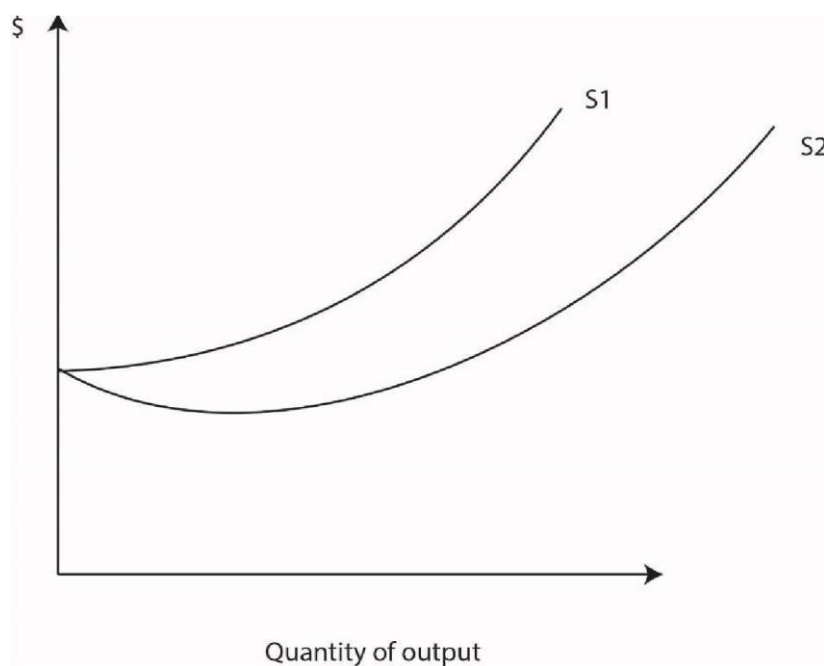


DIS Environmental Economics

An in-class exercise to get us thinking about cost-benefit analysis

1. Production-related benefits from reduced pollution

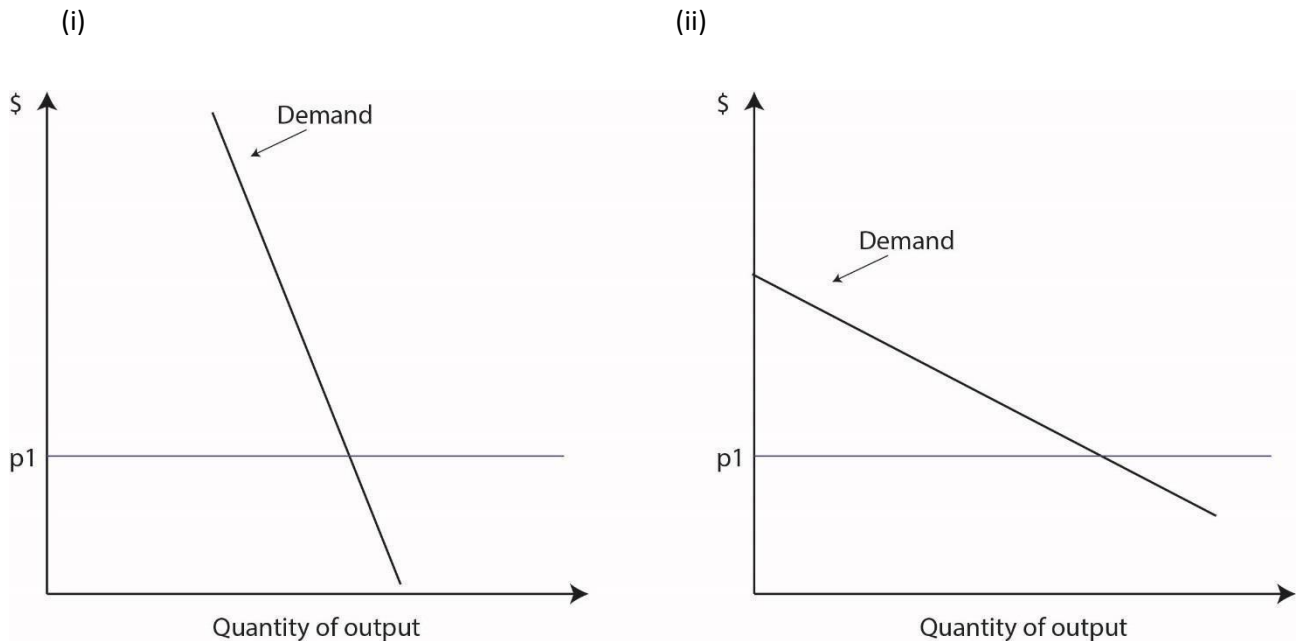
Imagine that a group of agricultural producers in New York State's Hudson Valley have been positively affected by reduced acid rain caused by a drop in sulfur dioxide emissions by upwind Rust Belt factories. This reduction in acid rain pollution will cause yields to increase in Hudson Valley farms, as is shown in the diagram below. S1 is the supply curve for the farmers *before* the improved air quality, while S2 is the supply curve after the improvement.



- Assuming that prices are unaffected by these output changes, draw in a price line (p_1) that intersects both supply curves.
- Mark the output levels at this price, both before (q_1) and after (q_2) the decrease in pollution.
- Shade in the area representing the value of the increased output. Is this area a good approximation of the net benefits of the decrease in pollution?
- Typically, production costs will change in response to diminished air pollution, as when farmers increase their use of certain inputs. In the example above, mark the total value of output—total costs and total net income—both before *and* after the change. Label the different areas accordingly.
- Based on the above, identify the areas representing the improvement in net income.
- If we do not already know the farm's supply curve, how might we measure the benefits of the reduction in pollution?

2. The effect of output adjustment on costs

Now consider those rust belt factories. In the diagrams below, the horizontal line ($p1$) is the supply curve representing marginal production costs at the Dirty Widget Factory in Cleveland. Sulfur dioxide control laws then cause production costs to rise.



- Draw an upward shift in the supply curve ($p1$) in both (i) and (ii). Mark the higher price $p2$.
- In figure (i), mark the quantity of output both before ($q1$) and after ($q2$) the price change. Similarly, in figure (ii), mark the quantity of output both before ($r1$) and after ($r2$) the price change.
- Indicate the areas representing the increased cost of producing the *initial* output. Label them a , b , and c in figure (i), and d , e , and f in figure (ii).
- Why does the above overstate the true costs? Mark the areas representing the true costs.
- Consider the difference between the figures (i) and (ii). What does the extent of the decline in output depend on?
- In which case (figure (i) or (ii)) is the original calculation (in part c) above) a better approximation to the true burden on society? Why?