INTERNATIONAL ECONOMICS OLYMPIAD

2025 Economics Open Questions

Answers and Solutions

Open Question 1. Buying Cars

Two neighboring families, Lee and Xi, are thinking about buying new cars. Each family can choose to buy a modest or a luxury car, these decisions are made simultaneously and independently. The matrix below shows the payoffs from each possible outcome of this social interaction.

		Xi	
		Modest	Luxury
Lee	Modest	2, 2	0.5, 2.5
	Luxury	2.5, 0.5	1, 1

(a) (6 points) Provide a narrative that is consistent with all four pairs of payoffs.
(b) (6 points) Find the Nash equilibrium or equilibria for this social interaction (explain your reasoning) and discuss its social desirability.
(c) (8 points) Describe a reasonable policy that yields a socially preferable outcome and its corresponding payoff matrix.
(d) (10 points) In a nearby suburb, families replace their cars every few years and keep a close eye on one another's choices. A market-research firm surveyed the households and found out that their individual preferences are consistent with the story you came up with in **(a)**, however, the observed choices are at odds with the prediction you derived in **(b)**. Using game-theoretic reasoning, discuss why this can be the case.

Solution

(a) There might be different narratives. But, as the game represents a Prisoners' dilemma, any narrative must be consistent with the following points:

- Both are better off if both buy modest cars than if both buy luxury cars
- A family prefers to buy a luxury car if they other family buys a modest car

A nice example could use conspicuous consumption, where consumption is driven by a desire to signal wealth or status rather than purely practical needs. a luxury car does not provide a better service than a modest car, but social status. But a family obtains social status only when they are the only ones with a luxury car. This is also known as the "keeping up with the Joneses" phenomenon or the Veblen effect.

Marking scheme:

- 4 points for providing a consistent narrative
- 2 points for referring to conspicuous consumption, "keeping up with the Joneses" or the Veblen effect, or other consistent externality effect.

(b) Nash Equilibrium: NE=(Luxury, Luxury).
Reason: For both families, luxury is a dominant strategy. (The student can also explain row-by-row, column-by-column e.g. 'If Lee choose Modest, then Xi's best response is to choose Luxury).
Students may refer to the fact that this game has a Prisoners' Dilemma structure.

The Nash equilibrium is not Pareto efficient, since the outcome (Modest, Modest) would be better for both parties.

Marking scheme:

- 1 point for stating that (Luxury,Luxury) is the unique NE
- 3 points for the correct argument of the equilibrium: either dominant strategies or Nash equilibrium a best response for both families
- 2 points for the correct argument that the NE is not Pareto efficient

(c) There might be different answers, but all must provide a payoff where (Modest, Modest) is the new equilibrium. The policy must make sense.
One example could be to set a tax on luxury cars sufficiently high to more than compensate for the benefits of social status. Consider a tax on luxury cars that reduces the payoffs by 0.75 (any number higher than 0.5 works). Tax revenue is distributed equally between all families.

		Xi	
		Modest	Luxury
Lee	Modest	2, 2	0.5, 1.75
	Luxury	1.75, 0.5	0.25, 0.25

The new equilibrium (in dominant strategies is (Modest, Modest).

Mark scheme:

- 4 points for the description of a reasonable policy that yields a Pareto improving outcome.
- 4 points for a payoff matrix that is consistent with the policy description (only awarded if the policy is reasonable and yields a Pareto improvement).

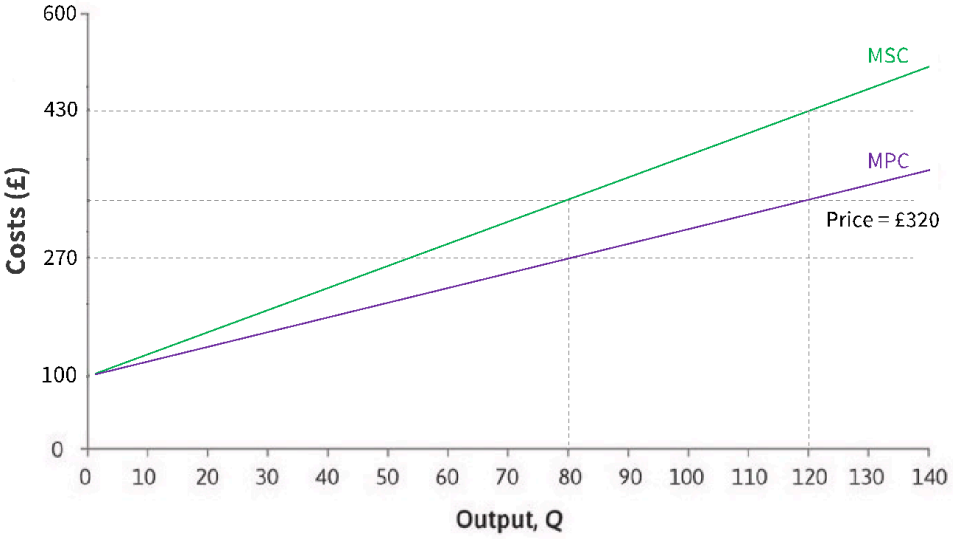
(d) The narrative describes a "repeated Prisoners' dilemma". With sufficiently patient families (meaning families value future payoffs sufficiently enough), the Pareto-efficient (Modest,Modest) outcome can be observed as the result of a credible threat: if one family buys a luxury car, all families will switch to buying luxury cars indefinitely. The prospect of continuously receiving a payoff of only 1 (instead of 2) in future periods, deters any single family from unilaterally buying a luxury car in the present and obtaining 2.5, but only for one period.

Mark scheme:

- 2 points for identifying that repeating the game is the key element
- 4 points for providing a well argumented reason consistent with the observations.
- 4 points for describing the strategy that sustains the (Modest,Modest) equilibrium.

Open Question 2. The Problem of Noisy Factory

A factory producing car parts is located next to a care home for the elderly. The production process is noisy, which disturbs the sleep and daily activities of the care home residents. The factory is a price-taking firm that sells its car parts at the market price of £320. The figure below shows how marginal private and marginal social costs vary with the number of units produced (*Q*).



(a) (6 points) Explain why the firm's profit-maximising choice of output is not Pareto efficient. Calculate the deadweight loss associated with this decision.
(b) (2 points) Explain why producing Q=80 units is socially optimal.
(c) (6 points) Suppose the government assigns property rights to the care home residents, meaning they have the right to enjoy a peaceful environment.

Assuming negligible transaction costs and that the socially optimal quantity will be produced, calculate
(i) the maximum amount that the car part factory is willing to pay to produce that quantity. Explain your answer.
(ii) The minimum amount that the care home residents are willing to accept to tolerate the noise. Explain your answer.

(d) (8 points) Now suppose the government assigns property rights to the factory, meaning it has the right to make as much noise as it wants and the care home residents must compensate the firm for each unit not produced (compared to the profit maximizing quantity).
Explain how they could reach an agreement to produce the socially optimal output and how much the firm would receive as compensation.
(e) (8 points) Thinking about situations of noise pollution in the real world, explain two reasons (aside from transaction costs) why the bargaining process in parts **(c)** and **(d)** may fail to produce a Pareto efficient outcome.

Solution:

(a) The profit-maximising choice of output (Q=120) is not Pareto efficient because it is possible to find a mutually beneficial trade (at Q=120, the care home residents would be willing to pay up to 430-320 = £110 to reduce production by 1 unit, which is more than the surplus the firm loses by reducing production by 1 unit).

Deadweight loss = area enclosed by MSC and price between Q=80 and Q=120 = 0.5 x (120-80) x (430-320) = £2,200.

Marking scheme:
- 2 points for explaining Pareto inefficiency
- 2 points for identifying the correct area (graphically or analytically) of DWL.
- 2 points for the calculation (providing the right DWL=2,200)

(b) At Q=80, the MSC equals the marginal social benefit, which is given by P.

Mark scheme:
- 2 points for the correct answer.

(c) i) Producers would be willing to pay at most their profits from producing 80 units: (220 + 50)/2 x 80 = £10,800 (the area below the price and above the MPC).
ii) The care home residents should receive at least the cost of listening the noise of producing 80 units (the total cost of the externality, i.e. the area between MSC and MPC) from Q=0 to Q=80 is (320 – 270) x 80/2 = £2,000.

Marking scheme:
For each of (i) and (ii):
- 1 mark was awarded for the correct explanation (description, in words, of the area that should be calculated or the intuition behind this area);
- 1 mark for the correct answer (the number);
- 1 mark for showing how the number was calculated.

(d) The care home residents are willing to pay up to £3,200 to the factory for reducing production from 120 to 80 (this is the cost of the noise they suffer, i.e. the area between MSC and MPC between 80 and 120). On the other hand, the factory obtains £1,000 profits from those 40 units (the area below the price and above the MPC). Hence, they could negotiate and reach an agreement in which both would be better off, whenever the company is compensated more than £1,000 and less than £3,200. The actual compensation would depend on the bargaining ability of both parties.

Marking scheme:
- 2 marks for mentioning that (Coasean) bargaining between care home residents and the factory will take place. [Note: any solution that mentions other policies, such as taxation, is incorrect.]
- 2 marks for acknowledging that the bargaining solution is not unique and there is a range of possible compensation depending on the bargaining ability of both parties.
- 2 marks for correctly calculating the maximum compensation.
- 2 marks for correctly calculating the minimum compensation.

(e) Many possible answers, including:
- Inability to pay (one party may be unable to compensate the other party enough to reduce/increase production to the socially optimal outcome)
- Missing information (measuring the total social costs imposed by the noise polluters is difficult because of the nature of noise – it is difficult to identify everyone affected and quantify how much the noise affects them)

- Enforcement (need a strong legal system to maintain the agreed-upon property rights and ensure that both parties meet the agreed-upon terms of the bargain e.g. if the firm doesn't reduce production or compensate the care home residents, the court can force the firm to reduce production/pay.)

Mark scheme:
- 2 points for each valid reason
- 2 points for each valid explanation of that reason

If there are more than 2 reasons provided, the first two are graded.

Open Question 3. Economics of Student Debt

In many countries, student debt has grown dramatically. In the US, it went up from $480 billion in 2006 to $1.8 trillion in 2025. In the UK, it grew 4.7 times in just the last 11 years (from £62bn in 2014 to £292bn in 2025). While intended to expand access to education, this debt now carries significant consequences for graduates and the broader economy. This question explores those impacts.

(a) (5 pt) Congratulations! You are admitted to Harvard and approved for a student loan to finance tuition ($60,000 per year), room and board ($20,000 per year), and other expenses ($7,000 per year) for four years. The loan has an annual interest rate of 8% and must be repaid in equal annual payments over 30 years after graduation (assume there is no interest while you are in college, the first payment happens in 5 years from now).

Explain why your annual payments are $30,912.

(b) (3 pt) After obtaining your Economics major, you found a great job paying $100,000 per year. Your average income tax rate is 25%. What percentage of your after-tax income will go to your student loan payment?

(c) (6 pt) Explain two reasons why a high student debt burden might negatively affect a graduate's ability to accumulate wealth over their lifetime.

(d) (6 pt) Now consider alternative ways of financing education for students who cannot afford it with their family wealth. Suppose the government decides to provide education for all students from families with incomes below the threshold. Describe how it changes the incentives of the universities.

(e) (10 pt) To pay for the education, the government decided to increase income tax to 50% for the high-income earners (starting at $100k a year). Unfortunately, higher taxes have reduced the expected economic growth from 3% to 1% a year. Assume that a typical working span is 45 years and calculate the value of after-tax salaries under the educational loans (starting salary $100k, grows at 3% for 45 years, tax 25%, minus the loan repayments) and then compare it with the government-funded education (starting salary $100k, grows at 1% for 45 years, tax 50%, no loan repayments). Discount at 8%. Explain which one is better for you.

Solution

(a) The Individual Burden (5 points)

Calculation Annual Payment:

Loan Amount = ($60,000 + $20,000 + $7,000) * 4 = $348,000

Plugging these into the annuity formula: 0.08 * $348,000 / (1 - 1/1.08^30) = $**30,912**

b) Payment-to-Income Ratio (3 points)

After-tax income = $100,000 * (1 - 0.25) = $75,000

Ratio = $30,912 / $75,000 = 41.2%

(c) Effects on Life-Cycle Decisions (6 points)

- **Delayed Homeownership:** Debt payments reduce savings for a down payment and worsen the debt-to-income ratio, making it harder to qualify for a mortgage.
- **Reduced Retirement Savings:** Income used for debt repayment cannot be invested in retirement accounts, leading to a significant loss of wealth from missed compound growth.
- **Lower Entrepreneurship:** The need to make fixed loan payments makes graduates more risk-averse and less likely to leave stable jobs to start a business.

(d) Effects of government-paid education (6 points):

Positive Incentives:

- **Stable Revenue** (if government pays): If the government reimburses universities for each student, institutions may have a stable or even increased revenue stream, encouraging them to expand capacity.
- **Focus on Access and Equity**: Universities might invest more in support services (e.g., tutoring, counseling) to help these students succeed, improving overall educational outcomes.

Potential Challenges:

- **Reduced Incentive to Compete on Price**: If tuition is covered by the government, universities may have less incentive to control costs or innovate to reduce tuition.
- **Admissions Strategy Shift**: Universities might adjust admissions criteria or outreach efforts to attract more students who qualify for government funding, at the expense of attracting students based on merit.
- **Tiered Service Quality Risk**: There's a risk that some universities could prioritize full-paying students (from higher-income families) for premium services or programs, while other universities might shift resources toward programs that are cheaper to provide (to maximize profit from a fixed government subsidy)**,** potentially creating a two-tier system.

(e) Paying for the government-funded education (10 points)

Scenario 1: Education Loans

Using the growing annuity formula, the present value of the after-tax salary payments in the first scenario:

1) $PV(after\ -\ tax\ salary)\ =\ \frac{\$100{,}000*(1-0.25)}{0.08-0.03}\left(1\ -\ \frac{(1+0.03)^{45}}{(1+0.08)^{45}}\right)$=$1,322,300

Since the discount rate is the same as the interest rate on the loan, the present value of the loan payments is equal to the value of the loan. Hence, the net value of this option to you is $1,322,300 - $348,000=$974,300.

Scenario 2: Government-Funded Education

Re-calculating the after-tax salary payments in the second scenario:

2) $PV(after\ -\ tax\ salary)\ =\ \frac{\$100{,}000*(1-0.5)}{0.08-0.01}(1\ -\ \frac{(1+0.01)^{45}}{(1+0.08)^{45}})$=$679,270.

In the second scenario, there is no loan to repay.

Conclusion: The Education Loans scenario is better than the Government-Funded scenario because $974,300>$679,270. The high tax burden and reduced salary growth in the second scenario have a more significant negative impact on lifetime wealth than the cost of the loan.

Marking Scheme

(a) The Individual Burden (5 points)

- Loan Amount: **2 points**
    - Partial credit: 1 point if one mistake (eg if forgot to add expenses beyond tuition or forgot to multiply by 4 years)
- Correct use of the discounted cash flow approach / annuity formula: **3 points**
    - Partial credit:
    - 2 points if
        - The formula for the payment as a function of the loan size, loan term, and interest rate is derived correctly, but applied incorrectly
        - one small mistake in the formula (eg, wrong power or used perpetuity instead of annuity formula)
    - 1 point if more than one mistake, but made a reasonable attempt to use a discounted cash flow approach

      Note: there is no requirement to derive the formula in abstract form. It is totally ok to plug in numbers in the discounted cash flow and solve for the payment. If the solution is correct, it gets the full 3 points. If the solution has mistakes, it may still get partial credit (2 points if one small mistake, 1 point if multiple or larger mistakes, but a reasonable attempt is made)

b) Payment-to-Income Ratio (3 points)

- After-tax income: **1.5 points**
- Ratio: **1.5 points**

(c) Effects on Life-Cycle Decisions (6 points)

If more than **two reasons** are provided, only the first two are graded

- **3 points** for each reason with full explanation
- Partial credit:
    - 2 points for each reason with partial explanation
    - 1 point for each reason without explanation

(d) Effects of government-paid education (6 points):

Since there is no stated limit of 2 answers, all provided answers are graded and summed **up to 6 points total**. There is no requirement to provide at least one positive and one negative incentive to get full credit.

- **3 points** for each well-explained correct answer
- Partial credit:
    - 2 points for each partially explained correct answer
    - 1 point for each unexplained correct answer

(e) Paying for the government-funded education (10 points)

- Scenario 1: Education Loans - **6 points total**
    - **3 points** for deriving and correctly applying the growing annuity formula
        - partial credit: 1-2 points if small to medium mistakes
    - **3 points** for correct accounting for the loan
        - partial credit: 1-2 points if small to medium mistakes

Notes: An alternative solution uses the annual loan payment instead of the loan amount. This solution gets full 6 points if done correctly. A potential mistake in this solution would be assuming loan payments for 45 years instead of 30. Scenario 1 gets 4 out of 6 points if this mistake is made. If the loan is forgotten completely, Scenario 1 gets 3 out of 6 points.

Another potential mistake would be to use the loan repayment amount in the "c" calculation, i.e., to use [$100k*0.75-loan repayment] and then plug it into the growing annuity formula. This implicitly assumes that loan repayments grow at 3%, which is incorrect. This mistake also leads to 4 out of 6 points for Scenario 1.

- Scenario 2: Government-Funded Education - **3 points**
    - partial credit: 1-2 points if small to medium mistakes
- Comparison: **1 point**
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Author's Comment

All numbers in the question are real as of 2025, with some simplifications: student debt is paid monthly (not annually); many students get financial aid (e.g. whole tuition waived!) and/or help from parents, which reduces the loan size a lot.
US debt:
https://www.federalreserve.gov/releases/g19/hist/cc_hist_memo_levels.html
UK: https://www.statista.com/statistics/376411/uk-outstanding-student-loan-debt/
Harvard costs:
https://www.sofi.com/harvard-tuition-fees/#:~:text=Harvard's%20tuition%20and%20required%20fees,%2C%20according%20to%20CollegeData.com
Harvard salaries:
https://www.collegefactual.com/colleges/harvard-university/academic-life/academic-majors/social-sciences/economics/#bachelor_earnings

Open Question 4. Songs Make Money

The company *Songify* offers users a subscription for $1 per month, providing unlimited access to a music catalog of 50 million tracks, with the average track duration being 3 minutes. The average number of paying subscribers is 5 million people, and each user listens to about 300 tracks per month (not necessarily unique tracks). *Songify* keeps 20% of the subscription revenue for itself and distributes the remaining 80% among musicians, in proportion to the number of times their tracks are played.

Mark noticed that beginner musicians often complain about low income from the platform, while popular artists receive substantial sums. Mark launched a project called *TrackFactory*:

> "*TrackFactory* is a unique music label that helps lesser-known performers increase their income on the *Songify* platform. We handle all aspects of music promotion, guaranteeing artists stable and high payouts even with a small number of listeners."

The first clients of *TrackFactory* noticed that, indeed, even though their recognition did not grow, their monthly income on the platform increased significantly. However, Songify's security service soon noticed strange activity of some *TrackFactory* artists, and their accounts were blocked for "dishonest use of the platform."

(a) (10 points) How could the business model of *TrackFactory* be organized so that the income of lesser-known artists increased significantly *without* any real growth in their popularity?
(b) (10 points) Why is *Songify* willing to ban this practice?
(c) (10 points) Suggest a possible change to the business model or the user rules of the *Songify* platform that would help prevent such schemes in the future. Discuss if there are possible drawbacks in your suggestion.

Solution

(a) *TrackFactory* could have used a scheme involving the artificial inflation of the play count for its clients, without any genuine interest from real listeners. The company could have created its own user accounts or used automated programs ("bots") that continuously played the tracks of *TrackFactory*'s clients. Since musicians' income depends directly on the number of times their tracks are played, such artificial streams would provide stable and high income even for little-known artists.

(b) The money was redistributed in favor of TrackFactory's artists, at the expense of other musicians whose listeners were real users. This will decrease incentives of popular musicians to post their songs to *Songify,* thus decreasing the attractiveness of the platform overall for real paying listeners. Also, Songify becomes flooded with 'fake' AI-generated songs, which creates a mess and is detrimental for customers' experience. Together, this decreases Songify's profit in the longer run.

(c) Possible answers:

1. Artist payouts should depend not only on the number of plays, but also on the number of unique listeners. For example, the platform might allocate 50% of the revenue based on the number of plays, and the remaining 50% based on the number of unique listeners. Such a model would make bot usage unprofitable, since not only the volume but also the diversity of listeners would be important. Potential drawback: Possible bias against niche acts. An experimental artist with few but engaged fans (who replay songs often) could see their payout fall, even though no fraud is involved.
2. Set a maximum number of plays of a single track from one account that are counted toward artist payouts (for example, no more than 10 plays per day from a single account). This limit would reduce the effectiveness of artificially inflating counts, as repeated plays by the same user above the set threshold would not generate additional income. Potential drawbacks:
    - Punishes genuine superfans. Hardcore listeners who binge an album on release day would quickly hit the cap, reducing revenue for legitimate artists.
    - 'Track-splitting' workaround. Fraudsters could upload the same song chopped into many 30-second "parts" to reset the per-track counter, cluttering the catalogue and confusing users.
    - Genre discrimination. Instrumental, ambient and children's music is often streamed on loop; these artists could lose a material share of income despite legitimate demand.

Idea source: Bloomberg Opinion, 2024-09-09: Fake Songs Made Real Money

Marking Scheme

(a)

Code	Element in the answer	Max pts	Guidance for partial credit
A1	**Artificial/automated listening** – states that TrackFactory (or hired bots/fake accounts) repeatedly streams its clients' tracks without genuine listeners	**7**	• 5 pts if "bots" or "fake accounts" are mentioned but details are vague. • 3 pts if it only says "promotes plays" or "self-listening" with no mention of automation.
A2	**Cost/benefit or feasibility reference** – mentions that TrackFactory can pay a $1 subscription per bot (small cost) to capture a much larger share of the 80 % pool, or otherwise discusses why the scheme is profitable	**3**	1 pt if merely states "cheap" or "profitable" without any cost-side hint.

(b)

Code	Element in the answer	Max pts	Guidance for partial credit
B1	**Money flows away from really popular artists,** so they post fewer tracks	**5**	
B2	**This is bad for demand by real listeners,** which is a majority, and thus it decreases Songify's profit	**5**	2 pt if talks about redistribution and Songify's revenue/profit left unchanged (in fact, it first increases because the bots pay, but decreases in the longer run because other customers cancel subscriptions)

(c)

Code	Required component	Max pts	Guidance for partial credit
C1	**At least one concrete anti-fraud measure**	**4**	2–3 pts for a vague or partially effective idea; 1 pt for a generic "improve security" with no detail.
C2	**Mechanism of prevention is explained** – shows *how* the proposal makes bot streaming unprofitable or detectable	**2**	1 pt if the link is asserted but not justified.
C3	**Discussion of drawbacks / side-effects**	**4**	2 pts for naming a drawback but with no elaboration; 0 pts for merely saying "there may be disadvantages."

Total part (b) = 10 pts
*If a candidate proposes several measures, grade the **first** one. Do not sum over multiple proposals.*

Question 5: After-COVID Inflation

Country AA implemented COVID-19 lockdown support by increasing subsidies, offering loans to businesses, and distributing funds to citizens. These measures aimed to support household and business incomes during a time when production was significantly reduced. The government financed this support by increasing public debt, issuing and selling more government bonds, including to foreign investors.
If no other policies are introduced, this government support during COVID-19 would increase inflation in Country AA.
(a) (8 points) To counteract inflation, the central bank of Country AA raises its policy interest rate. How does this increase affect the interest rates that consumers and businesses face, such as on credit cards or business loans? Pay close attention to the exact transmission mechanism.
(b) (7 points) What are the most likely short-term effects of this interest rate increase on the economy? Consider consumption, production, and the labor market.
(c) If investors expect that the central bank's policy will cause a recession, and that the central bank will later lower interest rates to stimulate the economy, what will likely happen to long-term interest rates (e.g., 30-year bonds or mortgages) and why? (4 points) What does this imply about the shape of the yield curve? (1 point)
(d) If investors believe the current policy will control inflation without causing a recession, and expect stable growth and neutral monetary policy in the future, how will long-term interest rates compare to short-term rates? (4 points) What does this imply about the yield curve? (1 point)
(e) (5 points) Based on the discussion above about the role of expectations, how should the central bank design its monetary policy to effectively reduce current inflation?

Solution:

a) When the policy rate increases:

- (3 points) Banks pay more to borrow money from the central bank or other banks at the inter-bank market. Hence, banks' cost of acquiring funds (liquidity) increases.
- (3 points) Banks' alternative cost of funds increases - now banks can earn more by lending to other banks.
- (2 points) Banks pass these higher costs onto their customers - consumers and firms, to preserve their profitability.

b) Effects on the economy:

(2 points) Consumption: Decreases as borrowing becomes more expensive and saving becomes more attractive.

(2 points) Investment/Production: Falls due to higher financing costs and lower expected demand.

(3 points) Labor Market:

i) Slower hiring or layoffs as businesses cut costs.
ii) Wage growth may slow or even reverse.
iii) Unemployment may rise slightly in the short term.

c) Expect recession:

(4 points) Long-Term Interest Rates: under expectation hypothesis, they are a geometric average of expected short-term interest rates in the future. As investors expect expansionary monetary policy in the future, they expect interest rates to fall. Hence, long-term interest rates likely to fall.

(1 point) Yield Curve Shape: The yield curve would invert (short-term rates higher than long-term rates).

d) Expect recovery:

(4 points) Long-Term Interest Rates: Would be similar to or slightly higher than short-term rates, reflecting confidence in neutral central bank policy.

(1 point) Yield Curve Shape: The yield curve would be flat or gently upward-sloping.

e) Optimal monetary policy: [5 points]

To effectively combat inflation, the central bank should prioritize not only adjusting current interest rates but also shaping public expectations about future rate movements. Transparent communication and a strong commitment to its policy stance help reinforce the central bank's credibility. As a result, even modest changes in the policy rate can significantly influence long-term interest rates, tightening financial conditions across all maturities and contributing to lower inflation.

Marking Scheme:

a) Bank Lending Behavior (Total: 8 points)

- **Policy Rate Linkage (1 pt):**
  - Correctly state that bank rates are connected to the central bank policy rate and move together.
  - State that banks would **increase** their rates when the policy rate rises.
- **Cost of Capital (3 pts):**
  - Explain that the **cost of capital (borrowing costs)** for banks increases as a result of higher policy rates.
- **Interbank Lending Incentives (3 pts):**
  - Explain that banks can now **lend to other banks** at higher rates and earn more.
- **Profitability Argument (1 pt):**
  - Link this to banks' efforts to **preserve profit margins**.

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b) Consumption, Investment, and Labor Market (Total: 7 points)

- **Consumption & Investment:**
  - Correct direction of change for **consumption** (1 pt)
  - Correct direction of change for **investment** (1 pt)
  - Explanation for change in **consumption** (1 pt)

    - Explanation for change in **investment** (1 pt)
- **Labor Market:**
    - Describe correct dynamics: **hiring/layoffs and wage responses** (2 pts)
    - State the likely implication for **unemployment** (1 pt)

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c) Long-Term Interest Rates & Yield Curve (Total: 5 points)

- **Expectations Channel (4 pts):**
    - Explain that long-term interest rates reflect **expectations of future short-term rates** (e.g. as an average of future rates).
    - Full points require explicit mention of this expectation-based mechanism.
    - Partial credit (2 pts) for simply stating long-term rates are lower without explaining why.
- **Yield Curve Shape (1 pt):**
    - Mention **inversion or flattening** of the yield curve.

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d) Neutral Policy Expectations & Yield Curve (Total: 5 points)

- **Neutral Rate Expectation (4 pts):**
    - State that if a **neutral policy is expected**, interest rates are expected to be moderate in the future.
    - Explain how this expectation **keeps long-term interest rates high** via averaging.
    - Partial credit (2 pts) if long-term rates are mentioned as high but reasoning is not explained.
- **Yield Curve Shape (1 pt):**
    - Mention a **steep yield curve**.

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e) Central Bank Tools and Expectations Management (Total: 5 points)

- **Combination of Tools (2 pts):**
    - State that effective policy requires **using both tools**:
        - Adjustments to short-term interest rates
        - Management of expectations
- **Managing Expectations (3 pts):**
    - Explain **how the central bank can manage expectations**, including:
        - **Consistent and transparent communication**
        - Any other reasonable strategy to **influence and anchor public expectations**