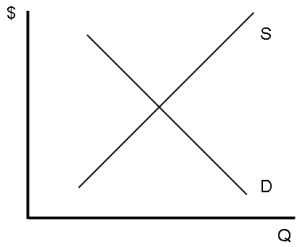
1. (7 points) Start with aggregated supply and demand curves, such as these:

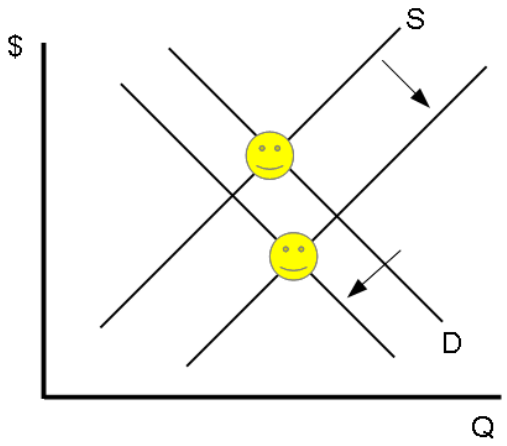


Show how (one or both) curves shift (in or out) and the new equilibrium. Comment on whether the equilibrium is stable (i.e., will price allow quantity supplied to match quantity demanded).

Solution: NB: "Stable" does not mean forever. It only means that supply and demand cross, which is true for every answer except (b).

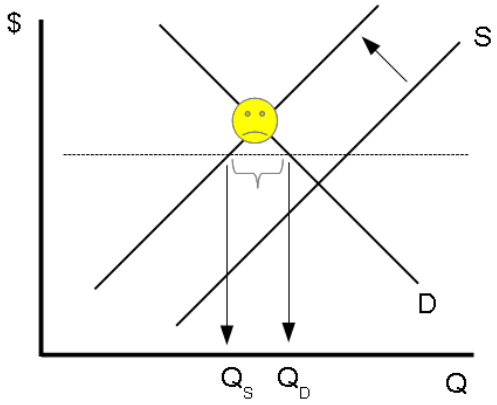
(a) (1 point) S and D for tomatoes: GMO technology reduces the cost of producing tomatoes, but some customers fear GMOs will kill them

Solution: Supply shifts out due to cheaper production, but demand shifts in as people "lose their taste" for tomatoes. Market P will be lower, but Q may be lower or higher (probably higher since price effects often dominate labeling/taste effects).



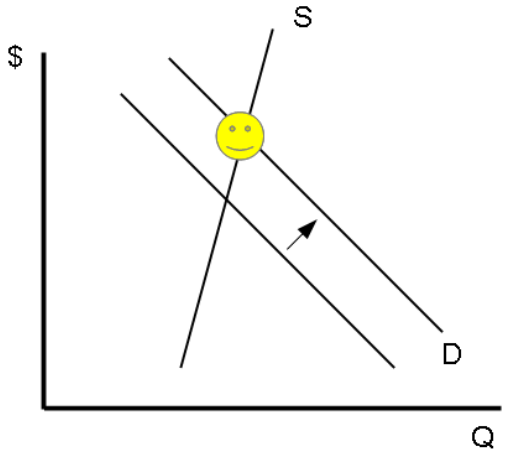
(b) (1 point) S and D for restaurant labor: The government requires a "skills certification" for wait-staff but puts a ceiling on wages to keep costs down

Solution: Supply shifts in due to cost of certification, but the wage ceiling prevents supply and demand from reaching equilibrium. There is excess demand for labor. Employers typically bridge this gap with non-wage compensation to employees (e.g., "free" food, health insurance, etc.)



(c) (1 point) S and D for time awake: Show supply (and its elasticity) and the change in demand for time awake after starting classes at LUC.

Solution: The supply of "waking time" is *relatively* inelastic, as it's essential to sleep. The outward shift in demand for that time (study, socialize, etc.) leads to more time awake, but the cost (fatigue, etc.) is higher, which appears on the "high price" of supply. (NB: Don't bother with long run vs short run elasticity – use one version.)

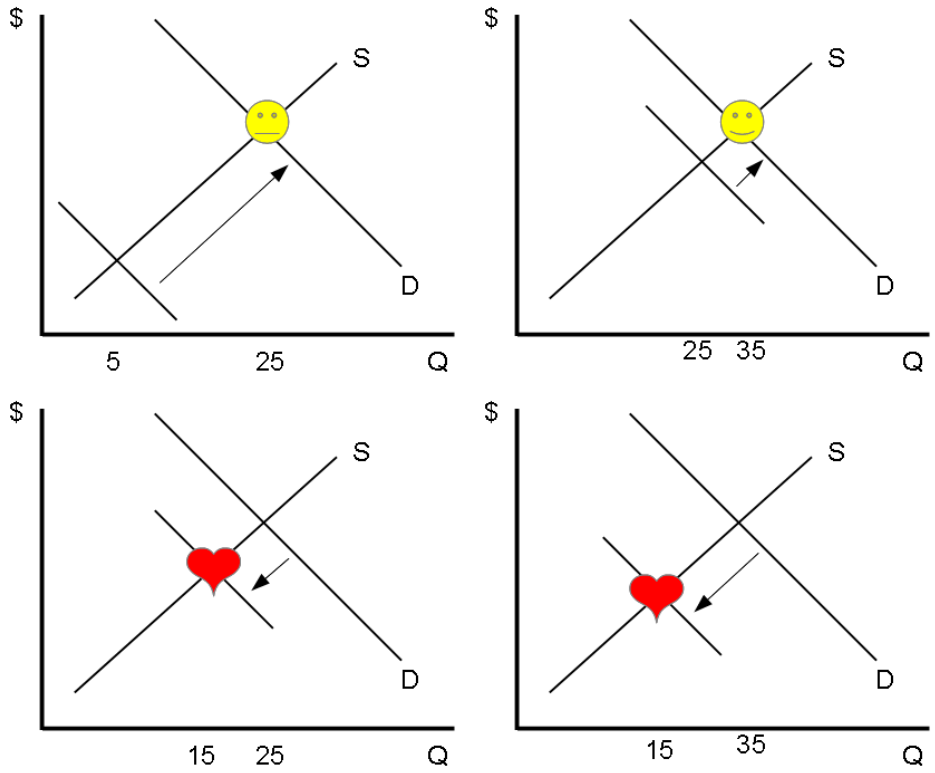


(d) (2 points) S and D for activities: Show S and D for time studying and time socializing before and after starting school (assume vacation was before). Write hours per week for each, based on old and new intersections, on the horizontal axis. NOW draw redraw in-school S&D curves and show the impact of a new (romantic) relationship on both types of time. (Alternative, you leave a romantic relationship.) Comment on the time value of love (i.e., is it worth the time?)

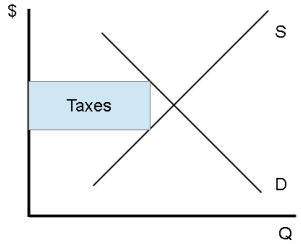
Solution: Your supplies of time for studying and socializing are more elastic than time awake, but the story here is on the demand side, where outward shifts in those demands result in you spending more time studying and socializing (this may not be true if you just left a bunch of friends from home, but maybe it is if you meet lots of people at LUC). Some of you said that the

supply of time for socializing has fallen (due to more time spent on studying), which is fine. Just don't get confused by moving BOTH supply and demand.

A new romantic relationship takes time from both activities (who hasn't skipped reading or ditched friends for a kiss?). Note that "time for love" here is 40 hours (given reductions in socializing with others and study) and perhaps more, if sleep time drops. NB: All of these numbers are made up. Yours only need to make sense. (Most did, with interesting variations.)



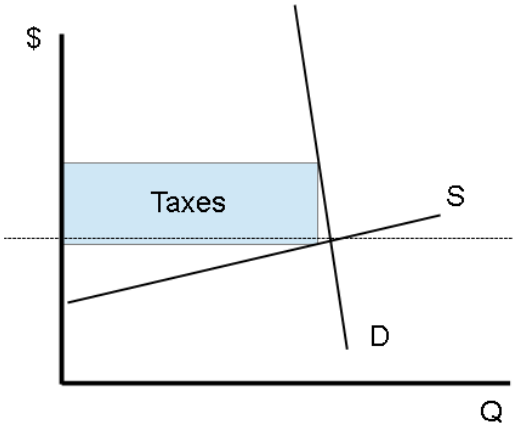
(e) (2 points) The government has decided to tax cigarettes, for which supply is relatively elastic and demand is inelastic. Show who bears the "burden" of this tax in terms of whose surplus the "tax box" depletes by more. This example shows the tax box but note it's showing S&D with "normal" elasticity:



Solution:

The tax burden falls on the "inelastic" side of the market, i.e., demand here. As discussed in class, it's efficient to raise revenues by taxing inelastic demand. In the case of cigarettes, it is also socially acceptable to tax such

a "sin" if it also discourages smoking. (A tax of perfectly inelastic demand would have no impact on smoking.)



Given your figure, why would *larger* cigarette companies want tax revenue to be spent catching cigarette tax evaders AND inspecting all cigarette manufacturing plants for health and safety regulations?

Solution: The tax will reduce quantity demanded by a little for all cigarette sellers. Larger companies want money spent on catching tax evaders and inspecting plants to reduce competition from (a) smuggled cigarettes and (b) smaller firms that may not be able to meet standards. (Note that big companies don't mind black markets for THEIR cigarettes.) The main idea is that the companies want the government to reduce competition so they can get a bigger share of the market ("Baptists and Bootleggers").

2. (2 points) A business faces a (perfectly elastic) demand curve of $p = 0.5$ and has a cost function of $c(q) = q^2$.

   Write down the business' profit function ($TR - TC$), and find its profit maximizing quantity. Also find the zero profit quantity.

Solution:

$\pi = TR - TC \rightarrow \pi = pq - c(q) = 0.5q - q^2$

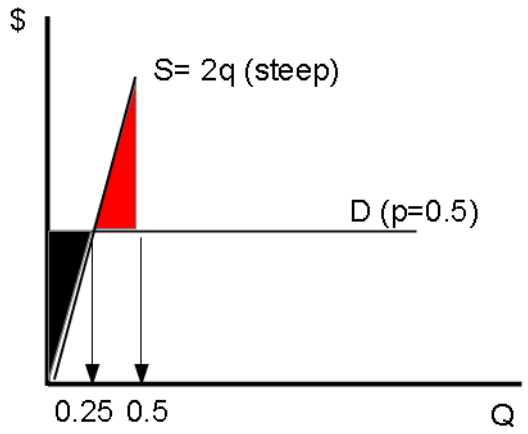
Profits are zero at $0.5q = q^2$, i.e., $q = 0.5$

Find the profit maximizing quantity via derivative wrt q, i.e.,

$\frac{\delta\pi}{\delta q} \rightarrow 0.5 - 2q \stackrel{\text{set}}{=} 0$, or $q = 0.25$

Draw supply and demand curves based on marginal revenue and marginal cost curves. Show the profit-maximizing and profit-eliminating quantities in relation to S&D.

Solution: $MR = 0.5$ and $MC = 2q$ (depending on your scale, the S-curve should be steep). The firm is "in the black" (an old expression for making profits) until 0.25 and "in the red" (another old expression for losing money) after that. Profits are zero at $q = 0.5$ and negative after that.



3. (1 point) In Chapter 6 of *Armchair Economist*, Landsburg discusses the benefits *and* costs of policies. Discuss a new government proposal to subsidize vacations for students in terms of opportunity costs, the equilibrium of p and q for vacations and the impacts on student debt and achievement.

Solution:

The main opportunity cost falls on taxpayers (higher taxes) or other government programs that lose funding. Subsidized vacations will decrease studying time and increase vacation time. Travel agents will be happy with higher demand and prices (student payment + subsidy). Student debt is likely to increase due to vacation-related spending. Achievement should fall, if vacations crowd out studies and work. Achievement *may* rise if overworked students are not taking adequate vacations. Overall (average) student achievement may not change if everyone, say, drops down by 2 points, but students may be happier (vacation time without loss of *relative* rank).