Tightening vehicle emissions standards resulted in higher rates of automaker non-compliance, new research shows

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A new study focused on the auto industry finds that tightening emissions standards not only fails to curtail on-road emissions, but actually

increases the likelihood of non-compliance by automakers.

In the paper "The Effects of Tightening Standards on Emissions", to appear in *Production and Operations Management*, researchers confirm the relationship between increased threshold-based regulations and non-compliance in the auto industry. The study also found higher non-compliance rates in automakers facing greater substitution pressure from competitors, as well as those with less advanced emissions control technology.

The study, co-authored by Kejia Hu from Vanderbilt Owen Graduate School of Management, Sunil Chopra from Northwestern University's Kellogg School of Management, and Yuche Chen from University of South Carolina, uses on-road data collected from the European Union between 2000-2014, a period in which regulators tightened restrictions on Nitrogen Dioxide (NO_x) three separate times.

"The main issue here is that the EU is using a straightforward cutoff standard. You have to hit the score to make it," explained Hu. "Anything like that is easily going to trigger unethical conduct."

This phenomenon isn't limited to the auto industry, although the 2015 Volkswagen emissions scandal is a well-known example. The paper mentions several instances of high-profile, threshold-based non-compliance, from dairy providers to accounting firms and financial institutions.

According to the researchers, the non-compliance stems from conflicting interests and external forces that impact automakers' strategic approach.

Economically, automakers have little financial incentive to abide by the tight emissions standards. The most common ways to meet emissions thresholds are to install expensive catalytic converters or reduce the

weight or horsepower of the vehicle. Price and safety are at the top of a car buyer's consideration list. "Emissions performance" is either at the bottom or hard to evaluate for a regular buyer. Non-compliant automakers are left with an unappealing set of options: increase the sticker price (or take a hit on profitability), reduce the perceived safety, exit the market, or cheat.

Moreover, other potential factors do not dissuade automakers from skirting the emissions requirements. Social pressure can be a powerful influencer but has not been in this particular arena. Regulatory oversight, as exhibited by the study's findings, has not been effective enough to compel compliance.

The co-authors recommend policymakers several options to address the study's findings: accompany tighter standards with stricter monitoring, regulate on technology instead of performance or offer credit-borrowing for automakers.

Hu noted that a switch from thresholds to guidelines or alternative requirements give companies more room to operate ethically. "In the electricity market, if you don't make the guideline, you can buy credits," she said. "Or we could get rid of outcome-based rules and change the requirement to a type of technology."

The authors urge policymakers and managers across industries to take note of their study. "When setting limit-based performance goals in situations with conflicting interests and imperfect monitoring," the paper states, "they should anticipate non-compliance from the regulated parties." The unintended consequence can occur in both public domain and private entities.

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