

Section A: Case Study Question 1 Japan and The Future of Energy

Suggested Mark Scheme

(a)	(i)	Compare the change in price of crude oil and natural gas between 2009 and 2011.	<mark>[2</mark>]
		Similarity: Both increased from 2009 to 2010. [1m]	
		Difference: While price of crude oil continued to increase thereafter, price of natural gas fell. [1m]	
	(ii)	Using supply and demand analysis, account for the difference above.	[3]
		Use dd-ss analysis	
		Ext 1: "Fukushima nuclear accident leading to a sharp rebound in the demand of conventional oil-based energy in 2010" \rightarrow rise in demand [1m]	
		Ext 1: "turmoils in Middle East" \rightarrow fall in supply [1m]	
		➔ Rise in prices in crude oil	
		Ext 1: "technological enhancement" for natural gas \rightarrow rise in COP \rightarrow rise in supply [1m]	
		➔ fall in prices of natural gas	
		1m for each factor identified and link to dd/ss & price.	
(b)	With boor	reference to Extract 2, explain two demand factors that have led to the ning alternative fuel vehicle market.	[4]
	<u>Cha</u> Ext 2 gas. rise	<u>Change in price of related good</u> Ext 2: "Rising diesel costs last year buying trucks that will run on cheaper natural gas" → relatively cheap natural gas (substitute) → rise in qty dd for natural gas → rise in dd for AFVs that run on natural gas (complements)	
	<u>Cha</u> Ext emis → ris	nge in tastes & preferences 2: "Driving cars that run on alternative fuels like liquefied natural gas can cut asions and reduce dependence on foreign fuels" \rightarrow changing tastes and prefs ase in demand for AFVs	
(c)	Usin lead	g a diagram, explain how the production of conventional oil-based energy s to market failure.	<mark>[5]</mark>
	Cos	t-benefit diagram to analyse inefficient resource allocation (neg ext) in the	



	production of energy (Refer to Ext 1: carbon emissions)	
	Market failure is said to occur when free markets, operating without any government intervention, fail to allocate scarce resources efficiently, in a way that maximises society's welfare.	
	<smb-smc and="" diagram="" externality="" loss="" negative="" showing="" welfare=""></smb-smc>	
	An individual power plant which generates conventional oil-based energy will only take into account its private costs and benefits. In a free market, the equilibrium occurs at <u>Qe where PMB=PMC</u>	
	Its private benefits include revenue from the sale of conventional oil-based energy. Its private costs would be labour costs and costs of running the power plant. However, this plant does not consider the negative externalities that would be generated – e.g. carbon emissions leading to global warming and pollutants resulting in air pollution. The costs of such effects e.g. healthcare costs to third parties (residents staying in the vicinity/ farmers experiencing poor harvests) not involved in the production and consumption are not taken into consideration by the individual plant (EMC).	
	Hence, due to the <u>presence of negative externalities</u> , there exists an EMC in energy production. Social costs of energy production is higher than the private costs (SMC lies above PMC in diagram above) and social equilibrium occurs at Qse where SMB=SMC (assuming no positive externality, PMB=SMB).	
	As the free market level of conventional oil-based energy production is higher than the socially efficient level (Qe>Qse), there is an over-production by the amount (Qse-Qe).	
	This over-production results in an increase in social cost of area ABQeQse while an increase in social benefit of only ACQeQse , hence creating a welfare loss of area ABC .	
	Thus market failure results as there is an over-allocation of resources to production of conventional oil-based energy.	
(d)	If you were the advisor to the Japanese Ministry of Environment, would you recommend that the government adopt the policy of taxation on nuclear plants?	<mark>[8]</mark>
	Recommend taxation on nuclear plants: $\downarrow SS \rightarrow \uparrow P, \downarrow Q \rightarrow \downarrow risk of nuclear power plant accidents (in view of Fukushima disaster)$	
	Besides generating power via nuclear energy, there are alternative energy sources such as hydropower Japan can turn to instead.	



ele	ectric generators incorporate all costs – including taxes – into the price of their	
oro on	oduct (esp. when electricity is price inelastic in demand) \rightarrow put upward prelectric rates, stunt economic development and job growth	ressure
Alte	ernative sources of energy are still undeveloped	
Hyo Pro are	dropower is however a relatively small share of generation pmoting the use of hydropower via subsidies \rightarrow trade-offs in spending or eas (health, education, etc)	n other
nuclear energy emits no carbon dioxide, generating electricity via nuclear energy emits no carbon dioxide, generating electricity via nuclear educes Japan's carbon emissions by about 14 percent per year -2 overcoming market failure from the over-production of conventional energy		
Ext 3: Japan's world's third largest consumer and producer of nuclear power made a great contribution to Japan's energy security by reducing its energy import requirements. Ext. 4: With taxation on nuclear energy and a fall in production Japan has to import other sources of energy (rise in import expd) + utility companies turn to more expensive electricity.		$\frac{1}{1}$
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Year Two H1 Economics 2013

(e)	Discuss the extent of the adverse impact of the Fukushima disaster on Japan's macroeconomic performance in view of the government's effort in rebuilding the economy.	[8]
	Impact on the 4 macro goals:	
	Potential Growth (IAS)	
	Japan to lose considerable physical and human capital $\rightarrow \downarrow$ pdv capacity	
	↓AS ↓Potential Growth	
	Actual Growth (↓AD) ↓C → loss of wealth (destruction of homes) ↓X → semiconductor equipment and materials; automobiles, etc ↑M → increase Japanese demand for oil to 4.5 million barrels a day, at an additional cost of about US\$100 million a day. ↑G → on rebuilding (pledged more than 20tn yen (\$249bn) on reconstruction)	
	$\downarrow AD \rightarrow \downarrow Actual Growth$	
	Impact on employment	
	Fall in employment resulting from the fall in AD	
	The extent of fall in AD, hence actual growth and employment, depends on whether government can stimulate the economy considering the huge amount of debt she is in ("government cannot afford to spend so freely because it is already straining under a debt load which is double the size of the economy")	
	Impact on GPL Higher electricity bills → ↑COP → ↓SRAS "Utilities companies would have to turn to coal, oil and gas-fired power plants to keep industry and households supplied with more expensive electricity" "power shortages could force them to cut production" "additional spectre of higher electricity bills would hit earnings"	
	BUT	
	Downward dd-pull inflationary pressures due to fall in AD	
	Cost-push inflationary pressures may be cushioned by the deficiency in AD.	
	Impact on BOP ↓BOT (imports had contributed to Japan's first trade deficit for more than 30 years last year)	
	Possible \downarrow FA (\downarrow FDI) due to a loss of FDIs	
	Conclusion	
	The Fukushima disaster is most likely to affect the macroeconomic performance of	
L		1



Jap gro anc unc the	ban adversely due to the destruction of resources which limits production with. With government's rebuilding effort, economy may recover more d the extent of the impact could be reduced. However, as government is der a debt loan, she may not afford to spend much on reconstruction prefore may not be able to lift the economy.	on and quickly already on and
L3	For an answer that analyses the impact of the disaster on most macro goals clearly using the AD/AS model, with good consideration of the context given.	
	Answer considered the government's effort in rebuilding the economy, hence lessening the negative impact on the economy.	7-8 m
	With justified conclusion/ evaluation on the extent of the impact – e.g. how government face constraint due to debt	
L2	For an answer that uses AD/AS analysis but with missing details or contains some errors. Answer is mainly theoretical and reference to extract is absent or minimal.	4-6 m
_1	Sketchy answer that just lists or briefly explains the effects of disaster with weak attempt to link to macro goals.	1-3 m