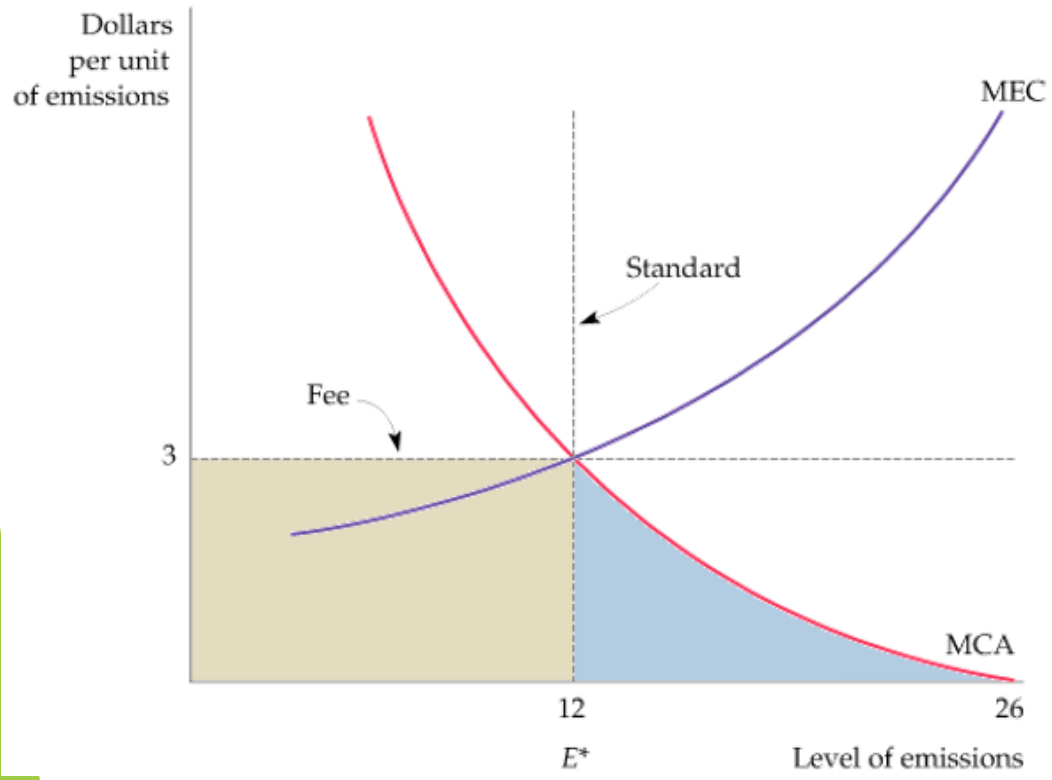
4.5 Are taxes more efficient than regulation (standards)?



- The efficient level of emissions at E* can be achieved through either a green tax or an emissions standard.
- Facing a tax of $3 per unit of emissions, a firm reduces emissions to the point at which the fee is equal to the marginal cost of abatement.
- The same level of emissions reduction can be achieved with a standard that limits emissions to 12 units.

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Problem

- Find the cost compliance of each policy knowing that
  - MAC = 15 – Q
  - MEC = 1 + (1/6)Q
- Which policy is less expensive for the firm?
  - Same emission abatement, lower cost
- Find the tax revenue generated by each policy
- Which policy generates more tax revenue?

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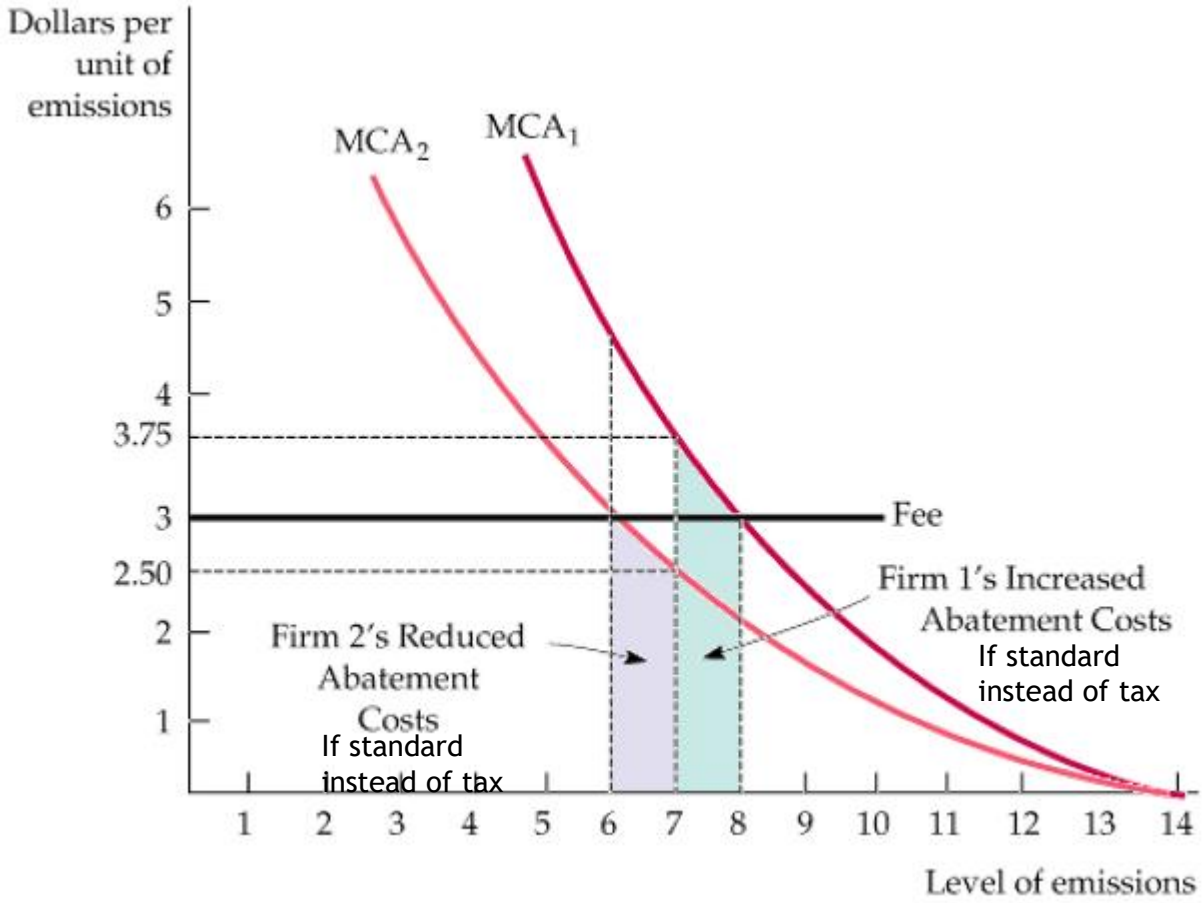
4.6 Are taxes more efficient than regulation (standards)?



- With limited information on the abatement technology used by firms, a single fee might be preferable to a single standard.
- The fee of $3 achieves a total emissions level of 14 units more cheaply than a 7-unit-per-firm emissions standard.
- With the fee, the firm with a lower abatement cost curve (Firm 2) reduces emissions more than the firm with a higher cost curve (Firm 1).
- Tax is the least-cost solution!
  - Static efficiency
- A tax gives more incentives to switch to greener technology.
  - Dynamic efficiency

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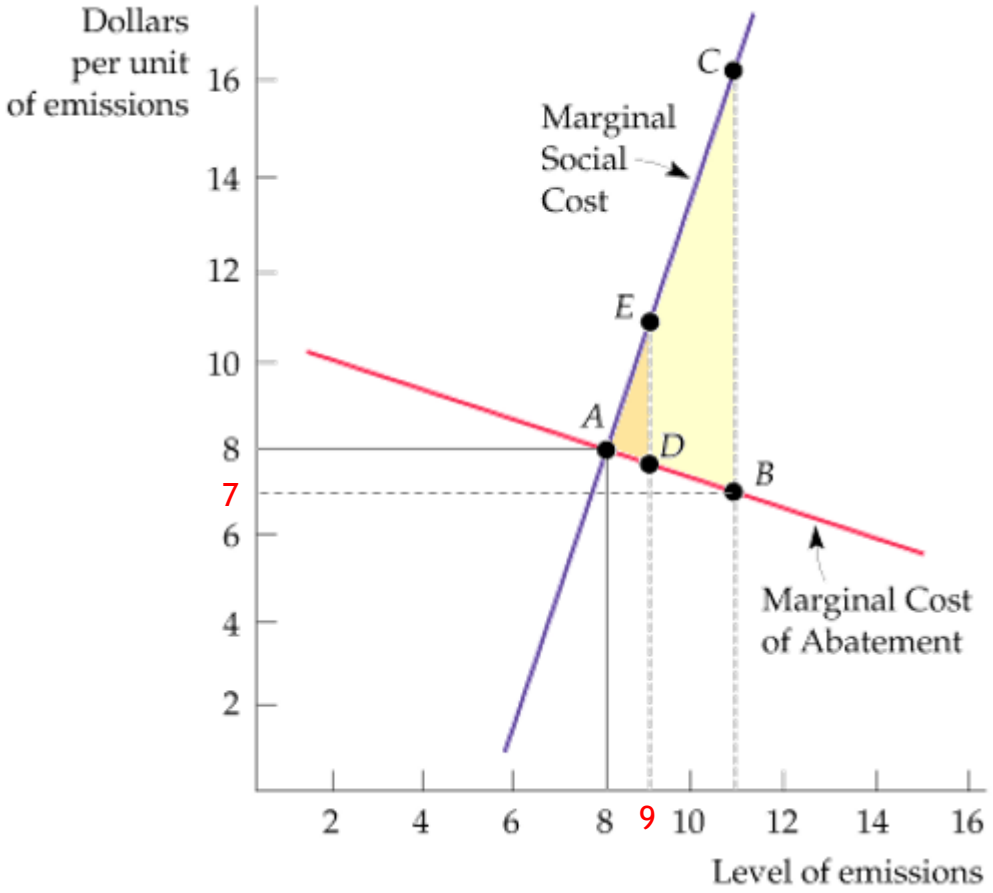
Problem

- Max emission quantity = 7
- Green tax = 3
- Find the abatement cost of each policy knowing that
  - $MCA_1 = 7 - (1/2)Q$
  - $MCA_2 = 5 - (1/3)Q$
- Which policy generates the lowest aggregate abatement costs?

4.7 Are taxes more efficient than regulation (standards)?



- When the government has limited information about the costs and benefits of pollution abatement, either a standard or a fee may be preferable.
- The standard is preferable when the marginal external cost curve is steep and the marginal abatement cost curve is relatively flat.
- Here a 12.5 percent error in setting the standard leads to extra social costs of triangle ADE.
- The same percentage error in setting a fee would result in excess costs of ABC.

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Problem

- MCA = 20 – (¼) Q
- MSC = – 10 + 4 Q

- Find the optimal standard and the optimal tax
- Estimate the social loss if the emission standard is 20% lower than the optimum.
- Estimate the social loss if the tax is 20% lower than the optimum.