**Term 3 2017 Revision**

**CSQ – Lesson 2 – Q1 - Market Failures**

**Singapore’s Transportation System**

factors affecting the degree of substitution – why people will switch to public transport

**Table 1: Top 3 most important public transport attributes1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2011 | 2012 | 2013 | 2014 |
| 1) | Travel Time | Travel Time | Travel Time | Travel Time |
| 2) | Waiting Time | Safety / Security | Waiting Time | Safety / Security |
| 3) | Reliability | Waiting Time | Reliability | Waiting Time |

Source: Land Transport Authority, Singapore

**Extract 1: Singapore reveals 3 economic solutions to traffic congestion for Asian peers**

Traffic congestion reduces a country’s potential for creating prosperity. Singapore identified this early in the piece and was able to create an effective system of incentives and constraints so traffic wasn’t a hindrance to economic growth.

It’s always a shock when people first hear about how much it’ll cost to get behind the wheel of a brand new Honda Jazz in Singapore. After hitting a low of S$3,864 in March 2011 the Certificate of Entitlement (COE) for a new car will now set you back over S$70,000. When you add on the additional registration fee, the level of which ratchets up to 180 per cent of the Open Market Value of the vehicle, you end up paying 2-3 times the regular price of the car.

**COE – controls car population but it will not control route and time usage – use more car ride to lower COE cost per ride**

By increasing the price of vehicles, the COE system restricts the amount of people that want or are able to buy a car. Twice a month, the Singapore Land Transport Authority runs an auction process for the available COEs. The amount of COEs is determined by a quota system.

**ERP – solve route allocation – time and route of road usage**

Further to the quota system and additional registration fees that new car owners need to pay, there’s also the Electronic Road Pricing (ERP) system that incentivizes drivers to avoid certain areas at peak times. Costing about the same as a cup of coffee, passing underneath an ERP gantry can cost a normal car up to S$5 during peak hours. If drivers aren’t in a rush they’ll think twice before turning down a road that could lead them to an ERP gantry.

*Source: Singapore Business Review, 24 July 2013*

1 Land Transport Authority (LTA) has conducted the Public Transport Customer Satisfaction Survey since 2006. The annual survey measures regular commuters’ satisfaction with Singapore’s mass public transport services, namely bus and Mass Rapid Transit (MRT) services.

COE (quota scheme)

Advantages

* directly regulate car population – reduce road usage
* strong financial deterrence -huge ownership cost

disadvantages

* increase car and road usage – reduce COE cost per ride
* controlling car population does not control route and time usage of road – PED for that particular route and time usage is price-inelastic

**ERP – congestion tax (specific tax)**

Advantages – can conduct route and time allocation of road usage

tax revenue for the government to raise funds for road development

Disadvantages – may divert the congestion to other areas

* cannot deter the high degree of necessity of demand (PED is price- inelastic)- tax occupies small proportion of income spent on it

Public transport

* mass transit of passengers – ease the demand for road usage
* spare our fund for other usage and reduce government expenditure on building roads

disadvantage

* subjected to the issue of substitutability
* huge initial cots of investment

**Extract 2: Fare regulation framework**

Public bus and train services are provided on a commercial basis, within the maximum fares approved by Public Transport Council (PTC). The Government does not provide direct subsidies for public transport operations.

To keep public transport fares affordable to the general public, public transport infrastructures such as MRT/LRT lines and bus interchanges are funded entirely by the Government. In addition, public buses are also exempted from COE payments. The Government also pays for the development and software cost of the contactless smartcard system. Therefore, bus and train operators are only responsible for operations, maintenance costs and investments in service improvements.

In regulating bus and train fares, the PTC carries out its statutory mandate to safeguard public interest by keeping fares affordable while ensuring the long-term financial viability of the public transport operators.

*Source: Public Transport Council, Singapore*

* **Fixed cost is paid by the government, use a tender system to find operator produce the service and pay the operator – will collect the fares and pay the operator (VARIABLE COST)**
* **IF FARES CALLECTED BY THE GOVERNMENT IS INADEQUATE, GOvT WILL PAY FOR THE SHORTFALL**
* **achieve allocative efficiency (P=MC) without incurring loss**

**Extract 3: Singapore transport fare hike draws protest**

About 400 people protested on Saturday against what they said were unjustified increases to public- transport fares in Singapore, marking the first major show of public dissent here this year.

Protesters gathered at Hong Lim Park in central Singapore, the only place where demonstrations are allowed here, to criticize a state-appointed panel’s decision last week to approve a 3.2% increase to public bus and rail fares that will take effect in April. Their rally comes amid growing public disquiet over perceived inadequacies in public transport, and follows a series of disruptions to subway services in recent weeks.

“Why is the government allowing the fare hike now, when it should first tackle the ongoing problems with our trains and buses?” said Dennis Khew, a 41-year-old sales executive who joined the protest.

Subway networks run by SMRT Corp. and SBS Transit, a unit of ComfortDelGro, have been plagued by repeated service disruptions, including severe breakdowns in December 2011 that stranded hundreds of thousands of commuters for hours. Citizens have also complained of overcrowding on buses and trains, as well as what they say is an inadequate taxi industry that doesn’t provide sufficient cabs for commuters during peak hours.

*Source: The Wall Street Journal, 26 January 2014*

**Extract 4: Despite push for public transport, a love for cars endures**

The Government has invested huge amounts of money to improve public transport as it seeks to wean Singaporeans off their cars. There will be 99 new trains by 2019, and 450 new buses by 2017

— on top of the 550 already added in recent years. By 2030, there will be new rail lines, more covered walkways, and a 700km cycling network.

Non-constituency Member of Parliament Gerald Giam, 38, in a Facebook post last month said that he had given up his car. He told TODAY that he did so after the COE for his second-hand 2005 Toyota Corolla Altis expired. With the duration of his journeys now two to three times longer compared to when he drove, Mr Giam said that advance planning is essential before he and his family leave home.

But people like Mr Giam are the exception, not the norm. Transport analysts noted that Singaporeans’ soft spot for automobiles is tough to eradicate.

*Source: Today, Singapore, 17 July 2015*

**Questions**

(a) Explain whether public transport in Singapore is a public good. [2]

(b) Using a diagram, explain why there is need for the government to intervene in the market for private transport in Singapore. [6]

(c) Analyse the impact of higher COE prices on the market for public transport. [4]

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

(e) Discuss the extent to which factors influencing price elasticity of demand are relevant to the Singapore government in encouraging the switch from private to public transport through policies mentioned in Extract 1. [10]

[Total: 30 marks]

**Suggested Answer**

**(a) Explain whether public transport in Singapore is a public good. [2]**

Public transport in Singapore is not a public good as it is excludable. If commuters do not pay the corresponding fares, they can be excluded from consuming public transport services.

Public transport in Singapore is not a public good as it is rival in consumption. The consumption of public transport services by one commuter reduces the number of seats or space available for another commuter.

**Extra qn: why the features of public good will lead to market failures?**

- significance of non-rival and non-excludable – leads to free ridership – no profit incentive for private producers to produce the good – How? – non rival – allows sharing – MC is zero, while non-excludable – cannot charge – P= 0 – therefore no production and complete market failure – complete loss of welfare

**significance of loss of welfare due to absence of public goods**

* undermine the welfare of the lower income group
* undermine the efficiency of the industry
* the whole society is compromised in terms of convenience and comfort

**(b) Using a diagram, explain why there is need for the government to intervene in the market for private transport in Singapore. [6]**

**explain why market failures occur bec of negative externalities**

**1)Introduction / 2) economics causation (Demerit good, negative ext, external cost/ DWL) / 3) draw diagram / 4)describe diagram / 5) analysis – key factor**

The consumption of private transportation in Singapore generates negative externalities in the form of traffic congestion, which refer to the adverse spillover effects imposed on third parties from the production or consumption of a good. This will lead to market failures and thus reguires government intervention.

When a person drives his car during peak periods on a busy road, he slows down traffic and causes delay to other road users. The cost of such delays is then borne by third parties like their employers as their workers turn up late for work and the delivery of their goods are delayed.

As traffic congestion disrupts economic activity hence adversely effects economic growth, curbing such congestion “could reduce a country’s potential for creating prosperity” (extract 1)



As seen from the diagram, there are no traffic jams and hence no external costs generated up to OQ. Thus MPC and MSC are identical. Beyond OQ, congestion sets in and worsens, so the MPC for each driver rises as he wastes increasingly more time and fuel being stuck in a worsening traffic jam. With increasing delays imposed on employers and businesses, MEC also rises, causing the MSC to diverge more and more from the MPC.

Assuming that there are no positive externalities or merit good effects, the demand curve DD which is also the marginal private benefit (MPB) curve will be equal to the marginal social benefit (MSB) curve. Without intervention, the free market traffic volume is Qp where MPB = MPC, while the socially efficient outcome where MSB = MSC is at Qs.

From Qs to Qp, as MSC > MSB (over-production and over-consumption), the deadweight loss of the shaded area is generated, indicating that there is market failures. Since Qp > Qs, the road is over consumed so there is a need for the government to intervene to reduce the traffic congestion.

the impact of negative externalities in terms of traffic congestion is severe as it determines the country’s economic efficiency and productivity – Thus, this calls for intervention

**(c) Analyse the impact of higher COE prices on the market for public transport. [4]**

higher COE price – decrease demand for cars – increase demand for public transport – increase price for public transport - but the price of public transport will not rise – why? fares are regulated for public transport by PTC

Rising COE prices translate to higher car prices and thus higher cost of private car ownership. As public and private transport are substitutes, rising cost of private car ownership should raise the demand for public transport, thus causing public transport fares and volume to rise.

However, as fares are regulated by the Public Transport Council (extract 2), public transport fares may remain unchanged.

Also, as car ownership is directly limited by the COE quota, rising COE and thus car prices may have no impact on the market for public transport in terms of price changes.

**(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.

**(e) Discuss the extent to which factors influencing price elasticity of demand are relevant to the Singapore government in encouraging the switch from private to public transport through policies mentioned in Extract 1. [10]**

**Explain why the determinants of PED will affect the government’s policy adopted to switch consumers from private transport to public transport**

**Determinants of PED**

**suitability of substitutes – will encourage the switch if it is suitable**

**time consideration for purchase – erratic – difficult to switch**

**proportion of income spent on it – small – will switch**

**use COE as a policy – raise the proportion of income on the private transport – deter from buying cars**

**degree of necessity of demand – nature of work -determine tiem and rout allocation of road usage**

Question interpretation

* What are the policies mentioned in extract 1?
* What is price elasticity of demand and how does it affect the effectiveness of these policies?
* What are the factors affecting PED of private transport in Singapore?
* Which is the more relevant elasticity factor?

Introduction

The policies mentioned in extract 1 are the COE, ARF and ERP schemes

This essay aims to first explain the meaning of PED and how it affects the effectiveness of these policies in curbing traffic congestion before analysing the factors affecting PED of private transport in Singapore

It concludes by assessing which factors are more relevant in influencing the effectiveness of these policies.

How does PED affect the effectiveness of COE, ARF and ERP?

Price elasticity of demand (PED) refers to the responsiveness of quantity demanded when the price of the good changes, ceteris paribus. It is measured by taking the percentage change in quantity demanded of a good over the percentage change in its price.

With a higher PED, raising ownership and usage costs of private cars through these policies will curb the demand for private cars more substantially, thus helping to reduce traffic congestion more effectively as the change in quantity demand is greater if there is an increase in price to reduce the quantity due to the above policies.

What are the factors affecting the PED for private transport?

The first factor is availability and closeness of substitutes. An increase in the availability and/or closeness of substitutes for a good will result in an increase in its PED. Extract 4 mentions of new buses and trains being put into operation and new rail lines being constructed. This should improve the quality of public transport in terms of comfort, accessibility, frequency and reliability, thus making it a closer substitute to private transport, thereby raising the PED of private transport.

The second factor is the time period. As people need time to factor in and respond to a price change, the PED of a good tends to increase with time. Time is required for private transport users to respond to higher COE prices, ARF rates and ERP charges before switching to public transport.

In the short-run, policies aimed at raising private transport costs may have limited effectiveness as most users may be unable or unwilling to change their travel pattern or modes. However, such adjustments can be made in the long run so the demand for private transport is likely to become more price elastic over time. For example, extract 4 mentions of Mr Giam making the decision to give up his private car after using it for many years.

Conclusion

In conclusion, Table 1 shows commuters consistently ranking travel time, waiting time and reliability as being the most important attributes of public transport. This suggests that making public transport a closer substitute to private transport is arguably the more important factor. Extract 4 suggests that drivers often only decide whether to switch transport modes after their existing COE has expired. This arguably suggests that the time period could instead be the more important factor.