve economic efficiency in Vietnam. [10]

[30 Marks]

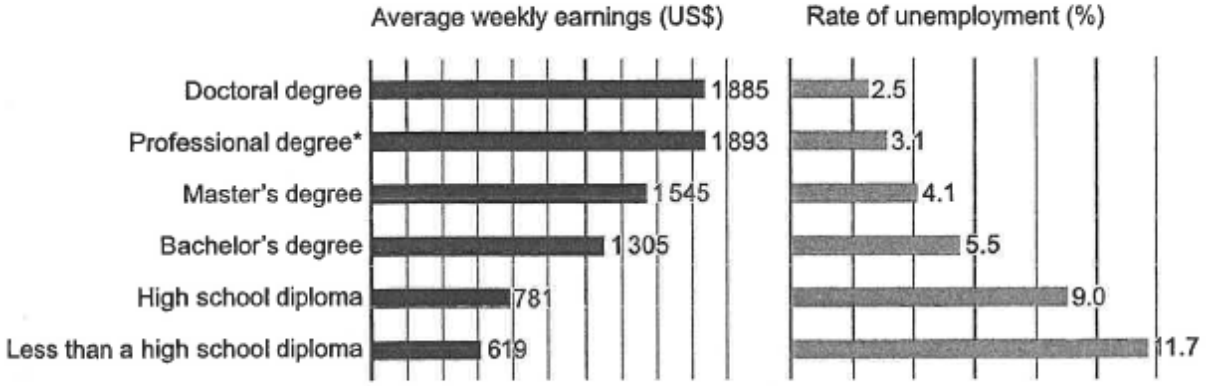
Question 2:

Question 1: Costs and benefits of education

Extract 1: The costs and benefits of Higher Education

Higher Education (HE) refers to the education of students at universities or similar establishments to graduate with a range of different degree level qualifications.

Figure 1: Earnings and unemployment rates by educational attainment, United States (US), 2020



*e.g. pharmacy, medicine, law and teaching

Sources: US Bureau of Labor Statistics, 21 April 2021

Costs and benefits of HE in the United Kingdom (UK)

Between 1970 and 2020, the number of students undertaking HE in the UK increased by over 400%. This increase in HE has to be paid for. Free market economists argue that, as students enjoy additional private benefits from their HE, they should cover the costs. Estimated additional career earnings of graduates compared to non-graduates, after direct taxes and student loan repayments have been paid, was over £252 000 for women and over £168 000 for men. These are the marginal private benefits.

The marginal private cost of HE, including tuition fees and other private costs of education (travel, books etc.), was over £31 000 for a student graduating in 2021. Living costs are not included, as it is argued that young people will incur these whether they go to university or not. Wages forgone must also be included as a private cost. These have been estimated at over £17 000.

It is not only the individual who benefits from HE. Society enjoys an even greater benefit from HE than does the graduate. For example, the extra tax paid by graduates compared with non-graduates is over £300 000 for women and over £260 000 for men. This is a marginal external benefit.

Source: adapted from The Economic Inefficiency of Student fees in England, Intergenerational Foundation, *April 2017*

Extract 2: The returns to investment made in education

Table 1: Private and social returns to investment in education by per capita income and educational level

	Private return (% per year)			Social return (% per year)		
Countries	Primary education	Secondary education	Higher education	Primary education	Secondary education	Higher education
Low-income	25.4	18.7	26.8	22.1	18.1	13.2
Middle-income	24.5	17.7	20.2	17.1	12.8	11.4
High-income	28.4	13.2	12.8	15.8	10.3	9.7

The private return is the annual rate of return to an individual on the investment made in education. The social return is the annual rate of return in the form of external benefits to society on the investment made in education.

Recent research indicates that the social rates of return in the table are under-estimates of the true returns because of the omission of benefits that cannot be easily expressed in monetary terms, such as reduced mortality rates and lower crime rates. In fact, the social rate of return to investment in education could be 50% higher than the one traditionally estimated.

Source: Returns to Investment in Education: World Bank Group, *April 2018*

Extract 3: Education and the demand and supply of labour

On average, the difference between the earnings of a university graduate and a high school leaver who does not enter HE is significant in most countries. This difference can, in part, be explained as the increase in productivity that HE gives to individuals. The difference in earnings can also be caused by differences in supply.

A well-trained and educated workforce is likely to be in high demand by employers. Demand will be lower for a workforce that is not well-trained or educated because employers will need to spend a significant amount of time and money training that workforce.

The higher the level of education required for a particular career, the lower the supply of labour. For example, there is a lower supply of medical doctors than nurses because of the additional training required to be a medical doctor.

Source: Principles of Economics, Rice University, *September 2021*

Extract 4: Educating children

Given the evident benefits of a basic education, why do so many children in so many countries not get one? According to economic theory, the under-provision of a product that is clearly desirable stems from market failure. This can arise from problems on both the demand and supply sides of the market.

The cost to households is one obvious reason why demand for education might be low, given that poor families must first meet their essential needs, such as food and shelter. Education costs could include tuition, books, school supplies and there may be expenses for transport and clothing.

Effective demand for education may be low because of the opportunity costs of educating children. Parents may need their children to work to supplement the household income, or to care for sick or dependent family members. Opportunity costs may make even free schooling unaffordable for some families.

Demand for education is also affected by its perceived value. Parents may not have enough information to assess the private return on an investment in their children's education accurately. They may see the private return as too low to justify the cost, perhaps because of the poor quality of the education available to their children. They may simply be unaware of the opportunities that exist, especially if they are poorly educated themselves.

There may be problems with supply. A government may lack sufficient resources to provide educational services or be administratively incapable of channelling resources to the schools that need them. Government-financed schools may exist in urban areas but not in rural areas or may vary greatly in quality. Such schools may be ranked as a low priority by the country's economic and political leaders. Public resources may be wrongly diverted from education to other projects that serve the interests of economic and political leaders.

Source: Educating Children in Poor Countries, Economic Issues no 33, IMF, *2004*

Questions:

(a) With reference to Figure 1, compare the potential benefits for a graduate in the US with a Bachelor's degree to a school leaver who has a High School Diploma. [2]

(b) With reference to Extract 1 and using a supply and demand diagram, explain **one** possible reason for the higher average earnings of graduates with a Professional degree compared to those with a Bachelor's degree. [3]

(c) 'Opportunity costs may make even free schooling unaffordable for some families.' (Extract 4)

Explain **one** example of an opportunity cost that might make free schooling unaffordable. [3]

(d) Explain how asymmetric information may lead to wrong choices in the market for education. [4]

(e) The government of a low-income country wishes to increase spending on education.

With reference to Table 1, discuss whether the government should concentrate this increase in spending on primary education. [8]

(f) Discuss whether equity issues are more important than market failures as a reason for the government to intervene in the market for education. [10]

[Total: 30]

Section B: Essay Questions

1 Discarded plastic and carbon emissions are among the biggest causes of pollution. The environmental damage to the air and water runs into billions of dollars. This affects not only our health but also our food supply.

(a) Explain how pollution leads to market failure. [10]

(b) Discuss the extent to which government policy measures are likely to address this market failure. [15]

Variant Question
Discarded plastics leach into the water degrading the water quality with toxic compounds and end up harming human and animal health. The Green Rewards scheme, which offers customers a 10-cent rebate when they bring their own bags to shop at FairPrice stores, is set to end on 1 August 2018. While there has been an increase in the number of plastic bags saved, progress has plateaued out.

(a) Explain why the consumption of single-use plastic bags might lead to unintended consequences on society. [10]

(b) Explain why the consumption of single-use plastic bags might lead to unintended consequences on society. [15]

2 Street lighting is considered to be a public good. However, there are also negative externalities resulting from the generation of electricity for the lighting on the environment and the effect of bright street lights on wildlife.

(a) Explain two different reasons for the market failure associated with the provision of street lighting. [10]

(b) Discuss the extent to which a government should intervene in the market to ensure that the benefits of street lighting can be obtained while minimizing the negative impacts. [15]

Variant Question
There is considerable agreement over the need for governments to provide public goods. There is less agreement over the extent to which markets fail because of imperfect information.

{a) Explain why markets might fail in the case of public goods and where information is imperfect. [10]

(b) Discuss whether government intervention is better than efforts by individual supermarkets to manage the problem of single-use plastic bags. [15]

3 The markets for health care and health insurance fail for many reasons. Market failures in health care and health insurance mean that government intervention can raise welfare by improving how those markets function.

(a) Explain how different types of information failure can cause each of the above markets to fail. [10]

(b) Discuss the effectiveness of various government interventions to correct failure in each of these markets. [15]

Variant Question

There was a serious outbreak of flu (influenza) across the world at the beginning of 2018. In many countries, vaccinations were provided free of charge to the most vulnerable people and various Health Authorities urged the elderly and children to get vaccinated as soon as possible.

(a) Explain why vaccinations against infectious diseases, if left to market forces, might be allocated undesirably. [10]

(b) Suppose the government decides to intervene in the market and subsidise vaccinations against infectious diseases.
Discuss whether government subsidy is the best policy to ensure vaccinations are allocated desirably. [15]

4 Market dominance is the main factor determining the profitability of firms.'

(b) Discuss whether government intervention is always needed when a firm dominates the market. [15]

5* A firm's decisions and strategies are influenced by the level of competition in the industry. Its decisions and strategies might also be influenced by consumer's cognitive biases and concerns about the environment.

(b) If markets fail due to a lack of competition, discuss whether consumers will be disadvantaged and what might be the most appropriate form of government intervention. [15]

**Appeared in Firms & Decisions Tutorial Essay Q4b*