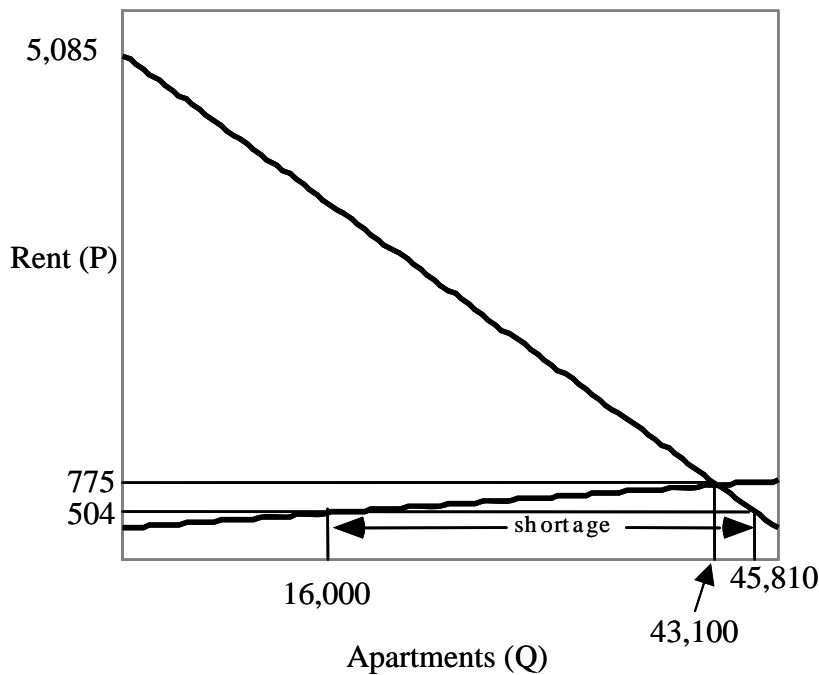


PPA 730-10: Fundamentals of Policy Analysis
Market model SOLUTIONS

I. Rent control in Cambridge, Massachusetts

Download the article "The Morning After" from the *The Economist*.

- Using the figures about available rental housing in Cambridge and the price (rent), draw a simple supply and demand diagram for apartments. Assume that the supply of apartments is normal (upwardly-sloping). Mark the axes, indicate the old (rent-controlled) price, the old number of apartments on the market, and the new (free market) price.
- Do you predict that under rent control there was a shortage or surplus of apartments? Why? Indicate this on your graph.



A statistician has estimated the equations for the supply and demand for apartments in Cambridge:

$$D: P=5085-0.1Q^d$$

$$S: P=344+0.01Q^s$$

- What is the slope and intercept of these equations? What do these numbers mean?
D: Intercept=5085=maximum rent anybody will pay; Slope=-0.1=amount by which the rent must fall such that one more renter enters the market.
S: Intercept=344=minimum rent that any landlord would charge; Slope=0.01=amount by which the rent must increase such that one more rental unit is made available.
- What is the quantity supplied at the controlled price? What is the quantity demanded? How large was the surplus or shortage of apartments?

At the old rent of \$504, $Q_s=16,000$ (as the article says). $Q_d=45,810$. The shortage is $Q_d-Q_s=29,810$

5. In the free market, what is the new quantity demanded? Quantity supplied?

In the free market, $S=D$. $Q_d=Q_s=43,100$. The new rent, as indicated in the article, was \$775.

6. Imagine that the government of Cambridge had set the maximum rent (under rent control) at \$800. What affect would this have had on the rental market? Why?

This policy would have had no effect (an ineffective price ceiling) because the ceiling is above the equilibrium price.

7. The article reports that when rent control ended, investment in housing and repairs went up. Does microeconomic theory predict that this would probably happen? Why or why not? (1 sentence)

This makes sense: Part of the de facto "rent" under rent control was the cost of living in run down housing; when the market clears and prices rise, this type of cost will go away.

8. Under the rent control policy, say if members of the following groups are winners, losers, neither, or possibly even both. Explain why. State any assumptions you make. (Maximum length: 2 paragraphs, typed.)

- Renters
- Landlords
- Politicians
- Taxpayers

Renters as a group are both helped and hurt: If you are able to find an apartment, it's nice and cheap (although you might have to paint and buy your own appliances). If you are one of the demanders not matched up with a supplier--the characteristic of a shortage--you are made worse off. Landlords, on the other hand, are almost certainly made uniformly worse off, since the law decreases the return on their real estate investment. It is difficult to predict the effect on the politicians who oversee the policy; this depends on the wishes of the population and the political strength of the real estate community. In general, rent control has been a popular, although generally misunderstood, policy. Taxpayers should not be affected, since this policy does not use tax dollars--it is just a regulation (except for the cost of program administration).

II. Demand, supply, and elasticity shifters

Model the effects of each phenomenon on the automobile industry.

1. Consumer incomes increase. (**$D\uparrow$**)
2. Many more rail lines are installed so commuters aren't as reliant on their cars. (**Demand elasticity \uparrow because there are more substitutes**)
3. Train fares fall. (**$D\downarrow$ because the price of a substitute good becomes cheaper**)
4. The quality of train travel improves, making it a better substitute for driving. (**Demand elasticity \uparrow because the quality of a substitute has improved**)
5. Train travel becomes more fashionable. (**$D\downarrow$ if "more fashionable" is in comparison with car travel, because tastes will have shifted toward a substitute. Also, demand elasticity \uparrow because the perception of the quality of a substitute has improved**)
6. The president says we can expect an increase in gas prices soon. (**$D\downarrow$ due to consumer expectations if we trust the president: People expect an increase in the price of a compliment good.**)

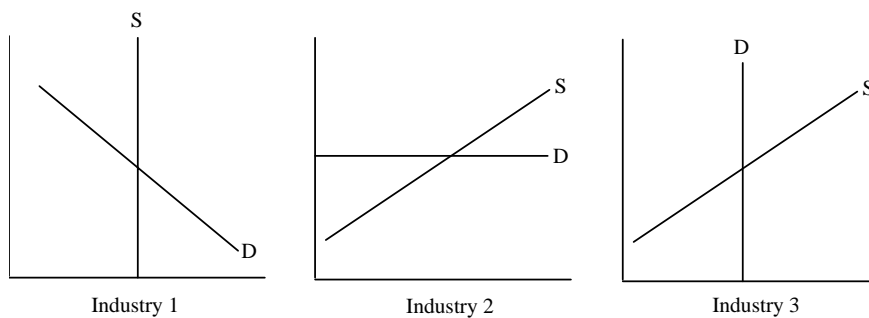
7. An unusual number of people turn 16 and get their drivers' licenses. (**D↑, since the number of potential consumers increases.**)
8. The price of cars rises. (**Nothing changes to the demand, supply, or price elasticity of demand. In equilibrium, the Qd and Qs will fall.**)
9. Cars, more expensive, become a more important part of consumers' budgets. (**Demand elasticity↑ because cars become a more important part of consumers' budgets.**)
10. The price of steel rises dramatically. (**S↓ because the price of an input has risen.**)
11. Just-in-time production methods are adopted and make car manufacturing more efficient. (**S↑ because a change in technology has improved production.**)
12. Changes in production methods make it easier for manufacturers to adjust to changes in steel prices (**Supply elasticity↑ because producers now require less time to adjust to a change in factor prices.**)
13. Chrysler finally goes out of business. (**S↓ because there is now one less seller.**)
14. Auto manufacturers expect a major oil shortage soon. (**S↓ probably, since in anticipation of a hike in gas prices and thus a fall in demand, manufacturers cut production to avoid excess inventories.**)

After you've finished, take these effects in different pairs. Graph their combined effects and speculate on the new price/quantity equilibria.

III. Elasticity/tax incidence

The state is going to implement a new tax targeted specifically at a certain sector of the economy. Three possibilities have been suggested:

- a. An industry in which demand is downwardly-sloping, but supply is perfectly inelastic.
 - b. An industry in which supply is upwardly-sloping, but demand is perfectly elastic.
 - c. An industry in which supply is upwardly-sloping, but demand is perfectly inelastic.
1. You are an advisor to the legislature. Suggest industries that fit each of the three descriptions.
 2. Draw the supply and demand curves for each sector.



The legislature, worried about a voter backlash, has decided that the new tax must be paid by businesses. Thus, the tax must be imposed in such a way that it does not affect buyers, only sellers.

3. Which of the sectors should be taxed? Why? (Your answer may be none, one, two, or all three sectors.) Show your reasoning with graphs, and explain in words.

This implies two things: The tax must be imposed on sellers, AND it must only affect sellers. Recall that these are not the same thing: Depending on elasticities, even if I levy a tax on the seller, it may be paid by the buyer. Remember that taxes are paid more by sellers when demand is more elastic and when supply is more inelastic. Thus, industries 1 and 2 should be taxed, while industry 3 shouldn't be. You would illustrate this on the graphs by showing that when supply shifts up by the amount of the tax, the equilibrium market price does not change, meaning that the seller pays all.

IV. Hospital beds in Syracuse

Your consulting firm is working for the hospital industry in Syracuse, which is concerned about capacity issues, pricing, and government regulation. They have a number of tough economic issues they need you to work through with them.

A recent economic study estimated the supply and demand equations Syracuse hospitals face are characterized by:

$$D: Q^d=1,000-10P$$

$$S: Q^s=100+15P$$

Q refers to the number of hospital beds, and P is the basic price per bed, per day.

1. Explain to the client (in one sentence) what the D-intercept means.

If P=0, people would want 1,000 beds per day.

2. Explain to the client (in one sentence) what the S-intercept means.

If P=0, the hospitals would make 100 beds available per day.

3. Explain to the client (in one sentence) what the D-slope means.

If P increased by a dollar, people would want 10 fewer beds per day.

4. Explain to the client (in one sentence) what the S-slope means.

If P increased by a dollar, the hospitals would provide 15 additional beds per day.

5. What is the price elasticity of demand, calculated when the price per bed increases from \$40 to \$60?

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6. The hospitals are losing money. Do you recommend that they raise prices to boost their revenues (not considering any other issues for the moment)? Why or why not?

Yes – demand is inelastic, so price increases will increase total revenues.

7. The State Assembly is considering legislation that will limit the price per bed to \$25 per day. Will there be a shortage or surplus of beds?

A shortage, because $Q^d > Q^s$ at this price.

8. Calculate the size of this shortage or surplus.

$$Q^d - Q^s = 750 - 475 = 275 \text{ beds per day.}$$

9. Without any regulation, what is the market-clearing price per bed? How many beds are filled?

$$P^* = 36, Q^* = 640$$

10. What would happen if the government set the maximum price to \$45?

Nothing – this would be ineffective price ceiling.

V. Essays

1. You are having a policy discussion with a bright friend, a lawyer with no training in economics. She observes that there seem to be ever-greater disparities between the incomes of people with high-wage jobs and people with low-wage jobs.

You say: "That's a problem with no easy solution."

Your friend: "No, the answer is simple. Make companies pay low-wage workers more. The minimum wage should be raised. By a lot."

You: "It isn't that easy. Raising the minimum wage can have undesirable, unintended consequences."

She is becoming impatient with your view. Explain to her what you mean. Do not give any opinions about whether the minimum wage is, on balance, a *good* or *bad* thing; just explain the most important insights on the issue gained from microeconomics. Don't forget to mention the likely winners and losers from a minimum wage increase. But again, **no jargon**, she won't follow you. **English only.**

When the government (or other institutions such as unions) doesn't get involved in setting the wage, the prevailing wage tends to be such that there are (within a few percentage points) the same number of jobs as people who want them. The reason for this is that if there were more jobs than workers, the wage would be bid up by competing firms until the wage were high enough to make the two equal. And if there were more workers than jobs, the wage would be bid down by workers in the same way. When the government raises wages by law, firms and workers respond differently: firms, facing higher production costs, want to cut back on workers. Workers, seeing a higher return to working, want to work more. The result is that there are more workers than jobs, and the wage level can't adjust to make them equal. This gap is called "unemployment." While raising the minimum wage means some workers earn more than before, it also means that *fewer* people find jobs (since the number of people actually working corresponds not to workers wishes, but rather firms' hiring) while *more* people want to work.

Increased unemployment is the main unintended effect of minimum wage increases, but there are others. For example, the higher unemployment tends not to be spread uniformly across the population; rather, it tends to be concentrated on groups of workers that are traditionally least favored by the labor market. Labor market data have shown that young people (and especially

minority youth) suffer much higher unemployment from minimum wage increases than the general population. The forced increase in production costs also gives firms an incentive to cut labor costs in other areas, such as benefits and working conditions for their workers; decreases in health coverage have traditionally followed minimum wage increases, for example. The irony of minimum wage laws is that they often do the most damage to the people they are intended to help. The winners from these policies, on the other hand, are often those considered to be less in need of income support: more mature workers, union members, and people who generally don't face discrimination.

2. You are having a policy discussion with a bright friend, a lawyer with no training in economics. You are talking about taxing tobacco to compensate states for their Medicaid costs in smoking-related illnesses among the poor. Your friend, who believes that tobacco companies are more to blame than smokers themselves for this cost to society, says that a tax should be levied on these companies; in this way, the tax pain will be felt by firms but not consumers. You respond that in reality, consumers of tobacco will be the ones who will probably pay much more than the firms. Your friend, surprised by your view, says this makes no sense. Explain to her why this so, in terms that she will understand. This means **no S & D curves** and **no use of the word "elasticity."**

How people react when the price of a good increases depends on the good: For some things, people don't react at all, whereas for others, any price rise will make consumers stop buying the good entirely. Cigarettes fall in the first category, mostly because people are addicted to them. You could double the price of tobacco, and most smokers would pay it (although they wouldn't like it). For goods like cigarettes, a tax on the seller is passed on to the buyer directly in the form of a higher price, because it *can* be--most consumers will pay the higher price (in effect reimbursing the sellers for the tax they must pay) without quitting smoking.

Note that this doesn't mean that the tobaccos companies are evil for passing on this tax, either; it's actually pretty hard for them *not* to. If they paid the tax themselves, they would be earning less in profits, and would probably want to scale back their operations as a result (sell fewer cigarettes in this country, for example, because it is a less lucrative market than before). This would lead to a shortage of cigarettes in the stores, and either smokers would start offering more for the scarce cigarettes, or the stores would start raising prices on their own. In the end, either the price of cigarettes will have risen for the smoker.