# GCE AS/A LEVEL

2520U20-1

S23-2520U20-1

**MONDAY, 22 MAY 2023 – MORNING**

# ECONOMICS – AS unit 2
## Economics in Action

2 hours

2520U201
01

### ADDITIONAL MATERIALS

In addition to this examination paper, you will need:

- a calculator;
- a WJEC pink 16-page answer booklet.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

You may use a pencil for graphs and diagrams only.

Answer **all** questions.

Write your answers in the separate answer booklet provided.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question.

You are reminded of the necessity for good English and orderly presentation in your answers.

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Answer **all** questions.

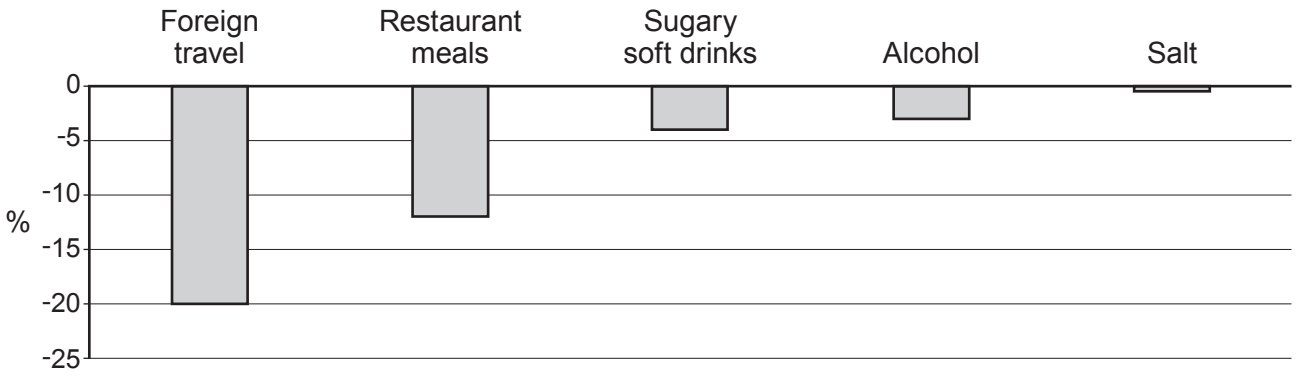
## 1. SIN CITY

Many governments use indirect taxes to discourage people from consuming goods that result in negative externalities, such as alcohol. These are sometimes called sin taxes. In recent years, some politicians have also turned their attention to sugar.

Obesity is on the rise across the world. For example, 40% of people in the US today are obese, up from around 15% in 1980. A number of cities in the USA such as Philadelphia have introduced taxes on sugary soft drinks in order to try to reduce the growing obesity crisis. The hope is that these taxes will both raise revenue and reduce how much sugar people consume. But do sin taxes even work?

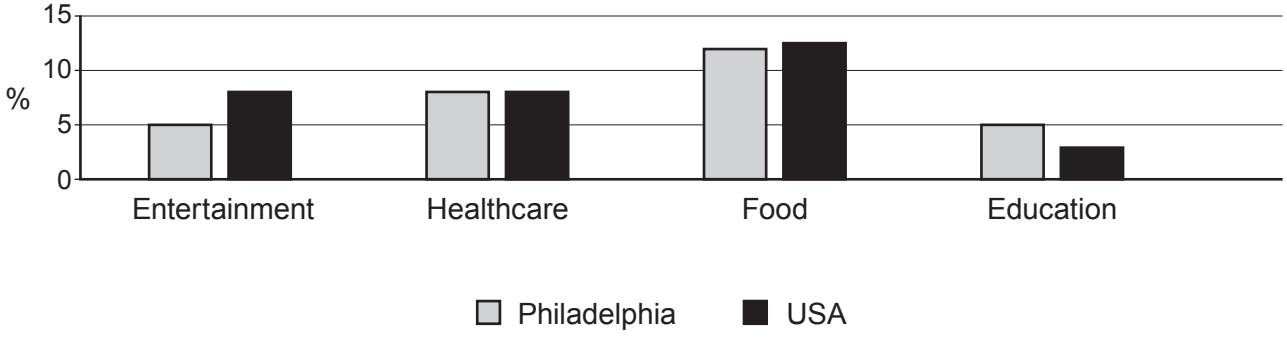
Several academic studies have tried to calculate the responsiveness of demand for various goods to a 5% increase in price. The results of those studies are shown in **Figure 1**.

**Figure 1:** US estimated % change in sales associated with a 5% increase in price




Philadelphia is a large city situated on the east coast of the USA. It is the sixth most populous city with 6.2 million people living in the metropolitan area and it has an estimated GDP of $432 billion. Philadelphia's three largest industries are financial services, healthcare and biotechnology so it is not surprising that its GDP per capita is much higher than the overall US GDP per capita of $57 467.

**Figure 2:** Percentage of average household expenditure spent on selected categories of goods and services: Philadelphia compared with the USA as a whole




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In the USA, cities are able to set their own tax rates. Philadelphia has recently introduced new taxes on alcohol and sugary soft drinks. These are shown below in **Table 1**.

**Table 1**

| Alcohol tax | Sugary soft drinks tax |
|---|---|
| 10% of the sale price | $0.015 per fluid ounce (there are 12 fluid ounces in a regular can of soft drink) |

(a) Using the data in **Figure 1**, calculate the estimated price elasticity of demand (PED) for the following goods **and** state whether they have price elastic or price inelastic demand.

(i) Foreign travel [2]

(ii) Sugary soft drinks [2]

(b) (i) Using the data, calculate Philadelphia's GDP per capita. Give your answer to the nearest whole number. [1]

(ii) With reference to the data, outline why entertainment could be considered an inferior good. [3]

(c) To what extent does the consumption of alcohol **and** sugary soft drinks result in negative externalities? [10]

(d) (i) Identify **one** ad valorem tax from the data and draw a diagram to illustrate its effect on the market supply curve. [2]

(ii) Using a mathematical example, discuss whether indirect taxes are always regressive. [10]

(e) Consider whether the imposition of an indirect tax on sugary soft drinks raises revenue for the government **and** reduces the amount of sugar that people consume in Philadelphia. Use an appropriate diagram in your answer. [10]



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## 2. THE WELSH ECONOMY

### 1 The construction industry in Wales

Welsh Gross Domestic Product (GDP) increased by 0.4% in the second quarter of 2019. Over these three months, the agriculture and services sectors grew by 3.8% and 2.0% respectively, while the construction sector's output fell by 6.7%. The Construction Industry Training Board (CITB) had previously estimated that the construction sector would achieve an average annual growth rate of 4.6% in Wales during the years 2019 to 2024. This was because at the time of the forecast, interest rates were low, banks were lending and there was a clear need for housing. However, the Managing Director of a house-building company based in Denbighshire did say: "The problem we have is just getting enough supply of land. If we can't get more land, we can't grow further."

Approximately 8% of the Welsh workforce are employed in construction in a large variety of jobs that offer very different incomes:

**Table 1:** Annual income ranges for selected jobs in the construction industry

| Job | Income range (£) |
|---|---|
| Labourer | 13 000–26 000 |
| Carpenter | 17 000–28 000 |
| Plumber | 18 000–34 000 |
| Architect | 18 000–50 000 + |
| Building Surveyor | 21 000–60 000 + |
| Civil Engineer | 23 000–50 000 + |

### Welsh exports

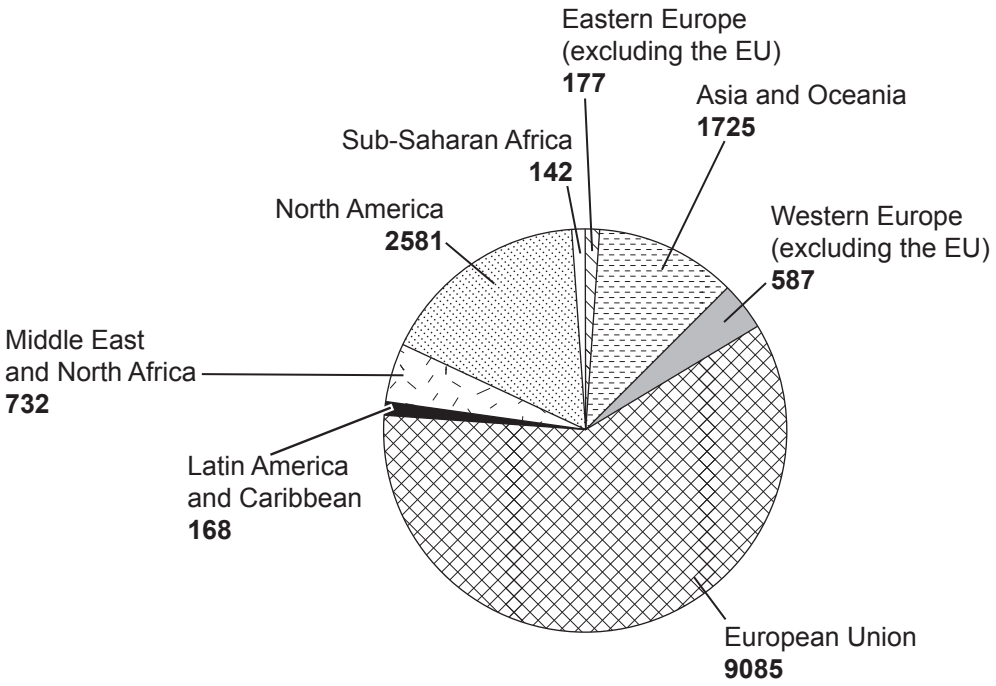
The value of exports for Wales in 2021 was £15.2 billion, up 12.4% compared with the previous year. Germany continued to be Wales' top export destination, while exports to the USA were up 22.3% compared with the previous year, and exports to the Republic of Ireland – worth £1.7 billion – had risen by 45.3%.

To some extent, this was as a result of the pound having lost around 10% of its value against the euro and US dollar since the UK voted to leave the EU in 2016.

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**Figure 1:** Destination of exports from Wales, £ million, 2021




20 **Other economic indicators**

The annual Consumer Price Index (CPI) inflation rate for the UK was 5.4% in December 2021, having climbed sharply from a figure of 0.6% in December 2020. The unemployment rate in Wales was 3.1% for the three months to December 2021. This was 0.7 percentage points down on the previous quarter and 1.4 percentage points down on the previous year. Overall,
25 Wales had a trade deficit of £0.9 billion in 2021.

(a) (i) Define the term **Gross Domestic Product (GDP) growth**. [2]

(ii) The data states that the construction sector is likely to 'achieve an average annual growth rate of 4.6% in Wales during the years 2019 to 2024' (lines 5–6). Evaluate the factors that could have caused high growth in this industry. [6]

(iii) Discuss the likely causes of wage differentials between construction sector jobs in Wales as shown in **Table 1**. [8]

(b) (i) With reference to **Figure 1**, calculate the percentage of total exports from Wales that went to the European Union over the period shown. Give your answer to two decimal places. [2]

(ii) Evaluate the likely effects of 'the pound having lost around 10% of its value against the euro and US dollar since the UK voted to leave the EU in 2016' (lines 18–19) on Welsh households **and** firms. [10]

(iii) To what extent might an improvement in Wales' trade balance contribute to the attainment of other government economic policy objectives? [12]

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| Surname | StemUp Model Solution |
|---|---|
| Answer booklet | Write the question number in the left-hand margin at the start of each answer. |

Question number

1 (a) (i) PED = %ΔQd ÷ %ΔP = −20% ÷ 5% = −4. Demand for foreign travel is price elastic (PED > 1 in absolute value).

1 (a) (ii) PED = −4% ÷ 5% = −0.8. Demand for sugary soft drinks is price inelastic (PED < 1 in absolute value).

1 (b) (i) GDP per capita = $432 000 000 000 ÷ 6 200 000 = $69 677 (to the nearest whole number).

1 (b) (ii) An inferior good has a negative income elasticity of demand (YED < 0): as income rises, demand for it falls, as consumers switch to better alternatives. Philadelphia's GDP per capita ($69 677) is higher than the US average ($57 467), yet Figure 2 shows Philadelphians spend only about 5% of household expenditure on entertainment compared with about 8% for the USA as a whole, so higher income is linked with lower spending on entertainment.

1 (c) A negative externality is a cost imposed on a third party, someone who is neither the buyer nor the seller, that is not reflected in the market price. Social cost = private cost + external cost. Consumers of alcohol and sugary soft drinks consider only their private costs (the price and the harm to their own health) and ignore external costs, so marginal social benefit is below marginal private benefit and both goods are over-consumed.
Alcohol creates large external costs. Heavy drinking causes liver disease and illness, which must be treated in hospitals funded by third-party taxpayers, who may face higher tax rates as a result. It causes absenteeism at work,

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lowering firms' output and profits, and drink-driving accidents. Alcohol is also linked to violent crime, domestic abuse and vandalism, which impose direct costs on victims through medical bills, lost earnings and repairing damaged property, as well as police costs.

Sugary soft drinks contribute to obesity, which in the US has risen from around 15% of people in 1980 to 40% today. Obesity causes type 2 diabetes, heart disease and tooth decay. In the USA much of this is paid for through Medicare, Medicaid and higher health insurance premiums for everyone, so taxpayers and other policyholders bear the cost. Obese workers may also take more sick days, lowering productivity, which is why cities such as Philadelphia now tax these drinks.

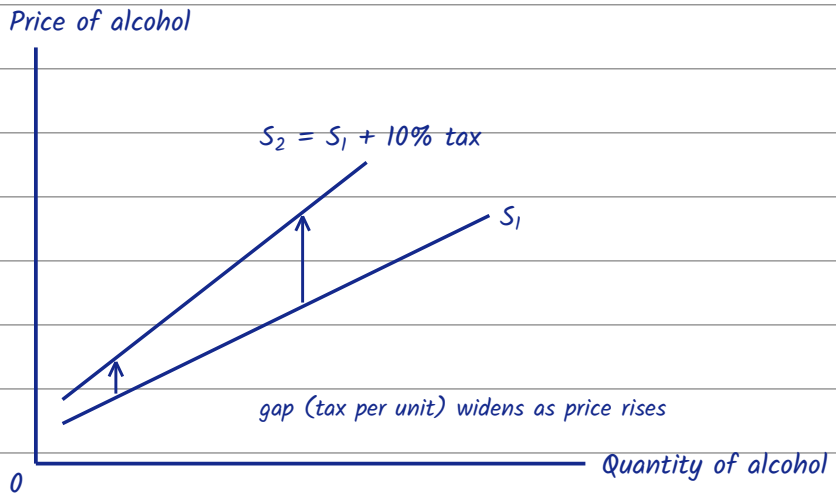
However, the extent varies. Most of the damage from both goods falls on the consumer themselves, which is a private cost, not an externality. Not everyone who consumes them suffers these illnesses: moderate drinkers and people who have the occasional can of cola gain utility and impose no cost on third parties at all. The external costs of sugary drinks are also smaller and less direct than those of alcohol, since a can of cola does not cause crime or road accidents, and obesity has many other causes such as diet and lack of exercise. In the USA much healthcare is paid for by private insurance, so the cost to taxpayers is smaller than in the UK. The costs may also be overstated: people pay taxes anyway and most never notice where they go unless directly affected. Finally, sin taxes like Philadelphia's internalise part of the externality, as the revenue can pay for the health costs.

Overall, alcohol clearly results in significant negative externalities, especially when consumed heavily, while for sugary soft drinks the externalities are real but smaller and depend on how much is consumed, so taxing heavy consumption matters most.

1 (d) (i) The alcohol tax (10% of the sale price) is an ad valorem tax. It shifts supply up and to the left, with the curves diverging because the tax per unit rises as

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the price rises:




1 (d) (ii) An indirect tax is a tax on spending on goods and services, such as VAT or Philadelphia's sugary drinks tax, paid by the consumer through the price. A regressive tax is one where, as income rises, a smaller proportion of income is paid in tax.

Indirect taxes tend to be regressive because people with different incomes buy similar quantities of many goods, so they pay the same amount of tax, which is a larger share of a low income. For example, the soft drinks tax is 12 × $0.015 = $0.18 per can. Suppose Household A earns $20 000 a year and Household B earns $80 000, and both buy 400 cans a year. Each pays 400 × $0.18 = $72 tax: 72 ÷ 20 000 × 100 = 0.36% of A's income but 72 ÷ 80 000 × 100 = 0.09% of B's income. The tax is regressive.

The same applies to VAT at 20%. Rachel earns £60 000 and spends £30 000, so pays £6 000 VAT, 10% of her income. Rebecca earns £20 000 and spends £16 000, so pays £3 200 VAT, 16% of her income. Low-income households spend a larger share of their income (higher average propensity to consume), so they pay a larger share in indirect tax.

However, indirect taxes are not always regressive. If a tax falls only on goods consumed mainly by the rich, a luxury tax on foreign travel, yachts or first-class flights, poor households pay little or none, so it can be progressive.

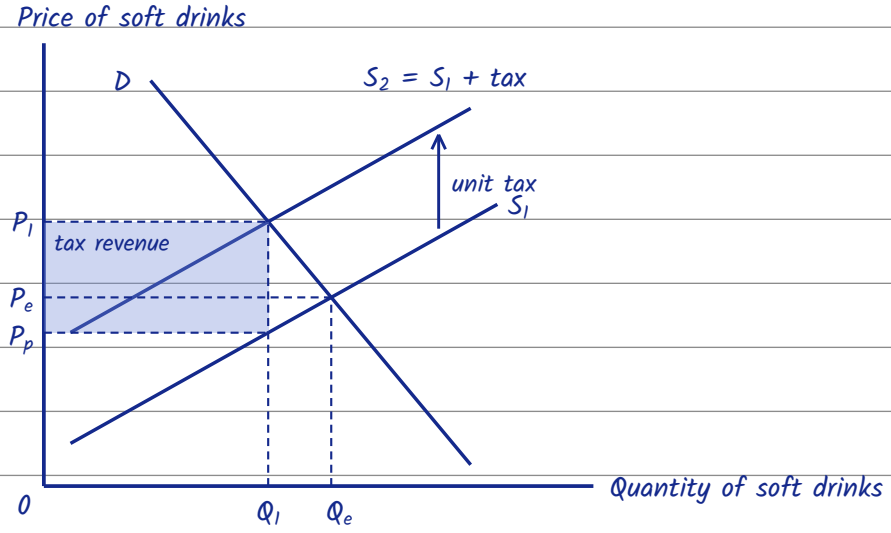
Ad valorem taxes like the 10% alcohol tax mean that people who buy

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expensive wine pay more tax per bottle, reducing the regressive effect. Necessities such as food and children's clothing are zero-rated for VAT in the UK, so the poor pay less. In theory, indirect taxes could even be set at different rates for different income groups. If the tax revenue is spent on benefits or healthcare for low-income groups, the overall effect on the income distribution may be progressive, and the poor, who are more likely to be obese, may gain most from better health.

Overall, most indirect taxes on goods everyone buys, such as sugary drinks and alcohol, are regressive, but it depends on which goods are taxed, exemptions and how the revenue is used, so they are not always regressive.

1 (e) Philadelphia's sugary drinks tax is a specific (unit) tax of \$0.015 per fluid ounce, or 12 × 0.015 = \$0.18 per 12 oz can. It raises firms' costs, so supply shifts upwards in parallel from $S_1$ to $S_2$, by the amount of the tax. As the diagram shows, price rises from $P_e$ to $P_1$ and quantity falls from $Q_e$ to $Q_1$, so fewer drinks are sold and less sugar is consumed. The government receives tax revenue equal to the unit tax × $Q_1$, the shaded rectangle $P_1$ to $P_p$.




On revenue, the tax should be successful. Figure 1 shows a 5% price rise reduces sales by only 4%, so PED = −0.8: demand is price inelastic, so quantity falls by a smaller proportion than price rises and most sales continue, giving a large tax base. In a city of 6.2 million people, even \$0.18 per can on

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millions of cans raises substantial revenue, and because demand is inelastic most of the burden falls on consumers.

On sugar consumption, the tax is less successful for the same reason. With PED of −0.8, quantity demanded falls only slightly. Philadelphia is a rich city with GDP per capita of $69 677, well above the US average of $57 467, so soft drinks are a very small proportion of income and a price rise of about 18 cents a can will barely be noticed. Drinks are habit-forming, which makes demand more inelastic. Consumers may also cross the city boundary to buy untaxed drinks in neighbouring areas, or switch to other sugary foods such as sweets and juice, so total sugar intake may not fall.

This shows a trade-off: the more inelastic demand is, the more revenue but the smaller the fall in consumption. If the tax rate was raised to cut consumption, the Laffer curve suggests revenue could eventually fall, and shopping outside the city or a black market would reduce revenue further.

However, producers may respond by reformulating drinks with less sugar or artificial sweeteners to avoid the tax, as in the UK after the 2018 sugar levy. This would cut sugar intake sharply even if revenue is lower. In the long run demand may become more elastic as people find substitutes and attitudes change, and the revenue could fund health education, adding to the fall in consumption. If the tax causes a net welfare loss for low-income consumers, it may be a government failure.

Overall, the tax is likely to raise revenue for Philadelphia because demand is price inelastic, but on its own it will only reduce sugar consumption slightly, unless the tax leads firms to reformulate their drinks or is combined with other policies.

2 (a) (i) GDP growth is the increase in the total value of goods and services produced in an economy over a period of time, usually measured as the % change in real GDP per year (Welsh GDP grew by 0.4% in Q2 2019).

| Question number | |
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| 2 (a) (ii) | The CITB forecast growth because at the time interest rates were low (line 7). Low interest rates on mortgages make borrowing to buy a house cheaper, so more people, especially first-time buyers, can afford to buy or trade up, increasing demand for new homes. Banks were lending (line 7), so mortgages were available. There was 'a clear need for housing' (line 8), due to population growth, more people living alone and more split families. As the derived demand for new houses rises, construction firms increase output. Government plans to build more social housing would add further demand.<br>However, growth may be constrained on the supply side. The Denbighshire house-builder said 'If we can't get more land, we can't grow further' (lines 9 to 10), and planning regulations slow building. The forecast may also be wrong: construction output actually fell 6.7% in Q2 2019 (line 4), COVID-19 lockdowns stopped building in 2020, and rising interest rates and Brexit uncertainty reduce demand. Growth will also be uneven, concentrated in prosperous urban areas. Overall, demand factors support growth, but shortage of land means 4.6% a year is optimistic. |
| 2 (a) (iii) | Wage differentials are differences in wages between workers with different skills in the same industry, or similar workers in different industries. Table 1 shows labourers earn £13 000 to £26 000, while building surveyors earn £21 000 to over £60 000.<br>Wages are set by the demand for and supply of labour. Architects need a degree and years of training, so the supply of architects is low and inelastic, whereas few qualifications are needed to be a labourer, so supply is high, pushing labourers' wages down. Net inward migration, for example of EU labourers, carpenters and plumbers, has increased the supply of these workers further. On the demand side, labour is a derived demand: architects, surveyors and civil engineers have higher marginal productivity and add more value, so firms demand them more. Labourers can more easily be replaced by capital |

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|---|---|
| | such as diggers, reducing demand for them, while surveyors cannot be. Differences in trade union strength also matter. However, the ranges overlap: a highly paid labourer (£26 000) can earn more than a newly qualified architect (£18 000), so differences within occupations, due to experience and seniority, may matter as much as between them. Non-monetary factors matter too: labouring is physical, dirty and often seasonal, which should reduce supply and narrow the differential, and the National Minimum Wage raises the floor for the lowest paid. Overall, differences in skills and qualifications, affecting both supply and productivity, are the main cause. |
| 2 (b) (i) | Total exports = 177 + 1725 + 587 + 9085 + 168 + 732 + 2581 + 142 = £15 197m. EU share = 9085 ÷ 15 197 × 100 = 59.78%. |
| 2 (b) (ii) | A depreciation is a fall in the value of the pound against other currencies in a floating exchange rate system. A 10% fall means exports from Wales become cheaper in euros and dollars, and imports into Wales become more expensive in pounds. Households: imported goods from the eurozone and USA, such as food, cars and fuel, cost more. This causes imported and cost-push inflation, lowering real incomes and the standard of living; CPI inflation rose from 0.6% in December 2020 to 5.4% in December 2021 (lines 21 to 22). Holidays in Spain, France or the USA become more expensive, so households may holiday in Wales instead. However, households working for exporters gain greater job security; unemployment in Wales fell to 3.1%, 1.4 percentage points down on the year (lines 22 to 24). Firms: exporters gain price competitiveness. They can cut their euro or dollar prices and increase sales, or keep prices constant and raise profit margins, so profits rise either way. This helps explain why Welsh exports rose 12.4% to £15.2 billion in 2021, with exports to the USA up 22.3% and to Ireland up |

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45.3% to £1.7 billion (lines 14 to 17). Firms competing with imports also gain sales. However, firms importing raw materials and components face higher costs, which squeezes profit margins or forces price rises and lower sales.

The significance depends on several factors. Not all EU countries use the euro, but Germany, Wales' top destination, does, and the EU takes 59.78% of exports, so most exporters benefit. The effect on exporters depends on the PED of their products: if demand is price inelastic, cutting prices raises sales only a little. Exporters who import components gain less. Ceteris paribus may not hold: the inflation rise in 2021 was mainly caused by energy prices and supply chain problems after COVID, not the depreciation, which happened in 2016. A 10% depreciation is also fairly small, and its effect depends on how long the pound stays weak. Small firms that buy and sell only in the UK are unaffected. Wales still had a trade deficit of £0.9 billion, so as a net importer the higher import costs may outweigh export gains.

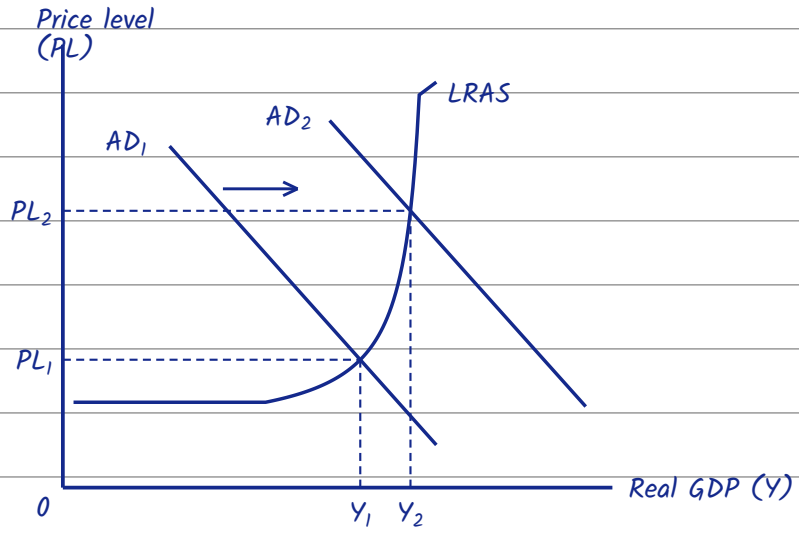
Overall, Welsh exporting firms have been the main winners, while households have mainly lost through higher prices, partly offset by more secure jobs, with the size of the effect depending on how long the pound stays weak.

2 (b) (iii)

The trade balance is the value of exports minus imports of goods and services. Wales had a deficit of £0.9 billion in 2021 (line 25), but exports grew 12.4% to £15.2 billion. The main other objectives are economic growth, low unemployment, low and stable inflation (2% CPI target) and a balanced government budget.

Growth: net exports (X − M) are a component of aggregate demand, AD = C + I + G + (X − M). An improvement shifts AD right from $AD_1$ to $AD_2$, raising real GDP from $Y_1$ to $Y_2$, as the diagram shows. Through the multiplier effect, exporters' extra income is re-spent in Wales, so GDP rises by more than the initial increase.

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Unemployment: labour is a derived demand, so higher demand for Welsh goods increases demand for workers in exporting industries, reducing unemployment, already down to 3.1% (line 23). Budget: higher sales raise corporation tax revenue, more employment raises income tax receipts and spending on benefits falls, improving the budget balance. Inflation: when inflation was below target (0.6% in December 2020), the extra demand-pull pressure could help return it to 2%.

However, the effect depends on spare capacity. With unemployment only 3.1%, Wales is near full employment, on the steep part of the Keynesian LRAS curve, so higher AD mainly raises the price level, not real GDP. Inflation was already 5.4% (line 21), well above target, so the improvement conflicts with low inflation, especially as it was partly caused by the 10% depreciation, which also raises import prices. The size of the improvement is also unclear: we know exports rose, but not what happened to imports, so the balance may have improved only slightly. The multiplier in Wales may be small because many incomes are spent on imports from England.

Overall, an improvement in the trade balance can support growth, employment and the budget balance, but with low unemployment and inflation at 5.4% its main effect may be more inflation, so its contribution depends on spare capacity and the size of the improvement.