

Index of State Abatement Costs

This discussion is taken from Levinson (2001). The state pollution cost index compares the *actual* pollution abatement costs in each state, unadjusted for state industrial composition, to the *predicted* abatement costs in each state, where the predictions are based solely on nationwide abatement expenditures by industry and each state's industrial composition. Let the actual costs per dollar of output be denoted

$$(A.1) \quad S_{st} = \frac{P_{st}}{Y_{st}}$$

where P_{st} is pollution abatement costs in state s in year t , and Y_{st} is the manufacturing sector's contribution to the gross state product (GSP) of state s in year t . By failing to adjust for the industrial composition of each state, equation (A.1) likely overstates the compliance costs of states with more pollution-intensive industries and understates the costs in states with relatively clean industries.

To adjust for industrial composition, compare (A.1) to the *predicted* pollution abatement costs per dollar of GSP in state s :

$$(A.2) \quad \hat{S}_{st} = \frac{1}{Y_{st}} \sum_{i=20}^{39} \frac{Y_{ist} P_{it}}{Y_{it}}$$

where industries are indexed from 20 through 39 following the 2-digit manufacturing SIC codes, Y_{ist} is industry i 's contribution to the GSP of state s at time t , Y_{it} is the nationwide contribution of industry i to national GDP, and P_{it} is the nationwide pollution abatement operating costs of industry i . In other words, \hat{S}_{st} is the weighted average pollution abatement costs (per dollar of GSP), where the weights are the relative shares of each industry in state s at time t .

To construct the industry-adjusted index of relative state stringency, S_{st}^* , divide actual expenditures in (A.1) by predicted expenditures in (A.2).

$$(A.3) \quad S_{st}^* = \frac{S_{st}}{\hat{S}_{st}}$$

When S_{st}^* is greater than 1, that indicates that industries in state s at time t spent more on pollution abatement than those same industries in other states. When S_{st}^* is less than 1, industries in state s at time t spent less on pollution abatement. By implication, states with large values of S_{st}^* have relatively more stringent regulations than states with small values of S_{st}^* .