COMING UP FOR THE REST OF THE COURSE:
Today: Porter bottle bill paper
Tuesday: Chapter 9 (Human investment) and Gramlich's Perry Preschool Project paper
Thursday: He's gone to a conference, but Holly's in the classroom holding special office hours to talk about papers
Tuesday the 22nd: Railton article, course evaluation, LAST CLASS, paper due at the beginning of class.

PORTER'S BOTTLES
Michigan started requiring deposits on beer and soft drink containers back at the end of the 1970's.

- There were two rates of return: 5¢ for a standardized bottle that could be reused, 10¢ for idiosyncratic bottles (like Coke) that couldn't be reused.
- Every merchant who sold these beverages had to accept returnable containers. This added significantly to the convenience of returning these containers, which was a critical factor in the success of the program.

Benefits and costs at various stages of the container's "life cycle" (note that deposits are generally not a cost except to those consumers who don't return the containers or who break them so they can't be returned, but here most people did return them):
Bottler's costs could either rise or fall

- If they reused bottles, they didn't have to buy new ones, but they'd have to clean them and sort them, getting rid of damaged ones. Net result could be positive or negative.

Distributors costs would rise

- They have to store the empties and do the bookkeeping relating to deposit refunds. Warehousing and shipping empties is costly.

Consumer costs would probably rise a little

- In fact the price did rise. Two possible reasons:
    - Costs at the previous stages would rise and would be passed on to consumers
    - To the extent that distributors had market power, a cost decrease might not be passed on to consumers and in fact a

price increase might occur because of the excuse of the new law

Inconvenience cost to consumers of returning containers

- Porter's method of valuing this is very clever and a good example of reasonable benefit-cost analysis with lousy data

Litter reduction

- Reason for the law was not conservation of container raw materials, but litter: the hope was that either those who drank the beverages would return the containers rather than pitching them out the window, or that others would collect the containers that others pitched.
- Question is whether the civic pride of living in a clean state makes this a benefit-cost winner

Government cost saving

- cost of picking up litter reduced
- cost of waste disposal reduced

This is Porter's second study: one was done before the bill passed to estimate the effects of the bill. This one was done after the bill was in place, so he had more real information for this one.

Actual effects (containers are 12 oz.):

- Price rose somewhere between 3-5¢ for beer and 2-3¢ for pop/soda.
- Quantity consumed fell: beer dropped by 0.17 billion containers; soda/pop dropped by 0.11 billion containers.
- 95% of containers were returned. This was expected: Oregon had a 2¢ deposit and got the same result, so the price of the deposit doesn't give a better result (5% loss for damage and accidental trash)
- litter fell 85% (question whether that's all litter or just container litter; not clear from the paper)

How do we evaluate these things?

<u>government cost saving</u>: studies were done before and after to see what the costs were to clean up litter. The study he used was done in rural Michigan, where crews went out once per year to clean up the roads. Two ways that this could have changed: the Adopt-A-Mile program has since been started, and prisoner crews can be used (they cost less). It's a little easier to clean up urban areas, so he

tweaked the numbers to adjust for that fact and came up with a figure of $4 million savings.

There's also a savings for waste disposal; less tonnage has to be picked up and disposed of. Savings were $18 million.

Litter reduction: There's no way to put a dollar value on this because it depends on people's willingness to pay for living in a cleaner state, so he makes this a variable and then figures out how high it would have to be for the program to be a winner.

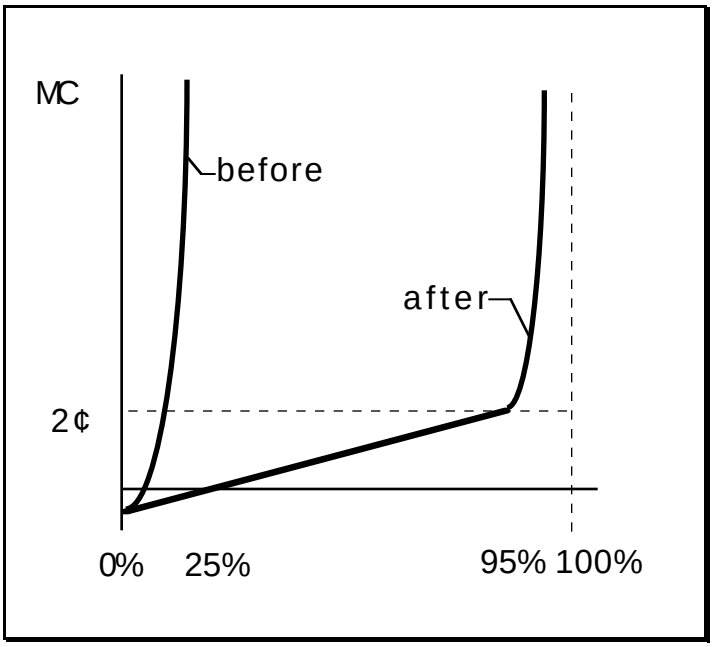
Miscellaneous unquantifiables: If these are small and hard to estimate, it's not worth trying to put a number to them, but they must definitely be included in a good paper (along with the reasons you ignore them) to keep your reader from thinking "what about this" and destroying your credibility. In this case, Porter mentions a couple of effects:

- There were a few recyclers in Michigan that supported themselves by accepting recyclable materials (bottles and cans especially) and selling them to companies. These people had a lot less to do after the bottle bill passed and would probably have been forced out of business. Also, the recycling of things that weren't profitable like newspaper no longer got done because they closed. This was probably a small cost.
- Waste disposal companies lost a little money, but landfill costs were saved. Land is expensive, and landfills are a finite resource, so the fact that they were filling up less quickly was a saving.

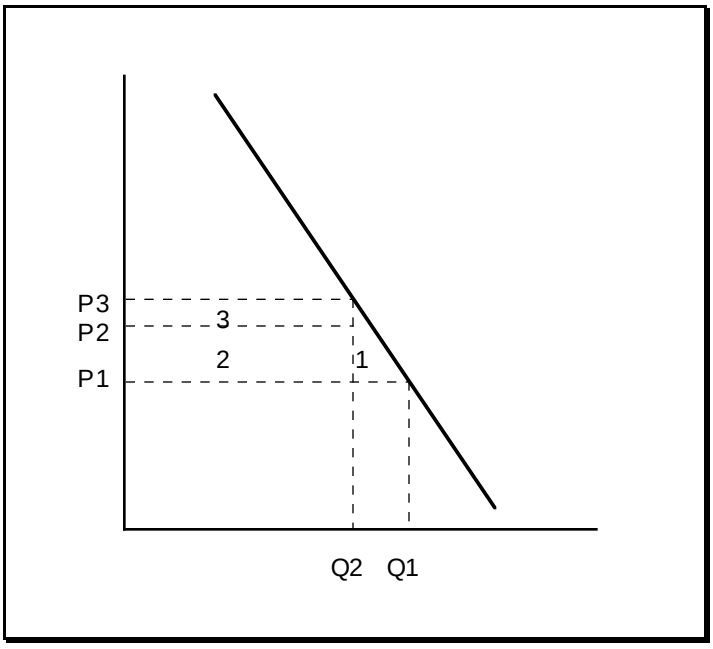
(finding counterbalancing unquantifiable costs and benefits and assuming that they pretty much cancel each other out is a great technique to simultaneously list all the issues and show that they won't make much difference to the bottom line).

Inconvenience costs: 0.7¢. We have pretty good information because we know that when there was no monetary gain from returning containers there was a relatively low return rate, but now that there's a deposit to be had 95% of containers were returned. There's both a monetary benefit and a psychological benefit (the environmentalist's personal pat-on-the-back). By doing a net inconvenience cost, we're accounting for the psychological benefit. The bottom line is that the maximum cost is the value of the deposit (if the inconvenience was worth more than the deposit the container wouldn't be returned). Oregon's experience, with a 2¢ deposit, got the same 95% return, so the inconvenience is probably bounded by a 2¢ per container upper bound.

See the paper for a good version of this graph of the before and after marginal costs and rates of recycling containers.



He assumes a linear form for the curve, running from the point where it crosses the axis at 25% to the 95% point. It's not entirely right, since we should include the little bit where the curve drops below the axis and cut out the part where it fell below the axis before the bill was passed.



P1 is the original price; P2 adds in the deposit cost; P3 adds in the inconvenience cost. This graph shows the change in consumer surplus.

Porter calculates areas 1 and 2, but not 3. Why is this? We're already counting this (0.7¢) in the list above.
1=loss from beer not consumed
2=loss from higher price on consumed beer
3=inconvenience cost.

He may be leaving out a couple of benefits to society: less beer drinking leads to fewer traffic fatalities and to marginally less noise from beer parties. These probably aren't very big.

If we were sure that the entire price increase was a cost increase in the chain of production, then this would all be a cost to society, but he thinks that some of the price increase was a monopoly power price increase, which means that they're charging a price above costs and some of this is a transfer from consumers to distributors. Porter suspects that part of the post-bottle-bill price increase was due to an exercise in monopoly power, so not all of this is a social cost.

He now has two variables: x for the reduction in litter, and μ for the percentage of the price change that is a true cost change. We also had a range of price increases (see above). He sums this all up in a graph showing a break-even area, a fail and a win area.