

93402



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SUPERVISOR'S USE ONLY

OUTSTANDING SCHOLARSHIP EXEMPLAR



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Scholarship 2016 Economics

9.30 a.m. Tuesday 15 November 2016

Time allowed: Three hours

Total marks: 24

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Pull out Resource Booklet 93402R from the centre of this booklet.

You must answer ALL questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–28 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

QUESTION ONE: REGULATING TRANSPOWER

Use information from **Resources A to E**, and your knowledge of microeconomic theory, to answer this question.

Since 2011, the Commerce Commission has been actively involved in regulating prices for Transpower, the state-owned enterprise that owns the national network of power transmission lines and cables.

Discuss why the Commerce Commission would have chosen to regulate prices for Transpower, and evaluate the extent to which the pricing regulations would improve allocative efficiency in the electricity market. Use appropriate economic models, and integrate relevant resource material to support your answer.

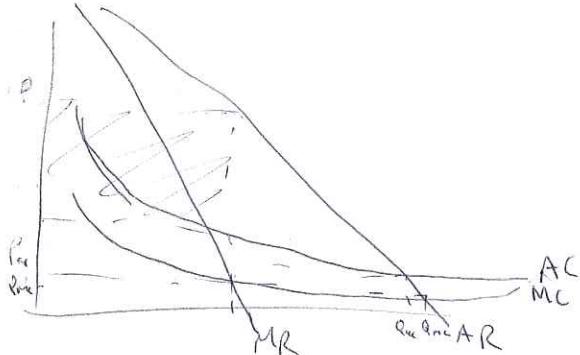
In your answer, you should:

- explain why Transpower is an example of a **natural monopoly**
- illustrate and explain the shape of Transpower's revenue and cost curves, and why operating at **profit-maximising output is not allocatively efficient**
- analyse the possible **pricing options** that the Commerce Commission could use in regulating prices for Transpower to improve allocative efficiency
- evaluate the **extent to which the factors** considered by the Commerce Commission in regulating prices for Transpower allow **allocative efficiency** to be achieved in this market.

Use this space for planning your essay. This plan will NOT be marked.

PLANNING

- high cost infrastructure
- Better as monopoly
- AC always ↓ as high set up



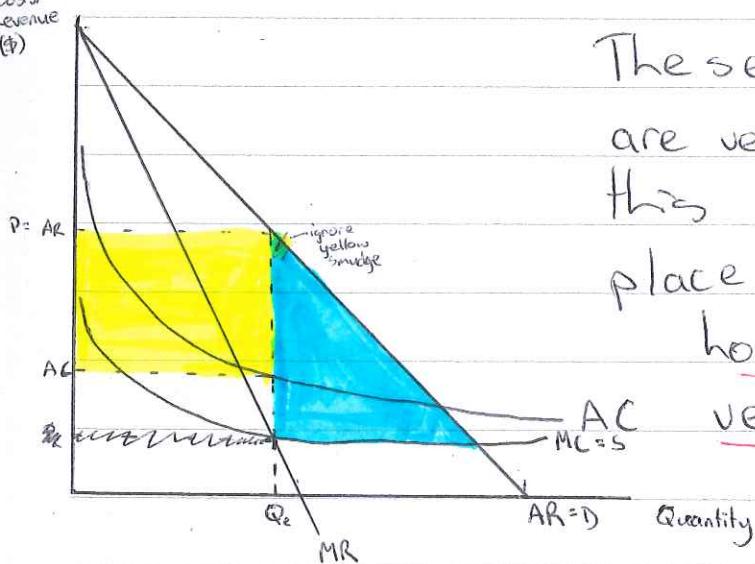
AC DWL
Normal Profit

MC AE
Sub-normal Prof

Transpower is a natural monopoly as it is the only firm in the market ~~with~~ that owns & maintains a nationwide electrical grid hence is a monopolist. This is a natural monopoly as it is cheaper and more efficient to have just one electricity network across the country ~~as having many due to the very high set-up costs of constructing a nationwide electrical grid.~~ Hence the Commerce Commission ~~does not~~ does not need to encourage competition in this market as having multiple electricity networks would be both expensive and impractical.

with 1180 km of high voltage lines by 186 substations. (Resource A)

Price/
Cost/
Revenue
(P)



The set up of a national grid are very high, however once this infrastructure is in place the extra cost per household utilising it is very low. Hence the average costs (AC) of Transpower form an asymptotic curve. This begins very high for the first few units but falling steeply as more units are consumed and a very similar total cost is dispersed over more units. The AC curve continues to be downward sloping over the whole range of demand. The marginal cost (MC) is hence

~~an exponential~~ ^{exponential decay} ~~as~~ an asymptotic curve. This begins very high for the first few units but falling steeply as more units are consumed and a very similar total cost is dispersed over more units. The AC curve continues to be downward sloping over the whole range of demand. The marginal cost (MC) is hence

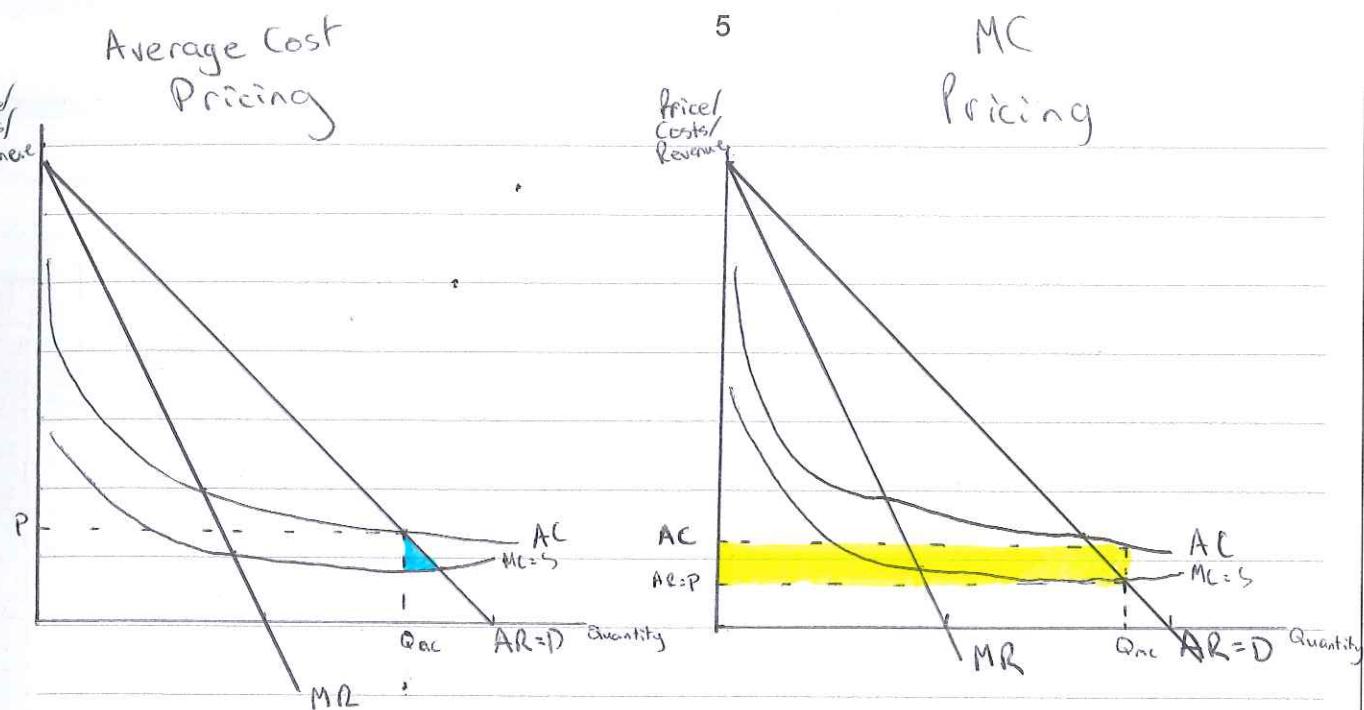
always less than the average cost over the range of demand as MC must only cut the AC curve at its lowest point.

Both Transpower's Marginal revenue (MR) and average revenue (AR) curves are downward sloping as the Law of demand (as price falls, quantity demanded rises & vice versa, *ceteris paribus*) holds for consumption of the electricity grid hence Transpower's ^{marginal} average revenue will fall proportional to price as quantity demanded rises.

When operating at the profit maximisation point ($MR = MC$) Transpower will produce the quantity Q_e and will make a large super normal profit $\$$ (the yellow shaded area). Producing at this point is not allocatively efficient as producer and consumer surpluses are not maximised ~~the~~ ^(\rightarrow), resulting in a large dead weight loss - the blue shaded area. This dead weight loss occurs as the market is not operating at equilibrium as demand (derived from AR) does not equal supply (derived from MC).

This is able to occur as Transpower is a monopoly so can charge a much higher price in order to maximise profits without losing market share as there are no competitors to take over their market share.

Average Cost Pricing



ASSESSOR'S
USE ONLY

In order to reduce the dead weight loss in the market and ~~charge~~ ^{electrical} super normal profit, and ensure ~~high~~ public safety with high quality transmission infrastructure it is ~~useful~~ advisable for the Commerce Commission (CC) to regulate Transpower. According to Resource A, Transpower has been subject to regulation since April 2011 including quality standards and maximum revenues. These maximum revenues has resulted in some ~~of~~ revenue collected being paid back to the government still leaving the consumer worse off as they have already paid the high price charged. One option to regulate pricing the CC could employ is average cost pricing where the price is fixed where $AC = AR$ hence ensuring the firm receives a normal profit - enough profit to keep them

10% of
final household
bill (ResC)

\$188 million in
2014/15 financial
year (Resource
(\$188 m))

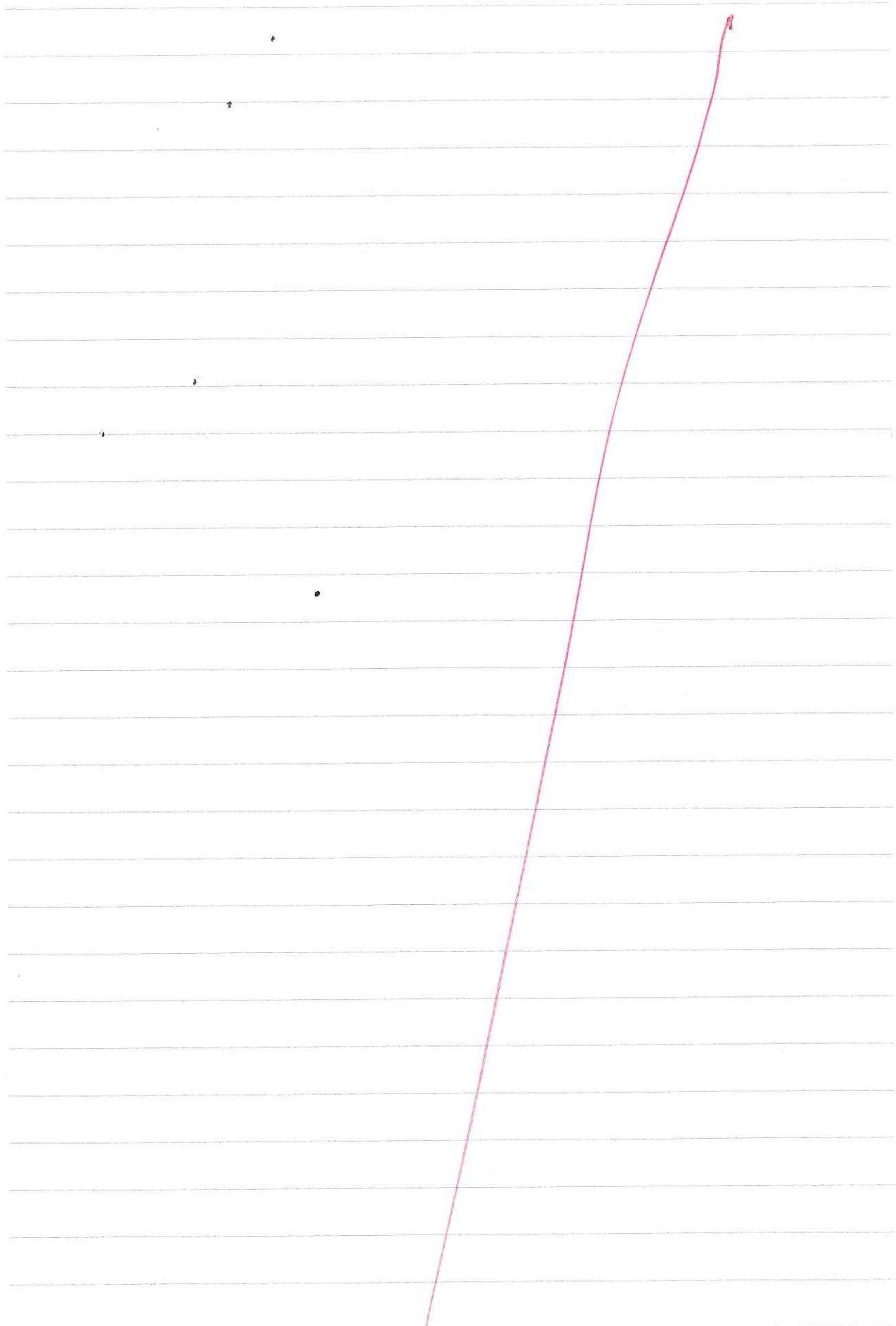
producing at current levels. This would eliminate the supernormal profit and reduce the price for consumers allowing more households access to electricity and hence a better standard of living. The dead weight loss would also be reduced but would still exist as the blue shaded area as the market is still not at equilibrium hence CS & PS are not maximised so allocative efficiency has not been reached.

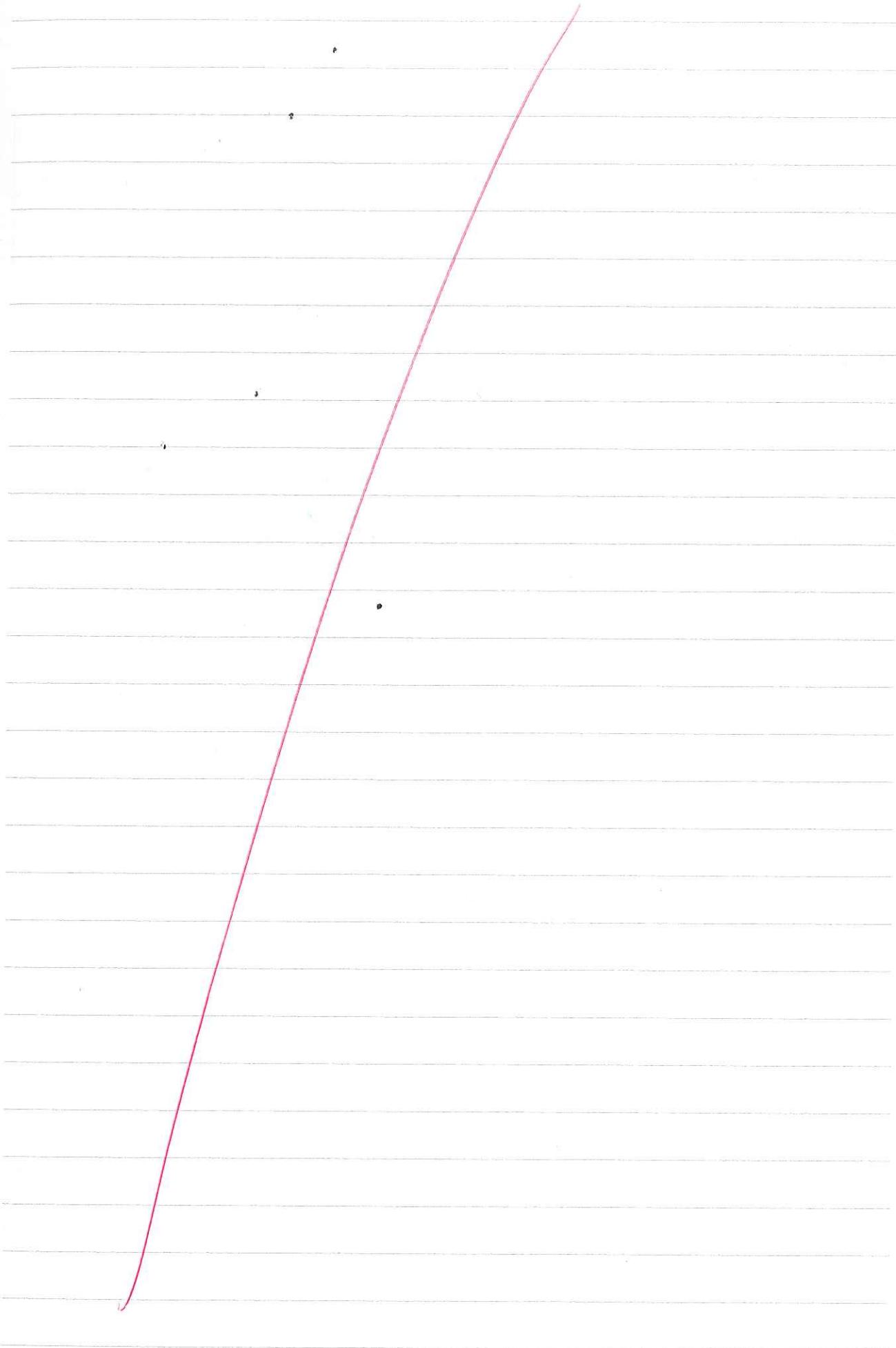
Marginal cost pricing would alleviate this issue as the price is set where $MC(\text{Supply}) = AR(\text{Demand})$ hence the market is held at equilibrium and allocative efficiency is reached. However as AC is greater than AR at this point Trans power will make a small subnormal profit (yellow area). As a subnormal profit is not enough profit to cover economic costs the firm will want to leave the market and seek more profitable ventures elsewhere.

The CC consideration of ensuring "suppliers have profit incentives to innovate & invest" (source B) may allow ~~redun~~ loss of allocative efficiency in the

market as when suppliers innovate & invest they can reduce their marginal & average costs thereby at a set price P their profits will increase as MC will no longer equal AR so dead weight loss will occur in the market. In the pricing options considered previously this factor was not considered as if Transpower innovated causing AC & MC to fall the set price would also fall. ~~the~~

The CC's other consideration of reliability, quality & efficiency of services and limited supernormal profits as stated in resource B may be achieved while maintaining allocative efficiency as seen with MC pricing where allocative efficiency is reached with no supernormal profit however the trade-off is due to the sub-normal profit the quality of the service may fall as this is not sufficient to cover all economic costs hence Trans power may fail to maintain their infrastructure ~~as~~ to a high enough standard 1





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QUESTION TWO: THE ECONOMICS OF CLIMATE CHANGE

Use information from Resources F to K, and your knowledge of microeconomic theory, to answer this question.

Many studies published in respected scientific journals show that 97 per cent or more of climate scientists agree that climate-warming trends over the past century are very likely due to human activities. In addition, most of the leading scientific organisations worldwide have issued public statements endorsing this position.

Source (adapted): <http://climate.nasa.gov/scientific-consensus/>

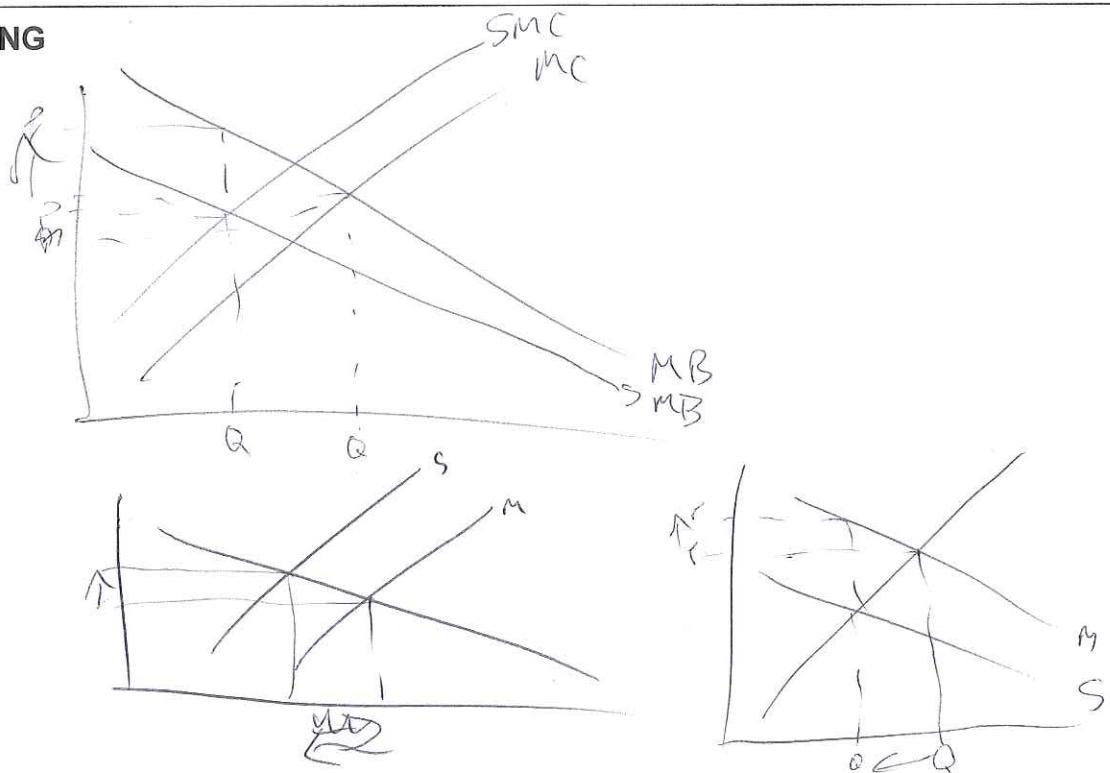
Human production and consumption have resulted in climate change and associated negative externalities. Analyse how these externalities have arisen, and why the response to climate change has been slow. Evaluate key economic policy options that could be used to slow down climate change. Use appropriate economic models, and integrate relevant resource material to support your answer.

In your answer you should:

- explain how human production and consumption result in climate change and its associated negative externalities and why market failure is occurring
- explain why the environment could be considered to be a public good and why this may have led to delayed responses by individuals and governments to the threat of climate change
- analyse and evaluate key economic policy options that governments could use to slow down climate change.

Use this space for planning your essay. This plan will NOT be marked.

PLANNING

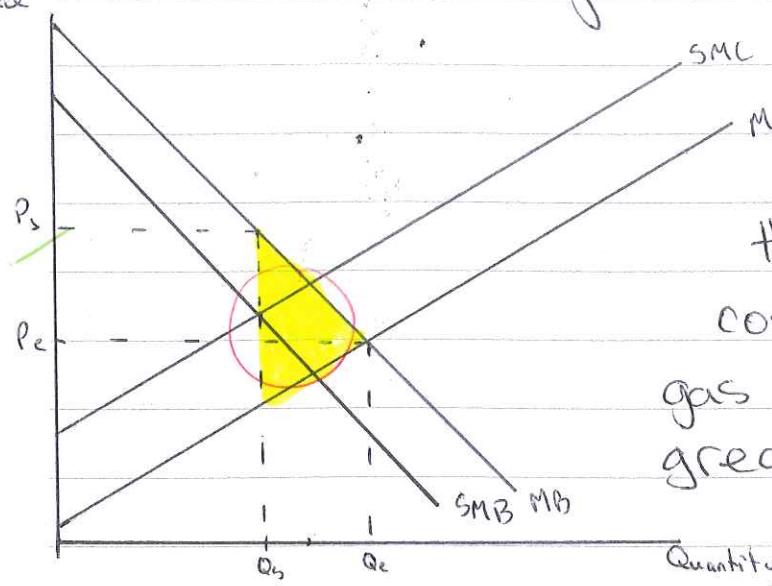


Production processes emit many tonnes of climate change causing greenhouse gases. All production requires transport at some point releasing CO₂ from fossil fuels in trucks, planes & boats. Dairy production further contributes to gas emission through methane emissions of cows and production in many factories is driven by fossil fuel powered machines. Agriculture is a big contributor in NZ with 46% of 2018 CO₂ emissions from agriculture (Resource G).

Consumers also contribute to gas emissions by consuming fossil fuel powered transport, fossil fuel generated electricity, and refrigeration & air conditioning containing damaging Hydrofluoro carbons. These gas emissions result in market failure due to the negative externalities of production & consumption causing gas emitting goods and services to be underpriced and over produced and consumed. A ~~negative~~ externality is where an individual or firms production or consumption causes a third party to be worse off.

In this case the third party is ~~human~~ life worldwide, including humans, which is threatened with extinction.

if climate change is not limited.



The negative externality of Climate change means that the social marginal cost (SMC) of producing gas emitting products is greater than the marginal cost (MC) while the social marginal

benefit (SMB) of consuming these products is less than the marginal benefit (MB). Hence the spill over costs to society are not being accounted for in pricing and consumption choices so products are overconsumed with Q_e being consumed rather than the socially efficient Q_s . Products are also under priced at P_e rather than P_s . Although the market is in equilibrium it is not allocatively efficient it is not in social equilibrium and therefore not socially allocatively efficient (SAE) hence a social dead weight loss of the yellow area occurs.

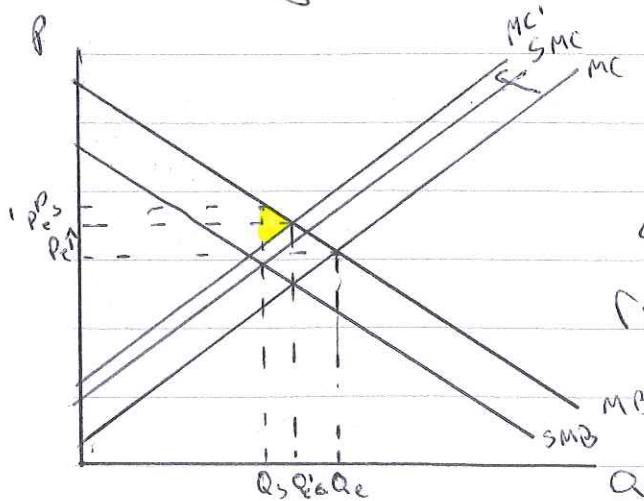
The environment can be considered a public good as it is non-exclusionary so available to everyone, free, and has no established property rights. As a

public good the environment is highly susceptible to the "tragedy of the commons". As stated in Resource 1 if a clear property right does not exist no individual has an incentive to manage it ~~and~~ social costs are left out of market pricing and ignored. This has occurred with climate change as everyone continues to emit greenhouse gases with the attitude "someone else is emitting more, they should change." This has allowed the threat of climate change to begin to become reality as individuals, and governments are reluctant to act on the basis it may ~~make them less competitive~~ firms make them less competitive against those who continue to emit and pollute.

In order to internalise the externality clear property rights must be established in order to mitigate the "tragedy of the commons", promote personal responsibility and integrate the social cost into market pricing. One suggested option is an emissions trading scheme for firms in certain sectors of the economy as described in Resource 1. This would encourage reduced emissions in order to reduce costs of production and maintain price competitiveness.

As this scheme is created to account for both emissions in production and consumption of the product it will help mitigate some negative externalities of production & consumption. It may not however reduce emissions greatly as some ^{products} firms with inelastic demand or little competition may be able to just pass the increased cost onto consumers. With inelastic demand these price rises will not reduce consumption greatly so emissions would still be high. Another issue could be flat emissions produced by consumption of some products are difficult to attribute to only one product for example with cars it is both the car, the fuel and the oil that together contribute to emissions.

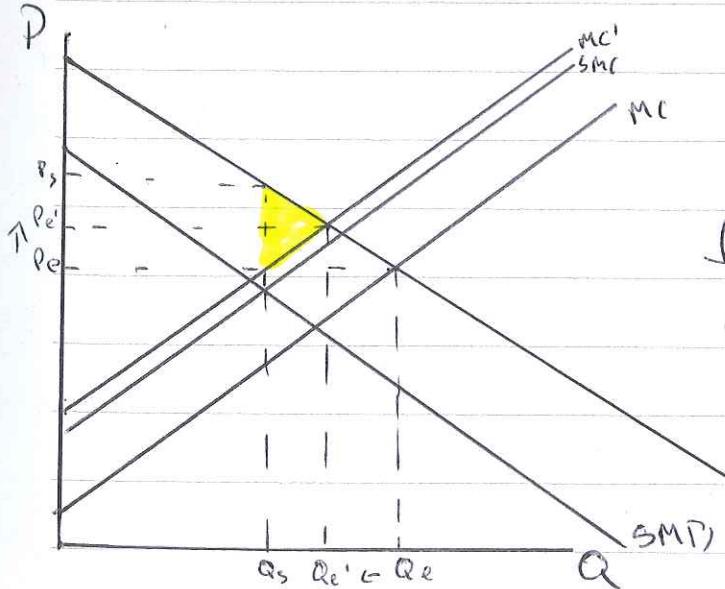
The inclusion of the dairy sector in this policy could also reduce its effectiveness due to their large contribution to gas emissions. If effective this policy will increase MC to MC' thereby shifting the market equilibrium closer



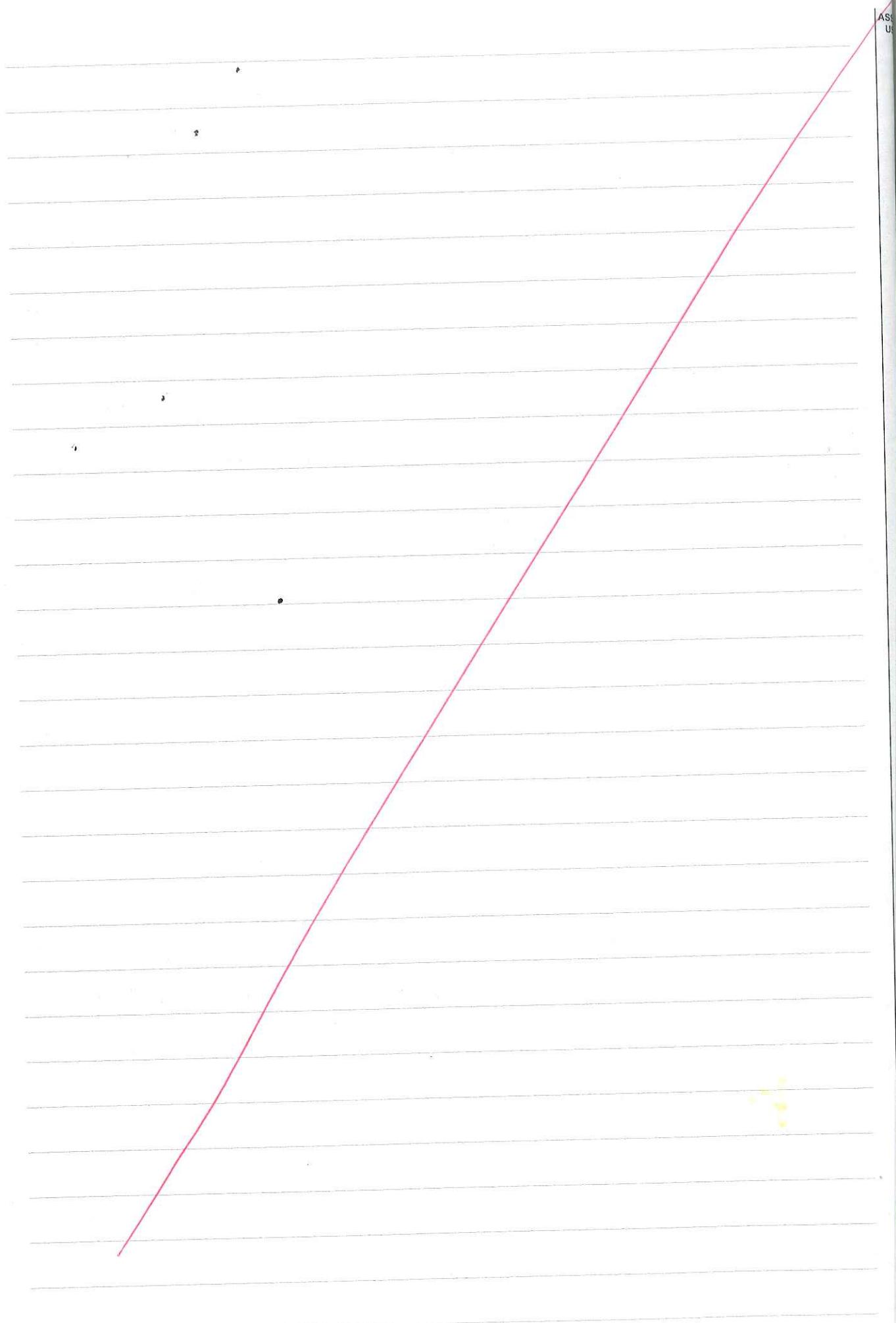
to social equilibrium reducing the social dead weight loss to the small yellow area thereby reducing the externality although not totally removing it

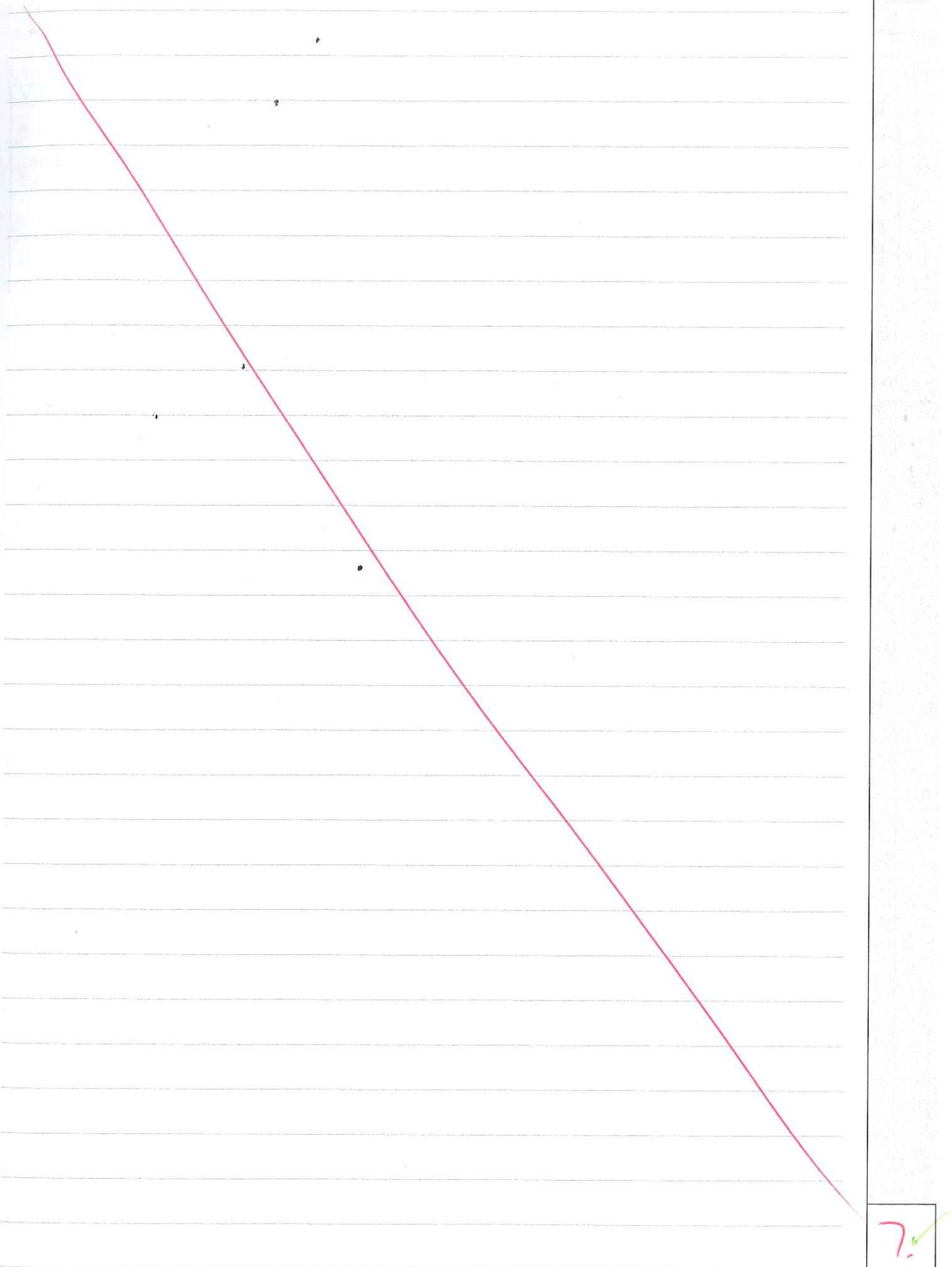
An alternative, but similar, policy is a carbon tax where fossil fuels are taxed based on the emissions of their consumption. This will be effective in that all production processes and ^{all} ~~most~~ consumers use fossil fuels, most daily, so this will mitigate both the production & consumption externality. It will also effectively target the energy sector who are a main gas emitter (42% in 2012). The price-competitiveness of alternative energy will be improved and the switch to alternative energy generation will be encouraged. It will not however account for hydro fluoro Carbons in refrigeration etc or dairy methane emissions hence would likely be less effective than a trading scheme.

It would however have the same effect on the market increasing MC to MC'



and price from P_e to P_e' thereby reducing quantity from Q_e to Q_e' and bringing the market closer to social equilibrium. There will still be a social dead weight loss (yellow area).





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QUESTION THREE: WHAT TO DO WITH A SURPLUS?

Use information from Resources L to Q, and your knowledge of macroeconomic theory, to answer this question.

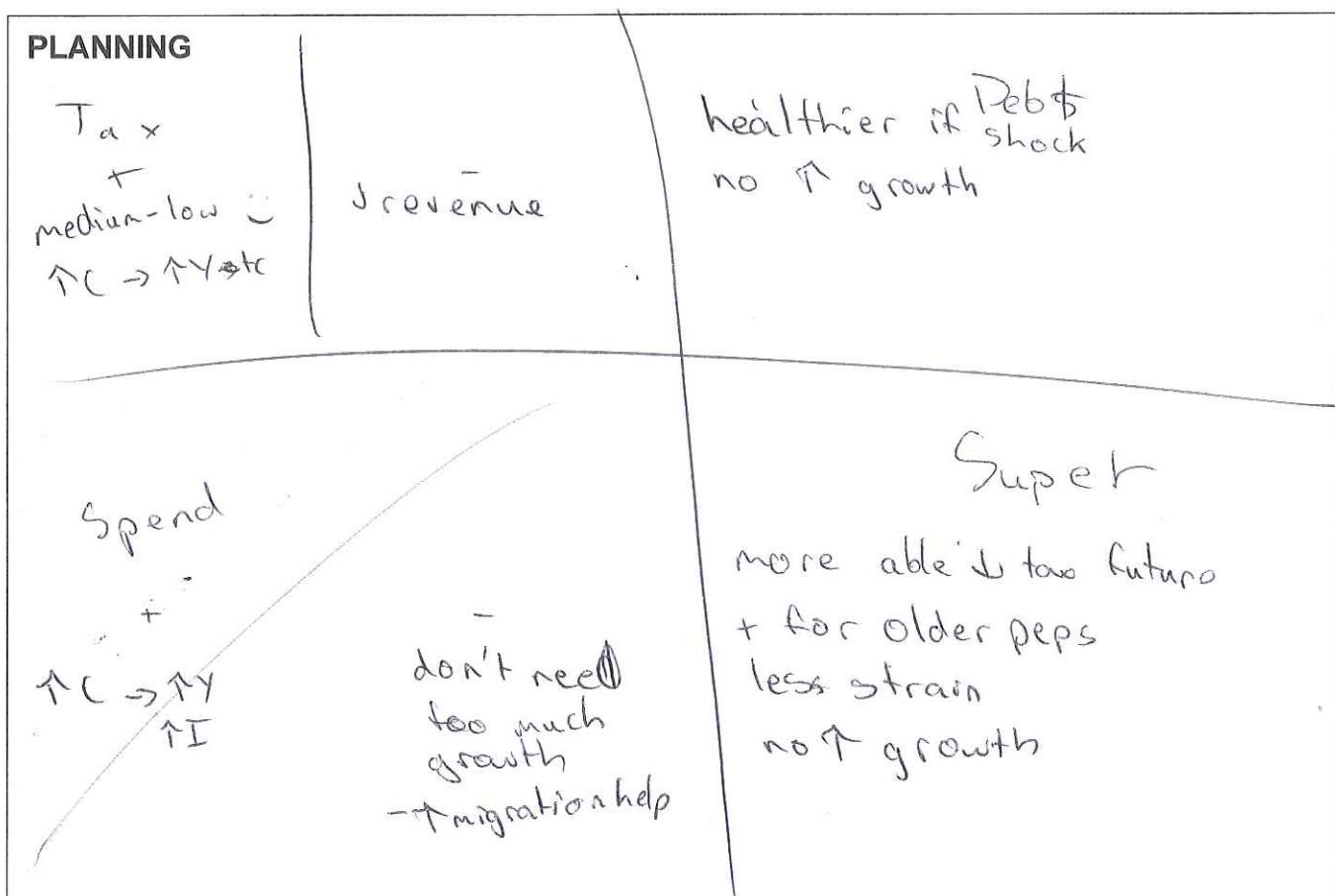
In 2015, the Government achieved the first operating balance surplus since 2008. There is uncertainty, however, as to whether surpluses can be maintained in the future. The Government has identified reducing income taxes and reducing public (government) debt as priorities for the use of the surplus. Others would prefer to see the surplus used to increase government spending on infrastructure and other forms of national investment to support economic growth, or for payments into the New Zealand Superannuation Fund to be restarted.

Analyse the short- and long-term impact on the New Zealand economy of EACH of the four options suggested for using the surplus. Evaluate which option is likely to have the greatest economic benefit to the economy in the long term. Use appropriate economic models, and integrate relevant resource material to support your answer.

In your answer, you should:

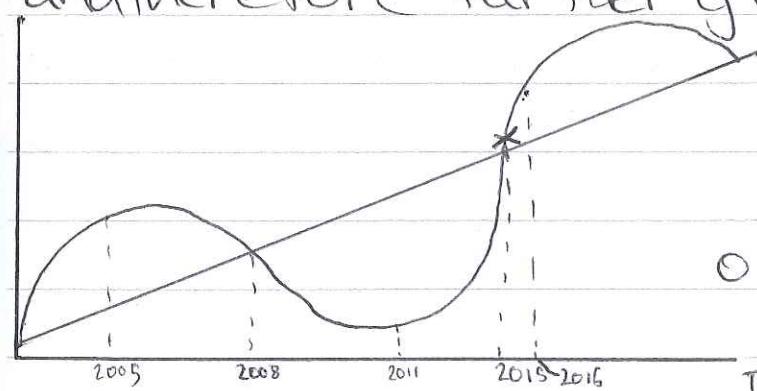
- explain the significance of achieving an operating balance surplus in the government budget and the impact the business cycle has on the government's ability to achieve this goal in the future
- analyse how each of the options for using the surplus will affect the economy in terms of economic growth and employment, in the short term and in the long term
- provide a justified recommendation as to which option is likely to have the greatest economic benefit to the economy in the long term.

Use this space for planning your essay. This plan will NOT be marked.



Achieving a government operating balance surplus is significant in signalling the NZ economy is in the recovery phase of the business cycle and growth in the economy is strong. It is especially significant following the 2008 global financial crisis in signalling ~~per~~ the economy has passed the crisis and there are prosperous times ahead. This signal can increase business & consumer confidence leading to increased consumption spending (C) and investment (I) and therefore further growth.

Red AOP

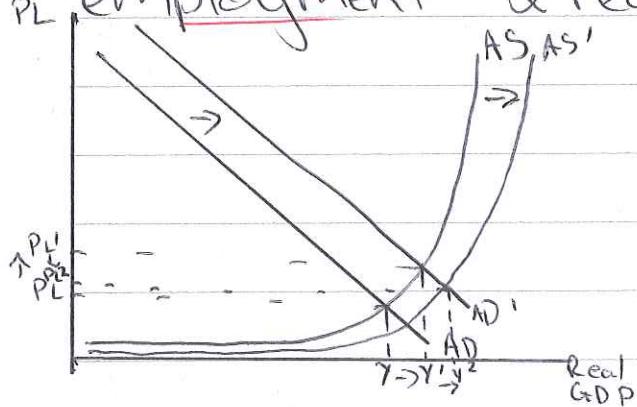


~~The business cycle~~: The pattern of the government operating balance over time mirrors that of the business cycle as in prosperous times government runs surpluses to ~~reduce~~ contain the inflationary gap while in a recession government runs deficits to stimulate economic activity.

Currently I predict, ~~as~~ based on the government operating balance, the NZ economy is still in the recovery phase so government should be able to continue to run ^{also} surpluses as predicted by resource L, past 2019. If

the economy does however suddenly dip into recession the government may well likely no longer be able to ~~refund~~ run surpluses.

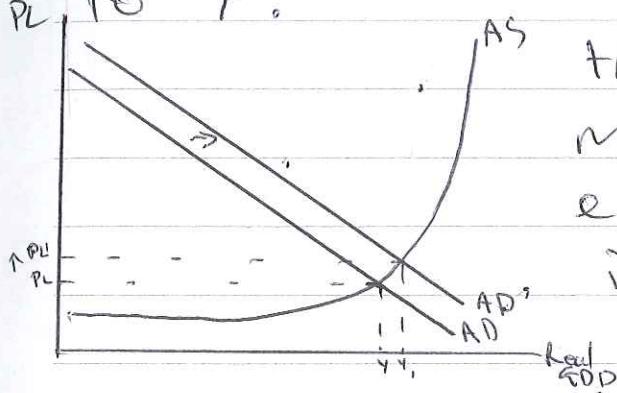
By using ~~of~~ the surplus to increase government spending (G) on infrastructure an increase in growth will occur in the short term as the spending creates jobs thereby increasing household income therefore increasing C . As both C & G , components of aggregate demand (AD), increase more goods and services will be demanded across the economy increasing aggregate demand and causing an increase in employment & real GDP from Y to Y' .



In the long run the improved infrastructure will allow productivity in the economy and therefore aggregate supply to increase to AS' causing further growth and employment increases to Y' .

Using the surplus to give tax cuts to those on low-medium incomes will increase their disposable income therefore allowing them to increase C . This increase in demand will increase the demand for labour

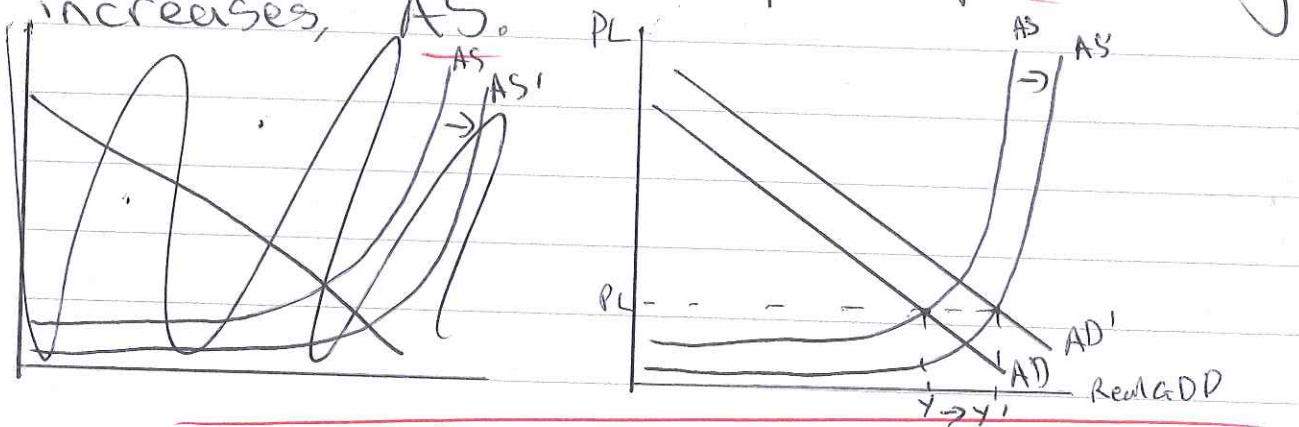
- as the labour market is demand-derived. Hence more workers will be able to find jobs thereby increasing employment and further increasing household incomes. In the short term these tax cuts will increase aggregate demand to AD' and therefore employment & real GDP to Y' .



As the cuts are modest this rise will also be modest even with the effect of the multiplier taken into account. In the long run tax cuts ~~will~~ may allow a ~~be~~ higher standard of living for low-medium income households. As NZ's population continues to grow, over the long term government revenue will not fall significantly.

IF government uses the surplus to pay back the 25% of GDP (Resource) of debt they hold ~~they~~ will keep the level of public debt prudent in case of further economic shocks. Reducing ~~s~~ public debt will have little effect on the NZ economy in the short run however in the ~~long~~ medium term it may increase ~~the~~ NZ's credit rating

thereby increasing overseas investment in the NZ banking system. This will make more funds available for banks to lend to NZ firms for investment. This may cause increase capital formation and therefore increase both ~~aggregate AD~~ and, due to subsequent productivity increases, AS.



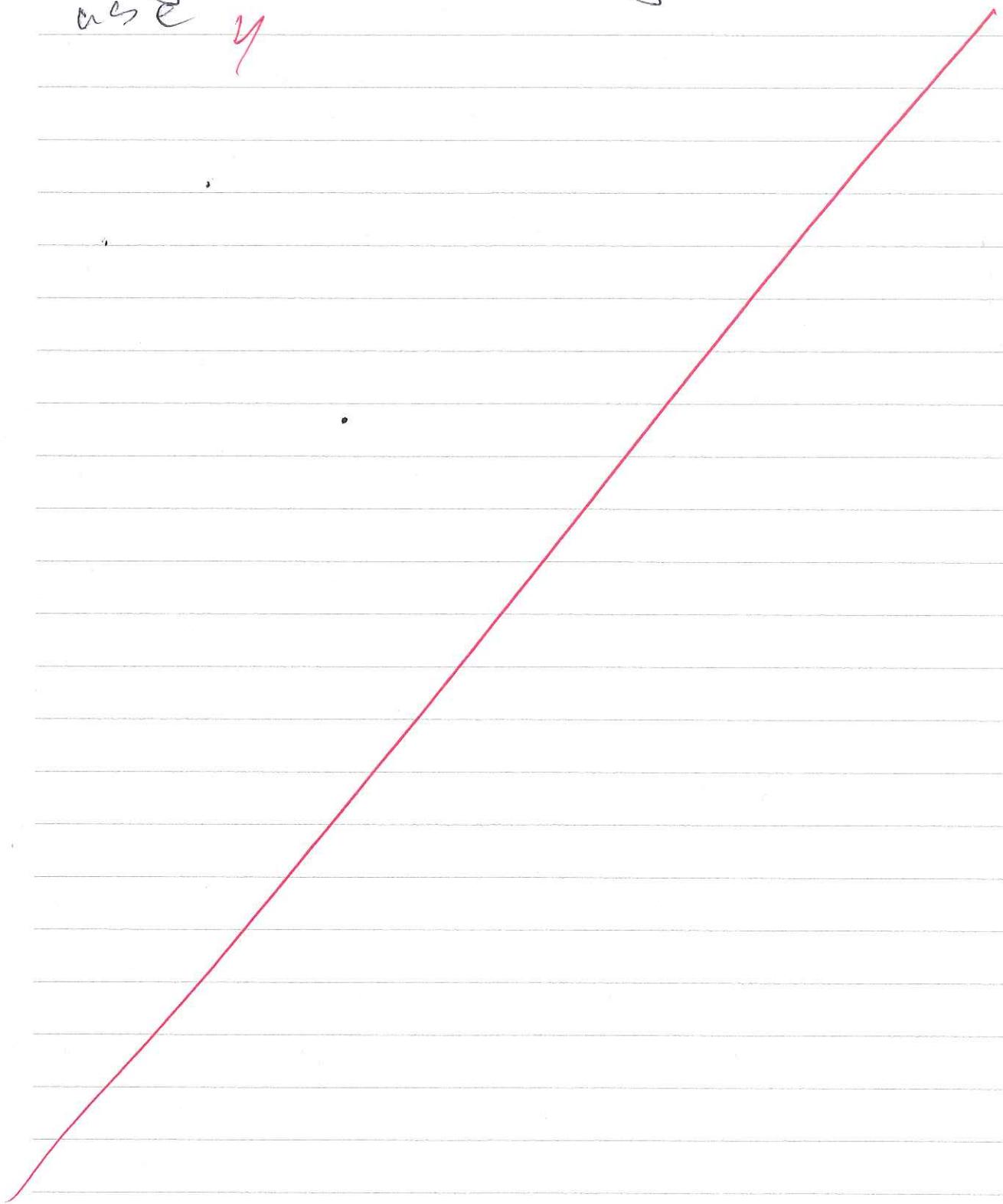
These increases will cause arise in production and therefore employment and real GDP from Y to Y' . In the long run repaying debt will ensure the NZ government is able to borrow readily should another global financial shock or recession hit.

By using the surplus to resume contributions to the NZ super fund government will be ensuring they are in a suitable position to help fund the pension of the aging NZ population. This would not cause growth or

increased employment in the economy but will help maintain growth and public services as future workers have to carry less of the financial burden of supporting pensioners. It also reduces dependence on foreign investment so will mean the NZ economy will be more able to maintain growth and investment irrespective of the NZ credit rating or global tightening.

Overall I would recommend government uses the surplus to payoff debt and contribute to the NZ Super Fund in order to keep the economy strong and able to withstand future shocks. Although these do not give short term growth they allow for increase employment they allow future growth and stability. Tax cuts may not have the desired impact on growth and employment as consumers may instead save their extra income. Increased spending is likely unnecessary if NZ is in the recovery phase growth should pick up and with the rebuild from the recent earth quake will likely boost

growth. Overall the low growth and rising unemployment do not indicate weakness in the economy and instead are due to strong migration hence government should use y



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Outstanding Scholarship Exemplar

Mark: 21/24

Question One

The candidate produces and effectively communicates a sophisticated economic analysis of the allocative efficiency of *Transpower* as a natural monopoly and of possible pricing regulations, by applying appropriate microeconomic theory. The answer demonstrates perception and insight.

The candidate provides a detailed explanation of why *Transpower* is an example of a natural monopoly (Page 3). The candidate provides a definition of a natural monopoly and a reason as to why this is applicable to *Transpower*. This has been supported with evidence from the resource material.

An accurate model has been provided (Page 3) and the shape and/or placement of the curves has been adequately explained (Page 4). Additionally, *Transpower's* allocative inefficiency when operating at profit maximisation has been identified and described.

An analysis of Average Cost Pricing has been provided (Page 5). The candidate has explained the Commerce Commission's strategy, referencing the resource material and an appropriate model (Page 5). The impact on *Transpower* has been accurately described.

Marginal Cost Pricing has also been analysed (Page 6). The explanation references an appropriate model (Page 5), and the impact on *Transpower* is also accurately described.

An evaluation of the extent to which the Commerce Commission regulation of pricing of *Transpower* would allow allocative efficiency to be achieved in the market has been provided.

Overall, the essay is judged to have reached Outstanding Scholarship standard because the analysis was convincing and economically literate, and the resource material was integrated effectively. A more thorough explanation of the placement of the marginal revenue and the existence of a deadweight loss using marginal analysis would have led to a higher grade.

Question Two

Overall, the candidate has produced an effective and sophisticated analysis of the causes and effects of climate change and of economic policies to slow down climate change. The candidate has effectively integrated the resource material; shown independent thought in the analysis; and produced a logical, clear, and economically literate answer. The candidate could have improved this further by omitting some

errors in their understanding of how allocative efficiency relates to the market in the case of externalities and by better explanation around the idea of the environment being seen as a public good.

The candidate explains the connection between greenhouse gas emissions, climate change, negative externalities of production and consumption and market failure in some depth (Pg 11 & 12). They correctly illustrate these externalities, accurately combining the illustration of consumption and production externalities on the single model to correctly illustrate the socially desirable quantity and price, showing a sophisticated degree of understanding of the model (though incorrectly identifying the area of deadweight loss and confusing the idea of allocative efficiency in a market where externalities exist).

The candidate provides a brief, broad explanation of why the environment may be considered to be a public good. This could have been improved by more specifically connecting the characteristics of a public good to the features of the environment (Pg 12 & 13). They provide a sound explanation of why there has been a delayed response to climate change, though again this would have been enhanced by specific connection to the features of a public good.

The candidate provides a sophisticated analysis of the pros and cons of an emissions trading scheme, recognising the potential impact on both production and consumption externalities and some potential limitations of the scheme (Pg 14). This could have been strengthened further by considering the potential for the emissions trading scheme to support firms generating positive externalities such as forestry companies.

The candidate similarly provides a sound analysis of the pros and cons of a carbon tax, effectively incorporating resource material and recognising the potential impact on both production and consumption externalities (Pg 15).

Question Three

The candidate produces and effectively communicates an outstanding and sophisticated economic analysis of the short-term and long-term economic impacts of different options for utilising the government operating balance surplus, by applying macro-economic theory. The essay contains most of the requirements for Outstanding Scholarship but, however, deals inadequately with one essential point.

The introduction is adequate, though the candidate did not explain in detail the reasons why a surplus would be more difficult to achieve in an economic downturn. The candidate draws a diagram of the business cycle which could have been used to reinforce this point (pg 19).

The candidate explains how the government's increasing expenditure on infrastructure development will cause both aggregate demand and aggregate supply to increase. The candidate explains how the changes to productivity will have a long term impact on the economy. This demonstrates a level of economic insight. An aggregate demand/aggregate supply model is drawn that illustrates an increase in real GDP (pg 20).

The candidate provides an explanation as to how a cut in personal income taxes will cause an increase in aggregate demand. The candidate also explains how the multiplier effect will also enhance this policy. The candidate explains how the government revenue will not decrease significantly, which is an important consideration. An aggregate demand/aggregate supply model is drawn that illustrates an increase in real GDP (pg 21).

The candidate writes an explanation as to how reducing public debt levels will have a positive effect on the economy. The candidate provides some insight into how this may cause the credit rating to improve and the consequences to the economy of this improved credit rating. The candidate draws an aggregate demand/aggregate supply model to show how lower borrowing costs will cause an increase in aggregate demand and an increase in aggregate supply (pg 22).

The candidate explains how contributions to the superannuation fund will lead to less reliance on foreign investment. This would allow greater resilience of the economy in the event of an economic shock. This paragraph shows a degree of sophisticated economic analysis of the long-term impacts of usage of the budget surplus (pg 23).

The candidate has written a convincing conclusion (pgs 23-24) in which they weigh up the different options to use the budget surplus. This conclusion demonstrates independent reflection and extrapolation. The candidate also shows they have a high level of economic literacy by integrating sophisticated theories into their analysis.

Overall, the essay was judged to have met the criteria for Outstanding Scholarship. A stronger essay would have included a greater level of integration of resource materials and would have been slightly more coherent.