**Types of graphs for market failures**

**1. How negative externality leads to market failures**

Qn: Explain how market failures occur in the road usage? (4)

There is market failure in the road usage industry as there is the presence of negative externalities which will call for government intervention.

1. Overview sentence

2. economic causation (apply the economic principles to the context of the question)

3. draw graph

4.description of graph

5 Analysis

Structure of discussion

In the road usage market, the usage of road, which is termed as a demerit good, causes the rise of negative externality in the form of traffic jam. This gives rise to external cost which is seen in the form of higher cost of traveling which can create a condition of welfare loss like loss of productivity and revenue to the retailing industries as there is delay in traveling to destination to consume. Thus, this implies that the industry to experience market failures as there is no maximization of net social benefit gain due to the presence of deadweight loss.

As seen from the diagram, the market equilibrium is set at QM­ where MPC is equal to MPB without the consideration of negative externality. However, the **presence of negative externality** will lead to the **rise of external marginal cost** which will lead to the **pivotal rise of MPC to MSC (MPC + MEC = MSC),** implying that the social equilibrium of production of cars at QS is lower than the market equilibrium of car at QM. Between Qm and Qs, without government intervention, the economy will experience DWL (shaded area), implying that market failure has occured.

**2. How positive externality leads to market failures**

In the production and consumption of merit goods like education services, it gives rise to positive externality such as the benefit of more productive workers will arise. This leads to the rise of external benefit such as the fall in average cost of production and there is a condition of under-production as the market equilibrium is below the social equilibrium when there is no government intervention. As a result, the society fails to reap the benefit and thus, contributing to deadweight loss (DWL); **welfare loss to society which is the value of external benefit the society fails to reap.**

P0

Qty of Education Services

Cost/Benefit

QS

QM

MSB = MPB + MEB

MSC=MP

MPB

DWL

As seen from the diagram, the **market equilibrium is set at Qm where the MPB is equal to MPC and no externalities have been taken into account. T**he presence of positive externalities will create external marginal benefit that will raise the MPB to MSB (PMB + EMB), causing the market equilibrium of the production education services to be set at Qm which is lower than the social equilibrium level of production education services at Qs where MSB=MSC and there is under-production or consumption. Consequently, the value of deadweight loss will arise between Qm and Qs if there is no government regulation, implying that there is market failure.

3. How over-consumption of demerit good leads to market failures

**7.2 Explain how market failures will occur as a result of over-consumption of demerit good**

In the consumption of demerit goods such as gambling, there will be negative externalities seen in terms of the social problems associated with this good. This will raise the external cost whereby there is higher cost of administration of the social problems. Without any government intervention, there will be a rise in deadweight loss (DWL), which is the cost of loss of investment, production and national income as a result of social and political instability

In this industry, over-consumption occurs where the consumers will consume at a level beyond the social equilibrium as their level of demand represented by PMB (Private Marginal Benefit) is higher than the level of demand deemed socially beneficial to the society represented by the SMB (Social Marginal Benefits). This is because the value of benefit of demerit good is deemed higher by the individuals than the value deemed by the society

MSC= MPC+ MEC

MPB actual

SMB

Qty

Qm

Qs

P­m

Cost/Benefit

(Private benefit)

(Social benefit)

As seen by the diagram, the value of external cost is represented by the SMC which will include the PMC (Private Marginal Cost) and EMC (External Marginal Cost) while the PMB represented the demand of the individuals. As individual perceived the benefit of consumption based on private demand (PMB) to be greater that actual level of benefit of consumption based on social demand (SMB), as there is imperfect market information about the detriments of gambling. The consumption at Qm will experience overconsumption as the quantity at market equilibrium at Qm is higher than the social equilibrium at Qs and thus, there will be occurrence of DWL represented by the shaded portion, as SMC is higher than SMB at production level between Qm and Qs. This indicates that there is an overconsumption of demerit good which contributes to market failures.

**4. How imperfect market information leads to market failures (consumer have lesser information) – misinformation about the cost of production of a good**

The consumers are deprived of information about the good as in the purchase of a car and may have greater hidden cost. This leads to consumers to perceive the cost of purchase to be higher and therefore, they believe that they buy at higher price level as the perceived MPC is higher and output is supplied at higher price and lower output, creating a missing market that leads to presence of welfare loss, indicating market failures.

In the healthcare industry, doctors may recommend additional medical treatment that leads to higher cost of medical healthcare which raises the cost of production of medical healthcare. As a result, this rise in medical cost will mean that the insurance cost is now higher, and the producer of the healthcare insurance increases. The MPC perceived by the healthcare producer is higher and the output is at Qm which is below the social equilibrium level of output at Qs. Consequently, there is missing market seen in terms of Qm and Qs which contributes to the rise of DWL.

**Diagram and description**

**5. How information inaccuracy leads to overconsumption (overconsumption of merit good) Moral hazard**

In this situation, the consumers are not provided information and may be persuaded by the stakeholder like producers and sales agent of services, to buy excessively beyond the required level of services. Consequently, consumers overconsume at an output level beyond the social equilibrium level of output where welfare loss occurs.

In the gambling industry, the gamblers perceive the private benefits at market equilibrium at Qm to be higher than the private benefit at actual deemed socially optimal at Qs by the society. This contributes to a condition of over-consumption whereby the social equilibrium at Qs is at a lower level of output than Qm. Consequently, deadweight loss arises as MSC is greater than MSB between Qm and Qs, giving rise to market failures due to imperfect market information.

**Diagram**

**Description of diagram**

**6. How misinformation leads to under-consumption of merit goods**

The lack of information about the merit good like vaccination leads to the choice by the consumers to under-consume below the social equilibrium. This causes the society’s failure to reap the external benefit of the good like herd immunity and causes welfare loss as the market equilibrium is below the social equilibrium, contributing to market failures. Individuals are misinformed about the side-effects and ignore the significance of the contribution to society.

Diagram

Description of diagram

7. how taxation solve market failures

Taxation as a form of collection by the government from the consumers attempts to correct consumption and production behaviours which lead to rise in cost of production and this decreases the supply. It will raise the price level and reduces quantity in the industry from market equilibrium to social equilibrium, reducing the effects of negative externality and eradicate market failures as welfare is not incurred.

Diagram

Description of diagram

**8. how subsidy to producers solves market failures**

The provision of subsidy lowers the cost of production to increase the supply of the goods, making it cheaper for consumers to incentivize consumers to increase quantity demanded. In the process, the industry reaps the external benefit and shift production level from market equilibrium to social equilibrium. This enables the industry to reap the external benefits and prevent the rise of welfare loss to contribute to market failures.

**Diagram:**

**Description of diagram**

**9. how subsidy to consumers solves market failures**

In the provision of subsidy to consumers, it increases their disposable income and raises the purchasing power of the consumers, shifting their market demand from Do to D1 (MPBo to MPB1). This ensures that the output is at social equilibrium instead of being at market equilibrium. This means that the industry can reap the external benefit to prevent welfare loss and market failures.

**Diagram**

**Description of diagram**

**10. How quota solves market failures**

A quota is economic solution where the output level is fixed by the government, and it is often directly set at the output level where output level is set at the social equilibrium to ensure that there is now external cost incurred by stopping the occurrence of negative externality. In doing so, the industry produces and consumes ate the social equilibrium where there is no welfare loss, and the next social benefit gain is maximized, preventing the occurrence of market failures.

**Diagram**

**Description of diagram**

**11. how public education solves market failures**

**Public education is used to provide more information of the positive externality or negative externality to ensure that the consumers are aware of the effects of third party effects and impact on them.**

**12. How rules and regulation solve market failures**

List of questions

**Alcohol was not a direct cause of the riot, the Committee of Inquiry said. “However, it was a major contributory factor, among others, to the nature and escalation of the Little India riot.”**

1. Explain why the quantity of drinks a rational consumer decides to have often differs from what the regulator deems to be rational. [10]
2. Discuss whether banning alcohol consumption should be implemented given the decision of consumers differs from that of the regulators. [15]

Part (a)

The decision of a consumer or a regulator is said to be rational if the decision is made based on the marginalist principle, that is comparing the benefits and costs of small incremental adjustments to an existing plan on action, which in this case refers to an extra unit of drinks. Although the decisions for both the consumer and regulator is based on the marginalist principle, the benefits and costs from the consumer’s point of view might differ, hence the quantity of drinks the rational consumer to decide often differs from what the regulator deems to be rational.

The rational consumer decides how much to consume by comparing his marginal private benefits and costs. For example, with reference to Fig 1, for Q1th unit of drinks, the private benefits and costs are depicted by P2 and P1 respectively. Since the marginal private benefit is greater than the marginal private cost for this unit, the rational consumer should consume this unit but such a level of output is not at the maximized level of output or the efficient resource level of resource utilization.

P2

P1

Qe

Q2

0 Q1

MPB

MPC

 $

Quantity

Figure 1

In fact, up to Qe unit, the marginal private benefits surpass the marginal private costs. As such, the rational consumer should consumer up Qe. It is irrational for him to consume beyond that as the marginal private costs surpass the marginal private benefits. For instance, for Q2 unit, the marginal costs surpass the marginal private benefits. Hence, consuming this unit only decreases his net benefits. Therefore, the optimal level of consumption is Qe where the marginal net benefit where marginal private benefit gain is equal to marginal private costs and there will be maximization of net private benefit gain., indicating efficient resource location in the alcohol market.

However, this quantity of drinks the rational consumer has decided to have is irrational from the regulator’s point of view. This is because, to the regulator, the consumer has underestimated his private cost and disregard the external costs.

The external costs, in this case, refers to the adverse side effects of consumption on the third parties. As highlighted above, when the consumer consumes more, he is increasingly losing his ability to control oneself. And this inability to control oneself often leads to him puking on the streets, shouting, driving recklessly or resorting to violence, causing him to be a public nuisance or cause harm to pedestrians or family members. As such, the true marginal cost to the regulator consists not only the consumer’s private costs but also the costs to the third parties which demand the regulator to impose administration cost to interfere to clear up the public disturbance to the society.

Qe

0 Qs

MPB

MPC

 $

Quantity

Figure 2

D

MSC = MPC + MEC

A

P3



B

C

P4

F

With reference to Fig 2, the amount of drinks the rational consumer decides to have, Qe, given by the intersection of MPB and MPC, is considered irrational from the regulator’s point of view as the marginal social cost P3 exceeds the marginal private benefit P4. The presence of external cost contributes to the divergent pivotal shift of the MPC to MSC where MSC=MPC+MEC and this contributes to over-consumption as the social equilibrium at Qs is higher than the market equilibrium at Qe. This implies that MSC is greater MPB= MSB, giving rise to deadweight loss represented by ABC. Consequently, the regulator sees the consumption level at Qe an irrational choice as it gives rise to welfare loss in this industry.

Hence, it can be shown that the rational level of consumption chosen by the consumer is likely to differ from the regulator’s view of the rational level of consumption. The different level of consumption is justifiable as there is the rise of deadweight loss and the regulator will impose solutions to convert the consumer’s level of output to the regulator’s output level that is considered efficient resource level of allocation, preventing market failures.

STRUCTURE OF DISCUSSION FOR PART

Question 1

**Alcohol was not a direct cause of the riot, the Committee of Inquiry said. “However, it was a major contributory factor, among others, to the nature and escalation of the Little India riot.”**

1. Explain why the quantity of drinks a rational consumer decides to have often differs from what the regulator deems to be rational. [10]
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Question 2

**(d) Evaluate the relative effectiveness of road pricing and fuel duty in solving traffic congestion and pollution problems. (10m)**

Introduction

Road pricing and fuel duty are forms of taxation to increase the cost of car usage.

Evidence: In extract 3 both UK and S'pore have adopted road pricing to tackle the problem of traffic congestion. The pollution problem is also evident from the extract and figure.

Explain how road pricing works to reduce traffic congestion & pollution

* Road pricing will directly increase the costs of car usage and hence increase the MPC of car usage to the left as seen below



* The road pricing internalizes the external cost associated with traffic congestion & pollution. For e.g. traffic congestion increases incidences of accidence and the 3rd party impacted is uncompensated for. Pollution can also lead to respiratory health problems for 3rd parties and left uncompensated for. For e.g. in Figure 1 - private car usage is the main source of pollution in UK of 58.5%

**Question 3**

**(d) Discuss whether rail fares charged by public transport operators in Singapore should be regulated. [8]**

Question interpretation

* What is the relevant market structure for rail services in Singapore?
* What are the reasons for and against rail fare regulation in Singapore?
* Should rail fares in Singapore be regulated?

reasons for government to regulate monopoly or duopoly

Introduction

The market for rail services in Singapore resembles that of a natural monopoly, which refers to a situation where a single firm can supply the entire market at a lower cost than two or more firms. This essay aims to analyse the reasons for and against regulating rail fares in Singapore before evaluating the need for such regulation

Reasons for regulating rail fares in Singapore

1. need to achieve allocative efficiency (P = MC)
2. huge initial cost of investment

Due to the high cost of setting up the rail infrastructure e.g. the network of tracks, tunnels & stations, the fixed costs are probably much larger than the variable costs (cost arising from the fuel used and wear and tear incurred from taking an additional passenger). Thus AC follows the shape of AFC, which is always falling with output. This is a natural monopoly – to regulate it to achieve allocative efficiency – P = MC



AC and MC is downward-sloping as the fixed cost is very significant and the variable cost occupies small percentage of the total cost – output increases – AC will fall – features of a natural monopoly – the whole industry demand is provided by one firm

allocative efficiency – set output at price = MC at Q\* but the firm makes a loss = TFC – solution – government subsidize the loss (TFC) and the consumers pay for variable cost. the public transport achieves allocative efficiency and achieve normal profit

If left to the free market the monopolist will produce Qm, where MC=MR and charge a price Pm. However, the allocative efficient price and output occurs at P\* and Q\* where P=MC or DD = MC.

With Pm being much higher than P\*, this means many consumers will find rail fares being too costly and thus refrain from taking trains, resulting in Qm, which is very much lower than Q\*.

There will be substantial under consumption of rail services, which will cause a large loss of potential welfare that is equal to area ABC, hence the free market will be highly allocative inefficient.

Extract 2 mentions that Singapore’ public transport operators do not need to cover the fixed cost of building the public transport infrastructure as this is fully borne by the government.

This means that they do not need to cover the entire AC (which includes AFC) but only need to cover the operating costs i.e. AVC (which is equal to MC if MC is assumed to be constant).

Thus, MC pricing can be employed to achieve the allocatively efficient outcome without causing public transport operators to suffer losses.

Reasons against regulating rail fares in Singapore

* Regulation of rail fares means that private rail operators will only earn normal profits in the long run.
* They therefore lack the ability to engage in costly upgrading of rail mechanics or extensive maintenance of the rail system.
* This could have led to the repeated service disruption and severe breakdowns mentioned in extract 3.
* Without supernormal profits, private rail operators also lack the incentive and ability to improve service standards that could encourage the population to make the shift from private to public transportation.

Conclusion

Given the severe market failure arising from a natural monopoly, governments arguably need to intervene in public transportation, therefore, my view is that rail fares should be regulated in Singapore. However, instead of MC pricing, the price should be set higher so that the cost of upgrading and maintaining the rail system is accounted for. Alternatively, MC pricing could still be used if the government is willing to also bear the cost of upgrading and maintenance of the rail system.

Question 2

1. ERP – a levy imposed on road usage
* Internalize the external cost as part of cost of consumption
* Solve road congestion by relocating road usage based on tiem and route allocation
* Diagram - draw how tax will reduce qty demanded from Qm to Qs
1. COE- quota imposed on the sale of new cars
* Reduce the car population so that it can reduce the qty of road usage
* Diagram is based on new cars and need not draw for road usage
1. Public transport – provide an alternative mode of transport to reduce road usage so as to ease traffic congestion
* Assess the advantages and disadvantages
* Relative effectiveness – how ERP is better than COE in reducing road congestion

Discuss whether ERP is the best policy to solve market failures due to presence of negative externality. (10)

Explain how fuel tax works to reduce traffic congestion & pollution

Fuel tax will directly increase the cost of using petrol for car usage.

* Increase in fuel tax → increase in cost of supplying fuel
* Equilibrium price of fuel increases & equilibrium qty of fuel exchanged is reduced.
* Hence with lower levels of fuel usage, level of pollution will be reduced.
* Higher prices of fuels → increase cost of car usage → shift the MPC for car usage to the left and hence socially optimal level of car usage will be attained → traffic congestion will be reduced.
* Hence, with road pricing, the equilibrium qty of car usage will be reduced to Q\* which coincides with the socially optimal level of car usage.
* Society's welfare loss resulting from the presence of externality would be eliminated.
* Hence, the level of traffic flow will be at the socially optimal→with less car usage →lower pollution levels. .

Evaluate the effectiveness of Road pricing and Fuel tax according to Evidence available

Examples:

* Road pricing is more effective in reducing traffic congestion than pollution - e.g. in S'pore case the ERP system may redirect traffic flows according to time and space but not reduce car usage and hence pollution levels – conduct road allocation based on time and direction of usage – ease the problem of too many cars traveling to the same place at the same time
* In UK case - the satellite system takes into account the distance traveled hence will be more effective in reduce both the traffic congestion and pollution levels.
* Fuel tax works primarily to reduce usage of fuel - however, citizens can switch to using non-fuel based cars hence the traffic congestion problem may still prevail. Evidence fig 2: there is growing sales of green vehicles in UK which is a substitute for fuel based cars and even though pollution has fallen the traffic congestion problem can still prevail. 9reduce consumption on road but still cause traffic jam)
* In UK they have existing fuel and road taxes however the need to introduce a new road pricing system imply that existing policy is insufficient. This may imply that fuel tax alone is not effective in reducing traffic congestion.

Evidence: Ext 3 - the road pricing replaces the road & fuel tax. This may imply that road pricing is a more superior policy to reduce both traffic congestion & pollution in UK.

Conclusion

In one way or another both road pricing and fuel tax will have an impact on reducing traffic congestion and pollution through the channels of raising the cost of car usage. However, a combination of the use of road pricing and fuel tax is needed to specifically target the root source of externality.

Question 4

**Extract 9: The artificial intelligence factor**

The adoption of technology has been one of the biggest drivers of ASEAN’s growth in recent years. Businesses across the region have pushed the frontiers with technology adoption, which has improved productivity, created entirely new industries and made geographical borders redundant to new, open markets. The capabilities of technology will expand at an even faster pace over the next decade, and its prices will fall even further. This will boost its adoption and open up even greater growth opportunities. Its impact on jobs, though, is likely to be very different than we have seen in the past decade. That is because the biggest improvements in technology will come on the artificial intelligence (AI) front. AI-enabled technologies will deliver substantial productivity gains across all sectors, resulting in major benefits for businesses and prosperity for the region. However, this will have a significant impact on the labour market. AI will make many skillsets and job profiles redundant. This will bring about major changes, as workers will need to forge new career paths or face unemployment. The scale of the challenge is enormous.

*Source: World Economic Forum, 18 September 2018*

**Extract 10: Building an inclusive digital ASEAN**

Projected to hit $200 billion by 2025, A.T. Kearney research shows that ASEAN has the potential to enter the world’s top five digital economies. The digitisation and digital transformation is an obvious path for ASEAN countries to catch up in Industry 4.0 and leapfrog their economic growth, as no single country can count on the advantages of natural resources or cheap labour.  To move up the ladder of development, they have to pursue a knowledge, technology and data-driven growth model. However, it does not make sense to reach a faster growth rate but create more inequality.  The application of digital technology must be for inclusive development, embedded with “the leave no one behind” principle.

But the region needs concrete steps to increase access to skills training for everyone within ASEAN, by developing modern educational and training infrastructure. Some low-skilled workers may be unable to survive slower growth in low-skilled jobs, which will require social protection policies. Investing in education and upskilling or retraining is among indispensable ways to ensure the impact of new technologies will not lead to greater inequality.

Other means to engender inclusive growth are building infrastructure for digital connectivity, promoting the gig economy and supporting dynamic micro, small and medium-sized enterprises (MSMEs).  Still, there are concerns over the digital gap between urban and rural areas in a country as well as between the more developed and the less developed ASEAN countries.

*Source: The Jakarta Post, 7 September 2019*

1. **Assess ‘public provision of research services’ (Extract 4) and ‘extended producer responsibility’ (Extract 5) as alternative intervention measures aimed at correcting the market failure arising from the improper disposal of tyres. [12]**

**Explain how improper disposal of tyres may lead to market failure**

Individuals, when deciding on the disposal of tyres, would consider their MPB and MPC.

* MPB of improper tyre disposal = cost savings from making trips to the used tyres collection centre = fuel cost + value of time foregone
* MPC of improper tyre disposal = expected value of the fine

[because it is ‘improper’, the individual is likely to face a fine when caught]

* MEC of improper tyre disposal = gov spending of millions of tax dollars to put out fires caused by those tyres disposed improperly

Private equilibrium, Qp where MPB=MPC for the last unit of tyres is being disposed

Socially optimum output, Qs where MSB=MSC for the last unit of output disposed

Since Qp > Qs, the improper disposal of tyres generate a *deadweight loss of area abc.*

Since government aims to achieve efficiency, it has to step in to correct this market failure



**Explain how ‘public provision of research services’ (Extract 4) corrects market failure and its limitation.**

Government can fully subsidise the research services. This will incentivise firms to engage in more research activities and explore the different ways to recycle the used tyres (from which they are able to derive alternative sources of revenue) instead of disposing them. This would then reduce the MEC generated.

Limitations (any 1)

* Governments also face limited resources in terms of budget constraint. The increased govt spending on “public provision of research services” may lead to a diversion of resources from other areas such as cutting down healthcare subsidy and reduce the supply of healthcare. The opportunity cost of forgone healthcare services could be greater than the benefits of removal of the deadweight loss caused by the improper disposal of tyres. This results in greater allocative inefficiency.
* If the government faces budget constraint, it may resort to raise taxes (eg GST) to finance the R&D but then this cause supply to fall in other markets and create deadweight losses in other markets. Moreover, it conflicts with the goal of equity if the poor are disadvantaged by the relatively higher tax burden on them.
* Long-term policy, benefits not certain, not immediate

**Explain how ‘extended producer responsibility’ (Extract 5) corrects market failure and its limitation.**



If government imposes legislation and force producers to bear responsibility for the collection and processing of the resulting waste, this increases the MPC of the producers to MPC’ and reduces their net benefits. To avoid this, they will find ways to collect back the tyres and recycle them, reducing MEC at the same time. This helps to cut down the number of tyres disposed to Qp’ and lead to a more allocative eff outcome.

Limitations

Difficult to monitor unless govt reinforce the producers to emboss their company’s name on the tyres for accountability and fine them if any tyre is found disposed improperly. The amount of fine (marginal cost) has to be greater than marginal benefit of not tracking the disposal or management of used tyres, otherwise it will not be effective in solving the problem.

By introducing EPR, firms have to find ways to reduce the number of disposed tyres eg by retreading and recycle the used tyres. However, there is a lack of demand due to a lack of consumer confidence for retreaded tyres. Firms can engage in public education and increase the demand for such tyres. At the same time, firms are obligated to engage in R&D and find ways to lower the MC of retreading the used tyres. This will make the retreaded tyres more price competitive as compared to the new tyres. When price of retreaded tyres become relatively cheaper, consumers may switch and purchase these recycled tyres instead.

 **Evaluation**

 **Which is a more effective/appropriate policy**

* Short-term v.s. long-term
* Who bears the cost of transition

**Question for structuring**

**CSQ Question 1**

Discuss whether “antibiotic free” labels on meat products is likely to be a better policy than banning the use of antibiotics to improve consumer welfare. **[8]**

**CSQ question 2**

Discuss whether “antibiotic free” labels on meat products is likely to be a better policy than banning the use of antibiotics to improve consumer welfare. **[8]**

**CSQ question 3**

‘Many households seem to take water for granted and feel that water is less valuable than diamonds.’ (Extract 1)

Using examples from the data, explain the concepts of cost, price and value in the context of water. (6)

**CSQ question 4**

Discuss the factors a government should consider in deciding whether water should be provided by a national firm like Manila Water. (8)