DP IB Economics: HL

Your notes

2.6 Price Elasticity of Supply (PES)

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* Understanding Price Elasticity of Supply (PES)

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The Definition & Calculation of PES

- The **law of supply** states that when there is an increase in price (**ceteris paribus**), producers will increase the quantity supplied and vice versa
  - Economists are interested **by how much** the **quantity supplied will increase**
- **Price elasticity of supply (PES)** reveals how **responsive** the change in **quantity supplied** is to a change in **price**
  - The responsiveness is different for different types of products

Calculation of PES

- **PES can be calculated** using the following formula

$$\text{PES} = \frac{\%\ \text{change in quantity supplied}}{\%\ \text{change in price}} = \frac{\%\ \Delta\ \text{in QS}}{\%\ \Delta\ \text{in P}}$$

- **To calculate a % change**, use the following formula

$$\%\ \text{Change} = \frac{\text{new value} - \text{old value}}{\text{old value}} \times 100$$

Worked Example

In recent months, the **price of avocados** has increased from AU$ 0.90 to AU$ 1.45. *Bewdley Farm Shop* in Margaret River has sought to **maximise their profits** by increasing the **quantity supplied** to the market. They have been able to increase sales from 110 units a week to 120 units a week. Calculate the **PES of avocados** and explain one reason for the value **[4]**

Answer:

Step 1: Calculate the % change in QS

$$\%\Delta QS = \frac{120 - 110}{110} \times 100$$

$$\%\Delta QS = 9.1\%$$

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Step 2: Calculate the % change in P

$$\%\triangle P = \frac{1.45 - 0.90}{0.90} \times 100$$

$$\%\triangle P = 61\%$$

Step 3: Insert the above values in the PES formula

$$PES = \frac{\%\triangle \text{ in } QS}{\%\triangle \text{ in P}}$$

$$PES = \frac{9.1\%}{61\%}$$

$$PES = 0.15$$

(Two marks for the correct answer or 1 mark for any correct working)

Step 4: Explain one reason for the value

The PES value of 0.15 indicates that **avocados are very price inelastic in supply** [1]. Even with a significant increase in price, suppliers are **unable to supply more** likely due to the time it takes to grow additional avocados [1]

Examiner Tips and Tricks

When doing **elasticity calculations,** make sure that your final answer for PES is **not** expressed as a **percentage**. This is a common error and loses marks.

In Paper 2 you are occasionally given the PES value and the %Δ in QD. You are then asked to calculate the %Δ in price. Follow the standard math procedure as follows:

1. Substitute the values provided into the equation

2. Substitute X for %Δ in price

3. Solve for X

Interpreting PES Values

The Values of PES vary from 0 to Infinity (∞) & they are Classified as Follows

Value	Name	Explanation
0	**Perfectly Inelastic**	The QS is **completely unresponsive** to a change in P (e.g. fixed number of seats in a theatre)
0→1	**Relatively Inelastic**	The %Δ in QS is **less than** proportional to the %Δ in P (e.g agricultural products)
1→∞	**Relatively Elastic**	The %Δ in QS is **more than** proportional to the %Δ in P (e.g t-shirts)
∞	**Perfectly Elastic**	The %Δ in QS will **fall to zero** with any %Δ in P. However, supply is unlimited at a particular price. This is a very theoretical scenario

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The Determinants of PES

- Some products are more responsive to **changes in prices** than other products
- The factors that determine the responsiveness are called the **determinants of PES** and include:

1. **Mobility of the factors of production**
   If producers can quickly switch their resources **between products**, then the PES will be more elastic. E.g. If prices of hiking boots increase and shoe manufacturers can switch resources from producing trainers to boots, then boots will be **price elastic in supply**

2. **The rate at which costs of production increase**
   It costs more to produce each additional unit of output (**marginal cost**). If the rate of the marginal cost increase is low, the quantity supplied will be more elastic. However, if marginal costs rise quickly, then the quantity supplied will be more inelastic

3. **Ability to store goods**
   If products can be easily stored then **PES will be higher** (elastic) as producers can quickly increase supply (e.g. tinned food products). An inability to store products results in **lower PES** (inelastic)

4. **Spare capacity**
   if prices increase for a product and there is a capacity to produce more in the factories that make those products, then supply will be **elastic**. If there is **no spare capacity** to increase production, then supply will be **inelastic**

5. **Time period**
   In the **short run**, producers may find it harder to respond to an increase in prices as it **takes time to**

produce the product (e.g. avocados). However, in the **long run** they can change any of their factors of production so as to **produce more**

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Examiner Tips and Tricks

Many students **confuse PES with PED** and inadvertently answer questions using **knowledge from PED**. When faced with **PES questions**, tell yourself to **think like a producer** (not a consumer!) and it will help you to stay focused on providing the correct answer.

The PES of Primary Commodities & Manufactured Products

- The price elasticity of supply (PES) of **primary commodities** (agricultural products or raw materials) tends to be **lower than that of manufactured products** (washing machines, phones, cars etc) for several reasons
- The best way to explain the reasons for the differences is to **apply the factors that determine the price elasticity of supply**

A Comparison of the PES of Primary Commodities & Manufactured Products

PES Factor	Primary Commodities – Inelastic (PES = 0–1)	Manufactured Goods – Elastic (PES = >1)
Mobility of the factors of production	▪ If the price of a specific agricultural commodity increases, it's not for farmers to quickly **switch to producing a different crop**	▪ There is generally more flexibility to **switch production to alternative goods** in response to price changes, leading to a higher PES ▪ E.g. a car manufacturer may be able to **adjust its factors of production** from producing family car to sports models relatively easily
The rate at which costs of production	▪ The PES for primary commodities is **typically lower**	▪ The PES for manufactured products is **typically higher**

(marginal costs) increase	▪ The production of primary commodities is often **subject to inherent constraints**, (e.g. longer production cycles) ▪ The cost to produce one more unit of output is **relatively high**	▪ The additional costs of supplying **mass produced manufactured products** is generally lower as it is **easy to add on extra units** to production output
The ability to store goods	▪ Perishable agricultural have limited storage capabilities ▪ This reduces the **short-term supply responsiveness** and contributes to a lower PES for primary commodities	▪ Manufactured products can be stored for longer periods without significant deterioration or spoilage ▪ This allows firms to **respond to price changes** by adjusting the quantity supplied **from existing stock**
Spare production capacity	▪ Output is relatively **labour or land intensive** which places limits on the amount of spare production capacity leading to a low PES	▪ Output is often generated using machinery and so there is **more capacity when producing manufactured products** leading to a higher PES
Time period	▪ The time period to **grow or extract primary commodities is much longer** than that required to manufacture products	▪ Many products are manufactured in a **relatively short time period**


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