Diploma Programme
Programme du diplôme
Programa del Diploma

Economics
Higher level
Paper 3

Thursday 27 October 2022 (morning)

1 hour

Candidate session number

Instructions to candidates

- Write your session number in the boxes above.
- You are permitted access to a calculator for this paper.
- Do not open this examination paper until instructed to do so.
- Answer one question.
- Answers must be written within the answer boxes provided.
- Unless otherwise stated in the question, all numerical answers must be given exactly or correct to two decimal places.
- You must show all your working.
- Use fully labelled diagrams where appropriate.
- The maximum mark for this examination paper is **[30 marks]**.

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Please **do not** write on this page.

Answers written on this page
will not be marked.

Answer **one** question. Answers must be written within the answer boxes provided.

1. "Best Meals" is one of many small catering companies, each of which prepares a variety of different meals for airlines in Country X. **Table 1** shows the costs of production in US dollars (US$) on a per hour basis for "Best Meals".

Table 1

Meals prepared per hour	Average cost (US$)	Total cost (US$)	Marginal cost (US$)
14	7.25	101.50	
15			6.50
16	7.19		

(a) (i) Determine the missing cost figures and insert your answers in **Table 1**. [2]

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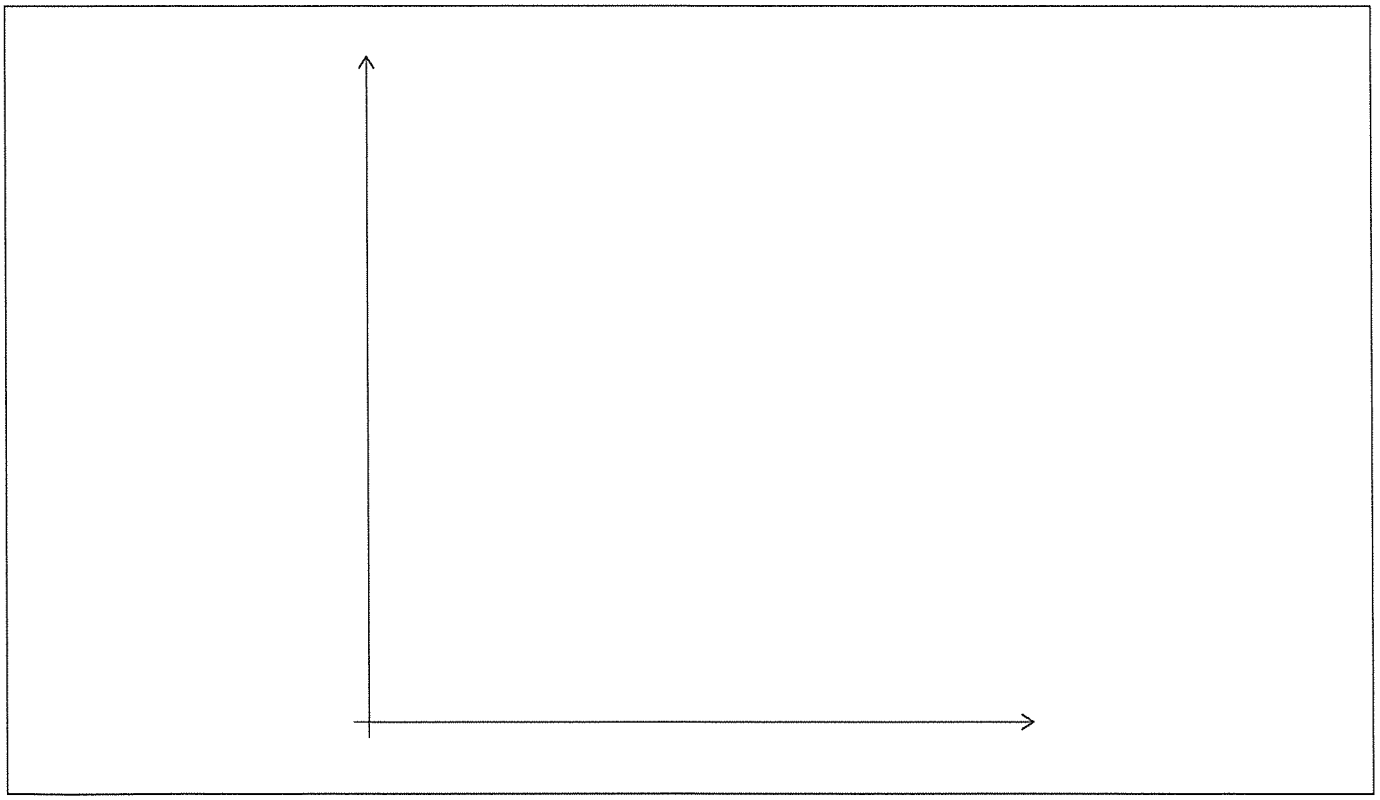
(ii) Assuming that this catering market is in long-run equilibrium, sketch a diagram in which the profit-maximizing level of output for a firm in this market is shown. [2]



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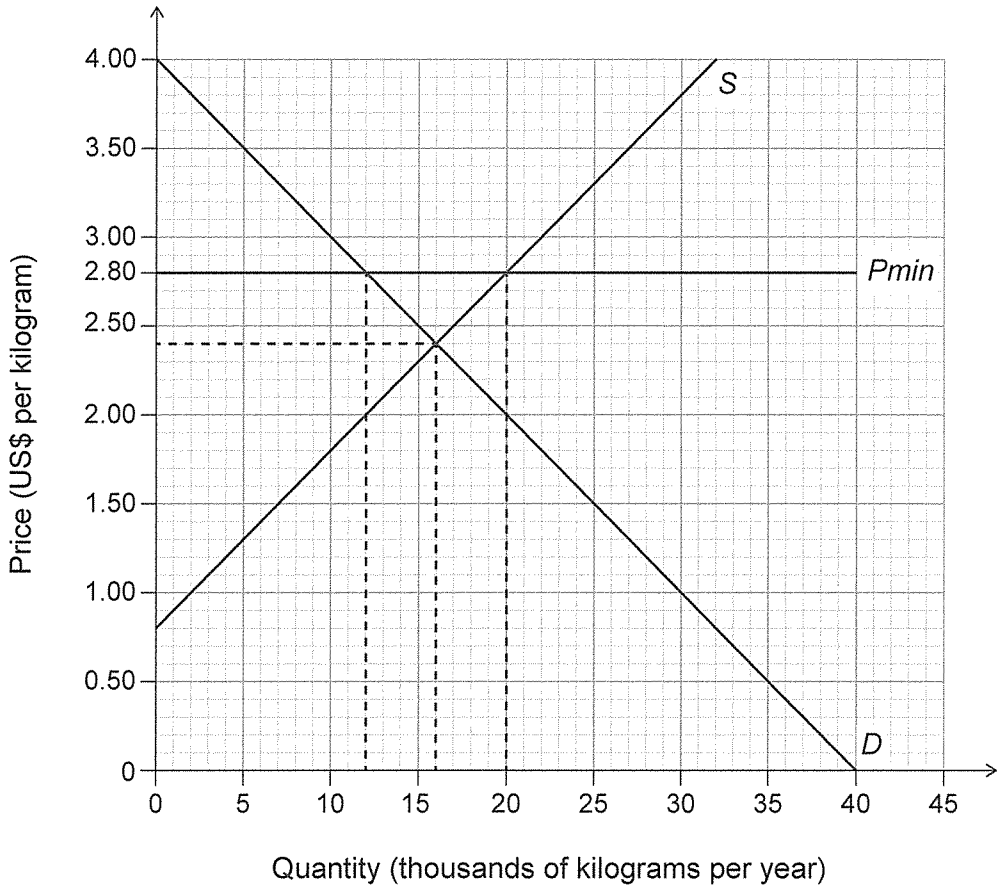
(Question 1 continued)

The catering companies buy tomatoes from the domestic market to prepare their meals. **Figure 1** illustrates the domestic market for tomatoes, which is perfectly competitive. *S* is supply and *D* is demand.

Figure 1



In order to support the incomes of the tomato farmers, the government of Country X has set a price floor (*Pmin*) at US$2.80 per kilogram.

(iii) Using **Figure 1**, calculate the change in the consumer surplus resulting from this government intervention. [2]

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(Question 1 continued)

(iv) With reference to **Figure 1**, explain how the price floor will impact on allocative efficiency in the market for tomatoes. [4]

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(v) Calculate the indirect tax paid by airlines for the catering meals they bought in 2021 if the domestic indirect tax rate on food was 6.5 % and their expenditure on meals was US$54 506.70. [2]

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(Question 1 continued)

The information that follows refers to the aviation industry, which is considered a significant contributor to global warming and climate change.

Table 2: Energy used and carbon dioxide (CO_2) emissions for rail travel and air travel

	Rail travel	Air travel
Energy used (million joule[1] per passenger kilometre[2])	1.387	1.576
CO_2 emissions (kilogram per passenger kilometre)	0.085	0.156

[1] joule: a standard unit of energy
[2] passenger kilometre: one passenger travelling one kilometre

Table 3: Estimates of price elasticities of demand (PED) for leisure and business air travel and estimates of income elasticities of demand (YED) for domestic and international air travel routes

Type of air travel	PED estimates
Leisure travel	–2.28
Business travel	–0.34
Air travel routes	**YED estimates**
Domestic routes	1.1186
International routes	1.546

- The aviation sector creates emissions that account for about 4.9 % of human made global warming and its share of greenhouse gas emissions is rapidly growing.
- A flight from San Francisco to Paris can produce around 1.25 metric tons of carbon emissions per passenger. This is more CO_2 than the average person in certain countries generates in an entire year.
- The energy source for aircraft is not easily substitutable. Road and rail-based passenger vehicles can switch from carbon-based fuels to renewably sourced electricity. Aviation emissions are thus not expected to be easily reduced.
- The aviation industry's growth has also accelerated as a result of subsidies, including general sales tax and fuel tax exemptions, which are unavailable to other modes of transport.

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(Question 1 continued)

(vi) The impact of a 4.5% rise in the price of airline tickets on the quantity of leisure travel demanded has been calculated to be –10.26%. Using the figures in **Table 3**, calculate the impact of the same 4.5% rise in the price of airline tickets on the quantity of business travel demanded. [2]

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The Economist Intelligence Unit is predicting that between 2020 and 2030, global incomes will rise on average by 3% annually.

(vii) Using relevant information from **Table 3**, describe the expected impact this rise in global incomes will have on the demand for domestic routes in relation to the demand for international routes. [2]

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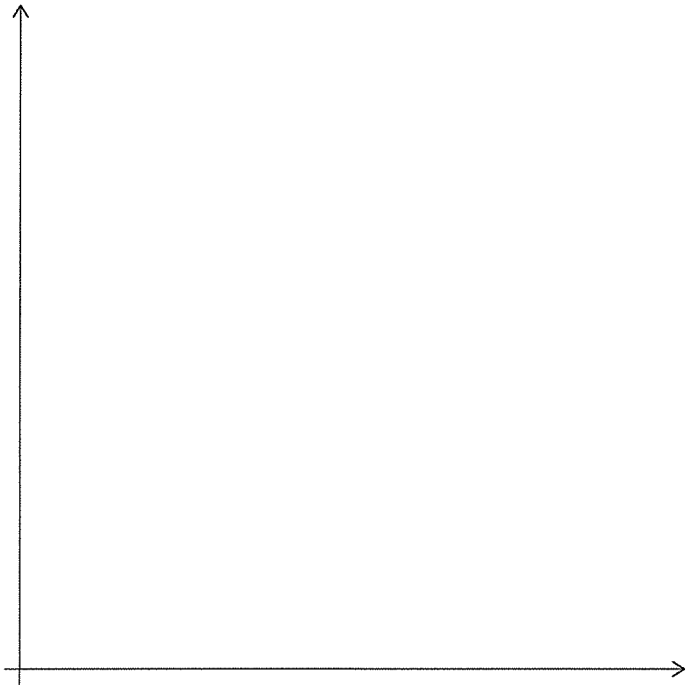
(Question 1 continued)

(viii) The information on **page 6** strongly suggests that the aviation industry is responsible for a significant market failure. Using this information **and** an appropriate diagram, explain the market failure the aviation industry creates. [4]



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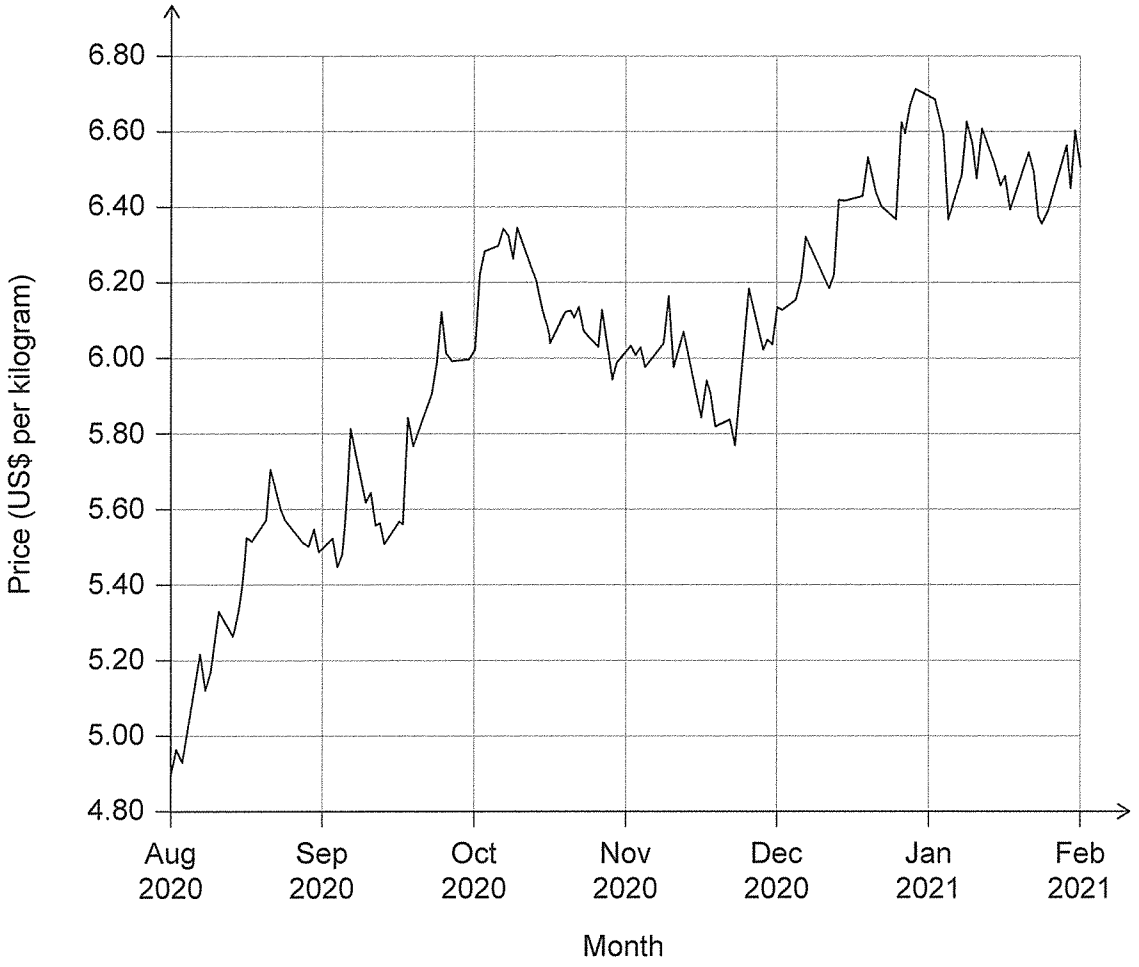
(Question 1 continued)

(b) Using the text/data provided and your knowledge of economics, recommend a policy that may be implemented to reduce the contribution of emissions the aviation industry makes to global warming. [10]

2. **Figure 2** illustrates the daily world price of wheat in US dollars (US$) per kilogram from August 2020 to February 2021.

Figure 2



(a) (i) Describe the information shown in **Figure 2**. [2]

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(Question 2 continued)

On 17 December 2020, Turkey eliminated a 20 % tariff it had imposed on wheat imports from Russia. Russia had recently decided to introduce a tax on its wheat exports. Turkey is the largest flour exporter in the world and Turkish flour exporters buy 85 % of the wheat they need in their production process from Russia.

(ii) Using **Figure 2 and** the information above, explain **two** reasons that may account for Turkey's decision to eliminate the 20 % tariff on wheat imports from Russia. [4]

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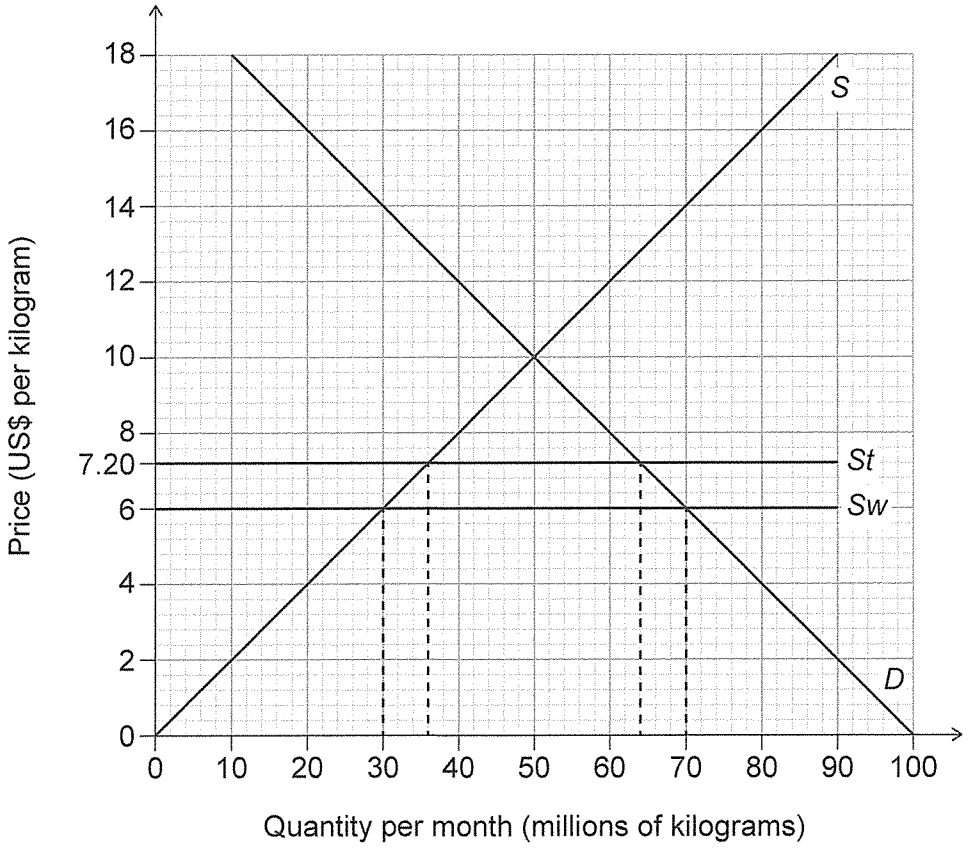
(Question 2 continued)

Figure 3 illustrates the Turkish wheat market. Before the 20% tariff was eliminated, the price for wheat in Turkey was US$7.20 per kilogram. *S* is domestic supply, *D* is domestic demand, *Sw* is world supply and *St* is world supply with the tariff.

Figure 3



(iii) Using **Figure 3**, calculate the change in social/community surplus that resulted from the elimination of the 20% tariff. [2]

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(Question 2 continued)

(iv) The currency of Turkey is the Turkish lira (TL). If TL1.00 = US$0.134, using **Figure 3**, calculate in TL, the change in the monthly total revenues of Turkish wheat producers as a result of the elimination of the 20% tariff. [3]

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Table 4 shows the income tax rates in Turkey for 2020.

Table 4

Annual income (TL)	Marginal income tax rate (%)
0–22 000	15%
22 001–49 000	20%
49 001–180 000	27%
180 001–600 000	35%
600 001+	40%

Beycan resides in Turkey and earns TL955 000 annually.

(v) Using information from **Table 4**, calculate the additional income tax Beycan would pay if the Turkish government decided to increase the marginal tax rate for incomes over TL600 001 to 55%, as it has been in Austria since 2016. [2]

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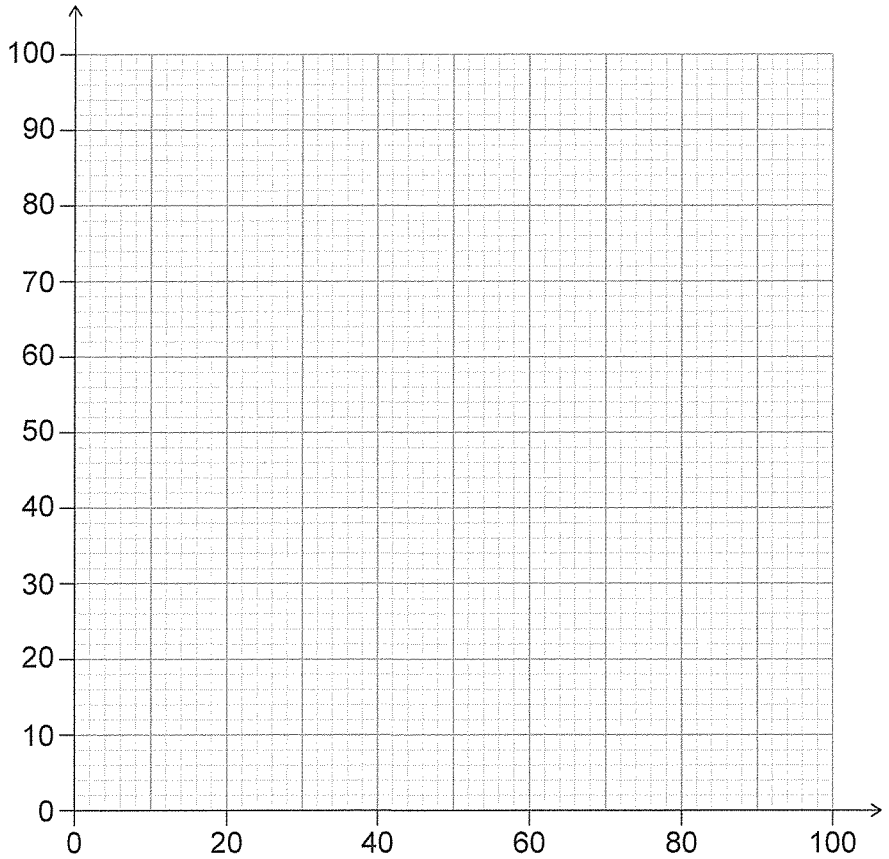
(Question 2 continued)

Table 5 shows the income earned by different quintiles of Turkey's population for 2017.

Table 5

Quintile	% of total income
Lowest 20 %	6.2
Second 20 %	10.8
Third 20 %	14.8
Fourth 20 %	20.6
Highest 20 %	47.6

(vi) Using the income distribution information in **Table 5**, construct a fully labelled Lorenz curve diagram for Turkey in 2017. [2]



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(Question 2 continued)

Table 6 shows selected tax revenue sources and the Gini coefficient for Turkey, Austria, Germany and the OECD average.

Table 6

	Selected sources of tax revenue (as a percentage of total tax revenues)			Gini coefficient
	Personal income tax	Corporate income tax	Indirect taxes	
Turkey[1]	15.4%	8.7%	40.5%	0.40
Austria[1]	22.6%	6.4%	28%	0.28
Germany[2]	27.4%	5.2%	27%	0.29
OECD average[2]	23.9%	9.5%	32.1%	0.32

[1] 2018 data
[2] 2019 data

(vii) Using the data in **Table 6**, explain why a greater reliance on indirect taxes compared to income taxes for revenue collection is often associated with a higher Gini coefficient value. [4]

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(Question 2 continued)

The following information was published in the United Nations Development Programme 2016 Regional Human Development Report: "Inequalities in Turkey: An Overview":

- The Human Development Report reported that Turkey's gross national income (GNI) per capita ranks at 50, while its standard Human Development Index (HDI) rank is lower at 62.
- Turkey's Inequality-adjusted Human Development Index (IHDI) score is almost 16 % lower than its standard HDI score.
- The share of public expenditure on education is 2.9 % of gross domestic product (GDP) in Turkey, while the average share of public expenditure on education is 4.9 % of GDP among other high human development countries. Even among low human development countries, the average share is 3.6 %.

(viii) Identify **one** reason for the difference between Turkey's GNI per capita ranking and its HDI ranking. [1]

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(Question 2 continued)

(b) Using the text/data provided and your knowledge of economics, recommend a policy that the government of Turkey could introduce to reduce income inequality. [10]

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References:

1. De Bruyckere, L., and Abbasov, F., 2016. *Aviation ETS – gaining altitude - An analysis of the aviation EU ETS 2013-2015* [online] Available at: <https://www.transportenvironment.org/sites/te/files/2016_09_Aviation_ETS_gaining_altitude.pdf> [Accessed 29 September 2021] SOURCE ADAPTED.

Brajcich, K., 2020. *What are Carbon Offsets and How Do They Work?* [online] Available at: <https://sustainabletravel.org/how-carbon-offsets-work/> [Accessed 29 September 2021] SOURCE ADAPTED.

The Economist Intelligence Unit, 2015. *Long-term macroeconomic forecasts - Key trends to 2050* [online] Available at: <https://espas.secure.europarl.europa.eu/orbis/sites/default/files/generated/document/en/Long-termMacroeconomicForecasts_KeyTrends.pdf> [Accessed 29 September 2021] SOURCE ADAPTED.

Zeng, Youzhi & Ran, Bin & Zhang, Ning & Yang, Xiaobao, 2021. Estimating the Price Elasticity of Train Travel Demand and Its Variation Rules and Application in Energy Used and CO2 Emissions. *Sustainability*. 13(2), 475.

Mumbower, S., Garrow, L., Higgins, M., 2014. Estimating flight-level price elasticities using online airline data: A first step toward integrating pricing, demand, and revenue optimization, *Transportation Research Part A: Policy and Practice*. 66, pp.196–212.

Table 2 U.S. Department of Energy, U.S. Department of Transportation and U.S. Environmental Protection Agency, n.d.

Table 3 Granados, N., Kauffman, R., Gupta, A., 2012. Online and Offline Demand and Price Elasticities: Evidence from the Air Travel Industry. *Information Systems Research*. 23.

2. Destek, M., Sinha, A., Sarkodie, S., 2020. *The relationship between financial development and income inequality in Turkey* [online] Available at: <https://journalofeconomicstructures.springeropen.com/articles/10.1186/s40008-020-0187-6> [Accessed 29 September 2021] SOURCE ADAPTED.

Macrotrends, n.d. *Wheat Prices - 40 Year Historical Chart* [online] Available at: <https://www.macrotrends.net/2534/wheat-prices-historical-chart-data#:~:text=The%20price%20shown%20is%20in,2021%20is%20%246.5075%20per%20bushel> [Accessed 29 September 2021] SOURCE ADAPTED.

Hürriyet Daily News, 2020. *Turkey extends zero-tariffs on wheat imports to April* [online] Available at: <https://www.hurriyetdailynews.com/turkey-extends-zero-tariffs-on-wheat-imports-to-april-160933> [Accessed 29 September 2021] SOURCE ADAPTED.

PricewaterhouseCoopers, n.d. *Austria: Individual - Taxes on personal income* [online] Available at: <https://taxsummaries.pwc.com/austria/individual/taxes-on-personal-income> [Accessed 29 September 2021] SOURCE ADAPTED.

Buğra, A., Yılmaz, V., Birelma, A., Gürsoy, B., Taşkın, Y., Dodurka, Z., Ekim Akkan, B., Göçmen, I., 2016. *The CASE STUDY on: Income and Social Inequalities in Turkey* [online] Available at: <https://www.tr.undp.org/content/turkey/en/home/library/human_development/socialinequalities.html> [Accessed 29 September 2021] SOURCE ADAPTED.

Table 4 Crowe, 2020. *Practical Tax Turkey 2020* [online] Available at: <https://www.bcct.org.tr/wp-content/uploads/202011-Crowe-Practical-Tax-Summary-November2020.pdf> [Accessed 29 September 2021] SOURCE ADAPTED.

Table 5 Kayikci, H., 2019. Course of Income Inequality in Turkey. *Theoretical Economics Letters*, 9, 2085–2092.

Table 6 Enache, C., 2020. *Sources of Government Revenue in the OECD, 2020* [online] Available at: <https://taxfoundation.org/sources-of-government-revenue-in-the-oecd-2020/> [Accessed 29 September 2021] SOURCE ADAPTED.

Tax Foundation, n.d. *Taxes in Turkey* [online] Available at: <https://taxfoundation.org/country/turkey/#:~:text=Individual%20Taxation%20in%20Turkey&text=These%20taxes%20are%20typically%20progressive,addition%2C%20countries%20have%20payroll%20taxes> [Accessed 29 September 2021] SOURCE ADAPTED.

Tax Foundation, n.d. *Taxes in Austria* [online] Available at: <https://taxfoundation.org/country/austria> [Accessed 29 September 2021] SOURCE ADAPTED.

Tax Foundation, n.d. *Taxes in Germany* [online] Available at: <https://taxfoundation.org/country/germany/#:~:text=Sources%20of%20Revenue%20in%20Germany,and%20services%2C%20and%20property%20taxes> [Accessed 29 September 2021] SOURCE ADAPTED.

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