UNIT 4

ANSWERS TO EXERCISES

coreecon

EXERCISE 4.1 SOCIAL DILEMMAS

Using the news headlines from last week:

1. Identify two social dilemmas that have been reported (try to use examples not discussed above).
2. For each, specify how it satisfies the definition of a social dilemma.

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Introduction

This is an open-ended question that can be assigned before the lecture to see whether students understand the idea of a social dilemma, and also to underline how common they are in the world around us.

Answer

Here are two examples from recent headlines in the UK:

Flooding in the north of England

- Flooding in the north of England (http://tinyco.re/6522353)

In December 2015 Storm Eva and Storm Frank caused devastating floods in cities across the north of England. Two major storm systems hit similar parts of England within the space of a week. This led to rivers bursting their banks and causing widespread flooding. Afterwards, questions were asked about the quality of flood defences and the amount of money which has been invested in them by the current government.

Flood defences are a classic example of a social dilemma: when individuals act independently they are unlikely to take action to mitigate the effects of flooding. This is because no individual would be willing to finance the necessary investment. As a result, the government normally takes responsibility for providing the infrastructure. In this case the defences were ineffective. This may have been due to the severity of the storms (which might have been partly due to climate change, another social dilemma already discussed in U1), or perhaps to a lack of adequate investment.

Air pollution in UK cities

- Air pollution in UK cities (http://tinyco.re/7554554)

It was announced in early 2016 that it has taken some streets in London just eight days to break air pollution limits which are meant to cap emissions for the year. The EU has set limits on the hourly amount of nitrogen dioxide (NO_2), a harmful gas produced by diesel vehicles, which can be produced per hour. Certain streets in London have breached this hourly limit more than ten times in the first quarter of 2016.

Pollution is a classic example of a social dilemma as in a society where everyone acted in the own self-interest, they would pollute freely. This is because pollution is normally a by-product of a decision which leads to an economic benefit for the actor. Examples of this include pollution created in the production process, and people choosing the comfort of travel to work in a car rather than taking public transport. In the long run the economic benefits created as a by-product of air pollution do not outweigh the costs that it creates (in this case nitrogen dioxide has been shown to cause respiratory and heart problems). Because London has a large population, no individual can reduce his or her emissions by enough to have any impact on the level of air pollution, so there is little incentive to do it. A more desirable outcome could be reached if individuals came together and each agreed to limit their pollution to a non-harmful level.

Marking guidance

A good answer should:

- refer to the definition of a social dilemma
- identify a social dilemma and be able to relate it to this definition

Teaching ideas

If students find it hard to approach an open-ended assignment like this, the lecturer may start things off by showing students a collection of items from the news headlines and asking them to use the definition to identify which ones are social dilemmas and which ones are not.

The lecturer might want to ask them to bring in a newspaper or magazine cutting (or e-version of the same) so that the discussion can focus on the specifics of each case.

If there is a large class, the lecturer might want to divide students into small groups to go through each of the examples brought in, and compare them with the definition in the text. This question can also be brought back later in the unit, by asking students to model the social dilemma that they have found in the media.

EXERCISE 4.2 POLITICAL ADVERTISING

Many people consider political advertising (campaign advertisements) to be a classic example of a prisoners' dilemma.

1. Using examples from a recent political campaign with which you are familiar, explain whether this is the case.
2. Write down an example payoff matrix for this case.

Introduction

The aim of this question is to help students apply the concept of a prisoner's dilemma.

Answer

Consider the US presidential campaign and the UK referendum campaign about leaving the UE, both from 2016.

EXERCISE ANSWERS UNIT 4

Both these campaigns are examples of two-player games (Clinton v Trump, and Remain v Leave, respectively) where a similar outcome could have been achieved if both sides had agreed on lower spending on ads. So the cooperative outcome would have had higher payoffs (same outcome with lower costs), than the non-cooperative one. In the Nash equilibrium, both sides end up spending large amounts, as this is the dominant strategy.

- US presidential campaign 2016 (http://tinyco.re/8455671)
- 2016 EU referendum campaign in the UK (http://tinyco.re/3467500)

An example payoff matrix is given below, where the first entry is for Party A and the second for Party B. The payoffs here are defined as the value of winning the election, net of the cost of ad spending:

	Party B spends	Party B doesn't spend
Party A spends	100, 100	250, 50
Party A doesn't spend	50, 250	200, 200

Marking guidance

A good answer:

- describes why political advertising is a prisoner's dilemma
- includes a payoff matrix as above (this does not need to be numerical)
- uses a real life political campaign to explain

Teaching ideas

Students should focus on a particular campaign (a municipal election, the independence vote in Scotland, and so on), and give examples of how the opposing parties used political advertising. It is obviously easier to make this connection if there are only two parties. If students can do some research on the amount of money spent on advertising, that would help put this discussion into perspective.

The tricky bit is defining the benefit of advertising. This could be just the fact that it increases the probability that the party wins power, or that once it wins power, it makes it more likely that it can push its own political agenda, or that once in power, the party can line its own pockets more easily.

Once these benefits and costs have been identified, students can write down a payoff matrix.

Students could be asked to find estimates of how much the parties actually gained from spending. Public records often include spending accounts, and students will need to find out the percentage of votes or number of seats the parties gained. They will finally need to figure out a way to value these seats to come up with the final payoff matrix.

Lecturers may want to refer to the article by David Vinjamuro on how political advertising has this structure.

- Vinjamuri, David, 2012. 'Political Advertising Has Become A Prisoner's Dilemma'. Forbes, 10 April. (http://tinyco.re/5230735)

EXERCISE ANSWERS UNIT 4

EXERCISE 4.3 ALTRUISM AND SELFLESSNESS

Using the same axes as in Figure 4.5:

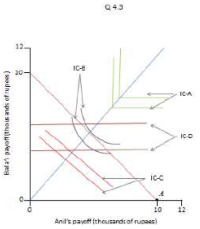
1. What would Anil's indifference curves look like if he cared just as much about Bala's consumption as his own?
2. What would they look like if he derived utility only from the total of his and Bala's consumption?
3. What would they look like if he derived utility only from Bala's consumption?

For each of these cases, provide a real-world situation in which Anil might have these preferences, making sure to specify how Anil and Bala derive their payoffs.

Introduction

This is a straightforward question testing students' ability to generate graphs from a description of preferences. There may be some discussion about the interpretation of these preferences.

Answer



1. The first variation may generate some discussion about the interpretation of these preferences. One way to interpret this is that these preferences produce Leontief indifference curves (IC-A): Anil only gets utility when both he and Bala have higher payoffs. Another is that the ICs are the usual shape but symmetric around a 45-degree line from the origin (IC-B): a change in either one's payoffs affects Anil's utility in exactly the same way.

2. If he derived his utility from his and Bala's TOTAL consumption then the indifference curves would be diagonal and linear (the exact same shape as the feasibility set).
In the original graph, these indifference curves could be coincident with the feasible set (where 10 is divided between two players) as this line shows all the points where total consumption is equal to 10. The indifference curves would shift out as total consumption increased and shift closer to the origin as consumption decreases. IC-C in the graph above is an example of such indifference curves.

3. If he only derived utility from Bala's consumption, then the curves would be horizontal straight lines (IC-D in the graph above). This is because Anil now only values Bala's consumption so will only be indifferent between points where Bala gets exactly the same amount regardless of the payoff that he receives. An intuitive way to think of this is to consider the shape of the curves when Anil was perfectly selfish. In this case we can think of him as being completely selfish on Bala's behalf.

4. An example for the first set of preferences (IC-A) is if Anil and Bala each own a firm that produces a different part of a product. For example, Anil owns a bicycle wheel factory and Bala owns a bicycle frame factory. Each person's payoff depends on the number of completed units that he/she can produce, which in turn depends on how many parts the other person produces. Using the bicycle example, holding Bala's production (and hence payoffs) constant, Anil's payoffs do not increase if he makes more pairs of wheels than there are bicycle frames. An example for the second set of preferences might be if Bala is Anil's spouse, so that his utility is based on household payoffs. The final set of preferences might result if Bala is Anil's child, which might make him completely altruistic.

Marking guidance

A good answer will:

- draw the graphs as above
- explain how the preferences are depicted by the graph
- be able to explain why Anil might have each of these preferences

Teaching ideas

The examples above are extreme. The lecturer might want to suggest some real-life situations following on from the discussion in Q4. For example, how might Anil's IC's look if Bala was his child, or his partner, or his rival?

Students may be asked to draw ICs relating their preferences and the ones of friends or family members to indicate how altruistic they feel.

EXERCISE 4.4 AMORAL SELF-INTEREST

Imagine a society in which everyone was entirely self-interested (cared only about his or her own wealth) and amoral (followed no ethical rules that would interfere with gaining that wealth). How would that society be different from the society you live in? Consider the following:

- families
- workplaces
- neighbourhoods
- traffic
- political activity (would people vote?)

EXERCISE ANSWERS UNIT 4

Introduction

The focus here is on how much of what people do is because of altruism or ethical constraints, and how much is just a rational payoff-maximizing strategy. For example, families may care for children out of love or altruism, but this may also happen if caring for children is considered an investment, which may pay off in terms of future earnings some of which benefit the parents. Similarly, individuals may respect traffic laws for fear of punishment or because of a moral rule.

Answer

- *Families:* The first and perhaps most drastic change that it is unlikely that anybody would have children. Raising children represents a significant financial burden, estimated to be in the hundreds of thousands of pounds, which is unlikely to be paid back, even in terms of support for elderly parents.
  It is unclear as to whether the institution of marriage would still exist. For many people marriage represents a significant cost (cost of a wedding, cost of taking time off work for a honeymoon, costs of spending time with spouse) and thus the amount of marriages may drop. Marriage may also generate cost savings, however (for example reducing the cost of housing and other services per person) and so, in some situations, marriage may represent a positive financial opportunity.
  For existing families (those who already have children) the home would become a place dominated by selfish acts. Jobs such as cleaning and cooking would not be done as no one would be willing to invest the time in an activity which benefitted the other members without financial reward. Parents who care for children would cease to provide this service and would instead focus on activities that increase their own payoffs.
- *Workplaces:* Workplaces will be dominated by selfish acts designed to increase the individual's salary either through promotion or bonuses. Since workplaces are perhaps not dominated by altruism, this sphere may not be affected as much as others.
  Even if working in teams leads to greater group rewards, teamwork would be hard to facilitate. This is because employees will be constantly seeking opportunities to increase their reward by elevating their position in the team or forcing colleagues out in order to decrease the amount of reward which will be split. As a result, developing trust and delegating tasks will be extremely hard. Consequently, it is easy to conceive a world where everyone works alone.
- *Neighbourhoods:* The idea of 'community spirit' would disappear. Individuals would see no value in building friendships with neighbours unless they would lead to financial gain. As a result, neighbours would not do any favours for one another and volunteer groups such as the neighbourhood watch would not exist.
  Furthermore, the incidence of littering and other forms of non-altruistic behaviour would increase. This is because individuals are unlikely to care about anything other than their own gain so will see no value in creating a safe and tidy neighbourhood beyond their own homes, unless that affected their own outcomes (for example, their house price).
  Finally, crime would increase. In the absence of ethical rules, individuals who only cared about their own wealth would seek any opportunity to increase it and thus would take any opportunity to take wealth from another person. It is also likely that individuals prioritising their own financial gain would invest a lot of time/money

in protecting their belongings from criminal activities. Gated communities and a rise in private security activities would be observed.

- *Traffic:* Road traffic is likely to be much less considerate. Acts such as letting other drivers through at junctions, and stopping to let pedestrians cross would be seen as a waste of time and thus would not occur.
  Furthermore, it would be much less safe. Drivers prioritizing only their own financial gain would place a higher value for getting to work on time so would be unlikely to stop for pedestrians or even observe road signs. This would dramatically increase the number of road accidents.
- *Politics:* Voting can be thought of as an altruistic task, as it involves taking the time to go to the polling station as well as any time spent researching the candidates, for no direct gain. Therefore, it is reasonable to expect that people prioritise going to work over voting and researching as the former activity leads to more financial gain than the latter activities.
  But, in a world where no one voted, a single person could decide the result by casting a vote in favour of the candidate who would benefit him/her the most. Therefore, as everyone will follow this logic everyone will want to vote for the candidate that benefits them the most. As a result, it is easy to see a world where everyone votes.
  In the case where everyone votes, it is easy to see how inequitable policies could be passed. For example, a politician who promised to take all of the income from 49% of people and give it to the other 51% will be elected. This is because 51% of people would see this policy as in their best interests and thus elect the politician.

Marking guidance

A good answer will:

- include a definition of what it means to be completely self-interested and amoral
- include specific examples from the contexts noted here

Teaching ideas

As in each of these cases, the motivation may be either altruism, or the fear of punishment or stigmatisation, the lecturer may want to ask students to make this distinction in each of their examples, and whether their observations are more compatible with one motive or the other. For example, is the probability of being caught speeding high enough to prevent fast driving solely on the basis of fear of punishment?

EXERCISE ANSWERS UNIT 4

EXERCISE 4.5 ARE LAB EXPERIMENTS ALWAYS VALID?

In 2007, Steven Levitt and John List published a paper called 'What Do Laboratory Experiments Measuring Social Preferences Reveal about the Real World?'. Read the paper to answer these two questions.

1. According to their paper, why and how might people's behaviour in real life vary from what has been observed in laboratory experiments?
2. Using the example of the public goods experiment in this section, explain why you might observe systematic differences between the observations recorded in Figures 4.9a and 4.9b, and what might happen in real life.

○ Steven D. Levitt, and John A. List. 2007. 'What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World?' Journal of Economic Perspectives 21(2): pp. 153–174 (http://tinyco.re/9601240).

Introduction

The focus of this question is on why experimental and observational data might differ. The reason is of course that humans may well behave differently under different conditions.

Answer

1. Levitt and List identified five factors that could influence behaviour and lead to humans behaving differently in laboratory experiments compared to real life. These were:

- *The presence of moral and ethical considerations* and *The nature and extent of scrutiny of one's actions by others:* The presence of researchers and other participants as well as the assumption that their actions will be made public may well lead people to act more altruistically than they otherwise would. This would be especially prevalent in an experiment designed to test how people behave in situations where no one is watching.
- *The context in which the decision is embedded:* It is very hard for people to state how they would behave in certain situations unless they are currently experiencing said situation themselves. Examples of this are situations where people are asked to state their actions under certain extreme circumstances as they may have little to no experience of making decision under these conditions.
- *Self-selection of the individuals making the decisions:* It seems likely that the people who willingly volunteer to take part in these experiments may exhibit similar behaviours. We can certainly state with confidence that they show a behavioural trait that enjoys taking part in experiments which may not be shared by the entire population. Participants in an experiment may also share non-behavioural characteristics, for example many experiments are conducted at universities where participants would likely be a similar age and have a similar level of education.
- *The stakes of the game:* In a laboratory, participants will be aware that any decision that they make will have no real-world consequences. Thus, there will be no rewards for a positive outcome or consequences for a negative outcome, aside from compensation for participating in the experiment. The paper also mentions that the differences in stakes matters and also depends on the setting of the game. Contributions decrease in a public goods experiment without punishment but are maintained when peer punishment is introduced. While it may be the

case that peer punishment is the reason for sustained contributions, it is also possible that participants were responding to other aspects of the experiment. For example, the fact that they are being monitored, the size of the stakes, or a non-representative sample of participants.

2. What we expect to see in real life depends on how closely the situation resembles the conditions of the experiment. For example, there are situations in which it is much harder to identify and punish non-contributors, and we would expect public goods contribution to be lower than suggested in the experiment. In other situations that involve interactions with people we know e.g. villagers in a close-knit community, we would expect public goods contribution to be higher.

Marking guidance

A good answer will:

- identify the differences between a laboratory environment and real life. For example, subjects may have fewer distractions in a lab or they may behave differently when they are the subject of an experiment (so someone is watching). On the other hand, they could behave more altruistically in a real-life situation
- use the experiment referred to in the question to explain how the observational and experimental data would differ in this case

Teaching ideas

Lecturers may want to encourage students to be as specific as possible in terms of their examples – does it matter what the experiment is, does it matter who the subject is, and so on? For the second question, students may want to think about whether the effect of having a punishment option might be quite as stark in real life (when you might already have some kind of social system that encourages altruism for example).

Give students a list of questions and ask them which might be better answered using experiments and which ones using observational data. Is there a way to make this distinction systematically based on the question?

- *Further reading:* As an extension, field experiments can be contrasted with lab experiments. There are many papers on randomised controlled trials often in field experiments v observational data, for example here: http://tinyco.re/6493461.

EXERCISE 4.6 CROWDING OUT

Imagine you are the mayor of a small town and wish to motivate your citizens to get involved in 'City Beautiful Day', in which people spend one day to help cleaning parks and roads.

How would you design the day to motivate citizens to take part?

Introduction

This question gets at the heart of how to set up incentives in a situation with a potential for free-riding. Students may also have some experience of similar initiatives at universities or in their own towns, and therefore may have

concrete ideas about how to design incentives.

Answer

The starting point for this answer is to define whom the mayor wants to target. Even if the target was 'all residents of the town', it is clear that different types of people will probably respond to different incentives.

- Gneezy, Uri, Stephan Meier, and Pedro Rey-Biel, 2001. 'When and Why Incentives (Don't) Work to Modify Behavior', *Journal of Economic Perspectives*, 25(4): pp. 191-210. (http://tinyco.re/2645111)

Some ideas for different incentives would be:

- *Young people:* Make the day something fun by having a live performance in parks during the clean-up drive.
- *Families with children:* Have face painting and other child-friendly activities along the roads/in the parks to attract children.
- *Older people:* If they are active, induce them to take part in the cleaning by inviting a celebrity from they know to accompany them. If they are unable to participate in the cleaning but looking for company, involve them in making tea for those cleaning, or doing shows for children while their parents clean.

A financial incentive would be the other obvious way to entice people to participate, but there is plenty of evidence that these do not work well in social activities (blood donation, or the day-care example in the textbook). There is also evidence that intrinsic motivation (social preferences) might work better than any kind of extrinsic motivation (market incentives), in which case the only incentive required might be a good marketing drive stressing how it is every citizen's duty to clean up.

Marking guidance

A good answer will:

- distinguish between incentives for different sorts of people
- discuss why monetary incentives may not work (or be too expensive)
- explain why intrinsic motivation might work better than extrinsic motivation

Teaching ideas

Many students will have experience of something similar (a food bank or blood donation drive), so using these experiences in the class is a good idea. For example, the instructor could collect student experiences, form a list of possible incentives and then poll students on which of these incentives would get them to participate. Students can then discuss why they responded to certain incentives, think about how others (older people, those with kids, and so on) would respond, and make a list of incentives for different types of people.

EXERCISE 4.7 ACCEPTABLE OFFERS

1. How might the minimum acceptable offer depend on the method by which the Proposer acquired the $100 (for example, did she find it on the street, win it in the lottery, receive it as an inheritance, and so on)?
2. Suppose that the fairness norm in this society is 50–50. Can you imagine anyone offering more than 50% in such a society? If so, why?

EXERCISE ANSWERS UNIT 4

Introduction

This question aims to give students practice working out the rules in the Einstein.

Answer

There are some situations in which the proposer may offer more than 50% of the money to the responder:

- *For altruistic reasons:* The proposer may derive utility from the gains made by the partner and so will make a generous offer. An example: if family members played the game, many would offer over 50% to the other person due to altruistic preferences.
- *For reasons based on how deserved it is:* The proposer may feel that the responder has earned/deserves a greater split of the money as a result of its origins. For example, imagine that the proposer acquired the money through a project where the work was divided 75-25 in favour of the responder, as opposed to an equal split. In this scenario, the proposer would recognize that an offer of $75 may be fair.

Marking guidance

A good answer will:

- show their understanding of the algebra in the Einstein
- offer realistic reasons for an offer over 50%

Teaching ideas

The lecturer might want to give students some different scenarios for:

- how the $100 was obtained (paid as wages, a birthday gift, bank loan)
- who the other player was (family member, friend, rival, stranger)

and ask them how *R* might change in each case.

EXERCISE 4.8 SOCIAL PREFERENCES

Consider the experiment described in Figure 4.12:

1. Which of the social preferences discussed above do you think motivated the subjects' willingness to reject low offers, even though by doing so they would receive nothing at all?
2. Why do you think that the results differed between the Kenyan farmers and the US students?
3. What responses would you expect if you played this game with two different sets of players—your classmates and your family? Explain whether or not you expect the results to differ across these groups. If possible, play the game with your classmates and your family and comment on whether the results are consistent with your predictions.

Introduction

This question focuses on data from an actual experiment, and asks students to reflect on the background of the players, which might affect their behaviour.

Answer

1. The most obvious answer here is that the subjects value fairness and a low offer violates their idea of fairness. The subjects show a preference towards punishing players who make an unfair or an unreasonable offer. We may say that they receive $x worth of satisfaction from rejecting what they deem to be an unreasonable offer and thus depriving their opponent of the money, where x is as least as high as the amount of money they are rejecting.

2. There could be many answers here including the fact that there are cultural differences, and the Kenyan farmers may have more demanding norms of fairness than the US students. Students could either make a list of potential reasons, which the lecturer could then give feedback on based on the original paper (linked in the text). Or students could be asked to read the paper before making their list.
It could be that Kenyan culture is more altruistic, and thus a social norm around sharing has developed. This would explain the farmers' unwillingness to accept low offers as they themselves would be unlikely to make such an offer if they were in that position, so they have higher expectations about what a fair offer is.
The US students, on the other hand, may be more accepting of the pursuit of simple self-interest and would accept a lower offer as they would be likely to make a low offer if they were in that position.

3. When playing the game among family members we might expect an increased desire to be altruistic, which may result in a large number of 50-50 offers. This is due to individuals caring more about the family member than a stranger and thus having preferences which take their family's wellbeing into account.
When playing the game amongst classmates we might also expect a desire to be altruistic, but not as much as amongst family members. This is due to some classmates building relationships with each other but the bond not being as strong as amongst family members.

Marking guidance

A good answer will:

- be able to come up credible preferences to explain the results above
- be able to predict the differences between playing the game with family members, friends, and so on

Teaching ideas

For Q3, students may be divided into small groups to do this as a project over a couple of weeks. The lecturer may initially want to guide the students on how to choose the two sets of players. For example, they may choose other economics students v students in other fields. Or they may choose students v older people (university staff?). Ask them what differences they would predict, if any, and ask them to compare these predictions with the data once the project is completed.