

ECON1101

Student Name

Institution

Code

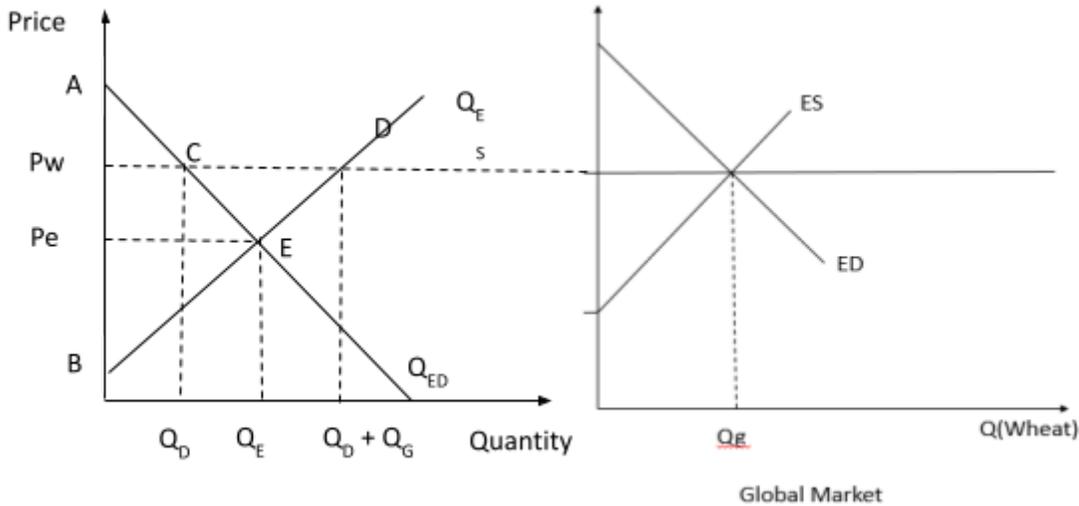
Instructor's Name

Date

Part I

Question One

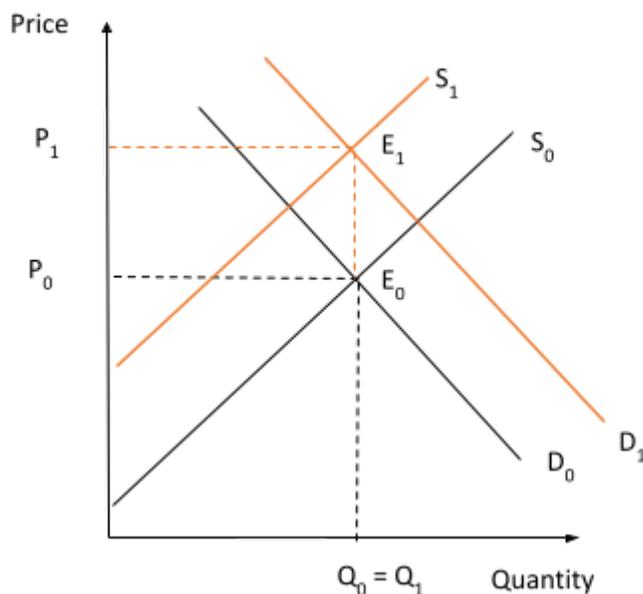
a).



The equilibrium in the wheat market assuming with and without international trade is shown in the graph above. In the absence of trade, the wheat demand (Q_{ed}) and wheat supply (Q_{es}) interact to create an equilibrium at point E where the quantity of wheat demand and supplied are equal. At this point, the price and quantity of wheat demand/supplied are equal to P_e and Q_e . As a wheat exporter, Australia has an advantage in wheat production compared to other countries and the global wheat price is higher than the price in the Australian market in the absence of trade. The wheat price will, therefore, increase to the global price (P_w) as producers are capable of shifting the excess wheat supplied above the domestic demand to the global market. At the new price level (P_w), the total quantity demanded is given as $Q_d + Q_g$ while the quantity demanded domestically is Q_d . The quantity sold in the global market is the difference between the two.

Looking at the welfare implications, the price increase will make food manufacturers and consumers, who demand wheat, worse off while Australian wheat farmers will be better off. In the absence of international trade, Australian wheat consumers enjoyed a surplus equal to the area enclosed by the triangle AEP_e . With global trade, consumer surplus shrinks to AP_wC . The loss in consumer surplus is equal to P_wCEP_e . The extent to which the loss in consumer surplus is absorbed by food manufacturers is dependent on the elasticity of wheat products. If wheat products are highly elastic with small changes in price resulting in disproportionately larger changes in quantity demanded, increasing the prices of wheat products will result in loss of revenue. Thus, the loss in consumer welfare will largely be borne by food manufacturers. Conversely, if the demand schedule is highly inelastic, food manufacturers will transfer a larger portion of the welfare loss to consumers. The benefit to wheat farmers is evident from the increase in producer surplus (PS). In the absence of international trade, PS is given as BP_eE . With international trade, PS is equal to BP_wD . Thus, the portion of lost CS is transferred to producers. Overall, trade improves societal welfare: the increase in welfare in the trade scenario is equivalent to the excess gain in PS above the lost CS given as the area enclosed by the triangle CDE (Barkley, 2019).

b).

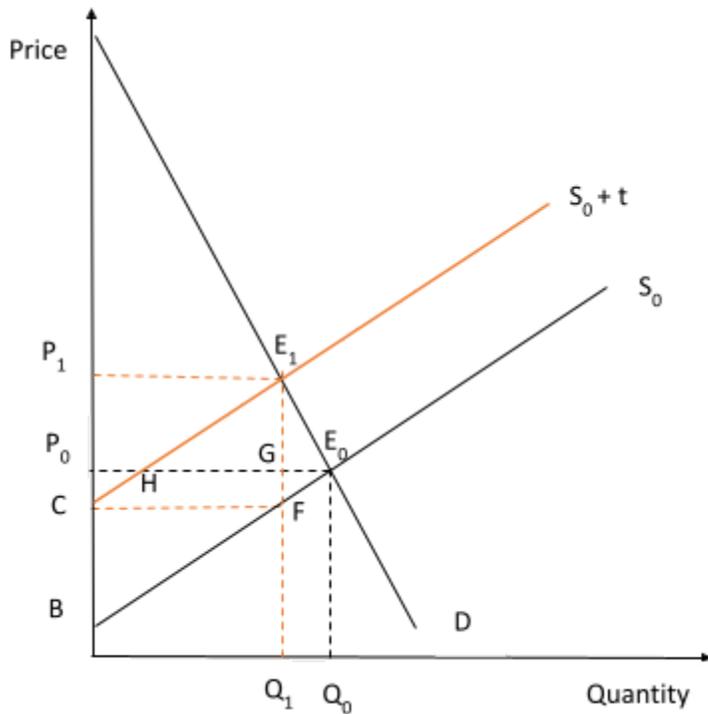


The war in Ukraine has had both demand-side and supply-side effects on the wheat market. On the demand side, anticipation of the war negatively influenced consumer expectations regarding wheat prices. Consumers' expectations of higher prices and shortage of wheat due to supply chain disruptions caused a rightward shift in the demand curve from D_0 to D_1 as individuals hastened present period purchases. The initial demand curve (D_0) given in the graph corresponds to the global demand for Australian wheat. On the supply side, the sanctions placed on Russian products has forced Australian farmers to rely on fertilizers from other countries. The inaccessibility of Russian fertilizer has shrunk the overall supply for fertilizer, thereby increasing fertilizer prices. An increase in the price of a key input results in the leftward shift of the supply curve from S_0 to S_1 as the price of production is higher and suppliers are willing to supply lower quantities of wheat at all price levels. The interaction between S_1 and D_1 creates a new equilibrium point, E_1 , where the quantity of wheat supplied/demanded is equal to initial equilibrium quantity but the price is considerably higher at P_1 .

The increase in the price of wheat, a key component in the production of many food items will have flow-on effects in the wider Australian economy: wheat prices rose by 55% even before the war had started, but now that it is ongoing, the state of the Australian economy is expected to sour (ABC News, 2022). Inflation will increase due to the increase in the price of wheat and other agricultural incomes. Significant increases in the general price level are a source of economic instability that deter economic activity. Furthermore, the increase in production costs and relative unavailability of inputs might cause some wheat producers to exit the market, decreasing the wheat supply further and placing upward pressure on wheat prices.

Answer Two

a).



Other than the usual goods tax levied on consumer goods as a source of government revenue, governments often intervene in a particular market to correct a market failure or to incentivize individuals to change their economic behaviour. In the case of the petrol market, taxes are levied on petrol to incentivize consumers to decrease their use of fossil fuels in response to the worsening climate changes. The effect of taxes on the price and quantity of petroleum demanded and overall societal welfare is presented in the graph above. Petroleum is a necessary good and the quantity demanded is relatively unresponsive to increases in price since households require petrol for travel needs and firms utilize petroleum and its related products in the production process. While the amount of petroleum that is extracted through mining is fairly fixed due to the fixed nature of most mining expenses, the non-perishability of petroleum enables producers to vary their supply of petroleum to the retail market in response to price changes. Thus, the demand for petroleum is relatively inelastic when compared to its supply.

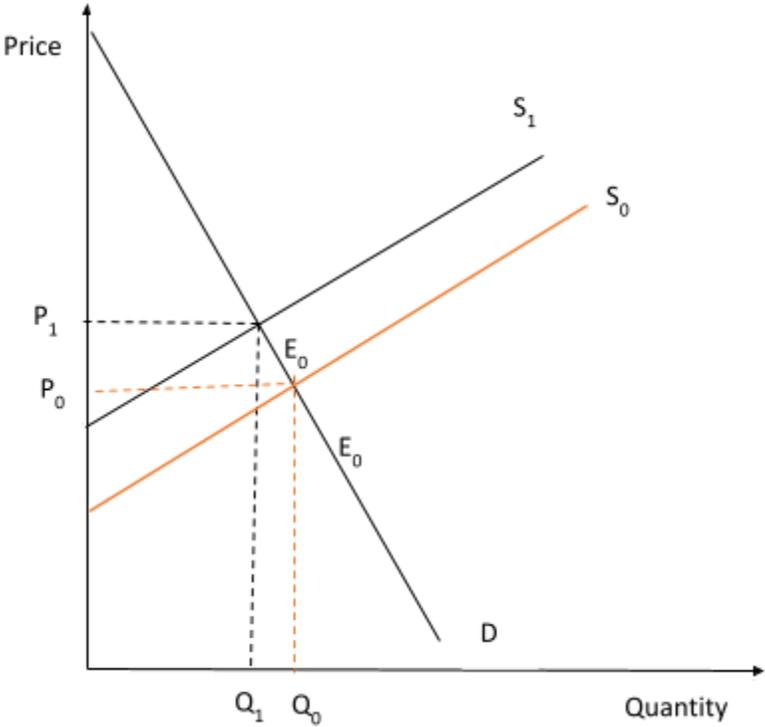
In the absence of the petrol tax, the equilibrium price and quantity of petrol are equal to P_0 and Q_0 . The petrol tax drives a wedge between the price consumers pay and the amount received by suppliers as suppliers transfer the tax to consumers. The price of a litre of petrol in the presence of the petrol tax is equal to the price without tax plus the tax per litre. As a result, the supply curve shifts leftward by an amount equal to t (per unit tax) to reflect the higher prices suppliers require at all quantities. The equilibrium price and quantity are equal to P_1 and Q_1 . The tax causes a decrease in the equilibrium petrol quantity and an increase in the equilibrium price.

Without the tax, consumer surplus would be equivalent to the area of the triangle, AP_0E_0 . The tax causes a decrease in CS, with the new CS given as AP_1E_1 . The loss in CS is given by the area under $P_1E_1E_0P_0$. Producer surplus in the absence of the petrol tax would be equal to BP_0E_0 . The tax causes a decrease in PS to the area of the triangle, CP_1E_1 . The loss in PS is given by the area under CE_1E_0B . Thus, the effect of the tax is to reduce both consumer and producer welfare. The government's tax revenue is equal to the per unit amount of tax (t) multiplied by the equilibrium quantity, and is given by the area of the rectangle, P_1E_1FC . The portion of CS loss given by $P_1E_1GP_0$ is transferred to the government as is the portion of PS loss given by $CHGF$. The reduction in the equilibrium petrol quantity results in the total loss of a portion of the initial consumer and producer surplus given by E_1E_0G and GE_0F , respectively. This loss is referred to as a deadweight loss and represents an overall reduction in societal welfare by an amount equal to E_1FE_0 .

In this scenario, the deadweight loss was largely borne by consumers as evidenced by the larger size of E_1E_0G compared to GE_0F . The higher the price inelasticity of a good, the higher the proportion of total welfare loss borne by consumers. As the tax imposed by the government increases, the equilibrium quantity decreases and the deadweight loss increases. The tax does not

correct a market failure but instead introduces market inefficiencies with both consumers and producers being worse off after the tax. Thus, the petrol tax is reflective of government failure. At the same time, the decrease in petroleum quantity demanded is in line with the government objective of reducing the usage of fossil fuels. If there exist other clean fuel source alternatives whose production costs are prohibitively high, the government can utilize petrol tax revenues to subsidize these sources of fuels, such that the demand and supply both increase and the price decreases. The gain in societal welfare from the subsidies in the clean fuel sector could offset the loss in societal welfare in the fossil fuel sector.

b).



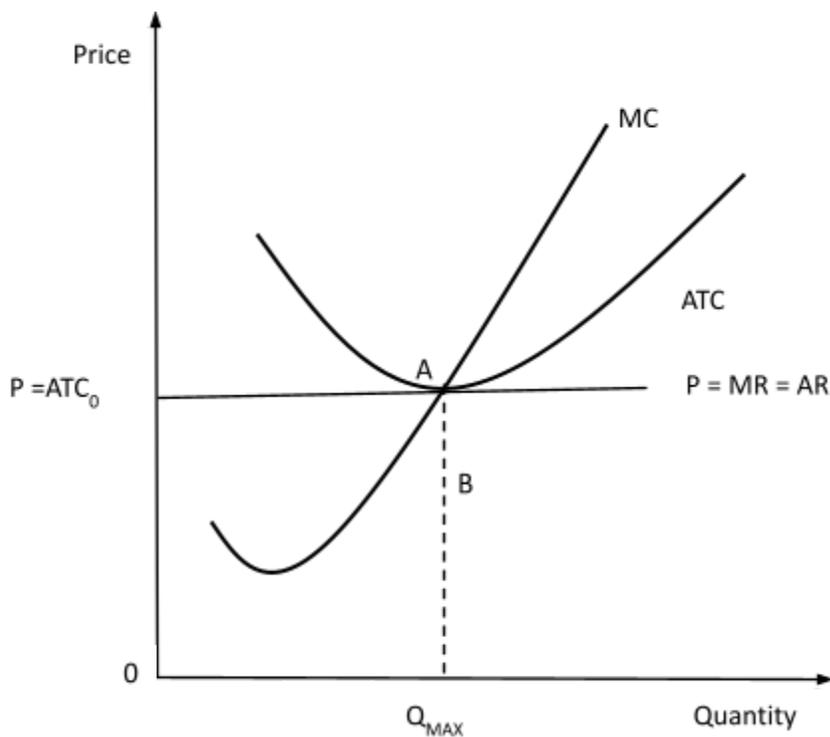
The increase in petrol prices stems from the decrease in petroleum supply as governments imposed sanctions on Russia, a key producer and exporter of fossil fuels. The number of oil producers in the wholesale market has decreased, thereby decreasing the supply of petrol in the

retail market. The initial supply of petrol (S_0) is equal to the supply in the presence of tax as discussed in part a) above. At equilibrium, consumers purchased Q_0 of petrol at a price of P_1 . The Ukraine war has caused a shock in the petrol supply with producers willing to supply lower quantities of petrol at every price in the supply schedule, which corresponds to a leftward shift in the supply curve to S_1 . The new supply schedule interacts with the unchanged demand curve to create an equilibrium at point E_1 where the price, P_1 , is higher than the initial price but the quantity supplied, Q_1 , is lower.

Part II

Question 1

a)

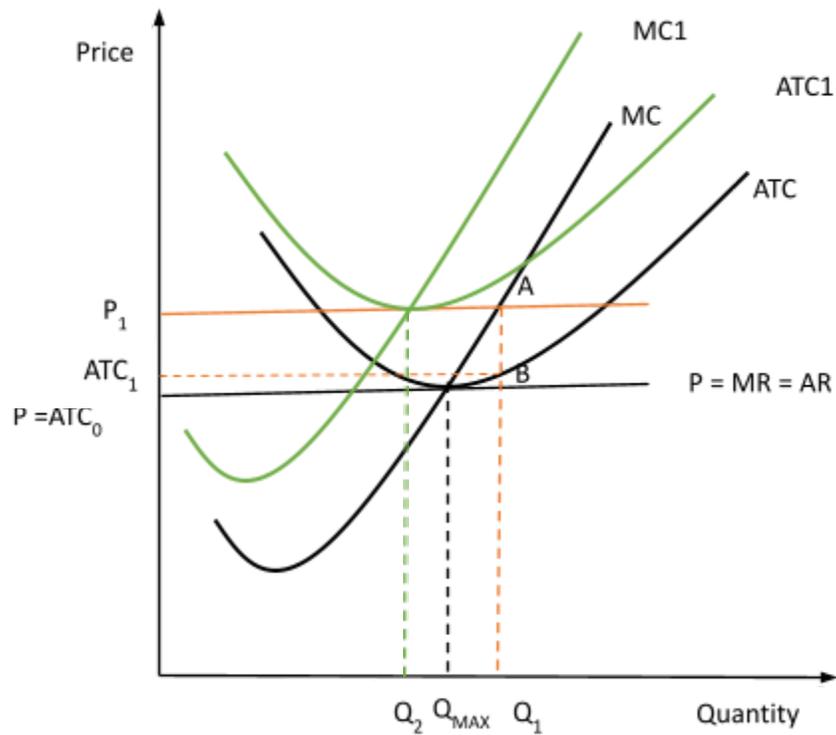


The wheat farming market is characterized by many buyers and many sellers producing undifferentiated products. The market is perfectly competitive and each individual firm has

negligible effect on the market, and acts as a price taker. The marginal revenue is equal to the revenue realized from selling an additional unit, and is, therefore, the price of a unit of wheat. The average revenue, calculated as the total revenue divided by quantity, is also equal to price. Since the firm is a price taker, the marginal revenue/price is constant regardless of the quantity produced ($P = MR = AR$). The marginal cost (MC) curve is downward sloping for a small quantity range until the point of diminishing marginal returns where the marginal cost curve slopes upwards to reflect the incremental costs from producing an additional unit. The average total cost (ATC) curve is U-shaped as the fixed cost per unit decreases as the number of units increases up to a point where the increasing variable production costs due to the diminishing marginal returns exceed the decreasing per unit fixed cost and the ATC slopes upwards. When the average total cost at the profit maximizing quantity is lower than the price, firms will make abnormal profits (profits above the opportunity cost of funds), which will entice other firms to join the market, increasing the quantity produced and pushing prices down until $P = ATC$. Therefore, in the long-run equilibrium the minimum $ATC = P$.

As long as the marginal revenue exceeds the marginal cost, the decision to produce an additional unit will increase the farmer's profits. Therefore, the farmer will increase production up to the point where the marginal cost is equal to the marginal revenue in order to maximize profits. At the profit maximizing quantity, the average total cost is ATC_0 . The revenue from sale of the profit maximizing quantity is equal to the price multiplied by quantity and is equivalent to the area of the rectangle, $PAQ_{MAX}0$. The total cost of production is equal to the average total cost multiplied by the quantity and is equal to $ATC_0BQ_{MAX}0$. The profit is the difference between the revenue and production cost. In the long-run, firms make zero economic profits since $PAQ_{MAX}0 = ATC_0BQ_{MAX}0$

b)



i) In the short-run, an increase in the world price from P to P_1 , will increase the profit maximizing quantity from Q_{MAX} to Q_1 . The average total cost at this level is ATC_1 . Before the increase in farm input prices, farmers would realize an economic profit equal to P_1ABATC_1

ii) The increase in fertilizer prices would increase both the marginal and average total costs. The new ATC and MC schedules are given in green. The increase in MC causes a decrease in the profit maximizing quantity to Q_2 . Assuming that the average total cost increases such that the minimum ATC is equal to MC, firms would realize revenues of P_1Q_2 and zero economic profits
 ad revenue = cost

c) In this instance, we assumed that the increase in fertilizer price was an increase in the variable cost such that the minimum ATC was equal to MC and the market adjusted to its long-run equilibrium with no entry and exit in the farming market. If the world price of wheat remains high, the quantity of wheat produced will be lower and consumers will suffer a loss of welfare, which will be partially transferred to suppliers with the remainder of CS loss being deadweight loss.

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