A simple market game
(to illustrate the relevance of strategic actions)

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There are 5 firms in a potential pollution permit market. Only the firm itself knows its own marginal abatement cost function, $MAC(z_i)$. Each firm has an initial emission level, z_i^o, and each firm is freely given pollution permits that is half of its initial emission level, i.e., $z_i^p = ½\ z_i^o$. Before the tradable permit market was introduced, total emissions, $Z^o = \sum_i z_i^o = 434$. The benefits from emissions reductions are not known, but the politicians have firmly decided to cut emissions to half of the initial amount.

The initial marginal abatement cost functions are all of the format $MAC(z_i) = (z_i^o - z_i) / \sqrt{z_i^o}$.

Extra: By making an investment of $z_i^o \sqrt{z_i^o}$ firms can get the new marginal abatement cost function $MAC_{new}(z_i) = ½ (z_i^o - z_i) / \sqrt{z_i^o}$. Under what conditions should the term invest? Can you figure out the analytical expression?

Suggested answer follows on the next page (*not available yet – it is not supposed to be that easy*) ...