

S6D To write essay ^{10 mins} 17/5 2-3pm
LT 3

MARKET FAILURE: KEY POINTS

In the allocation of resources, all economic systems, be it planned, free market or mixed, have to answer the 3 main economic problems of what and how much to produce; how to produce; and for whom to produce.

The free market economy makes use of the price mechanism to answer the above questions.

- o How does the price mechanism seek to answer the 3 economic problems of resource allocation?

The free market economy has always been regarded as an efficient system in the allocation of resources.

- o What is economic efficiency?
- o What are the conditions that must be fulfilled for the free market system to be socially efficient?
- o In a perfect competitive market, what is the condition for social efficiency in any activity to be maximized?

It is when the activity's social marginal benefit is greater than / equal to / less than* social marginal cost.

*Delete wrong answer(s)

However, there are 4 main reasons why the free markets will fail to bring about a socially efficient allocation of resources.

A. Failure to provide public goods

- o What are public goods?
- o Why can't the free market provide this type of goods?
- o What can be done to overcome this type of market failure?
~~**Possibility of government failure?~~

B. Existence of externalities (positive and negative)

- o What are externalities?
- o How does the existence of externalities lead to a socially efficient allocation of resources?
****Must know how to illustrate the respective market failures arising from negative as well as positive externalities.**
- o What can be done to overcome this type of market failure?
****Must know how to illustrate the use of a tax / subsidy in correcting negative and positive externalities respectively.**
~~**Possibility of government failure?~~

C. Market imperfections (market power, imperfect information / knowledge, and imperfect mobility of resources)

- o What is market power and how does it lead to market failure?
****Must know how to illustrate the market failure arising from market dominance.**
- o What can be done to clamp down on market dominance?
~~**Possibility of government failure?~~

- o What is imperfect information and how does it lead to market failure?
- o What can be done to overcome this type of market failure?
~~**Possibility of government failure?~~

- o What is imperfect mobility of resources and how does it lead to market failure?
- o What can be done to overcome this type of market failure?
~~**Possibility of government failure?~~

D. Inequitable distribution of income

Note:

- ❖ This is not the traditional market failure in the sense of $SMB \neq SMC$.
- ❖ In any economy, there will be many different socially efficient outcomes; however, some will involve greater equality than others. A totally equal and a highly unequal distribution of income can be both socially efficient.
- o What can be done to resolve income inequality?
~~**Possibility of government failure?~~

****You will need to be discerning when proposing solutions to address the market failure concerned. For eg. Nationalisation as a means to correct externalities or monopoly power is not really relevant now as the trend is towards privatisation for most major economies.**

GOVERNMENT FAILURE: KEY POINTS

- o What is meant by government failure?
- o What are the possible reasons why inefficiency may be made worse when the government intervenes to correct the market failure?

TYS N2002 (b) OPTIONAL

'In March 2000 Hong Kong's air pollution index was the highest it had ever been. Clouds of thick yellow smog remained a fixture of the city's skyline'

Far Eastern Economic Review, 11 May 2000

Discuss what economic policies might be used to deal with this situation. [13]

The key problem:

NEGATIVE EXTERNALITY in the form of AIR POLLUTION
POSSIBLE SOURCES: FACTORIES/ VEHICULAR TRAFFIC

The Measures

Broadly measures can be divided into :

- Market-based
- Regulation

Market Based

Taxes:

- Tax the polluter [polluter-pay-principle]
- Evaluate the pros and cons.
 - Market based solution -provide Incentive to the producers/markets to produce at the socially optimum level [MSC =MSB]. Let the market determine the optimal level of consumption/production.
 - Drawbacks: Difficult to ascertain the "right" amount of tax.
- Tax to encourage the use of "greener" petrol e.g. leaded petrol.

Subsidies:

- Subsidies (e.g. tax offsets) to encourage factories to use/install anti-pollution devices to cut down on the level of pollution.
- Lower taxes to encourage the production/use of "green vehicles" e.g. hybrids that run on hydro-power or solar-power.
- Subsidies to use of public transport.

Regulations:

- Legislation to set pollution limits/standards.
- Factories/Vehicles subject to regular compulsory inspection.
- Manufacturer to meet anti-pollution standards in designing vehicles e.g. catalytic converters. Otherwise vehicles are not allowed on the road.
- Hefty fines/Imprisonment for illegal discharge of waste by factories into the atmosphere or vehicles with smoky exhaust fumes..
- Regulation to locate dirty/pollutive industries away from population centres e.g. city area.. Government could target 'clean' industries and shun 'dirty' ones.
- Ban factories emitting highly toxic waste into the atmosphere [thick yellow smog -suggests the use of toxic sulphur-based chemicals]. This is a drastic/last resort measure only if the Total Social Costs clearly outweigh the Total Social Benefits.

Conclusion:

Government can tackle the problem of pollution via a combination of market-based measures as well as regulation [market-replacing measures].

TYS N2004

Illustrate your answer with examples, assess the policies that the Singapore government currently adopt to achieve an efficient allocation of resources when externalities are present, and consider whether some new policies should be introduced.

Examiners' Report

In general terms this question discriminated well. There was some excellent use of analysis by the very best candidates with some good evaluation, although there were limited alternative policies. The majority of candidates were able to give good examples of both positive externalities (education) and negative externalities (traffic congestion and smoking). Diagrams in many cases showed errors that suggested that these were memorised rather than evidence of genuine understanding of the concepts. Weak answers gave a vague definition of an externality and listed some appropriate examples that were neither explained nor developed.

Essay Outline

Intro:

Allocative efficiency is achieved when resources are allocated such that it is impossible to make someone else better off without making someone else worse off.

Resource use is efficient if we produce goods and services that the society values most highly. This implies that when allocative efficiency is achieved, we cannot produce more of a good or service without giving up some other good or service that we value more highly.

Therefore, if it is possible to reallocate resources such that somebody can be made better off without anyone being worse off, then the former allocation of resources cannot be at its optimum.

In the absence of externalities, allocative efficiency is achieved when $MB (P) = MC$.

If $P > MC$, it means that the price consumers are willing to pay for the additional unit exceeds the value they placed on the alternative goods forgone. Therefore, economic welfare would be increased if extra units were produced. There is presently an underproduction of this good.

If $P < MC$, it means that consumers' valuation of the additional unit is below that of the alternative goods sacrificed. Hence, it would make sense not to produce that additional unit and instead reallocate the resources to produce some other goods which consumers value more. There is presently an overproduction of this good.

When $P = MC$, it means that there is neither over nor underproduction. Society's welfare is maximised. There is no misallocation of resources.

Body:

Explain how inefficient allocation of resources arises when externalities (positive as well as negative) are present.

Usually, in the case of private goods that gives out externalities, only partial market failure exists. Thus government's policies are designed to assist the firms and households in ensuring efficient outcomes. However, when there exists complete market failure, as in the case of public goods, there is a need for direct provision.

Explain circumstances under which there exists complete market failure.

In Singapore, like most other economies, public goods such as defence, street lightings and community policing are directly provided by the government. This method is financed through taxes.

Define positive externalities. Diagram to show deadweight loss.

In the case of positive externalities such as education and healthcare, government uses subsidies to encourage more consumption/production. Use diagram to illustrate how subsidy can lead to socially desirable outcome. Grants are also awarded at university level.

However, these methods may breed inefficiency as the organizations receiving them may not have the incentive to find the lowest possible cost of providing the services.

Most innovations and research give rise to positive spill-over effects such as vaccinations and cures for diseases. IT discoveries can also lead to greater efficiencies and productivity of the overall economy.

In Singapore, we have policies to protect intellectual rights so as to encourage more innovations and research. These policies include patents and copyrights.

However, such policies protect the incumbents and may give rise to monopoly power; as such leading to another source of market failure.

Define negative externalities. Diagram to show deadweight loss.

In the case of traffic congestion which gives rise to negative externalities; policies have been designed to control both car usage (ERP, road taxes) as well as car ownership (COEs).

Of course, the former is more effective than the latter as the objective should be to "punish" those who use their cars during peak periods; and not those who own cars.

Moreover, the system allows different areas to have different rates depending on the level and time of congestion. Hence the method is more equitable because it deters those who do not need to enter the CBD during the hike of the peak period from entering. Hence, those who enter during the hike of the peak will pay the highest ERP charges as they will be the ones who are both willing and able to pay those charges.

In this way, this method it spreads out the traffic across the different hours of the peak period.

Currently, our government is trying to steer away from taxing car ownership towards car usage. Moreover, the taxing of car ownership may gradually lose its effectiveness if the incomes of Singaporeans continue to grow.

As for pollution, our country has pollution standards for the industries to observe. The drawback is that firms have no incentive to reduce their pollution beyond the indicated standard. Moreover, it may also be difficult and costly to monitor to ensure compliance.

Fines are also used to punish those who litter and dirty the environment. However, again such an extreme measure involves a lot of bureaucracy and only act as a deterrence rather than an incentive to reduce pollution.

In view of the pros and cons of the current policies, the followings could be considered:

-The government could consider giving subsidies to encourage innovation and research. Hence, a two prong approach can be adopted where firstly, patents will be issued to guard new ideas; and secondly monetary incentives can be awarded to further encourage such activities. However, subsidies given to producers may increase their profits even though it encourages them to increase their output. Moreover, it may be difficult to estimate the divergence between social and private benefit.

-More effort can also be put in to promote environmental consciousness. This will certainly be an added boost for those who reside near the industries that are emitting carbon monoxide. The

government can consider imposing a tax on per unit emission. This will encourage firms to find methods to reduce emission per unit of output they produce.

-In addition, marketable permits can be considered since the smallness of our market may make it easier to manage such a strategy.

Each firm is required to have a permit if it wishes to pollute otherwise it is required to do the necessary cleaning up. These permits (vouchers) are transferable (marketable), so they may be bought and sold.

The higher the market price of the pollution permits, the greater the incentive to reduce emissions.

The main problem is that the ones who clean up may end up to be those with the lowest clean up costs (i.e. those who do the least damage to the environment). This is because this system may give the incentive to those with a high clean up cost to purchase the permits from those with lower clean up costs, especially if the price of the permit is set to be lower than the formers' clean up costs.

-As for the traffic problem, the government should continue to harness their effort to encourage the use of public transport. This can only be achieved if they improve on our current system and ensure that it is easy to gain access to places using public buses. Hence, they need to have better-linked roads.

Conclusion:

Given that S'pore is moving towards a knowledge-based economy, the issue of intellectual property rights will gradually become the centre of focus for the government. In order to encourage more investment in research and development in our effort to ensure sustained economic growth, it is imperative for the government to look into ways to regulate the positive spill-overs arising from these investments.

As a country develops and concentrates most of her economic activities in the urban centres--CBD for our case, the problem of road congestion arises. For S'pore, the ERP system has proven itself to be effective in combating this problem and has now been extended to cover other areas. Perhaps, this new development has warrant our attention to a problem inherent in such a system, that is, it may shift the congestion problem to other areas as commuters explore other roads to avoid having to pay ERP. But our government has been fast in recognising this problem.

This was one of the most popular questions. It produced some very good answers, particularly for part (a), with the best answers also giving excellent evaluative discussion of Singapore's approach to dealing with this problem.

A common response, and one that could have been improved, was to set the diagrams within the context of the production of cars rather than the use of cars. An improvement would have been achieved if the horizontal axis on the diagram had taken account of this distinction i.e. through use of quantity of miles driven or the number of cars owned rather than number of cars produced. Pollution was thus presented as the result of the manufacture of cars rather than the use of cars, although all policies later presented in the Singapore case referred to pollution (and congestion) caused by the use of cars.

(a) In general terms this part of the question was well answered and Level 3 marks were frequently gained. Diagrams were normally correctly drawn and, although the majority of candidates carefully explained their diagrams, a surprisingly large number offered no explanation at all with a resultant loss of analysis marks. Key issues relating to deadweight welfare loss and overproduction were frequently correctly identified.

A small number of candidates gave incorrect diagrams in the sense that they showed pollution and congestion affecting the benefit curves rather than the cost curves. These types of answer were also normally very poorly explained and the diagrams usually badly drawn. A minority did not apply their answers to the question set and gave obviously rehearsed answers to the problems of dealing with externalities in general or with application to totally different sources of externalities e.g. external benefits from education!

(b) This part produced a much wider range of answers and as such worked as a very effective discriminator. The answers were normally set within the Singapore context and thus there was some good application. Mark differences were dependent to a large extent on the candidate's ability to set the answer within this Singapore context and on the degree to which these alternative policies were analysed rather than simply described. This analysts frequently included reference to relevant diagrams that illustrated to use of a taxation instrument such as COE or ERP

Good answers also recognised potential benefits and problems associated the use of specific policies thereby allowing additional marks for evaluation. For example, the very best answers considered the use of COE to reduce car ownership and the use of ERP to reduce car usage alongside the benefits of both approaches in reducing congestion and pollution. There were some insightful responses to an obviously very topical issue.

Mid-range answers tended to describe policies and offer limited evaluation. Weak answers simply listed policies or considered only one policy and then in a rather abstract manner.

(a) Explain why pollution and congestion caused by cars are likely to cause market failure. [10]

Introduction

Market failure occurs in microeconomics when free markets, operating without any government intervention, fail to deliver an efficient allocation of resources to produce goods and services. Due to the negative external cost incurred by congestion and pollution, markets do not capture the full cost associated with car-driving and thus cause market failure.

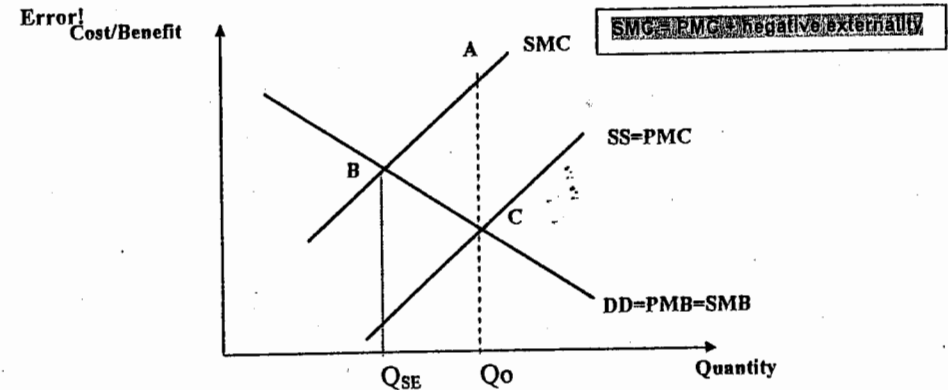
Body

Externalities are said to exist when the actions of producers or consumers affect not only themselves, but also third parties, other than through the normal workings of the price mechanism. Negative externalities are those externalities that have adverse effects on third parties.

As individuals drive cars and use roads, they normally only consider the private costs (the cost incurred by themselves) of their decisions, mainly the cost of fuel and at times, toll fee and the private benefits - convenience and savings on time brought by driving cars. They largely ignore, or are unaware of, the wider social costs (the full opportunity cost to society) of their actions, such as road congestion, which may cause loss of productivity and air pollution, which may harm others' health.

The price mechanism fails to bring about a socially efficient allocation of resources in this case. This is because the cost to society in terms of the problems mentioned above is unpriced by the price

mechanism and therefore is not included in the private costs of driving. Since the car-drivers do not bear the full cost of driving, they will drive cars and use roads beyond the socially optimal level.



As shown in the above diagram, the car-drivers drive to the level where Private Marginal Cost (PMC) = Private Marginal Benefit (PMB). Output level is therefore Q_0 . But due to the negative externality as a result of pollution and congestion (AC), the total cost is represented by Social Marginal Cost (SMC) which is higher than PMC. SMC lies above PMC, as it includes both PMC and EMC. The socially efficient level of car driving should be Q_{SE} . Area ABC represents the welfare loss due to over-usage of cars.

Hence, market failure occurs due to negative externalities.

(b) Discuss whether the Singapore government currently adopts appropriate policies to overcome this market failure.

[15]

Introduction

Currently the government has adopted various policies to reduce congestion and pollution by reducing car ownership, reducing car usage and provision of an efficient public transport system. The ultimate goal of implementing these policies is to effectively reduce the number of cars driving on the road per unit time, to the socially optimal level.

Body

Deter Car Ownership: High tariffs on imported cars, road tax¹ and Certificate of Entitlement (COE).

What?	Evaluation
COE is a scheme instituted by the government to curb car ownership, the number of vehicles on the roads. It requires the residents of Singapore to bid for the right to buy a car motor vehicle, with the number of certificates deliberately restricted, and it is valid for 10 years. Moreover, only one bid is allowed for one person every time.	However, due to the high number of cars being scrapped each year, the price of COE has been falling drastically. Also, along with the rising wealth of Singaporeans, COE is becoming less effective.
The COE has been effective in restricting the number of cars on the roads. According to the Land and Transport Authority, the rate of increase of car ownership is kept at 3% annum, which is an acceptable rate provided that roads are constantly expanded in Singapore.	Currently, our government is trying to steer away from car ownership deterrence towards car usage as the objective should be to "punish" those who use their cars during peak periods or congested roads and not those who own cars.

¹ Refer to Annex 1 for more details.

Reduce car Usage: ERP and fuel tax

What?	Evaluation
<p>Electronic Road Pricing Under this scheme it is anticipated that all vehicles in Singapore will be fitted with an in-vehicle unit (IU). Every journey made will require the driver to insert a smart card into the IU. On specified roads, overhead gantries will first read the IU, deducting the road use charge. If the car does not have a smart card or the smart card has insufficient funds in it, a picture will be taken and the details will then be relayed to a control centre, and the necessary legal penalties imposed.</p> <p>With road-side sensors or overhead gantries the traffic does not have to slow down in order for the charge to be made.</p> <p>Fee ranging from \$0.25 to \$3.00 is deducted from each vehicle as it passes through an ERP gantry and it could be adjusted in response to the magnitude of the problem.</p> <p>Both ERP and fuel tax attempt to shift the PMC upwards so that SMC = PMC (refer to diagram in part (a)) i.e. the externality is <u>internalised</u>. These two policies ensure drivers to bear the full social costs of their actions.</p>	<p>The system allows <u>different areas to have different rates</u> depending on the level and time of congestion. Hence the method is <u>more equitable</u> because it deters those who do not need to enter the CBD during the hike of the peak period from entering. Hence, those who enter during the hike of the peak will pay the <u>highest ERP charges</u> as they will be the ones who are both <u>willing and able</u> to pay those charges.</p> <p>In this way, this method <u>spreads out</u> the traffic across the different hours of the peak period.</p> <p>ERP on some roads may simply have the effect of diverting traffic, and hence congestion, to roads where there are no ERPs. What is more, ERPs can cause motorists to park on road shoulders before rates change or ERP is discontinued after peak hours. Also, more and more ERP gantries are set up where traffic has increased – creates a "chase after the jam" problem</p>

Provide Alternatives

What?	Evaluation
<p>Provide Good Alternatives Provide an excellent public transport system with highly subsidized rates.</p> <p><i>(Motto: Providing a smooth and seamless journey for all)</i></p> <p>Others</p> <ul style="list-style-type: none"> • Ez-link card (a quick and easy way to pay fares on trains and buses) • Provision of bus lane only • Convenient interchange and multi-lingual signs • Underground paths linked to shopping malls and office buildings • Lifts and ramps especially designed for the handicapped and people traveling with a baby 	<ul style="list-style-type: none"> • It increases the elasticity of the demand of driving since a close substitute (public transport) is provided by the government. • It is effective at curbing congestion at the peak-hour of the day, since it takes less time for passengers to travel in public transport than in private driving. • It is not so effective for rich and crowd-conscious passengers • Large sum to be spent to provide cheap public transport • Cost v.s. Benefit? Difficult to gauge
<p>Other Policies to Reduce Congestion</p> <ul style="list-style-type: none"> • Red Plate: vehicles with red plate are only allowed to run on the roads after office hours (7pm-7am), weekends, and public holidays; they pay a cheaper road tax as compared to private vehicles. • Car pooling: shared usage of cars by neighbours or colleagues • Improving infrastructure: broadening roads; construction of new roads, flyovers and tunnels. 	<ul style="list-style-type: none"> • Effective when the price of red plate and normal cars differs a lot.

Reduction on pollution is achieved once car usage is reduced.

Specific Policies to Reduce Pollution

Mandatory installation of catalytic converter in cars; car scrapping and annual inspection: ensuring car exhaust emission from all vehicles in use meet the limits set by Ministry of Environment; banning of leaded petrol to reduce sulphur content diesel fuel; introducing tax incentives to narrow the price gap between electric/hybrid vehicles and conventional ones.

Conclusion:

Singapore government has adopted various appropriate policies to reduce traffic congestion and pollution.