

Microeconomics, Module 18, "Externalities" (Chapter 13)

*Homework*

(The attached PDF file has better formatting.)

The Coase Theorem applies to many social activities. We illustrate with study time for actuarial exams.

An insurer provides its actuarial students with 120 hours of study time for each exam. The insurer presumes that candidates study six months for each exam, so study time is 20 hours a month. Each month has 20 work days, so study time is one hour a day. This is the official schedule, but trading among candidates and managers change the schedule.

The study program allows both managers and candidates to exchange study time among days, as long as they both agree with the exchange. The exchange rate may be 1 hour for 1 hour or any other rate, such as 1 hour for 2 hours; see below.

We use several assumptions to highlight the effect of transaction costs:

- Candidates value study time more than managers do; managers value work more than candidates do.
- Candidates prefer study time closer to the exam date. If the exam date is November 15, candidates prefer an hour of study time on Nov 10 to an hour on June 10. Preferences vary: some candidates prefer to study an hour each day and some candidates prefer to study heavily the month before the exam and enjoy leisure time the month or two after the exam.
- Work pressure is heaviest in mid-May and mid-Nov. Work pressure increases steadily from December through mid-May and from June through mid-November. Work pressure varies: sometimes it is heavy during the off-peak summer months and light during the peak months of April, May, October, and November. (This is not realistic, but it is useful to illustrate the effects of transaction costs.)
- Candidates can trade study hours with their managers. A candidate may offer to trade two hours in February for one hour in early May, since the early May hours are more valuable to candidates than the January hours. A manager may offer to trade one hour in early May for two hours in February, since work pressures are greater in early May. (These trades are in the opposite directions; each party prefers the May hours.)

We consider two scenarios.

- *Scenario YY:* Transaction costs are zero. Each actuarial candidate trades with his or her manager; no other approvals are needed.
- *Scenario ZZ:* Transaction costs are high. Each trade must be approved by all the Fellows in the Actuarial Department and by all candidates in the department. Fellows are reluctant to approve trades that seem too favorable to candidates and candidates are reluctant to approve trades that seem too favorable to managers. (We use Fellows interchangeably with managers.)

Homework #1: Which scenario generates greater social welfare? Use the following logic:

- Each trade is done only if it creates benefits for both sides. If a candidate trades two study hours in February for one study hour in early May, the manager gains one hour of work and the candidate gains study time that is more valuable.
- Transaction costs impede trade and create less social welfare.

Homework #2: To reduce the transaction costs but retain department control over trades, two options are considered:

- *Option #1:* Trades must be approved by a committee of Fellows, but not by candidates.
- *Option #2:* Trades must be approved by a committee of candidates, but not by Fellows.

Assume that salaries for candidates and study time are negotiated with no transaction costs. More study time makes the jobs more desirable and causes lower salaries; less study time reduces candidates' desire for these jobs and requires higher salaries.

Assume that candidates are much concerned with the distribution of study hours during the year; they much prefer study hours right before the exam dates. Managers are not much concerned with the distribution of study hours during the year.

- The Fellows say that study time is a privilege, not a right, so Fellows should approve all trades, not candidates.
- The candidates say that study time is a right, not a privilege (just like salary); since candidates have the greater concern about the distribution of study time during the year, they should approve the trades.

Which perspective would Landsburg agree with? Explain how *the proper choice creates greater social welfare gain for both candidates and Fellows*. (The better choice allows the Fellows to negotiate lower salaries.)