Appendix

Marginal Carbon Abatement Costs and Demand

A linear regression model was utilized to determine the marginal cost of abatement of carbon for each sector.

Within the linear regression model, subtracting a quantity of "0" from the current level of emissions for each sector attained the marginal willingness to pay for the first unit of carbon abatement.

Thus the current level of emissions was inserted into each sector's function to determine this customer willingness to pay when (x=0).

Sector "A"

a.
$$Marginal\ Abatement\ Cost(A) = -8.6444767 + 0.5768419(Tons\ of\ Abatement)$$

b.
$$WTP\ at\ Current\ Emissions(A) = -8.6444767 + 0.5768419(180 - x)$$

c. Sector A is willing to pay $95.19 for the first unit of abatement

Sector "B"

a.
$$Marginal\ Abatement\ Cost(B) = 9.3176977 + 0.1987443(Tons\ of\ Abatement)$$

b.
$$WTP\ at\ Current\ Emissions(B) = 9.3176977 + 0.1987443(200 - x)$$

c. Sector B is willing to pay $49.07 for the first unit of abatement

Sector "C"

a.
$$Marginal\ Abatement\ Cost(C) = -11.6550307 + 0.7838266(Tons\ of\ Abatement)$$

b.
$$WTP\ at\ Current\ Emissions(C) = -11.6550307 + 0.7838266(220 - x)$$

c. Sector C is willing to pay $160.79 for the first unit of abatement
d. Sector C is willing to pay the most for abatement

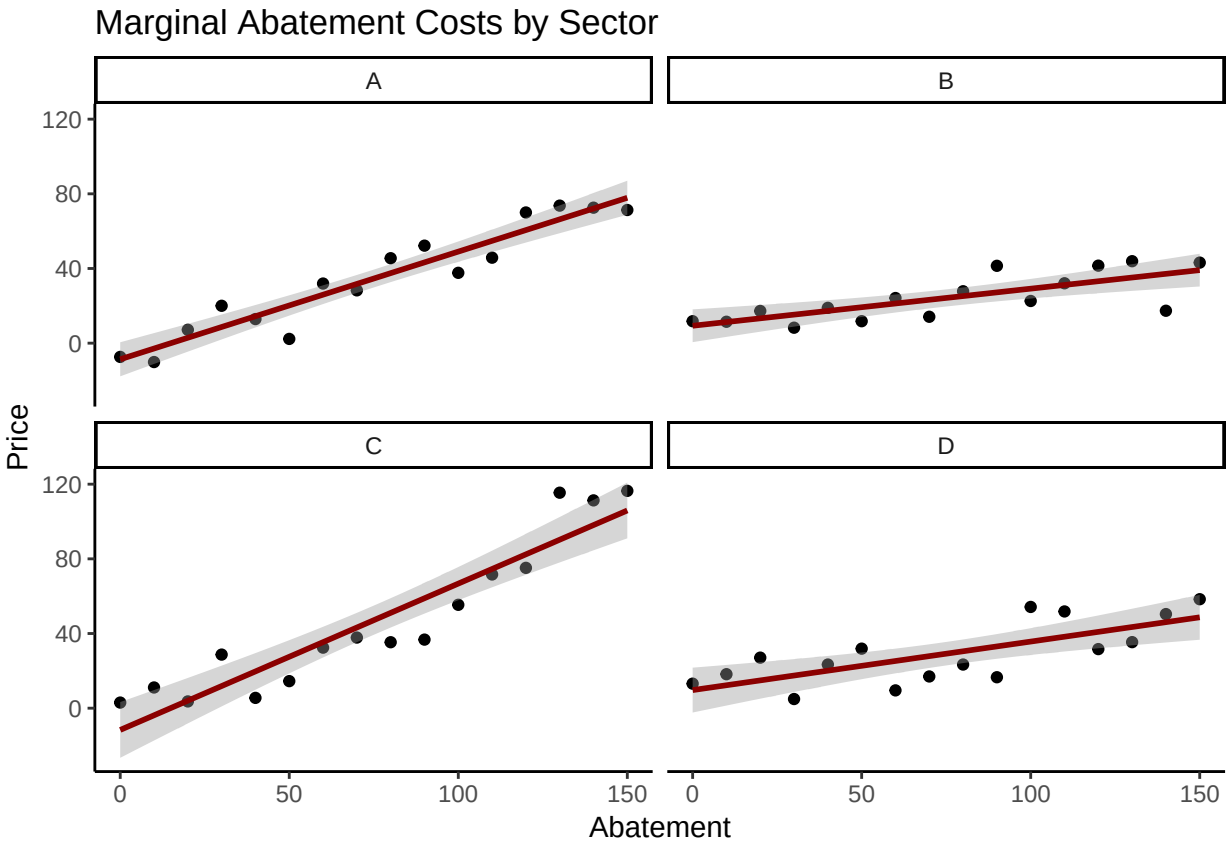
Sector "D"

a.
$$Marginal\ Abatement\ Cost(D) = 9.6875061 + 0.2599275(Tons\ of\ Abatement)$$

b.
$$WTP\ at\ Current\ Emissions(D) = 9.6875061 + 0.2599275(300 - x)$$

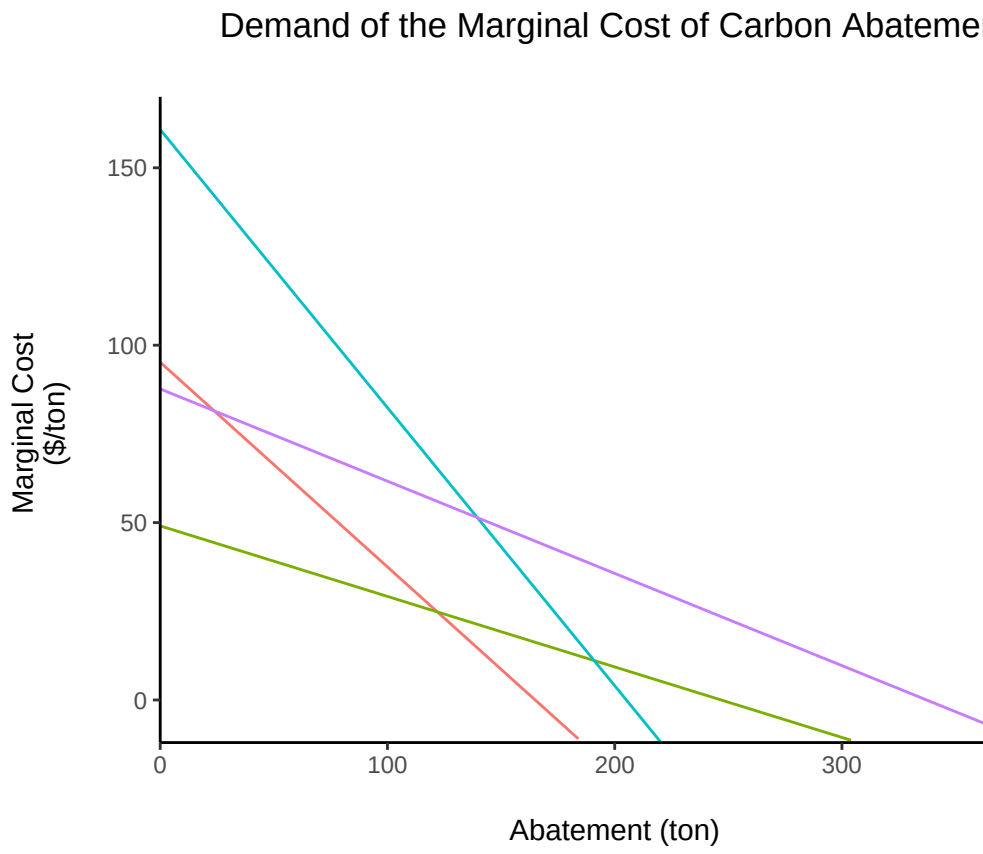
c. Sector D is willing to pay $87.67 for the first unit of abatement

Graphical Representation of Marginal Abatement Costs



Demand of Emissions

At any quanity, x, the marginal cost of abatement can be obtained using the above functions and substracting "x" from the current emissions scenario. The demand curves for each sector were determined through sequential



marginal willingness to pay estimations.

$$MC_A = -0.5768419(Emissions) + 95.18707$$
$$MC_B = -0.2453285(Emissions) + 49.06656$$
$$MC_C = -0.7308526Emissions) + 160.7868$$
$$MC_D = -0.2922217(Emissions) + 87.66576$$

Cutting Carbon Emissions in Half: Analyzing 3 Policies

Policy Option 1: A Cap on Carbon

Marginal cost of abatement curves for each sector are used to calculate the total cost of abating by 100 tons. The area underneath the marginal cost of abatement curve from 0 to 100 gives the total cost of abatement for that sector. The total cost of carbon cap is the sum of the costs of three sectors.

1. Total Cost of Carbon Cap

The total cost of the carbon cap is $6698.88

2. The Total Cost of a Carbon Cap for Each Sector

The total cost for Sector A is $2019.76

The total cost for Sector B is $1925.49

The total cost for Sector C is $2753.63

3. The Tax Revenue Generated from a Carbon Cap

There is no tax revenue generated with a carbon cap

Policy Option 2: A Tax on Carbon

1. The Total Cost of a Carbon Tax

The optimal tax is $39.43

The total cost of a carbon tax is $17707.79

2. The Total Cost of a Carbon Tax for Each Sector

The cost to Sector A is $5095.16

The cost to Sector B is $5604.46

The cost to Sector C is $7008.16

3. The Tax Revenue Generated from a Carbon Tax

The total tax revenue is $11827.97

Policy Option 3: A Cap and Trade Program

1. The Total Cost of a Carbon Cap and Trade Program

The total cost of a carbon tax is $5997.74

2. The Total Cost of a Carbon Tax for Each Sector

The cost to Sector A is $1939.66

The cost to Sector B is $1779.91

The cost to Sector C is $2278.18

3. The Tax Revenue Generated from a Carbon Tax

There is no tax revenue generated with cap and trade program