

1. Downtown Vancouver suffers from peak-hour traffic congestion. Explain why this happens (define downtown as a good) and suggest a way to reduce peak-hour congestion.

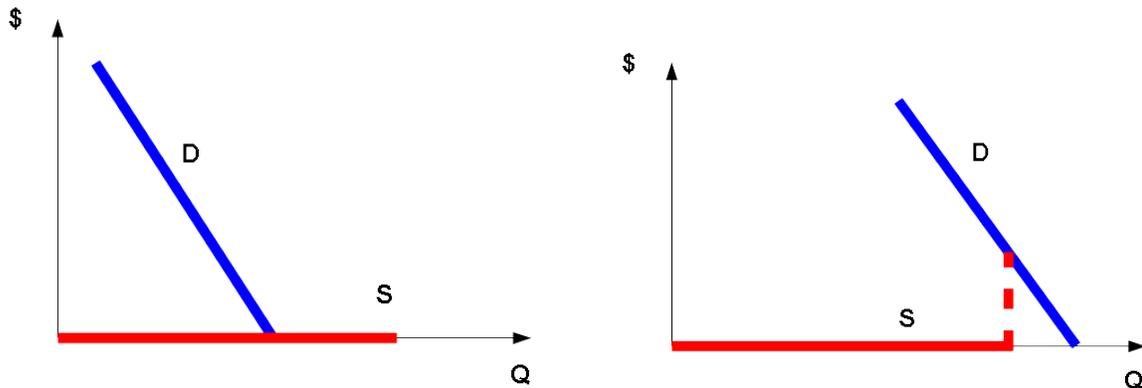
*Answer:* Downtown is a rival, non-excludable area, i.e., a **common pool good**. Downtown streets can be made excludable with a congestion surcharge of, say, \$5 to enter the area (**private good**). This method is used in London and Singapore. It's also possible to turn DT into a club good but not reasonable (only residents of DT can enter?), so that's NOT a right answer...

2. What's Hayek's main point about knowledge? What instrument allows us to share knowledge?

*Answer:* Knowledge is distributed in the population, so **nobody knows everything**. **Prices** make it easier to share knowledge because they reconcile different values by rationing goods to people.

3. Draw supply/demand curves for (a) a public good and (b) a common-pool good (showing rivalry). Label everything

*Answer:* (from Homework 2): A public good (non-rival, non-excludable) means that **supply is greater than demand at a price of zero** [left figure]; when demand exceeds this supply (and price is still zero), then the good is rival [right figure]. The **non-monetary "price" will rise above zero** (via waiting, fighting, searching, etc.) to ration the good. A swimming pool is a useful example for this problem, not an apple (always a private good).



4. Dolan says that GNP/GDP measures of "throughput" fail to include important information. Give one example of what GDP misses.

*Answer:* GNP does not measure well being (happiness). It misses the value or leisure, informal work, time with family and environmental degradation, i.e., **both positive and negative externalities**. GNP may go up if you buy a gun and kill someone (burial costs up, GDP up). It may go up when you mine for gold but kill an ecosystem.

5. Your oil-producing company uses an internal discount rate of 6 percent to decide whether to invest money today for production in the future. (Production occurs in the US, which has no carbon tax or permit system.) According to your calculations, a proposed project will make a small net profit for the company over its lifetime. Would the project still be a good investment if the company used a 3 percent discount rate? Explain why.

*Answer:* Yes, because future positive cash flows will be **worth more with a lower discount rate**, thereby increasing the NPV. Note that the question says pay now (costs) for later cash flow (benefits). A lower discount rate increases NPV by making those benefits worth more.

6. Now you (from question 5) go to a conference and present your company's plans. An environmentalist asks you what discount rate you've used for the project. You say 6 percent. The environmentalist says you should not do the project because the social discount rate is 3 percent. Explain why he's correct using TWO factors from cost/benefit analysis.

*Answer:* The environmentalist is **including future negative externalities** that do not show up in the company's "cash profits." These will reduce the project's net benefit (no matter the discount rate), so it's already a bad idea ("just break even" goes to negative value). A lower discount rate will reduce net benefits further, since future costs will be larger in present value terms. **Social discount rates are always lower than private rates because they include future generations.**

Note that we cannot manage environmental goods with prices because of the free rider problem (i.e., one person can protect environmental goods that benefit many, who do not have to pay). An environmental good must be converted into a private or club good if price is to be used to manage it.

7. Professor Reynold mentioned that the Food and Agriculture Organization classifies fisheries as "non-fully exploited," "fully exploited" and "over-exploited." What was the FAO's original term for "non-fully exploited," and why did FAO change it?

*Answer:* The old term, **under-exploited, gave the impression that there was not enough fishing activity.**

8. What does it mean when a renewable resource (e.g., a fishery) is mined?

*Answer:* **Harvest is greater than growth rate, so it's more like a non-renewable good.**

9. Hardin discusses two ways to regulate access to resources — private property or government regulation. What is an additional way of regulating access to resources? Give an example for forests.

*Answer:* **Community control** (club good). For a forest, the community may require that **everyone help** when someone wants to cut a tree, to ensure fair access.

10. Hardin suggests that moral awareness will lead people to have fewer children. Name two other forces (that I discussed in class, using examples of Taiwan and Bangladesh) that lead to lower birth rates.

*Answer:* Taiwan: **Female working** means babies have a higher opportunity cost; **direct cost** of raising a kid reduces Q demanded. Bangladesh: **Female education and maternal/baby health care reduces death rate, and thus birthrate.**

11. Gordon mentions that fisheries biologists who focus on "maximum sustainable yield" (MSY) miss the point of fishing. What goal does he prefer? Give an example of how fishing at MSY may be a bad idea.

*Answer:* He prefers to maximize net **economic** yield (i.e., profit maximization), i.e., considering costs. (Maximizing social surplus is even more correct because it considers negative externalities, but it wasn't Gordon's main point.) Fishing @ MSY occurs where the marginal productivity of fishing effort equals zero, i.e., more effort does not produce more fish. This point ignores cost. So it's a bad idea to **maximize physical catch because you will be losing money.**

12. The government has to choose between two projects. Project A produces \$100 of social surplus and employs 100 people. Project B produces \$100 of social surplus and employs 50 people. Which is better? Why?

*Answer:* **Neither. Social surplus matters, not jobs.** Project B is NOT better than A because it uses fewer people. It *may* use more capital. Surplus is all that matters. Surplus, remember, always considers the difference between benefits and costs, not their distribution. "More jobs" is a distribution issue, esp. for workers.

13. A company builds an oil pipeline to bring oil from A to B. True or False (and explain why):

- (a) The pipeline raises oil prices at B. *Answer:* **F. The pipeline brings more oil to B (presumably because the price of oil at B is higher than the price at A), which will lower prices.** If the pipeline displaced supply already arriving on trucks or trains, then it would STILL lower prices (assuming no change in demand) because transport costs are lower.

- (b) The pipeline creates a benefit of tax revenue to the government. *Answer: F. Taxes are a transfer.* Yes, the government (rather, bureaucrats and politicians) may see tax revenue as a benefit, but that benefit is a *cost* to the person who pays it. The correct phrasing is therefore “the pipeline creates benefits of X. A government tax will transfer some of those benefits from taxpayers (e.g., pipeline company) to the government, which can then use it – in theory – to create public goods. In reality, governments may use tax revenues for private purposes (e.g., subsidy to car drivers or bike riders).
- (c) House prices will rise in areas where well-paid workers live. *Answer: T. Higher wages increase demand for housing,* a normal good.

## Some comments on common mistakes:

**Q1:** Downtown is not a public good because it’s rival

**Q2:** Communication is not correct, as prices are simpler to transmit and understand

**Q5:** NPV rises because costs are now and profits in the future

**Q6:** Don’t forget to explain why social discount rates are lower

**Q7:** Needed to discuss psychological impact of “under exploited” (exploit more!)

**Q9:** Need to say ‘community’!

**Q10:** Need to discuss rules in those countries, not China

**Q11:** Policies promoting/protecting MSY do NOT cause extinction; they reduce profits

**Q12:** More or less employment increases social benefit ONLY when it creates surplus

**Q13b:** More production *may* lead to more tax revenue or not. What matters is surplus, not its distribution (wages, taxes, etc.)

**Q13c:** Housing prices go UP with congestion OR higher wages. They would fall IF pipeline is nearby, but that’s not stated.

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