

2016 JC2 H1 Econs - Prelim EQ3

- 3 While fossil fuels are useful, their usage leads to pollution. Internationally, governments provide a staggering \$775 billion to \$1 trillion annually in fossil fuel production subsidies.
- (a) Explain the main factors that determine the price elasticity of demand and price elasticity of supply of fossil fuel. [10]
- (b) Discuss the view that governments ought to remove fossil fuel production subsidies. [15]

INTRODUCTION

- Define price elasticity of demand and price elasticity of supply.

The price elasticity of demand measures the degree of responsiveness of the quantity demanded of a good to a given change in its price, *ceteris paribus*.

The price elasticity of supply measures the degree of responsiveness of quantity supplied of a good to a given change in its price, *ceteris paribus*.

- State the factors to be discussed.

BODY

1. Main factors that determine the price elasticity of demand for fossil fuel (any 2)

i. Availability of substitutes

Few close substitutes available – biofuel, nuclear energy, solar energy. Alternatives are hard to store and do not lend themselves easily to the diverse ways fossil fuels are used. An increase in the price of fossil fuel would lead to a less than proportionate decrease in quantity demanded, as consumers are less likely to switch to those alternative sources of energy. Hence, the demand for fossil fuel (broadly defined) is price inelastic.

ii. Time period

Since it takes time to find substitutes or change habit and preferences, the price elasticity of demand for fossil fuel might be higher when the time period is longer. Moreover, some consumers might be bound by long-term contracts or cost of switching to alternative fuels might be high (e.g. the need to modify machine/equipment in order to function using alternative fuel – petrol vs. CNG in cars in Singapore). In other words, the demand for fossil fuel tends to be price inelastic in the short run and only price elastic in the long run.

iii. Nature of the good

Fossil fuels such as coal, oil (including gasoline and diesel fuel) and natural gas are natural resources. Burning of fossil fuel powers our vehicles and industries, heats and cools our buildings, and runs appliances. It also produces electricity that we use for all sorts of purposes, such as lights and computers. As such, fossil fuels could be considered as necessities. Hence, the demand for fossil fuel is likely to be price inelastic because even if price were to change, it would lead to a less than

proportionate change in quantity demanded as most consumers can hardly cope with their daily lives without this source of energy.

2. Explain main factors that determine the price elasticity of supply of fossil fuel (any 2)

i. Time period

Fossil fuels are sources of energy that have developed within the earth over millions of years. Because fossil fuels take so long to form, they are considered non-renewable. New sources of supply is dependent on successful exploration and extraction of new deposits. As such, the supply of fossil fuel tends to be price inelastic. An increase in price of fossil fuel would lead to a less than proportionate increase in quantity supplied.

ii. Existence of spare capacity

Price elasticity of supply of fossil fuel also depends on availability of stocks of unsold fossil fuel such as crude oil as well as whether firms have excess capacity. For example, if firms have stocks of unsold crude oil or are not working at full capacity, producers can respond quickly to a rise in price of fossil fuel by using the excess capacity to increase production or readily drawing on their stocks. This increases the price elasticity of supply.

Accept any other relevant factors affecting PED or PES.
Students are expected to draw & use diagrams to explain.

CONCLUSION

- A quick summary of above points.

Level	Knowledge, Application, Understanding and Analysis
L3 (7 – 10)	For an answer that explains the main factors that determine the price elasticity of demand and price elasticity of supply of fossil fuel with aid of diagrams. Points are well-elaborated and contextualised.
L2 (5 – 6)	For an answer that explains the main factors that determine the price elasticity of demand and price elasticity of supply. Attempts to contextualise explanation and points are somewhat elaborated. The lack of diagram might have marred the quality of answers offered.
L1 (1 – 4)	For an answer that contains conceptual errors and some irrelevant points or a generic explanation of the factors without contextualisation.

(b) Discuss the view that governments ought to remove fossil fuel production subsidies. [15]

INTRODUCTION

- Define fossil fuel production subsidy
Fossil fuel production subsidy is a government measure to lower the cost of fossil fuel energy production, raises the price received by energy producers, or lowers the price paid by energy consumers.
- State objective of government subsidy
Given that fossil fuel is widely used as the main source of energy, the purpose of subsidising fossil fuel is to mitigate the rise in cost of living due to rising fuel price.
- The removal of fossil fuel production subsidy by the government has both positive and negative impact on the consumers, producers, and the economy as a whole.

BODY

Thesis: Government ought to remove fossil fuel production subsidies because it will bring about positive effects.

- Removal of fossil fuel subsidies exposes consumers to the true costs of using fossil fuels.

Subsidies \Rightarrow distort the market and mask the true cost of fossil fuel production and consumption. Essentially, fossil fuel subsidies \Rightarrow encourage more production & use of fossil fuels than would otherwise be the case.

Combustion of fossil fuels in power plants, vehicles, machinery and dwellings \Rightarrow leading contributor to global man-made greenhouse-gas emissions. Hence consumption / production of fossil fuel energy presents a case of market failure due to negative externality leading to over-consumption / production \Rightarrow over-allocation of resources \Rightarrow deadweight loss.

Government fossil fuel subsidies \Rightarrow lower MPC \Rightarrow increase over-consumption / production \Rightarrow larger deadweight loss \Rightarrow worsen allocative inefficiency. With the aid of a diagram, explain how this comes about.

Explain removal of fossil fuel subsidies \Rightarrow raises the MPC \Rightarrow as fossil fuels are now more expensive without the subsidies \Rightarrow reduce the over-consumption / production \Rightarrow reduces allocative inefficiency. Moreover, the higher price of fossil fuel e.g. gasoline encourages consumers and energy inefficient firms to find ways to economise on their use of fossil fuels e.g. switch to cheaper substitutes such as bio-fuels or even cut down on car usage altogether. This lowers the amount of greenhouse gases emitted which reduces the negative public health impact, local environmental pollution and climate change impact and costs.

- Removal of fossil fuel subsidies spurs research and development of alternative energy sources
Removal of subsidies might spur research and development in alternative energy sources which are beneficial in the long run in terms of cleaner energy \Rightarrow reduces negative externality by lowering the greenhouse gases released into the environment.

- Long-term sustainability
Slows down rate of depletion of fossil fuels, a non-renewable resource. Boost global effort to mitigate climate change and prevent further damage to human health and the environment.

Fossil fuel subsidies distort costs and prices which affect decisions of many producers and consumers, thereby perpetuating older technologies and energy-intensive modes of production. Increasing the price of fossil fuels through removal of subsidies encourages efforts to tap on technology to be energy efficient.
- High opportunity cost - fossil fuel takes government funds away from other uses
The huge amount of money used for subsidies could instead go to social spending. Subsidisation of merit goods or development of clean energy or other areas important to the well-being of the population. Removal of subsidy might help the government to reduce its budget deficit ⇒ might reduce national debts.
- Inequitable
Subsidies may not just benefit the low income groups. It may even be inequitable given that energy usage is greatest among the high income group who drive big cars and fly in jets. Hence, fossil fuel subsidy might benefit the high income group more than the low income groups.

Hence, there are real gains from removal of fossil fuel subsidies.

Anti-Thesis: Government ought not to remove fossil fuel production subsidies because it would bring about negative effects.

- Inflationary effect
Removal of fuel subsidies ⇒ price of fossil fuels rises ⇒ fall in SRAS as cost of production rises as fossil fuels are key inputs ⇒ might fuel cost-push inflation. Cost-push inflation discourages production and investment ⇒ fall in national income and increase in unemployment. Extent of increase in unemployment depends on the nature of the industries.
- Negative impact rising cost of living
As fossil fuels are regarded as necessity to power vehicles, the removal of fuel subsidies would lead to higher cost of living (e.g. higher transport cost) for countries, especially those where there is a lack of substitutes for fossil fuel.
- Negative impact on firms
Higher fossil fuel prices ⇒ increase cost of production ⇒ reduce profits of firms ⇒ producers who cannot pass on the increased cost to consumers would shut down.

Judgement

Based on the positive and negative effects of removal of fossil fuel subsidies, students make a judgement on whether governments ought to remove fossil fuel production subsidies. Economically sound justification for stand is expected.

Level	Knowledge, Application, Understanding and Analysis
L3 (9 – 11)	<p>For a comprehensive and detailed answer that provides a balanced discussion on whether governments ought to remove fossil fuel production subsidies. Both macroeconomic and microeconomic impact discussed in depth.</p> <p>Only positive and negative microeconomic impact discussed in depth – max low L3.</p>
L2 (6 – 8)	<p>For an answer that provides a balanced but undeveloped discussion on whether governments ought to remove fossil fuel production subsidies. Focus is on positive and negative microeconomic impact.</p>
L1 (1 – 5)	<p>For an answer that is mostly descriptive and with some inaccuracies or one-sided answer focusing on either the positive or negative impact.</p>
E2 (3 – 4)	<p>For a judgement based on economic analysis/adequately substantiated.</p>
E1 (1 – 2)	<p>For an unexplained judgement, or one that is not supported by economic analysis.</p>