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- 8 Using 2021 estimates of carbon emissions, it is estimated that a petrol car journey from London to Glasgow emits approximately 3.3 times more carbon dioxide per passenger than the equivalent journey by train.

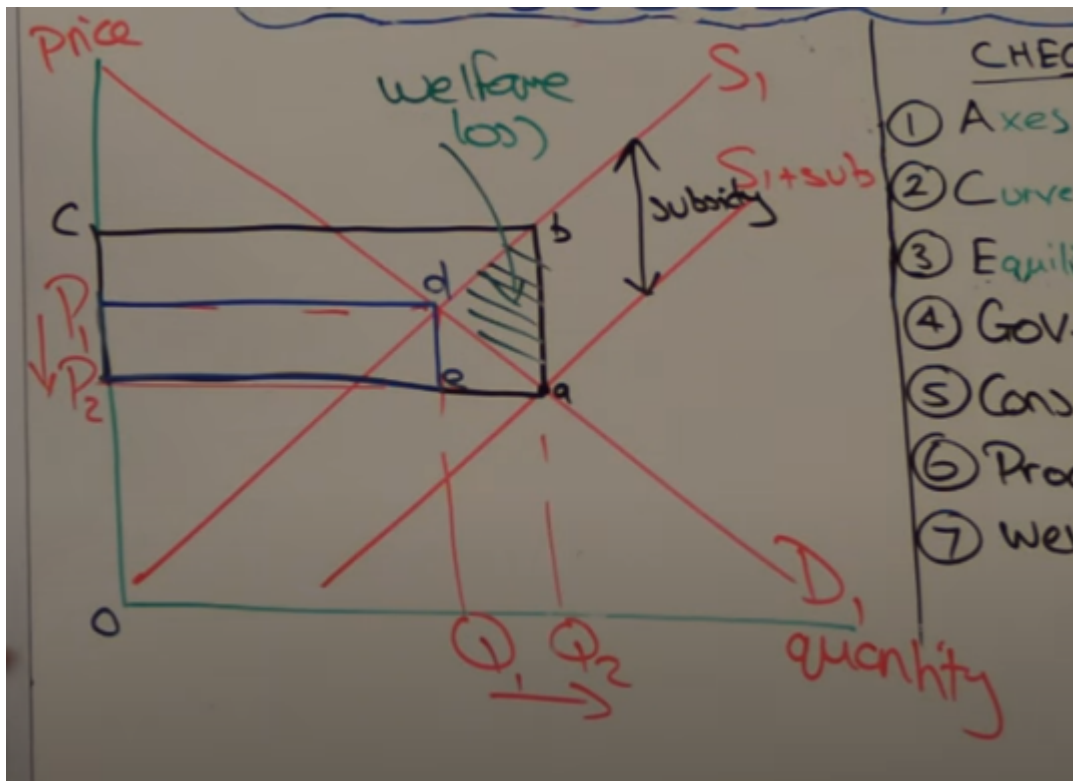
(Source adapted from: <https://www.gov.uk/government/statistics/transport-and-environment-statistics-autumn-2021/transport-and-environment-statistics-autumn-2021>)

Evaluate possible methods of government intervention to reduce carbon emissions caused by road transport in the UK.

(Total for Question 8 = 25 marks)

***Only need one graph in exam**

Government intervention, which is when governments intervene in free markets to correct market failures/a misallocation of resources, could reduce carbon emissions market failure as observable via the “transport-journey” industry. The specific market failure occurring in said industry, as outlined by the gov.uk source, is the overconsumption of “petrol-cars” which has led to a present level of “carbon emission” which needs to be reduced through government intervention. Thus this essay will explore three alternate forms of intervention: “subsidies, indirect tax and information provision”; drawing on evidence including strengths, weaknesses to present a case for each interventionary policy whilst also making a careful judgement of each intervention’s success specific to the UK transport-journey market.



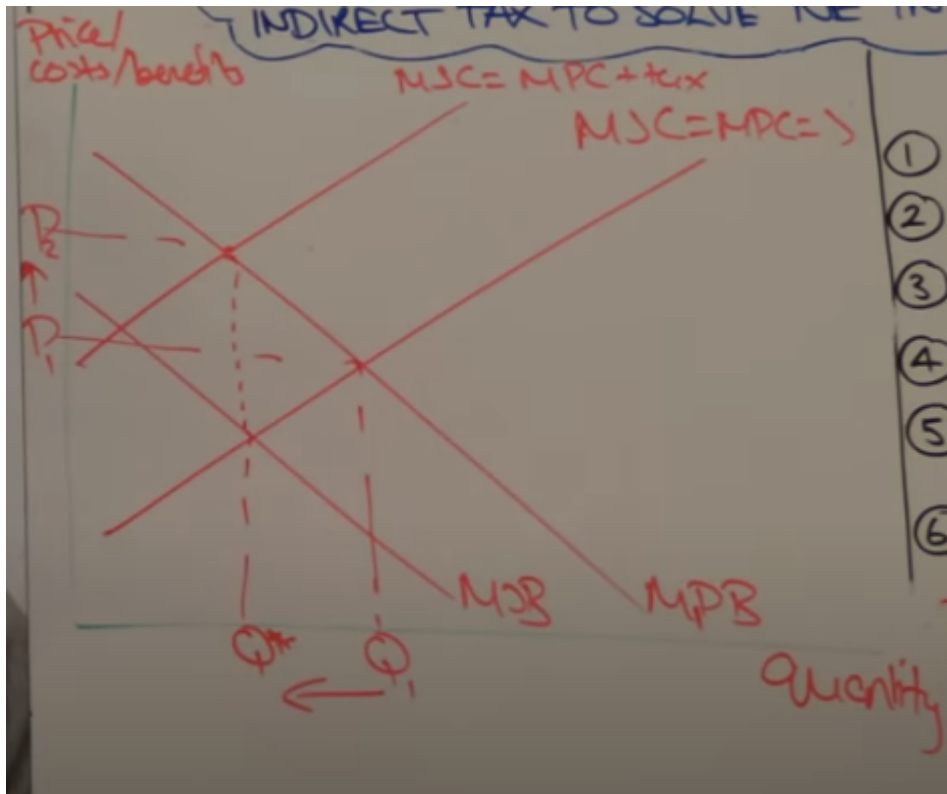
One interventionary policy is through the subsidisation of “UK train companies”. By the government providing financial grants to railway companies, said firms can lower their variable costs i.e. “upkeep/maintenance costs of stations, staff salaries etc”. This means that firms can offer consumers a new price level, P2 (as shown in the diagram), as opposed to the former and higher P1, **which can be implemented through reduced ticket prices. Passed onto consumer as lower prices.** Therefore, any reduction in ticket prices will translate to train companies offering a more competitive/attractive option to consumers looking to journey e.g. “London to Glasgow”; this is because consumers following law of demand, **condense this sentence** having had their consumer surplus increase, will be more inclined to choose train over alternative modes of transport e.g. “petrol-car journeys which approximately emit 3.3 times more co2 than equivalent train journeys”. This ultimately leads to increased ridership/quantity-demanded (as shown through Q1 shifting to Q2) for train companies and a decrease in the consumption of petrol-cars, thereby a reduction in carbon emissions. **Due to lower prices, demand increases from q1 to q2**

Don't use chunky words, dont mention multiplier in paper 1

Furthermore, in the long-run this price-reduction strategy through government subsidies can lead to consumer preference changes as a result of the subsidy. If train companies **pass on cost savings to consumers** successfully utilise the provision of financial grants to improve key services such as “catering, reducing train delay, service quality”, consumer preference may shift towards train travel, **(add multiplier shift to subsidy diagram?)** rather than buying/using petrol-cars, which further reduces carbon emissions in the long-run. However, this is highly dependent on the success of the subsidy. For instance, firms being ultimately profit-motivated may not actually pass cost-savings to consumers, through reduced ticket costs, as it is not in their best interest **as they are profit motivated.** to lose potential π due to managerial/stakeholder wants. **Therefore the subsidy may not be effective** This means that the magnitude of price decrease from P1 to P2 may be negligible/insignificant thus ineffective in attracting petrol-car consumers to use train for their journeys. This means that the quantity of petrol cars on the road will not change significantly, causing carbon emissions to not decrease as not enough consumers have transitioned from petrol-cars to train travel, as a result of the government subsidy.

***Firms may become dependent on subsidies. Governments suffer opportunity cost, money could be invested elsewhere such as: education, methods to reduce carbon emission (renewable technology) other alternatives on the table.**

Paragraph 2:



An alternative method of intervention is through the implementation of increasing indirect taxes e.g. “fuel duty” on petrol. Another method of government intervention is increasing fuel duty, indirect taxes. As shown by the diagram, when prices increase from p_1 to p_2 as a result of the indirect tax the quantity demanded of petrol shifts inwards from q_1 to q_2 . This leads to a decrease in the consumption of petrol, therefore reducing carbon emissions. Reduction in demand of petrol cars, means consumers may switch to public transport e.g. “tfl”, as driving petrol-cars becomes more expensive.

If the price of petrol increases (as shown from P_1 to P_2) a signalling function, via the price mechanism, is sent to consumers to adjust their consumption of “petrol”. This can lead to a decrease in quantity demanded (as shown from Q_1 shifting inwards to Q^*). This means that carbon emissions can be reduced, as petrol is a complementary good for petrol cars, thus if petrol is consumed less, carbon emissions (as caused by petrol-car exhaust fumes) will in turn also decrease. Furthermore, the signalling function may point consumers to look for alternative forms of transport, such as “train”.

However the effectiveness of the indirect tax depends on the price elasticity of petrol, as petrol can be considered a necessity in the UK, it is less responsible for price change, therefore it is inelastic. As shown by the diagram p_1 to p_2 , the price change will be disproportionate to the demand change. This means that the indirect tax will not be an effective measure to reduce carbon emissions.

However, this depends on the PED of petrol, to assess the effectiveness of the indirect tax. PED for petrol is <1 , due to the inelastic nature of petrol, since a price

increase (as shown from P1 to P2), will have a disproportionate magnitude on quantity demanded. Subsequently, change in quantity-demanded due to the indirect tax will be small. This means that the amount of petrol-car journey's in the UK may not decrease, thus there will be a negligible decrease in carbon emissions. However, one could argue if the tax revenue generated from "fuel duty increasing", if properly hypothecated, can be used to fund infrastructure/R&D into reducing carbon emissions i.e. "investing into UK carbon capture technology", thus in the long-run it can be argued indirect tax can aid towards lowering carbon emissions for future generations, as new technological innovations may be reached due to an increased funding. **Long run tax revenue generated, investments into renewable energy sources, less carbon emissions.**

Paragraph 3:

A final method of government intervention can be through information provision campaigns. Asymmetric information is an issue in the transport-journey industry, this is due to an imbalance of information regarding "carbon emissions" i.e. "petrol cars polluting 3.3x more than train, for the same equivalent journey", this may lead to consumers not taking into account the negative consumption externality generated from driving petrol cars. On the other hand, governments have access to a wider range of stats e.g. "ONS" which the general population may not be aware of/know how to access. Currently, TFL through bus/train advertising have created posters outlining the respiratory harm from "idle petrol engines", the government could expand on this concept and further inform the petrol-car consumers the dangers of raising carbon emissions or advertise "greener" alternatives such as EV or commuting via train. In theory, this may result in newly-informed consumers stop/lessen consumption of petrol-cars, due to fear of carbon emissions, thus effectively reducing carbon emissions. However, this depends on a time scale, in the short-run, even if targeted consumers find the advertising effective, they may be unable to purchase **electric vehicles** EV's due their relatively high price compared to petrol/diesel cars. However, in the long-run this may change as new cheaper substitutes can enter the market and be competitively priced, which may lead to said newly informed consumers switching to **electric vehicle** EV, reducing carbon emissions, as there are less petrol-car users on the road. **Due to asymmetric information, consumers may be misinformed about the negative effects of carbon emissions. Due to... As the government has access to statistics they can use provision campaigns in order to educate consumers on these negative effects, reducing the asymmetric information e.g. "TFL...". With greater information, more informed consumers may prefer taking public transport over petrol car.**

TFL Bus ads, effective information campaign?

Conclusion:

To conclude, the most effective way the UK government can reduce carbon emissions is to combine all 3 interventionary measures. Using all 3 measures will ensure that public transport prices are more attractive to consumers as well as a informing consumers more on carbon emissions. I would recommend that the government use all 3 measures to ensure that carbon emissions are reduced in the long-run. In the short-run, the measures may not be effective as subsidies take time...

To conclude, while each different interventionist strategy presented has its strengths and weaknesses, it is clear that reducing UK carbon emissions is a complex challenge that requires the factoring of several factors, e.g. "Time scale (LR vs SR), PED (Petrol is inelastic), Firms willingness to pass down savings". This means that a single strategy in isolation isn't the best approach. Rather, a synergistic combination of all 3 interventions is the most promising approach. For example, successful information campaign can set in motion a change in consumer thought, such as wanting "greener" alternatives to transport, that can only be capitalised if the current alternative, e.g. "Train prices" are more affordable/attractive which requires subsidisation of trains. Moreover, indirect taxes on petrol could further compound the benefit of trains, as since trains and petrol-cars are substitutes, when the price of the fuel petrol increases, quantity demanded for trains will increase and the revenue hypothocated from fuel duty taxes could finance subsidy/information schemes. Therefore, this essay has shown how a significant negative multiplier can be achieved through a 3 pronged approach, thus reducing the quantity demanded of petrol-car transport to Q4.

