

Written comments on Charge Question #2, by Jinhua Zhao

The charge question:

Section 3 of the report briefly describes potential reasons ex ante and ex post estimates might differ. Have we accurately described the various hypotheses? If not, how can this discussion be improved? Are there other hypotheses that should be included or considered?

Comments:

The report does a good job in amassing and explaining the variety of reasons for discrepancies between ex ante and ex post cost estimates. It lists such factors as industry incentives to overstate their costs in order to influence policy to their favor, induced innovation after implementation of regulations, changing market conditions over time such as the reduction in costs of transporting low sulfur coal in SO₂ regulation, etc.

The report provides a rather exhaustive list of factors that are prone to causing wedges between ex ante and ex post cost estimates. My main comments are regarding the grouping and classification of these factors. For some factors, the direction of the ex ante and ex post differences can go both ways, but for others, there is strong theoretical (and sometimes empirical) argument for the differences to go one direction only. On the other hand, it might be easier to “correct for” some differences but not for others. I recommend an alternative way of classification to highlight these features.

- Ex ante and ex post differences due to inherent uncertainties. Fundamentally ex post costs are dependent on *realizations* of states of nature, while ex ante the best one can do is to estimate the *distribution* of the states of nature. As such, differences, even large differences, are genuine features of imperfect information and are hard to correct. This kind of differences can go both ways, but if the ex ante distribution is skewed, the ex post realizations are asymmetrically distributed around the ex ante mean, leading to a higher probability of the ex post realization above or below the mean depending on the direction of the skewness.
- Differences arising from asymmetric information and strategic (mis-)reporting. Since the EPA often relies on the regulated industries for cost information, these industries might have incentive to strategically misreport their private information. Predominantly misreporting takes the form of over-reporting the compliance costs rather than under-reporting especially at the aggregate level. Over-reporting is more likely and of a higher magnitude when (i) more is at stake for the industries, (ii) the firms are more effectively organized and are more homogeneous, (iii) the degree of information asymmetry is high (e.g., lack of correlated information from objective third parties), and (iv) opposing groups (such as consumer groups) are more pronounced in voicing their opinions. (Note

that the four kinds of factors provide, at least theoretically, guidelines about the *drivers* for misreporting and possible ways of correction such as utilizing results from the mechanism design literature.)

- Differences due to firm responses to regulation. This includes induced innovation as well as other gradual responses such as using different inputs. The endogenous firm responses will make ex post costs lower than ex ante estimates.
- Differences due to exogenous shocks. They include exogenous changes in market conditions, in (related but separate) regulations, and in natural conditions after the implementation of the regulation. Ex ante and ex post differences can go either way. Although efforts can be made to better assess future changes, such shocks are difficult to be fully accounted for in ex ante cost estimation.
- Other factors, such as less than complete implementation.