

# ANGLO-CHINESE JUNIOR COLLEGE JC1 Economics

# H2

# MARKET FAILURE AND GOVERNMENT INTERVENTION

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### WHAT IS THIS TOPIC ABOUT?

- Due to the central economic problem of scarcity, resources need to be allocated in ways that bring about the most efficient outcome.
- In the free market, the price mechanism is the primary means by which resources are allocated and this would bring about efficiency in resource allocation.
- However, these conditions must be present for price mechanism to bring about efficiency:
  - There are price signals to 'direct' resource allocation.
  - $\circ$  No third-party effects (externalities) in consumption or production
  - The market is perfectly competitive.
  - Perfect information in the market.
  - Perfect factor mobility.
- When any of these conditions is not met, resource allocation becomes inefficient (market failure). Examples of the market failure:
  - Missing market for public goods.
  - Under or over-consumption/production due to externalities.
  - Underproduction due to market dominance (H2 only).
  - Collapse of market or under/over consumption/production due to information failure.
  - Inefficiencies due to factor immobility.
- Due to these market failures, the government has to step in to correct them in order to achieve an efficient and equitable allocation of resources.
- However, due to several constraints and factors, the government might fail. Its interventions may cause even greater inefficiency in resource allocation than under the workings of free market forces.

### LEARNING OUTCOMES

#### Enduring Understanding (students can explain and apply to real world):

• Price mechanism can fail to allocate resources efficiently and equitably.

NOTE: Inequity is a distributional issue and not considered a source of market failure.

- Government has to make decisions on how to intervene in markets to correct market failure in order to achieve efficient and equitable allocation of resources.
- However, even with government intervention, the intended outcomes may not be achievable due to constraints in policy implementation, uncertainty of policy effects, and unintended consequences.

#### Overarching essential question:

To what extent should governments intervene in the free market?

### Let's Think!

#### The Personal Mobility Devices (PMD) footpath ban

In November 2019, former Senior Minister of State for Transport Lam Pin Min said that the Ministry of Transport (MOT) announced that the use of e-scooters on footpaths would be banned, almost three years after their use on footpaths was made legal under the Active Mobility Act. This came amid an increasing number of accidents involving such PMDs.

Then-Transport Minister Khaw Boon Wan noted at the time that about 300 people were treated in hospital for PMD-related accidents in 2018, based on figures from the National Trauma Registry.

In April 2020, the footpath ban was extended to other motorised PMDs, such as hoverboards and electric unicycles. Although they are banned from footpaths, all such devices can still be used on cycling paths and Park Connector Networks.

PMD advocate Denis Koh described the footpath ban as "appropriate but abrupt", noting the disruption caused to responsible users as well as those who depended on such devices for work. Singapore University of Social Sciences (SUSS) lecturer Cecilia Rojas, whose research has focused on active mobility, said a longer notice time might have allowed those who used PMDs for work, such as delivery riders, more time to cope with the changes.

"Education, education," said Mr Koh, when asked what else could have been done to address the issue of safety on public paths. "Ultimately everyone keeps blaming the device instead of the errant rider," said the former member of the Active Mobility Advisory Panel, which proposes regulations on the safe use of bicycles and PMDs in public places here. "Remove the PMDs (and) these errant riders will use bicycles, then we will go back to all the complaints about cyclists we had six to eight years ago." Source: Channel News Asia, 31 Oct 2020

#### Questions:

- 1. Why do you think the Singapore government decided to impose these new regulations on personal mobility devices? (Hint: consider the concepts you have learnt in previous topics)
- 2. How might these regulations affect the following economic agents?
  - a) Consumers (in terms of welfare and consumer surplus)
  - b) Firms (In terms of revenue, profit, and producer surplus)

## 1. EFFICIENCY IN MARKETS

Governments mainly want to achieve resource allocation which meets the following microeconomic objectives:

#### 1) EFFICIENT and

2) EQUITABLE allocation of resources (to be discussed in section 3)

#### Understanding the concept of 'efficiency':

There are 3 types of efficiency you will learn in economics:

i. Productive efficiency

This refers to a situation where goods are produced at the <u>minimum</u> <u>average cost</u> possible for the given output size, based on current technology.

#### ii. Dynamic efficiency

This refers to when firms invest in <u>technology</u> so that productivity and product quality will improve over time.

#### iii. Allocative efficiency

This refers to the situation where the current combination of goods produced and sold <u>maximises society's welfare</u>.

For this topic, we will be focusing on allocative efficiency.

In free markets, resource allocation takes place with the following characteristics:

- The economic agents (individuals and firms) base their decisions on the pursuit of self-interest (satisfaction, profits).
- Prices of goods and services (price signals) will direct the movement of resources and goods and services between markets.
- No government intervention in markets.

Resource allocation through price signals can bring about **allocative** efficiency in markets.





In Figure 1 above, allocative efficiency is at market equilibrium point
 E. At this point, Triangle AEC is the total welfare to society (i.e. the sum of consumer and producer surplus). Social welfare is maximised.



We will revisit these efficiency concepts when we learn about firms and decisions in topic 4.

- The supply curve is determined by the marginal costs of production and, since this is the marginal cost to society, we refer to it as the marginal social cost (MSC).
- The demand curve is determined by marginal utility and, since this is the marginal benefit to the whole community, it is known as marginal social benefit (MSB).
- At Q<sub>1</sub> (or any quantity below Q<sub>0</sub>):
  - <u>MSB is greater than MSC</u>, so there will be net benefit added to society's welfare if one more unit of the good is produced/consumed.
  - $\,\circ\,\,$  There is a loss of potential welfare when society consumes at Q\_1. This loss of potential welfare is represented by the area of triangle BDE.
- At Q<sub>2</sub> (or any quantity above Q<sub>0</sub>):
  - <u>MSC is greater than MSB</u>, so there will be a net cost to society's welfare if one more unit of the good is produced/consumed.
  - $\circ$  A deadweight loss is incurred when society consumes at Q<sub>2</sub>. This deadweight loss is represented by the area of triangle EFG.
- Therefore, allocative efficiency will be attained at Q<sub>0</sub> where:

The attainment of allocative efficiency in markets requires the fulfilment of these conditions:

- 1. There are price signals to enable consumption and production decisions through price mechanism. For goods without price signals, market will fail to produce.
  - $\circ~$  Public goods (non-rival and non-excludable in consumption)  $\rightarrow~$  Missing markets
- 2. No third-party effects from the consumption/production of goods on others in the society (no externalities).
  - Firms and consumers base their decisions on the pursuit of selfinterest but society's valuation of costs and benefits (usually determined by the government) is based on the maximisation of society's welfare.
  - Presence of externalities  $\rightarrow$  market-based valuation of costs and benefits will differ from that of society's  $\rightarrow$  Free market equilibrium will not maximise social welfare.

#### 3. Perfect information

- $\circ$   $\,$  Consumers are fully aware of the actual costs and benefits of consuming a good.
- One party in the transaction (say firms) does not have more information than the other party (consumers). Inefficiency will happen if this occurs.

#### 4. Market is perfectly competitive

- $\circ$   $\;$  Firms do not have market power to influence the prices.
- $\circ~$  In the real world, markets are mostly imperfect  $\rightarrow allocative efficiency not achievable.$

Recall the marginalist principle learnt in previous topics, where utility is maximised at MB = MC

These conditions will be explained further in the next section of this topic.

#### 5. Perfect mobility of resources

- Resources can easily move from one use or industry to another.
- $\circ$  If resources are immobile →disequilibrium (shortage and surplus) cannot be self-adjusting →allocative efficiency not attained since market is not able to adjust towards equilibrium.

#### Key Learning Points in Section 1:

- ✓ Allocative efficiency is attained when the output in a market is where MSB=MSC (total net benefit to society is maximised).
- ✓ Allocative efficiency will not be attained when certain conditions are not fulfilled.

### 2. MARKET FAILURE AND GOVERNMENT INTERVENTION

Recall that for allocative efficiency to be achieved, the markets should satisfy certain conditions. However, in the real world, such conditions are not easily present, leading to market failure.

Definition: Market failure occurs when the price mechanism, operating without any government intervention, fails to allocate scarce resources efficiently to maximise society's welfare.

In this section, we will learn about the different sources of market failure and the various policies that governments may consider to solve them. As each measure has its strengths and limitations, it is important for governments to consider various factors before deciding and implementing the policy.

Each sub-section will be explained in the following manner:



Before we begin, the following flowchart provides an overview of the types of market failure that may occur.

### **OVERVIEW OF MARKET FAILURE:**



#### 2.1 **Missing Markets: Public Goods**



Think: Would you ever pay for street lighting? Why?

In this sub-section, we will look into goods which are collectively consumed by the consumers - termed as public goods. Due to the characteristics of public goods, there will be an absence of price signals for these goods which will lead to missing market. Government will then need to intervene with direct provision.

#### Characteristics of Public Goods:

Public goods are goods that are **non-excludable and non-rival** in the way they are consumed. As a result of these characteristics, public goods would not be provided by the free market.

Characteristic:	Definition:	Examples:
Non- excludable	Once the good is provided, it is <b>not possible nor</b> <b>economically feasible</b> to exclude a <b>non-payer</b> from using the good.	It is not possible to make all passers-by pay for the light from street lamps.
Non-Rival	The consumption of the good by one additional person does not diminish the amount or quality of the good available for another.	One person's usage of the street lamp does not diminish the light available for another person at the same time.
Non- rejectability	The <b>inability</b> of consumers <b>to refuse</b> consumption of a good once it has been produced.	The light emitted from the street lamp may shine into resident's house, reducing their quality of sleep at night and yet residents cannot request for it to be switched off.

Students should first explain the characteristics of non-excludable and non-rival. Nonrejectability should only be used when relevant.

SLS Lesson: "Public Goods"

#### Why Public Goods Cause Market Failure:

Problems associated with the good being non-excludable:

- It is not feasibly possible to exclude non-payers from benefitting in *Non-payers*: the use of a public good. For example, in the case of street lamps, the provision of light cannot be confined to only paying consumers. Therefore, once it has been provided, producers cannot feasibly exclude those who did not pay from benefitting from the lighting of the street lamps. This leads to producers not being able to assign property rights to paying consumers.
- Thus, paying consumers do not have the exclusive rights to street lighting and non-payers can free ride on those who paid for the street lighting to be produced. The ability of non-payers to free ride on paying consumers is known as a free rider problem.

Refers to people that do not pay for the good directly.

- Since consumers have no incentive to pay, they would not reveal their demand. The lack of effective demand leads to an <u>absence of price signals</u>.
- Without price signals, producers would not be able to charge a price for the goods produced and hence would not earn any revenue and thus, profit. Hence, producers would not allocate any resources to produce these goods. This means that no public goods will be produced by private firms and there would be **complete market failure**.

#### Problems associated with the good being <u>non-rival</u> in consumption:

- The consumption of street lighting by one person does not reduce another person's ability to consume the same good. This means that when a person enjoys the street lighting, it does not diminish the quantity or quality of street lighting available to another person.
- Since one person's consumption of the street lighting will not diminish the satisfaction derived by the next person, there is no additional cost incurred to provide street lighting for an additional person. <u>This means</u> that the cost of providing for one more person is zero (MC = 0).
- Since allocative efficiency is achieved at the market equilibrium, where Price = Marginal Benefit = Marginal Cost (P = MB = MC), the price that producers should charge should be zero to maximise society's welfare.
- However, producers would not be willing to price their goods at zero as there would be no revenue.
- Hence, if producers were to produce the good, they would price the good at P > 0. Therefore, when P > MC and the good would be under produced.

Due to the characteristics of non-excludability and non-rivalry, no producers would be willing to supply public goods. The market will fail completely as no resources would have been allocated for the production of public goods. There would be a **missing market** leading to complete market failure. In cases where public goods are essential and beneficial to the society, governments will intervene to ensure efficient allocation of resources to the production of these goods. Hence, the government can do so by supplying them, e.g. national defence, streetlights, and traffic lights.

#### Problems associated with the good being non-rejectable:

Since the government cannot capture the preference of the consumers, the level of consumption is not based on the consumer's valuation. As a result, government could be overspending in the provision of public goods since consumers who placed lower value on the public goods are unable to reject it once the government provides them. There could be <u>over allocation of resources</u> in the area of public goods.

• For example, in view of the rising terrorist threat globally, the government has deployed more armed police officers to patrol crowded places. While it may help to maintain law and order, it could also instil unnecessary anxiety among citizens.

Recall: the **Marginal Principle** explained in 'Price Mechanism and its Application' Equilibrium price is set when MB = MC.

This concept will be re-visited in next topic as well.



#### Take Note:

Public goods are NOT the same as goods (or services) provided by the public sector (the government).

#### 2.1.1 Government Policies to Address Missing Markets

#### **Direct Provision**

Direct provision refers to the provision of a good by the government directly to the consumers. These goods tends to be financed through taxation. It may be zero price or partial priced.

Public firms set up by the government or private firms engaged by the government could produce the goods.

- An example of direct provision by a government owned firm is national defence.
- In the case of street lighting, Singapore government agencies such as Land Transport Authority (LTA), National Parks (NParks) and Housing Development Board (HDB) engage contractors to build and manage street lamps.

#### **Strengths of Direct Provision:**

- a. Improves efficiency
  - Government can determine the adequate level of provision, improving allocative efficiency
- b. Reduces inequity
  - Direct provision ensures essential public goods are provided to the general public at zero price, directly resolving the problem of missing markets.

#### **Limitations of Direct Provision:**

- a. High cost of financing
  - The cost of providing these goods is a financial strain on the government, especially if the country requires financing in multiple areas such as healthcare, education and training.
    - Increase in cost of these goods could lead to higher taxes for citizens to finance these provisions.
  - Government provision may also incur substantial opportunity cost as there are competing needs in a country.

#### b. Insufficient information

- It is difficult to estimate how much the government should produce. This is especially true for public goods where there are no price signals.
- Government may not be able to accurately assess the extent of market failure. Thus, there could be over or under production of the public goods leading to possible loss of welfare.



SLS Lesson: "Government Intervention: Public Goods"

In summary, governments have to assess the importance of public goods when deciding to provide them. Many of these public goods are essential to society. Hence, the governments may decide that the benefits to society still outweigh the high costs of financing them.

#### Key Learning Points in Section 2.1:

- ✓ Public goods are non-excludable and non-rival in consumption.
- $\checkmark$  Non-excludability will lead to no price signals from consumers.
- ✓ Non-rivalry will lead to MC = 0, and therefore price = zero to achieve allocative efficiency, which firms are unwilling to set.
- ✓ The absence of price signals leads to there being no incentive for producers to produce these goods.
- Since there is a missing market, government intervention is necessary for the provision of public goods.
- Non-rejectable could lead to an over allocation of resources in the area of public goods when government is doing direct provision.

#### 2.2 Externalities

#### Article 1: Smoking Statistics in Singapore

"Members of Parliament (MP) have urged authorities to curb smoking in homes, citing residents' complaints about second-hand smoke wafting into their flats and the health risks associated with it.

This comes as Parliament on Monday (Sep 10) passed amendments to the Smoking (Prohibition in Certain Places) Act, which allow the Government to designate more no-smoking zones and give officers more enforcement powers.

But the MPs said the Bill failed to address second-hand smoke from neighbours' homes.

"We are now doing a lot to protect people from second-hand smoke in public areas," Nee Soon GRC MP Louis Ng said. "But the concern which has been raised in this House before is: What are we doing to protect people from second-hand smoke in their own homes?"

Tanjong Pagar GRC MP and surgeon Chia Shi-Lu said second-hand smoke contains hundreds of toxic chemicals, of which about 70 can cause cancer.

"It can lead to coronary heart disease, stroke and lung cancer. It can cause asthma attacks, respiratory infections and sudden infant death syndrome," he added. "There is no risk-free level of exposure to second-hand smoke."

Over the years, Dr Chia said he has received numerous complaints from residents about the "nuisance and unhealthy effects of neighbours' second-hand smoke drifting into their flats".

Source: Channel News Asia, 10 Sep 2018



#### Questions:

- What are the costs incurred by a smoker when he chooses to smoke a cigarette?
- Who else, besides the smokers, could be affected by the smoking of cigarette? What are the costs to them?
- Are these costs to the smokers equal to the costs incurred by society? Why or why not?

Article 2: Population, education and innovation: The long, medium and short-term drivers behind China's future growth

High-quality labour supply has been a key contributor to China's economic success. Since the higher education reform in the late 1970s, there has been substantial improvement in the capacity and quality of China's tertiary education system.

Nowadays, China produces more than 8 million college graduates a year, compared to only 1 million 20 years ago and less than 20,000 four decades ago. In addition, more than 600,000 graduates who study abroad return to China every year. This provides Chinese corporates with abundant supply of well-educated and highly productive young talent.

Supported by the large supply of talents, Chinese corporates have been evolving and increasing their budget in research and development (R&D) rapidly. This virtuous dynamic will continue over the coming decades, helping Chinese corporates and talents improve their innovative capabilities.

Population ageing is another major long-term trend that poses both challenges and opportunities for China. China's demographic is set to undergo significant changes in the decades ahead. Technological advancement in areas such as automation and machine learning can help boost labour productivity and therefore mitigate some of the negative impacts of population ageing.

Source: Investment Week, 19 Feb 2021

#### Questions:

- What are some benefits of higher education to students?
- Who else, beside students, could benefit from higher education?
- Are these benefits to the students equal to the costs enjoyed by society? Why or why not?
- Should the government increase subsidies for higher education? Why?

#### 2.2.1 Overview of externalities

An externality arises when:

- The production or consumption of a good <u>affects the well-being of an</u> <u>external or third party (negatively or positively)</u> who are not involved in the transaction of the good; and
- The affected third party neither receives compensation (for negative effects) nor pays (for positive effects) for the spillover effects.

Externalities may be in the form of:

- a) Positive externalities (benefit enjoyed by a third party) or
- b) **Negative externalities** (cost incurred by a third party)

Positive externalities are also known as **external benefits**, while negative externalities are also known as **external costs**.

# These are key terms used when discussing markets with <u>negative</u> <u>externalities</u>:

Key Term	Definition	Example
Marginal Private Cost (MPC)	Additional cost incurred by the consumer (or producer) in the consumption (or production) of an additional unit of the good.	The cost of buying cigarettes incurred by a consumer.
Marginal External Cost (MEC)	Additional cost borne by <b>third</b> <b>parties</b> who are not directly involved in the consumption (or production) of an additional unit of good and are not fully compensated for.	The healthcare cost incurred by non- smokers who suffer health issues from breathing in second hand smoke.
Marginal Social Cost (MSC)	Additional cost incurred by all and third parties) in society of production) of an additional under MEC is present (MEC > 0), MSC MPC and MEC. The presence of is higher than the MPC. MSC = MPC + Which also means MSC > N This can be represented diagrat Figure 2 below. The gradient of the slope for than MPC because the extent of with every additional unit consu- example, the likelihood of your higher if you smoke more increases as the quantity increases.	(consumers, producers in the consumption (or nit of the good. Where will be the sum of the MEC will mean that MSC • MEC • MEC





These are key terms that are used when discussing markets with positive externalities:

Key Term	Definition	Example	
Marginal Private Benefit (MPB)	Additional benefit enjoyed by <b>the consumer (or</b> <b>producer)</b> involved in the consumption (or production) of an additional unit of the good.	Higher future income earned by the consumer as a result of completing higher education.	
Marginal External Benefit (MEB)	Additional benefit enjoyed by third parties who are not directly involved in the consumption (or production) of the good and do not pay for the benefits received.Higher level of productivity enjoyed by firms as a result of a more highly educated workforce.		
	Additional benefit enjoyed by <b>all (producers, consumers and third parties)</b> in society in the production (or consumption) of an additional unit of the good. Where MEB is present (MEB > 0), MSB will be the sum of the MPB and MEB. The presence of MEB will mean that MSB is higher than the MPB. MSB = MPB + MEB		
Marginal Social	Which also means MSB >	МРВ	
Benefit (MSB)	This can be represented diagrammatically as shown in Figure 3 below.		
	The gradient of the slope for MSB is usually gentler than MPB because the extent of external benefits increase with every additional unit produced (or consumed). An example is that the level of production by the country is higher when more workers are educated, thus MEB increases as the quantity of education increases.		



#### 2.2.2 Negative Externalities

Definition: Negative externalities arise when the production or consumption of a good affects the well-being of a third party negatively and the affected-party does not receive any compensation for bearing the negative effect.

If the production or consumption of a good generates negative externalities, then the cost to the society is greater than the cost which the consumer or producer incurs.

# Analysis of the Problem: Negative Externalities in the Market for Cigarettes

#### What is the free market equilibrium?

- Smokers only consider their self-interests when choosing whether to smoke or not to smoke. This involves looking at their <u>marginal private</u> <u>cost</u> (MPC) and <u>marginal private benefit</u> (MPB) when making their decision:
  - MPC: The additional cost of buying additional cigarettes and the additional medical cost incurred by the smoker from additional cigarette consumption
  - MPB: The additional satisfaction gained from consuming additional cigarettes
- To maximise their own satisfaction, they will choose to consume the number of cigarettes at Q<sub>m</sub> where their MPC = MPB. (Recall that this is the condition for which economic agents maximise their well-being as they can do no better by consuming more or less cigarettes) Thus, Q<sub>m</sub> is the market equilibrium consumption level and P<sub>M</sub> is the market equilibrium price. Refer to the diagram below:

Note: Since the externalities arise from consumption, the analysis of MPC and MPB is from the point of view of consumers.



Figure 4: Market Failure in market for cigarettes due to negative

Note: Note that the divergence between MSC and MPC is due to the increasing MEC.

For example, the likelihood of your neighbours falling ill is higher if you smoke more cigarettes, thus MEC increases as the quantity of cigarettes smoked increases.

#### What is the marginal external cost and marginal social cost of smoking?

- However, these smokers do not take into account the impact of the second-hand smoke on third parties around them. Thus in this instance, there is a negative externality generated through their action of smoking. This implies that marginal external cost (MEC) of smoking is greater than zero.
- MEC: Medical costs incurred by third parties as a result of breathing in second-hand smoke. These medical costs could be due to respiratory illness, lung or mouth cancer. These third parties are not compensated
- Since MEC is positive, this implies that the MSC is greater than MPC (MSC > MPC) as MSC = MPC + MEC. This is illustrated above where the MSC curve is higher than the MPC curve.

#### Where is the socially optimal equilibrium? Why has the market failed?

- To society, the social optimum consumption level is at Q<sub>s</sub> where MSB = MSC, as this maximises society's welfare.
- Since Q<sub>M</sub> > Q<sub>s</sub>, there is an overconsumption of cigarettes by Q<sub>s</sub>Q<sub>M</sub>.
- Explanation of welfare loss:
  - For every additional unit consumed from  $Q_s$  to  $Q_M$ , MSC > MSB. Since the cost to society is greater than the benefits, society incurs a welfare loss (or deadweight loss) represented by **area E**<sub>s</sub>**E**<sub>M</sub>**A**.
  - $\circ~$  Area  $E_{s}E_{M}A$  represents the total net loss to society with the additional consumption of  $Q_{s}Q_{M}$  beyond  $Q_{s}.$
- Society's welfare can be increased by reducing the consumption of cigarettes.
- Thus, the market fails as there is an over allocation of resources to the production and consumption of cigarettes.

#### Negative Externalities in Production vs Consumption

In the analysis of the problem, it is important to identify whether the negative externality comes from production or consumption of the good.

This will determine whether the analysis of MPB and MPC is from the consumers or producers' point of view.

	Negative externality in PRODUCTION	Negative externality in CONSUMPTION
Economic agent causing externality	Producers	Consumers
Example	Market for palm oil in Indonesia	Market for cigarettes
Marginal private benefit (MPB) incurred	Additional revenue earned from an additional unit of palm oil sold	Additional satisfaction gained from an additional cigarette smoked.
Marginal private cost (MPC) incurred	Additional cost of clearing land, labour, and machinery to produce an additional unit of palm oil.	Additional cost of buying an additional cigarette and their own healthcare costs from smoking it.
Third party affected by production / consumption	Residents who live near the palm oil plantations	Neighbours, friends and passers- by who inhale second hand smoke
Marginal external cost (MEC) incurred by third party	Slash and burn methods of clearing the land to produce additional unit of palm oil lead to haze, causing people (third parties) around the affected areas to fall sick and incur healthcare costs	When smokers consume additional unit of cigarettes, third parties fall sick from breathing in second hand smoke and incur healthcare costs
Marginal social cost (MSC)	Since MEC > 0, MSC > MPC	Since MEC > 0, MSC > MPC
Consequence	Welfare of society is not maximised; palm oil is being overproduced	Welfare of society is not maximised; cigarettes are being overconsumed

#### Exam Tips:

Always identify whether the externality originates from consumers or producers first. Explain the MPC and MPB from the perspective of the relevant economic agent identified.

#### 2.2.3 Government Policies to Address Negative Externalities

The objective of government intervention is to achieve an **efficient allocation of resources.** In the case of negative externalities, it can be done by reducing production or consumption of the good to the socially-efficient level where MSB=MSC.

The following are the various ways (*list is not exhaustive*) the government can intervene. Governments can consider intervening in the market by influencing either the consumer or producer.



SLS Lesson: "Government Intervention: Negative Externalities"

#### <u>Taxes</u>

Taxes are compulsory payments made by firms or individuals to the government with no goods or services received in return.

Taxes force households and firms to **internalise** the external cost in their consumption and production through the influence on the market price. This will make external cost become part of their private cost. In this way, the MPC will increase to  $MPC_t$  as shown in Figure 5 below.

Examples of taxes to correct negative externalities include taxes on cigarettes and road tax.





- Per unit tax (or specific tax)
  - o Initially, the market equilibrium is at  $E_M$ , determined by MPC=MPB, with a market price of  $P_M$  and quantity of  $Q_M$ .
  - The amount of tax (tax =  $E_sB$ ) imposed is equal to the marginal external cost incurred at socially optimum output  $Q_s$ .
  - The tax will increase the cost of production and shift the MPC to the left to MPC<sub>t</sub>. Producers will pass on this cost to the consumers in the form of higher price from  $P_m$  to  $P_s$ . The higher price will cause quantity demanded to fall from  $Q_m$  to  $Q_s$ .
  - The new market equilibrium is at  $E_s$ , determined by MPC<sub>t</sub> = MPB. The new quantity consumed and produced will be reduced from  $Q_m$  to  $Q_s$ .
  - $\circ$  The imposition of the tax has caused the market output to be reduced to coincide with the socially optimal output, Q<sub>s</sub>, via the increase in price, thereby eliminating the welfare loss of area E<sub>s</sub>AE<sub>M</sub>.
- Lump-sum Tax
  - A lump sum tax is a one-time tax payment and the amount paid is fixed. Example of lump sum tax would be pollution tax.
  - $\circ~$  At output Qm, a lump-sum tax equal to the welfare loss (area  $E_{s}AE_{M})$  can be imposed.
  - The tax revenue collected can then be used to compensate those who were affected by the negative externalities.

#### Strengths of taxes:

a. Low costs of enforcement

• When taxes are implemented, the government can simply allow market forces to operate to achieve the social efficient outcome without much enforcement.

#### b. Potential source of revenue to finance additional policies

Taxation provides revenue for the government that could be used to finance additional projects e.g. encouraging the adoption of greener technology that further reduce the negative externalities.

#### c. Effective due to loss aversion (cognitive biases)

- Taxes tends to be an effective policy in reducing consumption and production of goods with negative externalities as human beings experience losses asymmetrically more severely than equivalent gains.
- There is hence a higher success in altering consumers' and producers' behaviour through taxes as compared to providing equivalent subsidies for using alternatives such as nicotine patches.

#### Limitations of taxes:

#### a. Not as effective if the demand for the goods is price inelastic

- The effectiveness of tax in reducing production level is also constrained by price elasticity of demand.
- E.g. In the case of cigarettes whereby demand for cigarette is price inelastic, tax is less effective in reducing consumption since consumers would be less responsive to an increase in price. This means that a large amount of tax is needed to reduce consumption to Q<sub>s</sub>, and this may not be a politically viable option
- Demand may also be more price inelastic due to cognitive biases like the <u>sunk cost fallacy</u>.
  - For example, high COE prices substantially raises the costs of owning a car in Singapore. To better spread the high fixed costs of owning a car over its lifespan, drivers in Singapore tend to utilise their cars more often. This lowers the price elasticity of demand for car usage, thus making drivers less responsive to a rise in ERP rates and petrol tax. This reduces the effectiveness of taxes as a measure to control road usage and hence traffic congestion

#### b. Insufficient information to determine the optimal amount to tax

- It is difficult for the government to measure or value the external cost incurred at the socially optimal level accurately (indicated by  $E_sB$  in Fig 5). For example, it is difficult to value the loss in productivity of those who fall sick from second-hand smoke.
- If the external cost were over-valued, this would cause quantity consumed to be below the socially optimal level.
- If the external cost were under-valued, the reduction in quantity consumed due to tax would not be enough to bring output to the socially optimal level.
- Either way, society's welfare is not maximised. The extent will depend on how close the new quantity is relative to the socially optimal level.

Loss aversion describes how economic agents make decisions based on avoidance of losses rather than making gains

The <u>sunk cost fallacy</u> describes our tendency to follow through on an endeavour if we have already invested time, effort, or money into it, whether or not the current costs outweigh the benefits.

- c. Trade-off in economic growth and standard of living
  - Taxes raises cost of production and if the tax (e.g. carbon tax) on firms is too high, firms might relocate their businesses abroad, causing a possible contraction to the economy.
  - Taxes increase the prices of goods and services. This could affect low income households to a larger extent, causing greater inequity.

#### <u>Quotas</u>

Quotas are restrictions on the quantity of a particular good/service in the market by the government to limit its sale or purchase. There will be a **fixed quantity** of a particular good which can be produced under official regulations.

The quota would be determined by the government and set at the socially optimal output level  $Q_s$ , as shown in Figure 6.



Figure 6: Quota to correct market failure due to negative externalities

Thus, producers can only sell up to  $Q_s$  units of the good, solving the problem of overproduction/overconsumption. The welfare loss of  $E_sAE_M$  is thus eliminated.

#### Strengths of quotas:

#### a. Predictability of outcome

 $\circ~$  Quotas are clear and easy to follow and thus able to achieve  $Q_{s}$  with greater certainty.

#### b. Immediacy of effect

• Once the rules are implemented, it is mandatory for all to abide by the law and the intended outcome can be achieved immediately.

#### Limitations of quotas:

#### a. High cost of monitoring and enforcement

- There are costs involved in maintaining a large manpower base capable of enforcing the quota and monitoring the markets.
- $\circ$   $\,$  Thus, the constraint of a limited government budget may limit the effectiveness of the policy

#### b. Insufficient information to determine the quota quantity

- $\circ~$  The government may have imperfect knowledge on the social optimal quantity  $Q_{s}.$
- $\circ\;$  If the quota is set too high or too low, social welfare will not be maximised.
- It is especially difficult to determine the quota since it may change over time. For example, new technology could reduce the level of pollution and raise the socially optimal quantity.



- As seen from Figure 6a, bans are used when externalities are very large (illustrated by a large divergence between MSC and MPC). The welfare loss is large as demonstrated by area E<sub>s</sub>AE<sub>M</sub>.
- A ban is effectively a quota at the quantity of 0. This may result in underproduction and underconsumption of the good below Q<sub>s</sub>.
- However, the resulting welfare loss, area BCE<sub>s</sub> is significantly smaller than the initial welfare loss area E<sub>s</sub>AE<sub>M</sub>.
- For activities that generate a high level of negative externality such that the social optimal quantity is at or close to zero, a ban is more economically viable to enforce than a quota or tax.
- If MSC>MSB at all levels, a ban would maximise social welfare. Try drawing the diagram to illustrate this.
- Do you think a ban will always increase social welfare?

#### **Rules and Regulations**

Government may control business activities by ensuring compliance through <u>licenses</u>, <u>setting quality standards and/or other administrative</u> <u>rules</u>. Such standards could limit or lower the external costs produced by the production or consumption of the good. Non-compliance usually leads to <u>punitive measures</u> such as fines or revoking of licenses on the offenders.

In considering whether to comply with the rules or not, producers/consumers now have to account for the extra cost of the punitive measures they may incur. If the penalty for non-compliance is large enough, and there is a high likelihood of being caught, the net benefit of complying with the rules would be higher. Therefore, there is an incentive to comply with the rules in order to avoid potential extra costs and maximise their net benefit.

With more producers/consumers complying with the rules and regulations, negative externalities can be reduced and social welfare is increased.

Some examples of rules and regulations:

- Industrial wastewater in Singapore must be treated to specified standards before being discharged into a sewer or watercourse to prevent water pollution. Industries generating large quantities of acidic effluent are required to install a pH monitoring and shut-off control system to prevent the discharge of acidic effluent into public sewers.
- The Singapore government is progressively extending the Smoking (Prohibition in Certain Places) Act to more public places. Smoking is prohibited in areas such as all common areas of the resident block including walkway, void deck, corridors, and linkways to bus stop and overhead bridges.

#### Strengths of Rules and Regulations:

#### a. Predictability of outcome

- Rules and regulations are clear and easy to follow and thus, it is more likely to achieve the government's aims quickly.
- If clearly spelled out, firms and consumers would be able to weigh benefits of compliance against the costs of punitive measures that follow unlawful practices

#### b. Immediacy of effect

• Once the rules are implemented, it is mandatory for all to abide by the law and the intended outcome can be achieved immediately.

#### Limitations of Rules and Regulations:

#### • High cost of monitoring and enforcement

- There are costs involved in maintaining a large manpower base capable of enforcing the regulations and monitoring the markets.
- Thus, the constraint of a limited government budget may limit the effectiveness of the policy

#### $\circ$ Does not address root cause of the problem

 Rules and regulations might not deal directly with the root cause of the problem, or create the right incentives for economic agents to act.

- Example: if the law enforces the cap on pollution level, there is no further incentive to reduce pollution beyond that amount.
- Increases cost of production
  - Rules and regulations may increase the cost of production that may deter small enterprises from setting up in the country.
  - For example, firms may be required to have multiple licenses before they can set up and manufacture their products. These multiple licenses may increase the cost of production of firms.
  - Thus, firms may not be receptive to the policy, or may not have the ability to compete in the international market once the regulations are imposed.

#### **Tradable Permits**

Tradable permits aim to reduce <u>pollution</u> to the socially optimal level. The government issues firms with permits on the maximum level of pollution they are allowed to emit.

Permits are required in order for firms to pollute the environment. The permits can be:

- $\circ$   $\;$  Auctioned off to firms or  $\;$
- Given at no cost to firms or
- o Issued based on a certain pre-determined price

These permits can be used by the firms for their own pollution or sold to other firms. Those emitting less than the permitted amount of carbon can sell their excess permits and those firms emitting more carbon will need to buy more permits.

Firms with higher abatement cost (the cost of reducing environmental negatives such as pollution) will have to buy permits to pollute and this cost of buying the permits are now part of firms' production cost. Thus firms are forced to internalise the external cost and their <u>marginal private</u> <u>cost (MPC) of production is increased</u>. The increase in cost of production forces them to cut their production levels to the socially optimal level. This effect is similar to a per unit tax, and can be illustrated in Figure 7a.



Firms also have an incentive to lower their levels of pollution because they can sell their permits if these are unused. The selling of unused permits generates revenue and increases profits for firms.

If firms are able to adopt cleaner methods of production, this would reduce the marginal external cost (MEC). In Figure 7b, this is shown by a decrease in the marginal social cost (MSC) to be closer to the MPC. When this happens, the socially optimal quantity (MSC = MSB) increases to  $Q_{S1}$ . The welfare loss to society is reduced as shown by the smaller shaded area.

#### Strengths of Tradeable Permits:

#### a. Encourages long term solutions to reduce pollution

- With the prospect of selling their pollution rights, firms being profit-motivated are incentivised to discover and use the cheapest method to reduce pollution.
- Each polluter is motivated to reduce pollution as long as the cost of reducing one more unit is less than the price of pollution rights.
- There is thus a market incentive for firms to develop improved pollution abatement technologies. This lowers the marginal external cost incurred in the long run.

#### Limitations of Rules and Regulations:

#### a. High cost of monitoring and enforcement

- It is difficult to measure and monitor pollution levels. There is a high administrative cost incurred for governments to ensure that the carbon emitted by firms is in accordance to the number of tradable permits they hold.
- Thus regular checks and monitoring is required and government may incur additional cost to ensure compliance by firms.
- In addition, the socially optimal level of pollution may change over time and thus government may need to periodically review the amount of permits issued.

#### b. Imperfect Information

- $\circ~$  Government might not know the socially optimal level of pollution generated at Qs, so it cannot determine accurately the number of permits to set.
- If too few or too many permits are issues, there would be under or over production of goods.

#### c. Inequity against smaller firms

- Bigger firms have greater ability than smaller firms to buy pollution rights, hence there is a lack of incentive for such firms to reduce pollution.
- $\circ~$  This could also lead to bigger firms dominating the market if smaller firms are not able to buy the permits needed.

#### Exam Tips:

Tradeable permits can only be used when the external cost is easily measured. It is most often used in the context of <u>air</u> <u>pollution</u> where the pollution by firms can be measured by installing filters. Using tradeable permits in the context of problems like smoking cigarettes would be incorrect.

#### Public Education

The government uses campaigns to educate the public and inform them about the harmful effects of consumption/production on third parties. This aims to influence demand by persuading people to consume at the socially efficient level.

When these efforts are successful, consumers may have a change of taste and preference and reduce their demand for such goods. For example, advertisements on harmful effects of plastic usage on marine life may convince consumers to use fewer single plastic bags or bottles.

The knowledge of cognitive biases can enable the government to enhance the effectiveness of public education. The government may be aware of <u>salience biases</u> in consumers. For example, obesity is a more visible problem as compared to other issues like diabetes. Thus, public education campaigns aimed at reducing sugar consumption are likely to be more successful than if they were to focus on how sugar can help weight loss rather than how it can help prevent diabetes.

<u>Salience bias</u> describes our tendency to focus on items or information that are more noteworthy, while ignoring those that do not grab our attention.

#### Strengths of Public Education:

#### a. Relatively lower cost of financing

• Dependent on the type of public education, the cost of financing may vary. However, once the initial effort has been created, the content used could be reused or tweaked to achieve the same outcome in the long-run. Hence, this policy is quite sustainable.

#### b. Better received by the target audience

- Public education is a softer approach compared to other policies such as taxes.
- Consumers have the knowledge and freedom to decide on their consumption levels of goods with negative externalities. E.g. Drivers can decide on the consumption level of alcohol if they are driving.

#### Limitations of Public Education:

#### a. Uncertainty of outcome

• The funds spent may not achieve the desired results. The outcome is uncertain as it depends on how receptive the public is to the campaigns. E.g. Drivers often continue to drink excessively despite knowing that drink driving may cause harm to third parties.

#### b. Outcome is not immediate / long time lags

 Consumers or producers may take a long time to understand or be convinced by the public education effort. The consumption habits for some types of goods, especially addictive goods, would take some time to be changed. Thus, the socially efficient level may take some time to be achieved.

#### 2.2.4 Positive Externalities

Definition: Positive externalities arise when the production or consumption of a good generates benefits to a third party not involved in the production or consumption of the good, and the third party does not pay for the benefit enjoyed.

If the consumption or production of a good generates positive externality, then the benefit to society is greater than the benefit which the consumer or producer enjoys.

# Analysis of the Problem (Positive Externalities in the Market for Education)

#### What is the free market equilibrium?

- Students only consider their self-interests when choosing whether to pursue a higher level of education or not. This involves looking at their marginal private cost (MPC) and marginal private benefit (MPB) when making their decision:
  - MPC: Additional fees for enrolling in additional unit of education
  - MPB: The additional satisfaction gained from additional education; higher expected wages and more job opportunities arising from pursuing additional education
- To maximise their own satisfaction, they will choose to consume the level of education Q<sub>m</sub> where their MPC = MPB. (Recall that this is the condition at which economic agents maximise their well-being as they can do no better by consuming more or less education) Thus, Q<sub>m</sub> is the market equilibrium consumption level and P<sub>M</sub> is the market equilibrium price. Refer to the diagram below:

# Figure 8: Market Failure in market of education due to positive externalities in consumption



SLS Lesson: "Positive

Externalities"

Note: Since the externalities arise from consumption, the analysis of MPC and MPB is from the point of view of consumers.

Note that the divergence between MSB and MPB is due to the increasing MEB.

An example is that the level of production by the country is higher when more workers are educated, thus MEB increases as the quantity of education increases.

# What is the marginal external benefit and marginal social benefit of education?

• However, these students do not take into account the impact of their education on third parties. Thus in this instance, there is a positive

externality generated through their action of pursuing higher education. This implies that the marginal external benefit (MEB) is greater than zero.

- MEB: a more productive workforce contributes to higher outputs generated in the workplace, benefitting employers.
- Since MEB is positive, this implies that MSB is greater than MPB (MSB > MPB) as MSB = MPB + MEB. This is illustrated above.

#### What is the socially optimal equilibrium? Why has the market failed?

- To society, the social optimum consumption level is at Q<sub>s</sub> where MSB = MSC, as this maximises society welfare.
- Since  $Q_M < Q_s$ , there is an **underconsumption** of education by  $Q_M Q_s$ .
- Explanation of welfare loss:
  - For every additional unit of education from  $Q_M$  to  $Q_s$ , MSB > MSC. Since these units are not consumed, the additional net benefit is not enjoyed by society. Society incurs welfare loss (or deadweight loss) of area  $E_s E_M A$ .
  - $\circ$  Area E<sub>s</sub>E<sub>M</sub>A represents the potential gain in total net benefit to society with the additional consumption of Q<sub>s</sub>Q<sub>M</sub>.
- Society's welfare can be increased by increasing the consumption of education.
- Thus, the market fails as too few resources are allocated towards the production and consumption of education.

#### Positive Externalities in Production vs Consumption:

In the analysis of the problem, it is important to identify whether the positive externality comes from production or consumption of the good. This will determine whether the analysis of MPB and MPC is from the consumer's or producer's point of view.

	Positive externality in PRODUCTION	Positive externality in CONSUMPTION
Economic agent causing externality	Producers	Consumers
Example	Market for mangoes	Market for vaccinations
Marginal	Additional revenue earned	Additional gain in protection
private	from an additional mango	from illnesses and better
benefit (MPB)	sold	health from an additional
incurred		vaccine taken
Marginal	Additional cost of land and	Additional cost of buying an
private cost	labour to produce an	additional vaccine
(MPC) incurred	additional mango	
Third party	The neighbouring beekeeper	Those who are not vaccinated
affected by	(assuming neighbour is	and firms who hire vaccinated
production /	running a honey-production	employees
consumption	business)	
Marginal	The flowers of the mango	Less spread of diseases
external	trees provide a good source of	resulting in lower healthcare

benefit (MEB) incurred by third party	nectar for the bees, allowing the beekeeper to harvest a healthy level of honey	cost incurred even by those who were not vaccinated. Firms enjoy higher
		less likely to take sick leave
Marginal social benefit (MSC)	Since MEB > 0, MSB > MPB	Since MEB > 0, MSB > MPB
Consequence	Mangoes are being <b>under</b> <b>produced</b> ; welfare of society is not maximised	Vaccines are being <b>under</b> <b>consumed</b> ; welfare of society is not maximised

#### 2.2.5 Government Intervention for Positive Externalities

The objective of government intervention in the case of positive externalities is to increase the production/consumption levels to the socially optimal levels where MSB=MSC. Similar to the policies addressing negative externalities, governments can consider intervening in the market by influencing either the consumer or producer.



SLS Lesson: "Government Intervention: Positive Externalities"

As with previous explanations, the government has to go through decisionmaking processes before implementing the measures.

#### **Subsidies**

There are two broad types of subsidies, one given to producers and the other for consumers. Most of the time, subsidies on goods and services are given to producers, but consumers may still benefit if a portion of this subsidy is passed onto them in the form of lower prices.

#### Subsidy given to Producers:

- A subsidy to producers is meant to lower the cost of production to producers (by the government absorbing part of the cost) so as to encourage a higher production level.
- The amount of subsidy (subsidy =  $E_{s}A$ ) is based on the value of the marginal external benefits generated at the socially optimal output level Qs.
- From the firms' perspective, when subsidies are given, cost of production will fall and MPC will decrease and shift to MPCs as seen in Figure 9. This causes the price to fall from  $P_M$  to  $P_{sub}$  and encourage consumption to increase from  $Q_M$  to  $Q_S$ . The new market equilibrium is at point A, determined by  $MPC_s = MPB$ , with lower price  $P_{sub}$  and higher consumption level  $Q_s$ . At this output, the producer will receive price  $P_c$  $(P_{sub} + subsidy of E_sA from government).$





#### Subsidy given to Consumers:

- Subsidies to consumers make goods and services more affordable to the consumers directly.
  - For example, in 2019, Singapore government announced a top-up of \$150 to be provided to the Edusave accounts of Singaporean children aged 7 to 16, on top of the annual contributions that they currently receive. Students above the age of 16 who are still in a MOE-funded secondary school will also receive the top-up. This brings the amount received of the primary school students to \$380 and secondary school students to \$440 by mid-2019.
- $\circ~$  The amount of subsidy is based on the value of the marginal external benefit generated at the socially optimal output level, indicated by  $E_{s}A$  in Figure 9 above.
- A subsidy that is received directly by consumers will similarly, shift the MPC curve to the right to MPCs, as their cost of consuming that good is now lower with the subsidy. The new market equilibrium that is attained will be at point A where MPB = MPCs. The consumption level increases to Qs, the socially optimal output. The market price is Pc (this is the price received by producers). However, the consumers only pay P<sub>sub</sub> after receiving the subsidy.

#### Strengths of Subsidies:

#### a. Reach specific target beneficiaries directly and reduce inequity

- When given for consumption of specified goods and services, grants and subsidies provide assistance directly to targeted beneficiaries.
- $\circ$  This can achieve fairness in the distribution of economic welfare.
- The government can subsidise the production or consumption of goods and services which the poor need but may not be able to afford, e.g. education and housing. Thus, subsidies provide a more equal opportunities for the poor to access the goods.

#### b. Less monitoring needed by the government

• Firms and households continue to freely pursue their self-interests through the consumption and production decisions made. Since

market forces operate based on the new valuations of MPB and MPC, the social efficient level can be achieved without much monitoring by the government.

#### Limitations of Subsidies:

#### a. Demand for the goods may be price inelastic

- The effectiveness of subsidy in increasing consumption level is also constrained by **price elasticity of demand**.
- If the demand for the good is price inelastic, IPEDI < IPESI, consumers are less responsive to a change in price. Thus, the government needs to provide a larger subsidy to the producer to increase the supply of the good and lower the price significantly so that consumers will response sufficiently to consume at the socially optimal level.</li>
- Such a large subsidy may result in a large opportunity cost incurred (see (b) below).

#### b. High cost of financing and opportunity cost incurred

- High government expenditure is required to finance the subsidy and the government may not have the financial capability to finance it.
- $\circ$  As a result, the government may have to either:
  - Increase taxes (e.g. corporate tax and income tax) or,
  - Reallocate funds away from other public projects to finance the subsidy. This can discourage investments or cause a reduction of spending in other important public projects. Thus, a high opportunity cost in the form of other public projects may be forgone
- Subsidies may lead to an overreliance on the government and the public may expect the government to provide larger subsidy in the future.
- Furthermore, once subsidy is given, it is difficult for government to remove the subsidy without creating unhappiness among the residents.

#### c. Insufficient information to determine amount of optimal subsidy

- It may be difficult to measure or value the exact external benefit of consuming a good that generates positive externalities (indicated by BD in Figure 8).
  - For example, it is difficult to measure the increase in productivity and hence economic growth due to higher levels of education.
- If the external benefit is over-valued, then too much subsidy might be given leading to over-consumption. A higher opportunity cost would also be incurred.
- If the external benefit is under-valued, this will result in a consumption level that is lower than the social optimum.

#### d. Wastage of resources

• The public may abuse these subsidies.

- For example, SkillsFuture Singapore was cheated of \$40 million through bogus claims in the biggest case of a government agency being defrauded.
- Subsidies may inadvertently help inefficient firms survive leading to wastage of resources. Inefficient firms may have higher cost of production and are likely to make losses. When making losses, these firms usually exit the industry. However, subsidies help these inefficient firms cover their cost of production, allowing these firms to survive. There is a wastage of resources as the resources could be better allocated in other areas.

#### Special Case: Full Subsidies

For some goods with significant positive externalities (i.e. there is a large divergence between MSB and MPB), the government may choose to subsidise it fully. In other words, the good will be provided for free to consumers. For example, COVID-19 vaccinations or primary school education in Singapore.



- A full subsidy lowers the MPC until the new market equilibrium has a price of zero. At this price, the market quantity is  $Q_F$ . Depending on the extent of positive externalities, there may be overconsumption of  $Q_S Q_F$ .
- However, the resulting welfare loss  $E_sBC$  is still smaller than the initial welfare loss of  $AE_sE_M$ .
- If the positive externality is large enough, a full subsidy may also maximise social welfare. Try drawing a diagram to illustrate this.
- Do you think a full subsidy will always increase social welfare?

#### Joint Provision

Joint production means that the good is jointly provided by **both** the **public and the private sector**.

The government allows the private sector to provide  $OQ_M$  and it will supplement the rest of the output  $(Q_MQ_S)$  to ensure consumption is raised to the social optimum. (Refer back to Figure 8)

• Examples: presence of government schools, hospitals and clinics coexisting with privately-supplied medical services.

#### Strengths of Joint Production:

#### a. Greater variety and better quality

- The co-existence of public and private sectors could lead to a greater variety of services and competition for consumers especially when there is market dominance.
  - While the private sector can provide certain niche services for consumers who can afford to pay for them, the government can focus on the lower income market, e.g. affordable pre-schools by NTUC Childcare vs privately owned pre-schools like Pat's Schoolhouse.
- There is some degree of competition for both public and private sector providers to improve the quality of goods and services involved.

#### b. Reduce inequity

 While the private sector can provide certain niche products for consumers who can afford to pay for them, the government can focus on the lower income market, e.g. heavily subsidised preschools by NTUC Childcare and privately owned pre-schools like Pat's Schoolhouse.

#### Limitations of joint provision:

#### a. High cost of financing and opportunity cost incurred

- The public usually expects direct provision of goods and services by the government to be free or highly subsidised.
- The cost of providing these goods is a financial strain on many governments, especially if the country requires financing in multiple areas such as healthcare, education and training.
- These costs have to be financed possibly through means like higher taxes.
- Government provision may also incur substantial opportunity cost.

#### b. Insufficient information

- It is difficult to estimate how much the government should produce, as the valuation of the external benefits may be difficult to determine.
- Government may not be able to accurately assess the extent of market failure, leading to possible loss of welfare if too much or too little is being supplemented.

#### Rules and Regulations

Rules and Regulations aim to achieve efficient allocation of resources by increasing consumption to the socially optimal level through <u>correction of behaviour</u>. One example of rules and regulations to address positive externalities is compulsory consumption.

#### Compulsory consumption:

 $\circ~$  This is where consumption of a good may be made compulsory by legislation.

- For example, under the Compulsory Education Act, a child of compulsory school age who is:
  - (a) born after 1<sup>st</sup> January 1996;
  - (b) a citizen of Singapore; and
  - (c) residing in Singapore,

Shall attend regularly as a pupil at a national primary school. Where a child of compulsory school age fails to attend regularly as a pupil at a national primary school as required, each parent of the child shall be guilty of an offence.



#### Take Note:

Compulsory consumption has to be used together with a full subsidy, as there may be consumers who are unable to afford the good / service. See Figure 8a and the accompanying explanation for full subsidy.

#### Strengths of Rules and Regulations:

#### a. Guarantees the social optimum in certain special cases

- For activities that generate a high level of positive externality e.g. primary education, rules and regulations would more likely ensure that society consumes at the socially optimal level.
- Rules and regulations are clear and easy to follow and more likely to achieve the government's objective

#### b. Immediacy of effect

- Once the regulation is implemented, it is mandatory for all to abide by the law and the intended outcome can be achieved immediately.
- Rules and regulations are clear and easy to follow and more likely to achieve the government's aims quickly.

#### Limitations of rules and regulations:

#### a. High costs of financing to enforce

- There are costs involved in maintaining a large manpower body capable of enforcement and monitoring the markets to ensure that there is compulsory consumption. The public usually expects services that are directly supplied by the government to be free or highly subsidised. The cost of financing is a strain on many governments, especially given the trends of ageing population and rising healthcare costs.
- Thus, the constraint of a limited government budget may hinder the implementation of the policy.

#### b. Impact on low-income households

 Rules and regulations such as compulsory primary school education may place a financial burden on the lower income families if no or little subsidies are given to help the families pay for the education.

#### c. Less well-received by the target audience

 Rules and regulation can be a blunt instrument compared to market-based solutions. Hence, such policy may not be welcomed by every member in society and may erode political support for the existing government.

#### **Public Education**

Public education may be used as a policy tool to increase the demand for a good with positive externalities as it causes consumers' preferences to shift more favourably towards the good. For example, there could be advertisements or campaigns to share about the benefits of annual health check-ups or vaccinations. This would increase the consumption levels closer to the social equilibrium.

#### Strengths and Limitations of Public Education:

Refer to Section 2.2.3 on page 26: Strengths and limitations of public education to address negative externalities



Summary of externalities and relevant government intervention:

#### Key Learning Points in Section 2.2:

- Externalities are spill over effects that could positively or negatively affect third parties who are not involved in the transaction.
- $\checkmark\,$  Externalities could arise through the consumption or production of goods.
- ✓ A market fails (socially efficient level not attained) when externalities are not accounted for in the decision to consume or produce.
- ✓ Government intervention is necessary to achieve the socially efficient level.

#### 2.3 Information Failure

- Recall that the price mechanism achieves an efficient allocation of resources (allocative efficiency) if all economic agents have perfect information about the product or service (e.g. buyers and sellers knowing the quality of the product).
- However, this is hardly true in the real world as there might be information failure, which results in inefficient market outcomes.

Information failure, or imperfect information, is one of the key **underlying causes of market failure**. There are two types of imperfect information:

- Insufficient or inaccurate information
- Asymmetric information



\*either the buyer or seller can be the one withholding the information

#### 2.3.1 Insufficient and Inaccurate Information

- Consumers/producers may be unaware of the true costs and benefits of consuming/producing a good.
- This could be because they have insufficient information on the product, or inaccurate information, perhaps due to misleading marketing strategies.

There are many situations that can lead to insufficient or inaccurate information, such as:

- Product complexity
- Misleading information
- User inexperience/ignorance
- Myopic decision making/uncertain about the future



SLS Lesson: Information Failure: Under-Consumption and Over -Consumption Analysis on Insufficient and Inaccurate Information: Underconsumption

Problem 1: Consumers underestimate the benefits of consumption (e.g. health check-ups)

- Due to ignorance, consumers may not be aware of the full benefits to themselves of going for regular health check-ups.
  - For example, healthy consumers may not realise that earlier detection of certain illnesses could increase the chance of recovery and extend their life expectancy in the long term.
- Thus, they may underestimate the actual private benefits.
- The consumer's perceived marginal private benefits (MPB) of health check-ups are lower than the actual marginal private benefits. (i.e. MPB perceived is lower than MPB actual)



- Assuming that MSC = MPC, and MSB = MPB<sub>actual</sub>, (i.e assuming no externality issues).
- The actual consumption level (i.e. the market equilibrium output) is therefore at Q<sub>M</sub> where MPB<sub>(perceived)</sub> = MPC, while the allocatively efficient consumption level (also the socially optimal output) is at Q<sub>S</sub> where MPB<sub>(actual)</sub> = MPC.
- At the Q<sub>M</sub><sup>th</sup> unit consumed, MPB<sub>(actual)</sub> is CQ<sub>M</sub> and MPC is BQ<sub>M</sub>. MPB<sub>(actual)</sub> is higher than MPC. Thus, there is net benefit of CB to be gained but is not gained by the consumers.
- Additional consumption of health check-ups from  $Q_M$  to  $Q_S$  would have increased the welfare by area ABC in Figure 9.
- However, under free market conditions, consumers would consume at  $Q_M$ , which is lower than  $Q_S$ .
- Therefore there is an **under consumption** of health check-ups of Q<sub>M</sub>Q<sub>s</sub> and there is a **welfare loss** of area ABC in Figure 9 where the societal welfare could have increased if quantity consumed was to increase up to Qs.

Analysis on Insufficient and Inaccurate Information: Overconsumption

Problem 2: Consumers overestimate the benefits of consumption (e.g. misleading advertisements)

- Firms may sometimes adopt **persuasive advertising**. This aims to convince its audience of a certain belief that leads to them buying their products.
- Such advertisements could result in inaccurate/misleading information given to consumers.
- For example, a dark chocolate firm may claim many benefits of consuming dark chocolate, such as reduced blood pressure. However, these claims are often based on studies that exaggerate their findings.
- Consumers may overestimate the actual benefit to their health involved in eating the dark chocolate (i.e. MPB perceived is higher than MPB actual)

Figure 10: Market Failure due to Imperfect Information



- $\Delta s = \Delta S$
- Assuming that MSC = MPC, and MSB = MPB<sub>actual</sub>, (i.e assuming no externality issues).
- Since consumers are misled, they ended up demanding more dark chocolate, resulting in the actual consumption level (i.e. market equilibrium output) being at  $Q_M$  where MPB<sub>(perceived)</sub> = MPC, while the allocatively efficient consumption level (also the socially optimal output) is at  $Q_S$  where MPB<sub>(actual)</sub> = MPC.
- This means that the market equilibrium consumption,  $Q_M$  is higher than the allocative efficient level,  $Q_S$  (the socially optimal output).
- Thus, there is an over-consumption of the dark chocolate, which imply that there is an over allocation of resources in the dark chocolate market, causing the market to fail.

The above analysis of insufficient and inaccurate information focuses on the estimation of benefits. Consumers can also wrongly estimate the <u>costs</u> of consuming a good.

# Problem 3: Consumers overestimate the costs of consumption (e.g. User's ignorance or myopic decision making/uncertainty about the future)

When left to the free market, there are some goods and services that are over-consumed because of consumers' **failure to recognise the full costs** that could be incurred in their consumption. They end up undervaluing their private costs. Alcohol and gambling are examples of goods that are over-consumed due to information failure.

- Due to ignorance, individuals can be **unaware** of the full harmful effects (i.e. the actual cost) of consuming a good <u>to themselves</u>.
  - For example, individuals may be unaware of the actual harm associated with obesity and the implication it has on their own health when consuming excessive unhealthy snacks.
- In other words, they may underestimate the actual private cost.
- Thus, a consumer's perceived marginal private costs (MPC<sub>perceived</sub>) for unhealthy snacks are lower than the actual marginal private costs (MPC<sub>actual</sub>) for unhealthy snacks because of the information gap.



- Assuming that MSC = MPC<sub>(actual)</sub> and MSB = MPB, (i.e. assuming no externality issues).
- In a free market conditions, consumers would thus consume at Q<sub>M</sub>, where MPC<sub>(perceived)</sub> = MPB. While the allocatively efficient consumption level (also the socially optimal output) is at Q<sub>S</sub> where MPB= MPC<sub>(actual)</sub>.
- At the Q<sub>M</sub><sup>th</sup> unit consumed, MPC<sub>(actual)</sub> is higher than MPB as since from the diagram where MPC<sub>(actual)</sub> is BQ<sub>M</sub> and MPB is AQ<sub>M</sub>. Thus, there is net cost of BA incurred by the consumers for excessive consumption of unhealthy snacks.
- Therefore, the additional consumption of unhealthy snacks from  $Q_s$  to  $Q_M$  resulted in an **over consumption** of unhealthy snacks by  $Q_S Q_M$ . There is a **welfare loss** of shaded triangle area ABC in, where the societal welfare would have increased if the quantity consumed was to reduce to  $Q_s$ .

Take note:

Students often confuse externalities and imperfect information. The key difference is that externalities refers to an impact on a <u>third party (external benefit/cost)</u>, while imperfect information refers to an impact on self (private benefit/cost).

# 2.3.2 Government Policies to Address Insufficient and Inaccurate Information

In addressing the issue of information failure, **government plays a crucial role to improve the functioning of markets** to achieve efficient allocation and fairer distribution of resources. This can be done through:

- Provision of information
- Providing incentives to facilitate the flow of information. This ensures accessibility of information to all relevant economic agents involved in the transactions.

#### **Rules and Regulation**

The government can implement rules and regulations that producers have to comply with to reduce imperfect information. For example:

- Labelling of ingredients is required for all food and beverage and beauty products. For food and beverages, producers are also required to chart the nutrition table.
- Advertisements need to adhere to the Singapore Code of Advertising Practice whereby all advertisements should be legal, decent, honest and truthful.
- Advertising is banned for some services, e.g. gambling and betting, some medical services, etc. This is to prevent persuasive advertising or misrepresentation.

With such rules and regulation put in place, it ensures accuracy of information disseminated through advertising. Thus, addressing the information gap, where consumers can make more informed decisions based on actual benefits and costs rather than perceived benefits and cost. This can thus lead to an allocative efficient outcome.

#### Strengths

Predictability of outcome

- Rules and regulations are clear and easy to follow and thus, it is more likely to achieve the government's aims quickly.
- If clearly spelled out, firms and consumers would be able to weigh benefits of compliance against the costs of punitive measures that follow unlawful practices.

Immediacy of effect

• Once the rules are implemented, it is mandatory for all to abide by the law and the intended outcome can be achieved immediately.

#### Limitations

Increased costs of enforcement

• There are costs involved in maintaining a large manpower base capable of enforcing the regulations and monitoring the markets.



SLS Lesson: Government Intervention: Under-Consumption and Over-Consumption) • Thus, the constraint of a limited government budget may prevent the implementation of the policy.

#### Public Education

Public education could include the **provision of accurate information** by the government so that information is easily available and accessible. This may also help consumers to be more aware of the actual costs and benefits, and make comparisons prior to purchase or consumption.

The government uses **campaigns** to educate the public and inform them about the full extent of benefits or harmful effects of the good.

For example:

• Governments may provide information on the healthier choices in food (with 'healthier choice' labels).

This aims at getting people to decide on the right amount of consumption for the good by making consumers and producers aware of the actual benefits or costs of consuming and producing a good respectively.

In doing so, it addresses the information gap by aligning the perceived MPB or MPC to the actual MPB or MPC respectively. With no difference between actual and perceived benefits/costs, it can ensure consumption and production at the allocative efficient level respectively, where market equilibrium output at Qm to coincide with the allocative efficient (i.e social efficient) output level, Qs.

#### Strengths and limitations

Refer to Section 2.2.3 on page 25: Strengths and limitations of public education to address negative externalities

#### Think about this:

- 1. Can you use a diagram to illustrate the impact of the above policies in correcting the market failure due to imperfect information?
- 2. In the earlier sections, we learnt about **taxes and subsidies** as tools of government policy. Can these also be used to correct market failure due to imperfect information?

#### 2.3.3 Asymmetric Information

Asymmetric information is the situation in which the economic agents (e.g. consumers and producers) involved in the transaction do not have the same amount of knowledge (i.e. one party has more information than the other party does), resulting in a distortion of incentives where rational decision-making leads to inefficient market outcomes.

There are two potential outcomes of asymmetric information:

- Adverse Selection
- Moral Hazard

#### 2.3.3.1 Asymmetric Information leading to Adverse Selection

Asymmetric information allows one party to hide information about the quality of the good or service from the other party. This results in the problem of adverse selection.

Adverse selection arises from information asymmetry between the buyer and seller <u>before</u> the transaction has been completed. The deliberate withholding of information led to certain parties naturally selecting themselves out of a market. This gives rise to the situation where the parties do not get to buy or sell the good even though it may be beneficial for them to do so. It results in high quality goods being squeezed out of transactions because they cannot demonstrate that the quality of the product they are offering for sale is higher. In other words, potential buyers do not have information to differentiate the better-quality goods from the poorer quality ones.

To make it clearer, some examples in different types of markets are provided below to help you to understand this idea:

Example 1: Goods Market

• A second-hand car seller might hide the fact that his car may have an engine problem, which may go undetected when the buyer scrutinises it.

Example 2: Insurance Market

• A middle-aged man might hide the fact that he has a rare genetic disease from his health insurer, so that he may enjoy lower health insurance premiums.

Example 3: Labour Market

• A recently graduated student might conceal the fact that he is lazy and obtained good grades in his university through sheer luck whilst he is applying for jobs.

Example 4: Financial Market

• A financial consultant might sell financial products that pose great risks to investors.

#### Analysis of the problem:

Using example 1 above, how does asymmetric information lead to adverse selection and market failure?



SLS Lesson: Asymmetric information -Adverse Selection and Government Intervention

- Used car dealers often have more information regarding the condition of the used cars being sold than buyers. To profit from the sale of used cars, dealers might hide some of the information they have about the condition of used cars from potential buyers.
- When potential buyers take this into consideration in the decisionmaking process, they tend to lower the price they are willing to pay for the used cars because they may be purchasing cars of lower quality (often referred to as "lemons").
- At this lower price, sellers with used cars in good condition (often referred to as "peaches") are less willing to offer the cars for sale, resulting in a used car market where <u>more low quality used cars</u> (lemons) are sold.
- Asymmetric information thus results in an adverse selection in the used car market where lower quality cars are selected over higher quality cars. There is an over allocation of resources in the used car market towards the transaction of low quality cars.
- Overall, with a lower quality and lower volume of transactions taking place, there is an under allocation of resources to the second-hand car market.

Thus in general, when adverse selection occurs, **high quality goods tend to be squeezed out of the market**. The entire market might then consist of low-quality products. Owners of high-quality products have difficulty selling their products and the buyers who are keen on buying high-quality products will find it hard to buy one too. The welfare of consumers and producers is not maximised and the market fails to function efficiently due to adverse selection.

#### Potential long term effects of adverse selection:

In each of the above examples, the party with less information (i.e. the consumers) will tend to be worried about an unfair transaction, which occurs when the party who has more information (i.e. the producers) uses it to their advantage. The fear of an unfair transaction can prompt the consumers to withdraw from the transaction, diminishing the quality and volume of transactions in the market. This may cause a spiralling effect and the eventual collapse of the market.

#### 2.3.3.2 Government Policies to address Adverse Selection

#### A. Provision of Information

#### Intended Outcome:

- Improve accessibility to information to economic agents to distinguish between good and poor quality goods & services.
- For example, **Consumers Association of Singapore (CASE)**, a nonprofit & non-governmental organisation is set up to inform, educate and protect consumers against misrepresentation. Consumers can check if a particular producer or product is on CASE's blacklist, allowing consumers to distinguish between good and poor quality goods and services. Consumers can then avoid buying the product or buying from that specific producer.



#### Think about this:

What are some of the strengths and limitations of the government's provision of information to solve information failure?

#### Hints:

- How easy is it for government to disseminate accurate information in today's digital age?
- How easy is it for government to tackle the issues of falsehoods, including fake news in today's digital age?

#### B. Rules and Regulations

#### Intended Outcome of rules and regulations:

• Ensure more information available to economic agents to distinguish between good and poor quality goods & services.

#### Some examples of rules and regulations to reduce adverse selection:

- Lemon Law
  - This law helps to protect consumers from asymmetric information on the quality of goods. This consumer protection law provides protection against defective goods (known as "lemons"), which fail to conform to the contract at the time of delivery.
  - Such laws obligate sellers to repair, replace, refund or reduce the price of those defective goods when goods do not meet the standards of quality and performance as stated in the contract.
  - In Singapore, the law covers all general consumer products purchased in Singapore (e.g. stationery, apparel, electronics, bedding, and big-ticket items such as motorcycles and cars)
- Require sellers to offer warranties
  - This can be used to tell potential buyers that the car is not likely to be a "lemon" since it would not be advantageous to sellers to offer warranty if the used car is a "lemon". A "lemon" is likely to require more repairs, and providing a warranty for it will end up costing the seller more. This can help to reduce adverse selection problem.
- Provide inspection services
  - Government can sample and test products to check on the quality of the product. In Singapore, all models of motor vehicles sold in Singapore are required to have certain safety features, and clear the standards on noise and air pollution levels prior to sale in Singapore.
  - This is also common among health insurance, food, drugs and electronics markets.
    - For example, HSA and AVA sample and test various food items to ensure that no harmful products are added, and that detrimental chemicals/bacteria count does not exceed a stipulated level.
    - In the health insurance market, potential buyers may be required to take mandatory health checks to avoid insurance coverage for any pre-existing ailments.

 All electronics sold in retail market in Singapore are to be cleared by the authorities so that it will not pose fire hazard to users.



#### Think about this:

What are some of the strengths and limitations of the government's rules and regulations to solve information failure?

Hint:

- How easy would it be for government to enforce its laws?
- How long does it takes for government to implement its laws?

#### 2.3.3.3 Asymmetric Information leading to Moral Hazard

Recall, asymmetric information allows one party **to hide information about their actions and intentions** from the other. Thus, apart from the result of adverse selection, it can also result in the problem of moral hazard.

Moral hazard refers to a situation where a person behaves in a way that is detrimental to society because the person does not fully enjoy the benefits or bear the costs of his actions. It is the situation in which it occurs <u>after</u> a transaction was made (for instance, after the purchase of a car insurance) and asymmetric information results in economic agents taking greater risks than they normally would because the resulting costs will not be borne by them (detailed analysis below).

#### Analysis of the problem:

To make it clearer, examples in different markets are provided below to help you to understand this idea:

Example 1: Product Market (example: Car Insurance)

- An insurance company sells insurance to a car owner. The insurance company has incomplete information about the actions of the car owner <u>after</u> the purchase of car insurance (i.e. once he has been insured.
- The owner of a car is more likely to prevent damage of his/her car by driving and parking carefully if he is not insured.
- However, when the car is insured for its full value, the car owner is covered and does not lose out in the event of any damage.
- As a result, the car owner has less incentive to protect his/her car against accidents and other forms of damage.
- This is detrimental to the profits of the insurance company as they would have to pay for the cost of the damaged car, especially if the car owner takes unnecessary risks and incurs unnecessary damages. Therefore, there might be an over allocation of resources to car servicing.



SLS Lesson: Asymmetric information -Moral Hazard and Government Intervention Example 2: Labour Market

- An employer hires a worker whose behaviour at work cannot be observed directly by the employer. The employer has incomplete information about how the worker will behave after he is hired.
- The worker is likely to be more diligent and productive if his behaviour is observable by his employer.
- However, since the worker's behaviour is hidden, the worker has an incentive to shirk and do a poor job.
- This is detrimental to the employer since the worker's performance at work might lower productivity.
- There is wastage of resources and productive efficiency is not achieved.

Example 3: Financial Market

- The U.S government **bailed out** (gave financial support to a company that faces serious financial difficulty) a number of firms in danger of failing, many of which are large banks.
- The government has incomplete information **about the behaviour** of a bank when they bail them out.
- Banks are likely to be more prudent in giving out loans if there was no chance of a bail out.
- However, if a bank knows that there is a good chance it will get emergency financial support from the government when it encounters problems, it would lead to the bank taking increased risks in giving out loans in the future.
- This is detrimental to the economy, as resources used to bail the banks out could have been used for other sectors of the economy with greater benefits to society.

Thus, in general, when moral hazard occurs, economic agents might take greater risks than they normally would because the resulting costs are not borne by them. This might result in excessive risk taking and inefficient market outcomes.

#### 2.3.3.4 Government Policies to address Moral Hazard

#### A. Rules and Regulations

#### Intended Outcome

• Ensure that firms and households do not take unnecessary risks than they normally would. This can be done by taking into consideration the appropriate **incentives** to encourage individuals to be socially responsible whilst maximising their self-interest.

For most cases of moral hazard, firms are the ones who lose out because consumers have more information than they do (for example in the case of health insurance or hiring of employees). However in some markets, firms are able to implement measures of their own to reduce the problem of moral hazard without having to relying heavily on government intervention. Refer to the box below for more details on these measures.

Governments may step in to aid the firms by making these measures mandatory on a national level for some goods and services. For example,

the government may make it mandatory for insurance firms to implement co-payments in health insurance policies.

#### Strengths and limitations

Refer to Section 2.2.3 on page 25: Strengths and limitations of public education to address negative externalities

Think about this:
 What may firms do to reduce the problem of asymmetric information?

Besides relying on government intervention, firms also can take measures to reduce the problem of asymmetric information that it faces. Some examples include:

#### To reduce adverse selection:

- Screening customers, especially in insurance markets.
- Offer warranties, so that consumers might be able to distinguish between high and low-quality goods. Producers of low-quality goods will tend not to offer warranties, as this would incur substantial additional costs for them if they have to replace or repair the good whenever it is defective.

#### To reduce moral hazard:

- **Contracts** could be written to try to eliminate undesirable behaviour. For instance, some contracts tie the wages of the employee to his/her performance, including a clause for his/her dismissal if his/her performance falls below par. This will help to prevent employees from shirking.
- Monitoring the actions of the worker to prevent shirking
- **Co-payment in insurance policies** which requires the insured person to bear a portion of the medical cost. This gives an insured person a direct incentive to make economically appropriate choices.

#### Key Learning Points in Section 2.3:

- ✓ Due to information failure, the decisions made by economic agents do not lead to socially optimal outcomes.
- ✓ Asymmetric information leads to adverse selection and moral hazard.
- ✓ Government intervention to provide information can reduce market failure due to imperfect information.

### Extension: Merit and Demerit Goods

#### **Merit Goods**

Definition: A merit good is one that is deemed by the government to be socially desirable and tends to be <u>under-consumed</u> in a free market.

- Examples of merit goods include education, healthcare, library services and immunisation.
- There are two main reasons why merit goods may be under-consumed in a free market:
  - 1. The **consumption** of merit goods produces **significant positive externalities**.
  - 2. There might be **imperfect information** present. Consumers might not know the full extent of benefits to themselves that could be gained from consumption of the good, thus their perceived benefits gained is less than the actual benefits they will receive.
- Markets for such goods may generate an undesirable distribution of income, resulting in the social exclusion of some individual especially from the lower-income group (inequity) from the access to such essential goods.
- Because of the points above, the government intervenes to encourage a higher level of consumption and production of merit goods.



Should there be direct provision of <u>all</u> merit goods by the government?

#### Demerit Goods

Definition: A demerit good is one that is deemed by the government to be socially undesirable and tends to be <u>over-consumed</u> in a free market.

- Examples of demerit goods include cigarettes, alcohol and drugs.
- There are two main reasons why demerit goods may be over-consumed in a free market:
  - 1. The consumption of demerit goods produces **significant negative** externalities.
  - 2. There might be **imperfect information** about the good. Consumers of the demerit good do not have full information about the harmful effects to themselves of consuming it, possibly because some of these effects might only arise in the long term. Thus, the actual costs of consuming the demerit goods might be greater than the perceived costs.
- Thus, the government needs to intervene to discourage the production and consumption of such goods.

#### Take Note:

The government policies to address merit and demerit goods would be similar to the policies to address externalities and insufficient information. You may refer to the earlier sections for the detailed explanation of these policies.

### 2.4 Factor Immobility

Article: Supporting vulnerable workers and upgrading skills key to growing an inclusive economy

Singapore aims to grow not just a vibrant, innovative economy, but also an inclusive one in which growth uplifts all Singaporeans, said Deputy Prime Minister Heng Swee Keat on Monday (Oct 5).

It will be achieved in two ways, he added, in a ministerial statement in Parliament. One, by providing holistic support to uplift vulnerable workers, and two, by ensuring workers have skills to stay relevant. Lower-income workers have been particularly hard hit by Covid-19, he noted. "Many of these workers face a twin challenge, as they are also in sectors that will be affected by longer-term structural changes in the economy, such as retail or F&B (food and beverage). Some are also in the gig economy."

With middle-income and middle-age workers, they not only have heavy family responsibilities and commitments, but also face the challenges of a rapidly evolving labour market, said Mr Heng, who is also Coordinating Minister for Economic Policies and Minister for Finance.

"For all these workers, there is even more urgency to upskill and transition into jobs with good long-term prospects." He acknowledged that improving the job market for Singapore's more vulnerable workers is a relentless effort.

"Beyond incentives, we need to shift culture and employer mindsets. But if we focus on the strengths of our workers and adopt flexibility in job design, we can customise creative solutions for different groups of workers." For instance, some workers find it hard to travel far for work, he noted. At the same time, some shops in the heartland struggle to find workers.

The Straits Times, Nov 4, 2020

# Some questions to consider:

- What are the problems faced by middle-income and middle-age workers?
- Is there a need for government intervention? Why or why not?



SLS Lesson: Factor Immobility Recall that the price mechanism achieves an efficient allocation of resources when there is perfect mobility of the factors of production.

However, if there is some form of factor immobility, then there might be inefficient market outcomes.

#### Analysis of the problem:

- When factors are immobile, it can result in firms employing inefficient labour-capital combinations.
  - In some cases, labours may even be laid off (unemployed), resulting in a surplus of workers in the declining industries to persist.
  - While there may be a shortage of workers in the growing/ expanding industries where workers are not allocated to areas that they can contribute the most (underemployed).

When this happens, labour resource is not efficiently allocated, leading to society's welfare not being maximised since more goods could have been produced if the labour are utilized efficiently but are not. This led to market failure.

- In addition, factor immobility (labour in particular) can lead to productive inefficiency too. The shortage of suitable labour in the rising industries can lead to increase in wages. Search cost and hiring cost will also increase for firms in their attempt to hire suitable workers from both locally and from overseas. Such high costs of production for firms will eventually lead to an increase in the long run average cost of the firms as compared to if labours are perfectly mobile, causing productive inefficiency to arise.
- There are two types of factor immobility, namely **occupational** and **geographical**.

(a) Occupational immobility

- Occupational immobility occurs when there are barriers preventing factors of production (such as labour) from being employed across different sectors of the economy. It results in labour being **unemployed** or used **inefficiently**.
- One common reason is that workers **lack the skills or educational qualifications** required by expanding industries in the economy. Some **job-specific skills** that are needed in growing industries for Singapore could be the finance and pharmaceutical industries.
- Other reasons for occupational immobility include,
  - Automation and technological changes Due to globalisation and technological progress, low-skilled workers in the manufacturing industry may be made redundant and thus find it difficult to find re-employment in other expanding industries.
  - Structural changes in economy There is a mismatch between the skills of the unemployed and the skills required by employers looking for workers resulting in structural unemployment
  - Lack of information on jobs available There may be lack of information about the jobs available in job portals.

Structural Unemployment will be explained in detail in the future topic of Macroeconomics. • Thus, these workers remain unemployed, or are used in ways that are not productively efficient.

#### (b) Geographical immobility

- Workers may also experience geographical immobility, when there are barriers preventing factors of production (in this case, labour) from moving from one area to another to find work
- Some reasons why geographical immobility might exist:
  - Family, social ties and commitments
  - High financial costs involved in relocation, e.g. housing and rental costs and other associated expenditure (general cost of living between regions)
  - Cultural, language and immigration barriers cultural or language barriers can prevent labour from moving to other countries to take up jobs. In addition, immigration barriers may mean that it is not always easy for people to get work permits to work overseas even if they wish to. It is especially difficult for unskilled workers.

#### 2.4.1 Government Policies to address Factor Immobility

The objective of government intervention in the case of labour immobility is to ensure efficient and equitable distribution of resources.

#### 2.4.1.1 Policies to address Occupational Immobility

#### Subsidies for trainings and education

Subsidies for training and education (supply-side policies) - aim to increase job mobility by equipping labour with the relevant skills through subsidised.

- The subsidies may be granted directly to lower-skilled workers, unemployed or even students to encourage them to learn new skills that match the needs of firms in the economy. With the relevant knowledge and skills, labours would be able to move into expanding industries with more available job vacancies and possibly higher wages.
- Subsidy can also be granted to firms to offset the costs incurred when sending workers for training, hence firms may be **more willing to hire workers with less suited skills**, since training costs are now lower.
- Some examples of subsidies include:
  - SkillsFuture is a policy that aims to help Singaporean attain mastery of skills and promote lifelong learning. This will equip workers with up-to-date skills to response to the changing demand of jobs.
  - When Singaporeans enter the workforce, they will receive a \$500 SkillsFuture credit to pay for course fees for work-skills related courses.



SLS Lesson: Government Intervention -Factor Immobility

#### **Government Regulation**

#### **Direct provision**

- Government can set up agencies to facilitate information sharing on jobs available in the various industries with institutes of higher learning, or via job portals to facilitate job matching. As the information on available jobs becomes more accessible, jobseekers will be able to find jobs that better fit their skillsets and profile and reduce unemployment due to factor immobility.
- Government can provide education and training for workers who have lost their jobs due to automation and equip them with new skills to take up available jobs in the economy. This would reduce occupational immobility and hence unemployment within the economy.

#### Partnership with Education Institutes

 Government can work with institutes of higher education (vocational institutes, polytechnics and universities) to ensure alignment between the courses provided and the changing needs of the economy.

#### Strengths

- Well received by targeted beneficiaries
  - Training subsidised by government will be well received by the public particularly the lower income workers who may lack the funds to sign up for training.
  - Direct provision of training institutions by government can reduce the hassles and hence encourage firms to send their workers for relevant job trainings. Similarly, government job matching portals can enhance the ease of accessibility to accurate and relevant job information.

#### Limitations

- Government budget constraints
  - Sufficient budget is needed to fund the training.
  - Subsidies for training incur huge opportunity cost for the government. The amount of money used for subsidising training could be used to develop other sectors of the economy.
- Insufficient information Government may fail to make an accurate valuation of the amount of subsidies required, causing inefficient allocation of resources should under or over-subsidy arises.
- Subsidy given to trainings, take a long time to take effect because both the process of designing new courses and training of workers take time. Hence, likely to be long term strategy at best.
- Uncertainty in policy outcome, as the effectiveness of training depends on the ability of workers to learn the new skills.

#### 2.4.1.2 Policies to address Geographical Immobility

#### Subsidies for housing and transport

The government could offer subsidies (e.g. housing subsidies & transport subsidies) to people who are moving into areas where there are shortages of labour. This would reduce the cost of moving to the new areas, reducing labour immobility across regions.

Example: Under the federal program of Trade Adjustment Assistance (TAA), the US government provides relocation allowance for workers. The relocation allowance subsidises the workers when they move to a new area outside of their normal commuting area.

#### **Tax Reduction**

The government could reduce specific taxes (e.g. property tax) to encourage labour to move into areas where there are shortages of labour.

#### Improvement in infrastructure

Government can implement reforms to the housing market which are designed to improve the supply and reduce the cost of rented properties, and to increase the supply of affordable properties. The improved transportation services will facilitate labour movements.

#### Provision of information

Government could provide information on where the job vacancies are to encourage workers to take up the jobs. Provision of job information could facilitate relocation by reducing uncertainty about employment prospects in other areas. Such provision of information could help match workers with jobs and diminish the perceived risks of relocation.

Strengths

• Directly reduce the cost of moving and promotes economic growth for the host country - With increase labour mobility across region, there can be an influx of labour into the country which can help to drive the economy and promote economic growth and higher standard of living for the country.

Limitations

- Budget constraint High cost of financing and opportunity cost is incurred - Most of the above policies requires government to fork out huge sums of money in order to be carried out and this can create a strain on the government budget and lead to trade-off between this and other needs of the country.
- Time Lag housing construction takes years. Hence, government provision of subsidised rental housing requires a long time to take effect.

#### Key Learning Points in Section 2.4:

- $\checkmark~$  The market fails to achieve an efficient outcome when there is factor immobility.
- $\checkmark$  The two types of factor immobility are occupational and geographical.
- ✓ Factor immobility leads to underemployment and unemployment.
- ✓ Firms are unable to achieve productive efficiency when there is factor immobility.
- ✓ The government policies adopted depends on the root cause of the problem and government would also consider other aspects such as the costs, benefits, constraints as well as the degree of imperfect information that exists, and the unintended consequences.
- ✓ The effectiveness of he policies also depends on the responsiveness of the economics agents.

### 2.5 <u>Market Dominance</u>

(This section will be covered in detail in the next topic, "Firms and Decisions")

13 chicken suppliers fined record \$26.9 million for price-fixing and agreeing not to compete

After four years of investigations, 13 fresh chicken distributors which supply more than 90 per cent of fresh chicken products here have been fined a record \$26.9 million for price-fixing and non-compete agreements.

The amount is the highest total financial penalty in a single case to date, the Competition and Consumer Commission of Singapore (CCCS) said in issuing its infringement decision on Wednesday (Sept 12).

Between 2007 and 2014, the suppliers met to discuss prices, and coordinated the amount and timing of increases on at least seven separate occasions, increasing prices by 10 to 30 cents each time. They also agreed not to compete for one another's customers.

The actions restricted market competition and customer choices, and likely contributed to price increases of certain fresh chicken products in Singapore, the CCCS said.

Chicken is the most consumed meat in Singapore, with more than 30kg consumed per person annually, compared to 1kg to 20kg for other meats such as fish, pork, beef and mutton. In 2016, about 49 million chickens were slaughtered here. Given the high consumption of chicken here and combined market share of the firms, a large number of the suppliers' customers and end-consumers were affected, the commission said.

The Commission said the total turnover of the suppliers is about half a billion dollars a year. "Price-fixing and market sharing are considered some of the most harmful types of anti-competitive conduct," said CCCS chief executive Toh Han



Dominance

Li. "Such conduct is particularly harmful when the products are widely consumed in Singapore, such as in this case." Source: The Straits Times, 12 September 2018 Some questions to consider: • What is the impact of the 13 distributors coming together to fix price and to limit the competition among themselves? • Should the government intervene? Why or why not?

Market Dominance can lead to market failure in the following ways:

- Allocative inefficiency
- Productive inefficient)
- Dynamic inefficiency

Note: More information on the types of inefficiencies and the types of firm's profits will be covered in detail in the next chapter "Firms and Decisions - Market Structure"

#### 2.5.1 Market dominance leading to allocative inefficiency

#### Analysis of the problem:

- Recall that the price mechanism achieves an efficient allocation of resources when the market is perfectly competitive.
- But if there is imperfect competition (where the market is dominated by a few firms) then the market fails as there might be too few resources allocated towards the production of the good.
- Firms with a dominant position in a market may make use of their market power to reduce their output, causing prices to drive up.
  - In fact, when the firm is under-producing, it causes consumers to enjoy less output than the allocative efficient output in the perfectly competitive market (where there is a lack of market power).
  - Also with under-production, it results in output prices rising. Consumers are charged at a price that is higher than the marginal cost of the good produced (Price charged is greater than Marginal Cost, P > MC).
- Since market output produced is not at the socially optimal level, resources are not efficiently allocated. The society incurs welfare loss as the consumers' welfare could have increased by producing more outputs and charging at a lower price.

#### 2.5.2 Market dominance leading to X-inefficiency

- X-inefficiency comes about due to a lack of competition in the market.
- Without competitive pressure on profits, firms get complacent and may end up overstaffing and over spending on buildings and equipment. There is also less effort to keep technology up to date or research new products.
- This could result in higher costs as firms are no longer productively efficient.

#### 2.5.3 Market dominance leading to dynamic inefficiency:

- Dynamic efficiency occurs over time and is strongly linked to the pace of innovation within a market and improvements in both the range of choice (products variety) for consumers and also the quality of products
- Firms earning supernormal profits tends to have the ability to re-invest the profits to improve the end product or production process, which enables them to lower their long run average cost.
- However with market dominance, firms with strong market power may choose not to re-invest the profits since it is protected by the high barriers to entry, resulting in dynamic inefficiency.

#### 2.5.4 Market dominance leading to inequity:

- Firms with a dominant position in a market may command higher revenue and hence profit than other small firms in the market.
  - For example, with a 90 per cent market share, Sistic will earn more substantial profit relative to her smaller competitors in the market. This causes an inequitable distribution of profit between Sistic and other smaller competitors.

#### Take Note:

Please refer to your subsequent lecture notes on 'Firms and Decisions - Market Structure' for more details on market dominance and government intervention.

#### 2.5.5 Government Intervention

The objective of government intervention in the case of market dominance is to increase the production levels to the socially efficient levels (allocative efficient) and ensure equity.

The following are the different ways of government intervention (this section will be briefly described below, though more details of these policies will be provided in the later set of lecture notes: Firms and Decision

#### • Price Regulation

- To regulate large companies with large market shares, the government can adopt various pricing policies (example, price controls MC or AC pricing) to ensure price charged will lead to consumption and production that is closer to the allocatively-efficient output level.
- Anti-Trust Laws
  - $\circ~$  Government can pass laws to prevent firms from merging and forming monopolies.
- Nationalisation
  - A government may decide to take over the monopoly (a process we call nationalisation) especially if the monopoly provides essential services. An example of essential service would be utilities.

#### Key Learning Points in Section 2.5:

- ✓ Firms with market dominance are able to restrict their output to increase prices and earn higher profits. Thus, market dominance leads to under production below the socially optimal quantity.
- ✓ Also, firms with market dominance may not have an incentive to minimise costs due to a lack of competition.
- ✓ Hence, firms with market dominance may lead to allocative inefficiency and productive inefficiency, and hence affecting consumers in terms of price, product availability, variety, and quality.
- Market dominance often results in inequity as dominant firms are able to earn higher profits compared to less dominant firms.

## 3. EQUITY IN RELATION TO MARKETS

#### 3.1 Understanding the concept of equity

- Equity is an <u>outcome</u> where society considers the <u>distribution of</u> <u>resources to be fair</u>. It involves ensuring that the low-income households have access to essential goods and services, such as food, education and healthcare services.
- Value judgements need to be made when discussing and deciding what goods and services are deemed essential in society. This is so as equity is inherently subjective as different economic agents in a society may have different perceptions as to what is considered as fair. This, means that different countries may deem different goods to be essential as well.
- Nonetheless, the lowering of prices and increasing in accessibility of goods such as education, healthcare, housing, transportation, food and utilities can translate to less in equitable outcomes.
- The issue of inequitable outcomes can arise in a free market because, whilst the price mechanism could help to achieve an efficient allocation of resources as explained in the above section, it could fail to achieve an equitable allocation of resources.

#### Possible causes of inequity

- Technological advancement
  - It gives rise to jobs requiring new skills, thus the demand for labour in such jobs increases, resulting in higher wages for skilled labour.
  - On the other hand, technological advancement could replace many jobs, particularly routine ones, reducing the demand for unskilled labour. This depresses the wages of unskilled labour.
- Globalisation
  - With increased flows in goods, capital and labour, many lowerskilled jobs in developed countries may be outsourced to developing countries. Thus, lower skilled labour might lose their livelihood.

Analysis of the problem of inequity:

- What matters in a market-based system is the **demand** (willingness and ability to pay) for goods and services or dollar votes.
- Since incomes are unevenly distributed, households with high-income levels will be able to determine what should be produced as they are able to cast higher dollar votes for the goods/services that they want.
- In this way, profit maximising producers will channel/ divert scarce resources away from the production of necessities that the poor desire to produce goods for the rich.
- The needs of the poor (in terms of goods/services such as necessity items) may not be satisfied since they do not have the ability to pay.
- It is thus crucial that the government takes into account the needs of all in the society, especially the disadvantaged, through measures such as subsidies and even direct provision of essential goods.



#### 3.2 Government Intervention to Address Inequity

Governments could make decisions to improve equity using policies such as subsidies and direct provision of goods that are deemed essential. The following are some policies the government may use to improve equity in the economy.

#### A. Subsidies

- Intended outcome of using subsidies: to achieve efficient allocation of resources as well as fairness in the distribution of economic welfare for such essential goods.
- The government can provide subsidies to the low-income households. This provide a more equal opportunities for the poor to access the goods they need but may not be able to afford, e.g. education and housing.
- The government can provide **transfer payments**, which are transfers from the government to individuals without production taking place. Examples of transfer payments are unemployment benefits and social security payments.

Transfer payments help to bolster the incomes of the poor and increase purchasing power to enable purchase of goods and services.

• Transfers given in the form of goods and services rather than cash (known as "in-kind transfers") ensure direct consumption of essential goods and services E.g. Food aids, medical services and USave rebates etc.

#### B. Rules & Regulations

- Intended outcome of rules and regulation: to achieve efficient allocation of resources as well as fairness in the distribution of economic welfare.
- **Price controls** are a form of legislation that governments use to achieve a more equitable allocation of resources.
- Recall from the last set of lecture notes (Price Mechanism and Its Application) the two types of price controls: price ceiling and price floor. Refer to the previous set of lecture notes for the relevant economic analysis.

Price Ceiling (Maximum Price):

- As the market equilibrium price is too high in a free market, a <u>maximum price</u> is set by the government to prevent prices from rising beyond the maximum price.
- The maximum price is the price that producers can legally charge. Thus, the prices are fixed **below** the market equilibrium prices.
- Price ceiling on necessities such as healthcare may help keep prices low enough for low-income families to afford essential goods and services so as to reduce inequity.
  - This is especially so for healthcare products and services where demand can be price inelastic. Any rise in cost of production could decrease supply causing sharp increase in prices.
  - Through maximum price, it keeps prices low so that low-income families could have access to affordable healthcare.

Price Floor (Minimum Price):

- As the market equilibrium price is too low in a free market, a <u>minimum price</u> is set by the government to prevent prices from falling below the minimum price.
- Thus, the prices are fixed <u>above</u> the market equilibrium prices.
- This policy can help reduce inequity by protecting farmers' incomes.
  - This is especially so for agricultural products where supply fluctuates severely, (e.g. crops prices can fluctuate due to bumper crops).
  - Through minimum price, it prevents the fall in farmers' incomes below subsistence level. This ensures that farmers have greater purchasing power to therefore gain access to goods and services.
- Another example of price floor is the minimum wage policy. This helps to ensure low-wage labour have higher wages to maintain a decent standard of living.

#### \_ Think!

- a) Should Singapore practice minimum wage policy?
- b) Do governments face a trade-off between efficiency and equity?

#### Key Learning Points in Section 3:

- ✓ Governments aim to achieve both efficiency and equity. Even when efficiency is achieve, there may still be inequity in the market.
- ✓ Equity refers to fairness in the distribution of income.
- ✓ The concept of equity is normative and is based on value judgements.
- ✓ Governments may choose to intervene in markets to ensure a more equitable distribution of income.

# 4. GOVERNMENT FAILURE

#### 4.1 Summary on government intervention:

Due to the various ways in which the market mechanism has failed to achieve an efficient allocation of resources (as explained in section 2), the government needs to step in and intervene in such markets, so that an efficient and equitable allocation of resources can be achieved. While this ideal situation may not be achieved, the government can at least ensure that resources are allocated more efficiently relative to a situation with free market forces.

Policies the government can adopt	Sources of market failure addressed
1. Direct Provision	Public Goods
2. Taxes and Subsidies	<ul><li>Externalities</li><li>Imperfect Information</li><li>Factor Immobility</li></ul>
3. Rules and Regulations	<ul><li>Externalities</li><li>Imperfect Information</li></ul>
4. Tradable Permits	Negative Externalities
5. Public Education	<ul><li>Externalities</li><li>Imperfect Information</li></ul>
6. Joint Production	Positive Externalities

The different channels of government intervention are as follows:

It is also useful to note that government can apply the knowledge of cognitive bias (sunk cost, fallacy, loss aversion or salience bias) when implementing policies so as to influence the decisions of economic agents such as consumers and producers when deemed needed by the government.

(Refers to section 2 explanation relating to cognitive bias when government intervene in the market.)

#### Lecture activity:

Read the article in the appendix at the end of this set of notes.

- What are the policies used by the government to address the problem of carbon emissions?
- What other policies could the government consider?



#### 4.2 Government Failure

Definition: Government failure is a situation where government intervention results in <u>greater</u> market inefficiencies than would otherwise be without government intervention.

Government intervention in the market can itself lead to problems where resource allocation is less efficient. This is possible as the government comprises of people, such as politicians and bureaucrats who may act in their own self-interest, just as other economic agents (firms and consumers) would.

Governments too, have limited resources but have many objectives to achieve. Conflicting objectives thus can occur; government actions may serve to reduce short run problems but lead to long run unintended consequences. It is important to recognise that government intervention does not necessarily lead to more efficient outcomes.

For example,

- The government may make policy decisions that bring about quick results or adopt more popular measures such as subsidies to favour key individuals or groups.
- In the case of subsidies, it is often used as a measure by the government to encourage production of some goods that government deemed as beneficial to the society. While this may result in more goods being produced and more consumers being able to enjoy the goods, it may actually allow inefficient firms to continue to survive, worsening market inefficiency.

#### Causes of government failure:

#### Lack of / distortion of market incentives

• Government intervention could remove or distort market signals by removing market forces or cushioning the effects of market forces. Examples include:

Welfare payments	<ul> <li>Discourage effort to work &amp; less likely to improve one's employability</li> <li>Create problems related to moral hazard         <ul> <li>With free treatment, one will be less cautious about staying healthy (e.g. they might smoke more)</li> </ul> </li> </ul>
Subsidy	<ul> <li>Protect inefficient firms from competition</li> <li>Create barriers to entry for new firms due to prices being kept 'artificially' low</li> </ul>
Taxes	<ul> <li>Tax on income: create disincentive effect and discourage individuals from working hard</li> </ul>
Direct provision of goods	<ul> <li>Lack of profit motivation</li> <li>May worsen inefficiency due to little incentive to seek out most efficient production methods</li> </ul>
Price controls	<ul> <li>Creates distortions that lead to shortages and surpluses</li> </ul>

#### Information gaps

- Governments may not have perfect information of the costs and benefits of policies.
- It may lack the ability to gather sufficient and/or interpret the data accurately to make effective decisions about the best way to allocate scarce resources.

#### Administration cost

- Developing and implementing measures requires funds, hence funds have to be raised from somewhere (such as through taxes, etc.)
- In addition, funds used for measures in certain areas would also imply that it could not be used elsewhere (opportunity cost must be taken into account).

#### Time lags

- Time lags arise because government measures take time to take effect. The issue of time lag would also vary for different countries, depending on how small or large a country is, the economic circumstances, etc.
- Thus, the issue of time lag may cause policies to be ineffective and in some cases, it may even destabilise the economy further. There are 4 main aspects of time lags:

Recognition lag	Time taken to collect and analyse economic data	
Decision lag After identification of the problem, gover policy makers need to decide on a suitable of action, before passing legislation, la administrative rules deemed necessary		
Implementation	After selecting a policy, steps are needed to	
lag	implement the policy	
Impact lag Time needed for policy to take effect and the intended consequences on relevant ecor agents		

#### Political pressure

• Some governments may be reluctant to use unpopular measures that might jeopardise the standing of the government.

#### Key Learning Points in Section 4:

- $\checkmark$  When market failure occurs, government intervention is needed.
- ✓ Governments consider the costs, benefits and constraints as well as apply the knowledge of cognitive biases when deciding on the best policy to use.
- ✓ Even with government intervention, government failure can occur as well. This may result in further refinements of the policies used.
- As long as the policy tools that the government uses are able to get the market to be closer to efficient allocation of resources, the society will still be better off than leaving everything to the market

#### Learning Reflection

Congratulations! You have finished this lecture topic. However, how much have you understood?

Below are the areas of focus in this topic and a checklist that you may use to know how much you have understood:

Areas of Focus	What you should be able to do	Check- list
Efficiency and Market Failure	<ul> <li>Define allocative efficiency</li> <li>Explain how the price mechanism might allocate resources efficiently.</li> <li>Explain why the social optimum is at the output and price where MSB=MSC.</li> </ul>	
Causes and effects of market failure • Public goods • Externalities	• Explain the characteristics of public goods and the rationales for government intervention in the provision of these goods.	
<ul> <li>Information failure</li> <li>Merit and demerit goods</li> <li>Factor immobility</li> <li>Market dominance</li> </ul>	<ul> <li>Illustrate and explain positive and negative externalities in both production and consumption using diagrams, and how they lead to inefficient allocation of resources</li> </ul>	
	• Explain the characteristics of merit and demerit goods, and why these goods are under/over consumed.	
	• Explain the different types of factor immobility, and how they may constrain producers in production decisions.	
Correction of market	• Explain the governments' objectives	
<ul> <li>Different policies that are used to address market failures</li> </ul>	• Explain and evaluate the decisions made by governments in using a range of policy tools to correct market failures.	
	Explain possible failures of government interventions	
Equity in resource allocation	<ul> <li>Explain the implications of inequity on resource allocation.</li> <li>Explain and evaluate the decisions made by governments to improve equity.</li> </ul>	

Annex 1:

## Decision Making by the Government

#### **Decision Making Framework for Governments**



#### 2. Identify Intended outcome/objective(s) of policy option(s)

- Increase consumption of training to the socially optimal level and achieve efficient allocation of resources
- Reduce information failure
- Ensure equity where there is fairness in the access to training for all individuals

#### 3. Factors that will influence decision making in choice of policies:

Having identified the problem(s) and the intended outcome / objective(s), the government will consider the policy options available.

To decide which policy to implement, the government has to go through the decision-making process by taking into consideration:

- 1. Possible **constraints** the government may face
- 2. Cost and benefits of the policies

#### Constraints

- 1. Quality & Quantity of Factors of Production
  - In trying to achieve the objectives, the government might have to consider if they have the necessary factors of production (capital, entrepreneur, land and labour) to increase production and consumption of training.
  - The country might not have sufficient qualified professionals to provide training to employees. This lack of trained professionals could limit the effectiveness of the policies (e.g. subsidies, joint production and public education) and prevent the society from consuming at the socially optimal level.

#### 2. State of Development of country

• The government will also have to consider if the country has the necessary infrastructure to provide quality training for employees, or whether there are guidelines and procedures in place to implement the policies.

#### 3. Consider the characteristics of country / economy

- The government will have to consider the characteristic of the country such as the size, accessibility and demographic of the country, as well as the population size.
- The size of the country could limit the government's effort to encourage employees to go for training. Larger country size could mean that more manpower and funds are needed to implement the policies at national level compare to country with smaller land size.

#### 4. Financial ability

- The government will have to consider if they have sufficient funds to implement the policies, especially if the policy requires huge funding. If the government does not have sufficient budget, the government might have to consider if they are able to borrow to finance their spending.
- If the extent of market failure is severe, the government might need substantial funds to correct the market. The limited budget might restrict the government's ability to finance the policies and hence the choice of policies. Certain policies (e.g. subsidies and direct provision) require substantial government expenditure.

#### 5. Political acceptability

• The government has to consider the receptivity of the public (employers and employees) to policies.

• Employers may not want to send their employees for training for fear that training would make it more likely for their employees to job-hop.

#### 6. Information

- The government has to consider the reliability, availability and accessibility of information.
- To provide subsidies for training, the government needs the correct valuation of the MEB. However, the lack of reliable and available information may lead the government to over or undervalue the externalities.

#### 7. Time frame

• The government has to consider the urgency of the problem. If low productivity growth requires immediate solution, it might restrict the type of policy that government can adopt. Some policies, such as subsidies, may see a more immediate result compare to public education.

Costs	Benefits
Cost of implementing policy may differ for	Government will also consider the benefits of
different policies.	the various policies.
<ul> <li>Some policies (e.g. subsidies require recurring spending by the government.</li> <li>While other policies (e.g. public education) only require a once-off spending by the government (if it is only a once off campaign).</li> <li>Opportunity costs are also incurred (e.g. the funds used for subsidies could have been used to build public infrastructure)</li> </ul>	<ul> <li>Some policies such as rules and regulations would yield immediate benefit for the society (employees, employers &amp; third parties).</li> <li>Subsidies will benefit the society especially the low-income families.</li> </ul>

#### Feasibility and Net Benefits

Having gathered all these information, the government will then select the policy that is feasible and gives the highest net benefit.

- 1) Feasibility:
  - A policy is feasible if the costs is within the constraints (costs < constraints)
- 2) Beneficial:
  - A policy is beneficial if the benefits outweigh the costs (benefits > costs)
  - The government will select the policy it deems to have the highest net benefit (where net benefit = total benefit total cost)

### Annex 2: Readings



# Article 1: Singapore's carbon tax could increase to \$80 per tonne of emissions by 2030

The carbon tax rate in Singapore will be increased from the current \$5 per tonne of emissions to between \$50 and \$80 by 2030, a move that will help the nation reach new, more ambitious climate goals announced in Singapore Budget 2022.

The carbon tax hike will be done in phases to give businesses more certainty, Mr Wong said. "When we introduced the carbon tax in 2019, we kept the initial tax low... to give our businesses time to adjust," Mr Wong said. "To move decisively to achieve our new net-zero ambition, we will need a higher carbon tax."

The Government does not expect to get additional revenue from the carbon tax increase in this decade, however. Instead, it will be used to support decarbonisation efforts and the transition to a green economy, and cushion the impact on businesses and households, said the National Climate Change Secretariat (NCCS) in a separate statement.

Singapore's carbon tax applies to all facilities producing 25,000 tonnes or more of greenhouse gas emissions in a year. This covers 30 to 40 large emitters such as oil refineries and power generation plants, which contribute 80 per cent of Singapore's greenhouse gas emissions.

When they accumulate in the atmosphere, they trap heat on the planet, throwing Earth systems out of whack and causing climate change. The result: rising temperatures and sea levels, and more intense extreme weather events that imperil lives and livelihoods.

A carbon tax is a means of assigning costs to the release of these planet-warming emissions. With Singapore upgrading its climate target so its planet-warming emissions reach net zero by or around 2050, a higher carbon tax rate is needed to send a signal to large emitters to take stronger action to reduce their emissions, said Mr Wong.

Mr Wong said advances in technology and new opportunities for international collaboration in areas such as carbon markets has allowed Singapore to bring forward its net-zero timeline.

A spokesman for oil company ExxonMobil said the firm supports an explicit price on carbon to establish market incentives and provide the needed clarity and stability required for investments. Carbon tax, and supportive government policies, can help to incentivise more industries and sectors to invest in research or technologies to reduce emissions, she said. "As Singapore has an exportoriented economy, it is also important that the designed carbon tax framework encourages greenhouse gas reductions, while safeguarding competitiveness of trade-exposed industries," she said.

Source: The Straits Times, 18 Feb 2022

**Discussion Question:** 

Evaluate the various policies the Singapore government can use to reduce the market failure due to carbon emissions.

----THE END----