

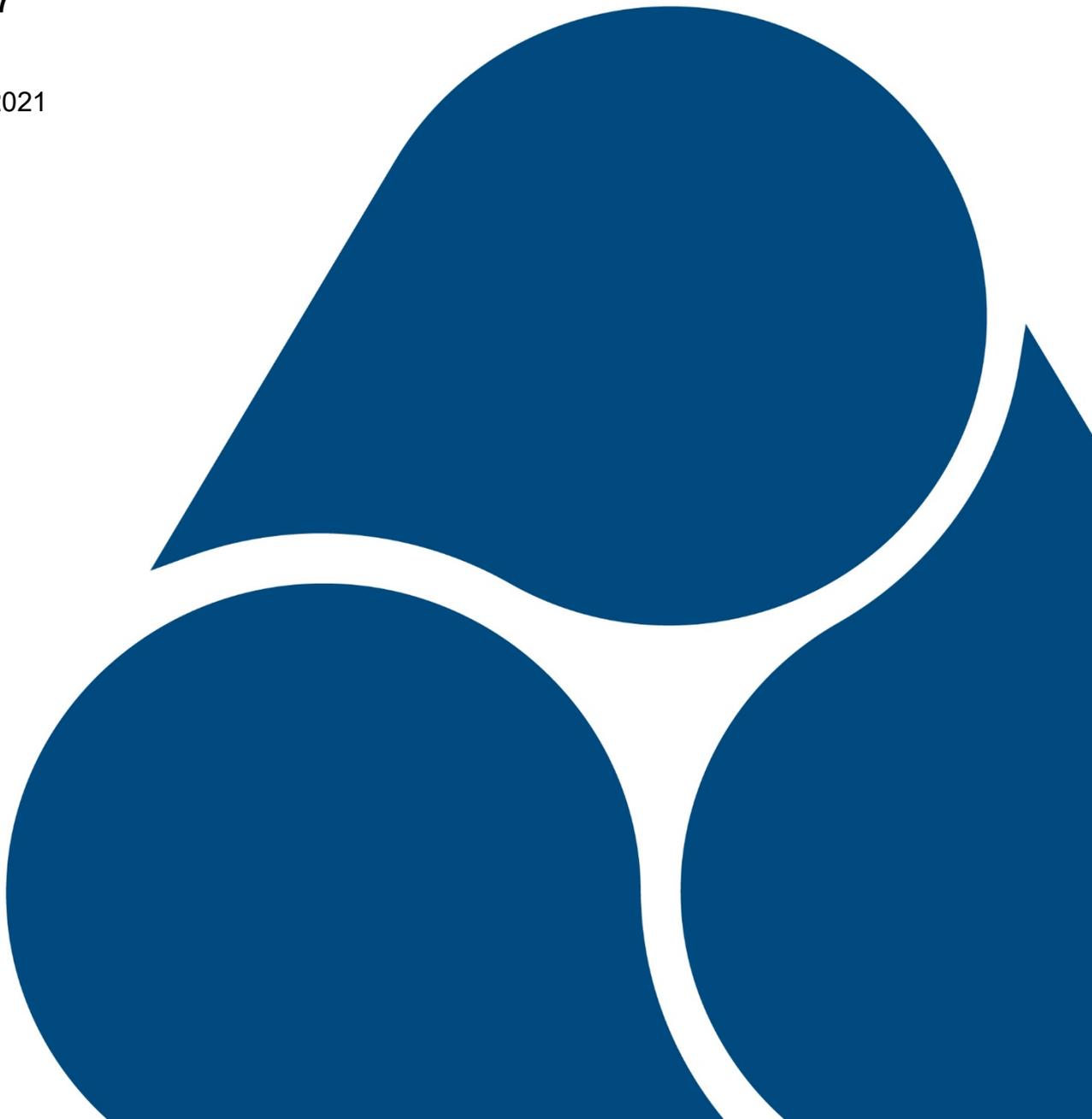


Office for Product  
Safety & Standards

# **The effect of transparency, penalty size and business size on safety regulations compliance**

Research Report of an Experimental Compliance Study:  
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# Backfiring effects of unequal penalty rates

A report for the Office for Product Safety and Standards (OPSS) by Christoph Kogler and Marcel Zeelenberg from Tilburg University, Jerome Olsen from Max Planck Institute, Bonn University, and Magda Osman from Judge Business School, University of Cambridge.

The views expressed in this report are those of the authors, not necessarily those of the Office for Product Safety and Standards or the Department for Business, Energy & Industrial Strategy (nor do they reflect Government policy).

## Effects of financial incentives and penalties

In our experimental study we investigated circumstances under which penalties can have unintended backfiring effects. Classical economic theories assume that financial incentives and penalties have clear positive effects on behaviour. Rewards and incentives are expected to reinforce desired behaviour and penalties for wrongdoing should result in amendment. In the context of compliance with authorities' regulations, control and sanctions are assumed to be main determinants of rule following. However, instances of counter-intuitive effects of such deterring factors have been identified in different relevant research fields. In this research project funded by the Office for Product Safety and Standards, we investigated potential backfiring effects of penalties, more specifically whether unequal penalties rates for non-compliance of businesses attenuate the effect of penalties when this penalty scheme is known.

## Aim of the conducted studies

In our experimental study, we let participants take on the role of a business owner that manufactures toys. They had to fill in a form and spend a certain amount of their virtually earned income as compliance costs to adhere to safety rules. The probability of being audited, the compliance costs due, and the business income varied systematically over the multiple rounds of the experiment. Importantly, participants were assigned to businesses with either higher or lower income, and we tested the effect of different penalty schemes and whether information on penalties other businesses faced was accessible or not. Compliance decisions in the experiment as well as potential controls resulting in penalties directly affected the final payoff. After making several decisions that impacted whether or not they were compliant, participants completed a short questionnaire, including attention checks, measures of risk propensity and norm following, as well as demographic information. Here are the three main research questions that were tested:

- Does an unequal penalty rate for businesses with higher income in contrast to businesses with lower income result in an attenuated effect on relative compliance when this information on different penalties is accessible than when it is not accessible?
- Does probability of being controlled, relative compliance costs and fluctuations in income influence relative compliance?
- Do differences in business income (low vs. high business income) influence compliance with safety regulations in general?

## Sample

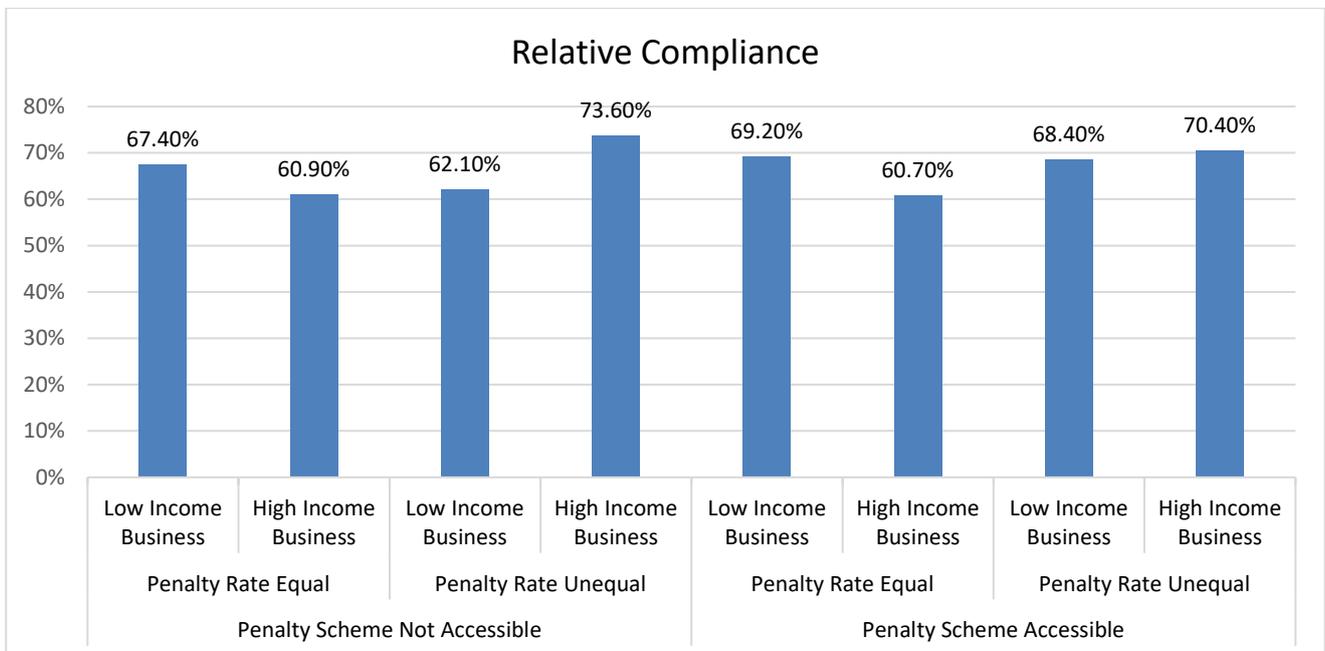
666 participants (243 men, 418 women, 5 other) living in the UK were recruited via the research platform Prolific Academic for remuneration. Their mean age was 34.89 years (median = 31; standard deviation = 12.86 years) and the mean payoff was £ 6.18 (standard deviation = 0.89).

## Results

Here are the most important insights from the study:

- When information on the penalty scheme is not accessible (businesses are only informed about their own penalty rate), and penalty rates are equal, then we observe higher compliance of low-income businesses compared to high income businesses. If the penalty rates are unequal (higher for high-income businesses), we observe a deterrence effect, i.e., higher relative compliance of high-income businesses.
- When the penalty scheme is fully accessible (businesses are also informed about the penalty rates that apply to other businesses as well as their own) and penalty rates are equal, higher relative compliance of low-income businesses is observed. Importantly, when an unequal penalty scheme is in place and this information is accessible, high-income businesses facing higher relative penalties are not more compliant than low-income businesses facing lower penalty rates. In this case average rates of compliance of high-income businesses are lower compared to the exact same situation where no information on other businesses' penalty rates is available. Figure 1 presents the observed influence of unequal penalty rates when the penalty scheme was accessible and when it was not accessible.

Figure 1: The effect of unequal penalty rates on relative compliance



The y-axis indicates relative compliance, the x-axis the experimental condition, as indicated by accessibility of penalty scheme (accessible vs. not accessible), penalty scheme (equal vs. unequal) and business income (low vs. high).

- We observe an effect of probability of control and compliance costs, as well as a small effect of income fluctuation. Accordingly, a higher probability of control resulted in higher relative compliance. More compliance costs lead to lower relative compliance. Independent of the differentiation of higher versus lower overall business income, comparing rounds with the higher income to rounds with lower income, we observe less relative compliance when income is higher.
- Considering only the experimental conditions in which big and small size companies faced the same penalty rates (i.e., the symmetric conditions), we find a difference in compliance between businesses of different size. Big businesses exhibited a significantly lower relative compliance compared to small businesses.

## Conclusion

We find that the deterring effect of a higher penalty rate for high income businesses in contrast to low-income businesses works when the penalties are scaled to the size of the business and knowledge of this is not made available to all businesses. However, when information about such an unequal penalty scheme is available to all businesses, the effect of the higher relative penalty is attenuated, resulting in lowered relative compliance of big income businesses.

Also, participants react in a similar way to changes in probability of auditing (highly likely vs. unlikely to be audited) and compliance costs, but in conditions where they face an unequal penalty scheme, average levels of compliance drop. While this was found in a simulated environment under laboratory conditions, it is likely that scaling the size of penalties to the size of the business may impact compliance rates to an even greater degree in reality. The reason for this is that participants in our experiment did not have to expend effort for their income (they received tokens to play with in the simulated environment), and therefore general less emotionally invested than real business owners.

Therefore, we would expect even greater decreases in compliance rates where penalties increase with the size of the business and all business types are aware of this. In combination with the finding that perceived unfairness of the scaled penalty scheme was associated with lower general compliance this suggests that penalty schemes that might be perceived as potentially unfair procedures can produce unintended negative effects on compliance of regulations administered by authorities.

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