

Justyna GODAWSKA

FRAMING EFFECT AND PUBLIC SUPPORT FOR THE ENVIRONMENTAL POLICY

Justyna **Godawska**, PhD (ORCID: 0000-0002-7470-7696) – *AGH University of Science and Technology*

Correspondence address: Gramatyka Street 10, 30-067, Kraków, Poland e-mail: jgodawska@zarz.agh.edu.pl

ABSTRACT: Framing effect consists in the fact that how a problem is presented (or framed) affects the decision maker's perception of the problem and their preferences. Public opinion about the environmental policy can vary depending on how the aims and consequences of particular policy actions or instruments are featured. The paper aims to exa-mine how alternative ways of framing SO_2 pollution problem (highlighting consequences for human health, nature and state finance) affect the public support for abatement policy (emission fees and emission trading) and bearing higher heating costs. The research made use of an experiment with students as participants. The results were analysed using the two-sample t-test. The findings suggest that highlighting the impact of environmentally damaging behaviour on human health may increase the public support for the imposition of environmental policy instruments and may encourage voluntary actions aimed to protect the environment.

KEY WORDS: behavioural economics, environmental policy, framing effect

Introduction

The mainstream environmental policy theory is based on the neoclassical economics assumption of *homo economicus* always acting with unbounded rationality and self-interested motives. This assumption can be found among others in Pigouvian negative externality analysis, Coasian property rights approach to pollution control, cost-benefit analysis of environmental changes, and common property resource management (Venkatachalam, 2008). However, individuals do not always react to environmental policy instruments as predicted by neoclassical economics. Human behaviour, determined by many psychological circumstances, often deviates from the *homo economicus* pattern. That is why some environmental economists move towards the theory of behavioural economics (including prospect theory, framing effects, decision biases, hyperbolic discounting) which offers more realistic views on human behaviour.

On the basis of behavioural economics foundations, R. Thaler and C. Sunstein developed the nudge theory. This theory assumes changing behaviour by modifying the choice architecture through the use of nudges (Cooper, 2017, p. 11). A nudge can be defined as a way of 'influencing choice without limiting the choice set or making alternatives appreciably more costly in terms of time, trouble, social sanctions, and so forth' (Hausman, Welch, 2010, p. 126).

The concept of using nudges in public policies has gained popularity among others in the UK and the US. The nudge can be seen as 'a substitute for more conventional coercive interventions such as command and control regulation' (Van der Heijden, Kosters, 2015, p. 4), so-called 'behaviourally informed interventions' (Olejniczak, Śliwowski, 2014, p. 24). An example of using nudges in public policies can be an appropriate framing, i.e. a congruent way of presenting the information.

The aim of the paper is to examine how alternative ways of framing (or presenting) sulphur dioxide (SO_2) pollution problem (highlighting consequences for human health, nature and state finance) affect the public support for abatement policy (emission fees and emission trading) and bearing higher heating costs. This study contributes to the discussion of behaviorally informed interventions in environmental policy as the human health and financial frames remain relatively under-researched. According to the best of the author's knowledge, framing SO_2 pollution issue taking into account impacts on human health, nature and state finance have not been considered in the literature before. The study provides new insights into framing the pollution problem in terms of economic consequences for state finance in an unexplored setting by investigating the public support for environmental

policy in one of the new European Union member states (i.e. Poland), in which the EU membership is an important political and social issue.

Behavioural aspects of environmental policy

Consequences of human biases resulting from bounded rationality and other psychological circumstances can be observed, among others, with regard to environmental policy. As for Croson and Treich notice, the environment is often associated with strong moral feelings (guilt, shame, pride etc.), which may affect citizens' beliefs and attitudes toward green consumption, policies and politics. Moreover, many environmental issues are complex and have the nature of public goods. They also often have long term and global effects, increasing the scope for bounded rationality (Croson, Treich, 2014, p. 336).

Environmental policy, as other areas of public policy, has to face different risks. According to some experimental research, people tend to systematically misjudge the expected impact of low probability, high-severity events such as catastrophic climate change, biodiversity loss, pest/disease invasion or nuclear disaster. These misperceptions can lead to inefficient levels of insurance and risk prevention, as well as incorrect economic valuations of environmental risks (Shogren, 2012, p. 5). The perception of risk by the public may be very different from that of experts, contrary to what is assumed in the neoclassical theory. An example of the risk perception bias in air pollution is the observed overestimation of risks associated with outdoor air pollution compared to those associated with indoor air pollution (Carlsson, Johansson-Stenman, 2012, p. 87). The problem resulting from the misperception of risks is the choice of the risk perception on which to base environmental policy: on the perception of risk by the public, by experts, or on other criteria (Carlsson, Johansson-Stenman, 2012, p. 88).

Crowding out effects are another behavioural aspect of environmental policy, neglected in the neoclassical environmental economics. They consist in the fact that financial incentives affect moral obligations to behave pro-environmentally. People can be deprived of the feeling of having done something good and thus can become less motivated intrinsically to behave in this way if altruistic actions are monetarily rewarded. What is more, compensating the effects of their behaviour can make them believe that they have a right to deviate from pro-environmental behaviour, in other words, that they have the right to pollute (Garcia-Sierra et al., 2015, p. 295).

For most people, self-image and social approval are important. They care about how they perceive themselves and how others perceive them. In terms

of environmental issues, people usually want to see themselves and be seen as responsible citizens. As Carlsson and Johansson-Stenman point out, 'the existing literature on ecolabeling and green consumerism, as well as that on fair trade, has often been framed within a classical market context in which price and quality are the drivers of consumer choice. However, consumers may also be concerned with the choices made by other consumers, and people's consumption decisions may therefore not be independent of social context' (Carlsson, Johansson-Stenman, 2012, p. 81).

The knowledge of behavioural patterns and biases of which examples are described above can be used in the environmental policy-making process, in the policy design and implementation (OECD, 2017). A key policy instrument in this context is 'green nudges' that make environmental behaviour of individuals be influenced by subtle modifications of their decision context. Among 'green nudges' aimed at promoting environmentally responsible behaviour, there are those:

- capitalizing on consumers' desire to maintain an attractive self-image through 'green' behaviour, by either simplifying product information or by making certain product characteristics more salient,
- exploiting people's inclination to 'follow the herd', i.e. to imitate the behaviour of their peers; e.g., by conveying certain social norms through peer comparison,
- exploiting the behavioural effects of purposefully set defaults that stipulate what happens if people don't actively choose (Schubert, 2017, p. 329-331).

Thus, the behaviourally informed interventions of the policymakers to tackle environmentally damaging behaviour include, among others, simplification of complex environmental information aiming to prevent information overload, framing of information in order to arouse desirable attitudes of individuals, changes to the default policy, changes to the physical environment, use of social norms, comparisons and timely feedback mechanisms. The practical examples of 'green nudges' can be:

- framing of energy efficiency labels aiming to focus on the savings that individuals could gain when choosing the best-in-class electric appliance in terms of energy efficiency,
- · the proper location and colour of recycling bins,
- sensor-based water taps,
- messages on the water bill comparing the household's consumption with the average household in the same neighbourhood,
- placing stickers emphasising the need to save water next to faucets,
- the default setting of thermostats at a lower temperature,

• real-time feedback on energy consumption through in-home displays (OECD, 2017, p. 4-5 and 8).

According to the OECD report (2017, p. 7) the majority of interventions are based on simplification and framing of information.

Framing effect as a cognitive bias in the environmental setting

When the same problem is framed in different ways, the psychological principles governing the perception of decision problems and the evaluation of probabilities and outcomes produce predictable shifts of individual's preference (Tversky, Kahneman, 1981, p. 453). Framing effect occurs when presenting information in different modes changes how people make judgments and decisions about equivalent choice problems. The literature suggests that the framing effect is critical to our understanding of how people make decisions, and especially choices involving risk (Carpenter, 2018).

Tversky and Kahneman have identified three particular types of framing that can result in actions that are anomalous by:

- framing of acts, referring to the question of whether two decisions are presented independently or in tandem,
- framing of contingencies, referring to whether a possibility is presented as more or less contingent or certain, and
- framing of outcomes referring to whether outcomes are presented as gains or losses in respect of the status quo (Nash, 2006 p. 318).

Framing effects with regard to environmental problems or policy are among the topics more and more often undertaken in the literature on behavioural, environmental economics. This is the case especially for climate change consequences and mitigation policy. Some studies presented below investigate how different framing impacts public opinion on environmental problems and policy actions.

The results of research on the effect of the message frame on attitudes towards sustainability and energy consumption in Belgium indicate that to promote and strengthen pro-environmental behaviour it is necessary to emphasize possibilities of overcoming environmental problems rather than the gravity of these problems. This case is similar to the so-called "Asian disease problem". Additionally, according to the research findings, the framing effect depends on age, gender, education level, and pro-environmental attitude (Van de Velde et al., 2010).

Severson and Coleman (2015) assessed the effects of various frames (moral, scientific, and economic) on support for climate change mitigation policies. The religious, moral frame emphasized the stewardship of humans

over God's creation, whereas the secular one accentuated widely shared values such as a duty to one another or concern for future generations. The economic frame took two forms: an equity frame and an efficiency frame. The former emphasized the uneven distributional effects of climate change among poor island countries and the latter referred to the costs and benefits to the United States of taking action on climate change. The negative science frame highlighted the negative consequences of inaction in the face of climate change, and the positive science frame underlined the positive consequences of climate change mitigation action. The research results are mixed. The positive and negative scientific frames, the secular moral frame, and the economic equity frame had the potential to increase public support for climate change mitigation policies, whereas the religious, moral frame and the economic efficiency frame were ineffective at enhancing this support.

The influence of framing climate change in terms of perceived scientific consensus about its environmental consequences was also investigated by van der Linden et al. (2015). Using pre and post measures from a national message test experiment in the US, they found that increasing public perceptions of the scientific consensus was significantly and causally associated with an increase in the belief that climate change is happening, human-caused and a critical threat. In another study (van der Linden et al., 2014) they present results of the research aimed at testing the efficacy of different ways to communicate the consensus-message (a descriptive text, a pie chart, and metaphorical representations) on climate change. According to their findings a visual form, i.e. a pie chart is the most effective in conveying the message about the scientific consensus due to its simplicity, shortness, and easiness to comprehend and remember.

In an experimental approach, Cason and Raymond (2011) used environmental framing as a treatment variable in the context of an emissions trading system with voluntary reporting of emissions and imperfect enforcement in order to investigate whether environmental framing influences behaviour towards pollution control and reporting. The imperfect enforcement was modelled as random inspections to determine whether pollution reports were accurate, with monetary fines imposed for under-reporting. In environmental framing, the item being traded was described as an emissions permit, and experiment participants were required to report pollution of greenhouse gas emissions at the end of each period, whereas in neutral framing participants traded "coupons" and reported a "number". The research result suggests that environmental framing reduced subjects' incentives to honestly report pollution to the experimental regulator due to the negative connotation of being a larger polluter. These results persist even when controlling for participants' self-reported attitudes toward the environment and climate

change, motivations for compliance with rules and demographic characteristics.

In a framed laboratory experiment on downstream water pollution, Czap et al. (2013) investigated the importance of empathy vs self-interest framing in determining the behaviour of upstreamers (i.e. persons who live upstream) regarding the negative externalities, and the potential of downstreamers (i.e. persons who live downstream) to influence the choices of upstreamers using non-monetary sanctions and rewards, alleviating the need for intervention by the local governments and regulatory institutions. Their findings provide evidence that environmental policy should appeal to the empathy of polluters and promote social punishment and public shaming as strategies to achieve lawful or cooperative behaviour. Empathy framing had a much more significant impact on individual behaviour than self-interest framing. Overall, individuals' behaviour was more profit-oriented in the self-interest framing and more egalitarian in the empathy framing.

Singh and Swanson (2017) examined the influence of three frames on the importance that individuals assign to climate change policy. These frames included putative national security, human rights, and environmental consequences of climate change. They did not find that framing climate change altered the perception of its importance as a policy issue among the overall public. However, they observed that the assigned importance of climate change policy varied depending on political views. Republicans and the right-ists sometimes assigned less importance to climate change policy when the issue was framed in terms of national security and climate change, while Democrats and the leftists, perceived climate change as more important in the case of national security and human rights frames. These patterns held the strongest when the frames were presented with accompanying official sources of information.

Individuals' preference for environmental policy may be influenced by news framed as either emphasizing harmony with nature or mastery over nature. The results of research on the interplay of ecological worldviews and media frames by Fung, Brossard, and Ng (2011) suggest that harmony frame amplified the effect of the balance-with-nature worldview in supporting a natural approach to flood protection. In contrast, the mastery frame amplified the effect of the human-domination-over-nature worldview on the preference for a structural approach to flood protection. The natural approach relied primarily on land management and suggests the relocation of businesses and houses, to restrict development on flood-susceptible lands, and to carve out more overflow areas for floodwaters. The structural approach suggested building stronger and more technologically advanced dams and leves in flood-prone areas.

Mossler et al. (2017) measured support for carbon emissions mitigation policies from individuals presented with one of five different policy frames (climate change, global warming, carbon pollution, air pollution, and ocean acidification). The "air pollution" frame generated the highest degree of policy support overall, while the "ocean acidification" frame elicited the least support overall. The "carbon pollution" frame won a little more approval for mitigation policies than "climate change" or "global warming" frames. Framing effects were partially contingent on prior knowledge and attitudes and mediated by concern.

Similar research has been conducted by Schuldt et al. (2011) who in a question wording experiment found that framing problems with rising temperatures as "global warming" rather than "climate change" made Republican respondents more sceptical that global climate change is a real phenomenon, whereas other political groups were unaffected by question-wording.

A comparison of local versus global framing of climate change in terms of individuals' perception of this environmental problem's severity, willingness to support policy actions and to take voluntary actions to mitigate climate change are also the topics of some studies. However, these studies present contradictory findings. According to Wiest et al. (2015), local framing is more effective in enhancing perceptions of the severity of climate change, support for sub-national policy action and some behavioural intentions to address climate change. Additionally, presenting information on the potential benefits (e.g. longer growing seasons) and losses of climate change weakens perceptions of the problem's severity at the local and national level as compared to information on the potential losses only. Wiest et al. point out that the effectiveness of particular frames of climate change impact depends to some degree on individual political leanings. Similar inferences were drawn by Scannell and Gifford (2013) who in their study, investigated how spatial distance influenced climate change engagement. In their experiment participants completed questionnaires concerning attitudes to climate change after having read messages on local or global climate change impacts. They found that local message frames appear to improve communication of negative climate impacts. On the other hand, the findings of the experiment by Spence and Pidgeon (2010) indicate that framing climate change impacts as distant ones results in perceiving them as more severe in comparison to local ones. Moreover, according to their research results, attitudes towards climate change mitigation were positive when individuals were asked to consider social rather than personal aspects of climate change (i.e. benefits and risks arising from climate change in terms of personal considerations only were assumed to relate to local climate change impacts).

In general, the above-presented studies suggest that framing an environmental problem in a certain way may have more potential than others to make individuals assign this problem greater importance, to increase public support for mitigation policy and to strengthen pro-environmental behaviour.

Research methods

The experiment was conducted during two academic years: 2017/2018 and 2018/2019 and a total of 288 students from AGH University of Science and Technology took part in it. Participants were randomly given one of three short descriptions of the consequences of excessive sulphur dioxide emission, presented in different frames referring to human health, nature (forests) and financial penalties (cf. table 1). Each treatment group numbered 96 persons concomitantly. The random assignment of the participants to treatment groups is a prerequisite for the experimental research. The data on socio-demographic features of the participants were not collected.

Table 1. Information frames for SO₂ emission effects

Frame	Content
Human health	Sulphur dioxide belongs to the most important air pollutants, and it is emitted mainly when fuels containing sulphur are burned. It causes severe health problems including cardiovascular diseases (e.g. narrowing of the arteries, heart attack), breathing problems, irritation of eyes, nose and throat, headache and anxiety. It contributes to the smog formation. According to different sources, about 20-67 thousand people die in Poland annually due to the smog.
Nature	Sulphur dioxide (SO_2) is very harmful to all living organisms, particularly to plants. In the air SO_2 oxidises to SO_3 and in combination with water forms sulphuric acid that is the main cause of acid rains. SO_2 may cause contamination of vast natural areas due to shifting around over long distance. It negatively impacts forests, causing soil acidification, dysfunction in the edaphic solution and changes in the availability of alimentary components. SO_2 emission and acid aggradation have been a significant problem in forest areas worldwide for several decades, leading to an overall reduction in the increment of trees, i.e. decrease of the thickness of growth rings and tree height and morphologic damage of needles and leaves.

Frame	Content
Financial	Within the struggle for abatement of excessive sulphur dioxide emission, the adoption of new European Union regulation is planned imposing penalties for member states for noncompliance with incoming tightened standards of concentration of this gas in the air. In the case of non-compliance with the new standards and taking into account the current level of sulphur dioxide emission in Poland, the estimated amount of financial penalties that Poland would pay totals about 3-4 billion PLN annually. EU member states have time to conform to the new regulation until the end of 2021.

Source: author's work. The information on health impacts was developed on the basis of the report of the European Environment Agency (EEA, 2013) and the effects on nature were described using the work by Baciak et al., 2015. The financial frame is the author's description.

Participants of the experiment were then asked to assess their support for two instruments proposed as a solution for excessive SO_2 emission: the imposition of additional emission fees and launching of the cap-and-trade program and to assess their support for (voluntarily) bearing higher heating costs due to the use of the least sulphur-containing fuel. They could express their opinion using a 7-point Likert scale (cf. table 2). In the analysis the answers were given the value from 1 to 7, starting from the strongly negative attitude ('I strongly disapprove') to the strongly positive one ('I strongly approve').

Table 2. Solutions for SO₂ emission abatement problem proposed to experiment participants

Description of proposed instruments within the environmental policy	Questions	Possible answers	
Proposed solutions of SO_2 emission abatement include the imposition of additional emission fees of 2,7 PLN/kg and/or implementation of the obligatory SO_2 cap-and-trade program for heavy polluters (mainly power plants). This latter solution consists in the allocation of allowances for SO_2 emission among polluters and the possibility of buying/selling allowances between interested parties. The enterprise participating in the cap-and-trade program has to cover its SO_2 emission with allowances granted or bought on the market.	 Do you approve of the imposition of additional SO₂ emission fees for heavy polluters? Do you approve of the launching of the SO₂ cap-and-trade program for heavy polluters? Do you approve of (voluntarily) bearing higher heating costs due to the use of the least sulphur-containing fuel? 	 I strongly disapprove I disapprove I rather disapprove I do not have an opinion I rather approve I approve I strongly approve 	

Source: author's work.

The differences in the support for environmental actions between three groups of participants were analysed by means of the two-sample t-test, in which (Wieczorkowska, Wierzbiński, 2007, p. 180):

- the null hypothesis is that the means of two populations are equal: H_0 : $\mu_{1=} \mu_{2.}$
- the alternative hypothesis assumes that the means are not equal: H_1 : $\mu_{1\neq}$ μ_2
- the t-statistic is the following:

$$t = \frac{M_1 - M_2}{\sqrt{\frac{s_1^2 + s_2^2}{n}}} \tag{1}$$

where:

M- the mean in the sample,

s – the standard deviation in the sample,

n – the strength of each sample.

Research results and discussion

The support for proposed instruments and voluntary action within the SO₂ emission abatement policy among the experiment participants is presented in table 3. Regardless of the treatment group, the participants back the least bearing higher heating costs due to the use of the least sulphur-containing fuel, which is quite understandable. In the case of nature and financial frame, the imposition of the cap-and-trade program commands the highest endorsement, and in the case of human health frame, most support is won by the imposition of emission fees. All three proposed solutions for excessive SO₂ emission are approved the most by the participants from the group with human health frame. The participants from nature frame back more on average the cap-and-trade program and voluntarily bearing higher heating costs than those from financial frame. The opposite happens in the case of emission fees. The average total support for two instruments and voluntary action is the highest among the participants provided with information in the human health frame (5.20), then among the participants provided with information in the nature frame (4.54) and in the financial frame (4.50).

The diversification of the participants' attitudes toward the imposition of emission fees and voluntarily bearing higher heating costs in all three treatment groups is moderate. The coefficient of variation, i.e. the ratio of the standard deviation to the mean for emission fees equals 27%, 30% and 32% in the case of human health, nature and financial frame respectively. This coefficient for bearing higher heating costs totals 28%, 30% and 42% in the

case of human health, nature and financial frame respectively. The participants' attitudes toward the imposition of the cap-and-trade program are slightly less diversified (the coefficient of variation is equal to 24%, 22% and 27% in the case of human health, nature and financial frame respectively).

Table 3. Support for proposed instruments and actions within the environmental policy

Instrument/action	Mean	Standard deviation
Human health frame		
Emission fees	5.53	1.51
Cap-and-trade program	5.41	1.28
Bearing higher heating costs due to the use of the least sulphur-containing fuel	4.68	1.31
Nature frame		
Emission fees		1.39
Cap-and-trade program	4.98	1.11
Bearing higher heating costs due to the use of the least sulphur-containing fuel	4.05	1.23
Financial frame		
Emission fees		1.51
Cap-and-trade program	4.90	1.33
Bearing higher heating costs due to the use of the least sulphur-containing fuel	3.91	1.63

Source: author's work.

Table 4. The two-sample t-test results

Frames	Emission fees		Cap-and-trade program		Bearing higher heating costs due to the use of the least sulphur-containing fuel	
	t-statistics	p-value	t-statistics	p-value	t-statistics	p-value
Human health vs nature	4.5353	0.0000	-2.4589	0.0148	-3.3915	0.0008
Financial vs nature	0.5434	0.5875	-0.4698	0.6390	-0.6973	0.4865
Financial vs human health	-3.7933	0.0002	-2.6992	0.0076	-3.5956	0.0004

Source: author's work.

Table 4 presents the two-sample t-test results. They reveal statistically significant differences in support for emission fees, cap-and-trade program and voluntarily bearing higher heating costs between human health and nature frames and between human health and financial frames at the significance level of 0.01 except for cap-and-trade program in human health and nature frame comparison (0.05). The attitudes toward proposed solutions in nature and financial frames do not differ in terms of statistical significance.

According to the findings of this study, framing the SO_2 pollution problem taking into account consequences for human health has more potential to increase the public support for proposed instruments and voluntary action within the SO_2 emission abatement policy than highlighting consequences for nature and state finance. These results are quite understandable, keeping in mind that health belongs to the most important values in life. The results of the survey carried out by the Central Statistical Office in Poland indicate that the health is of very great importance to 80.5% of the Poles and of great importance to 18.2% of them (GUS, 2017).

The nature frame has turned out to fail to increase the support for proposed solutions within the SO_2 emission abatement policy as compared to other competing frames. Similar results were indicated by Singh and Swanson (2017) who did not find the advantage of climate change framing in terms of environmental consequences of this change over other types of framing. Emphasizing the potential financial burden for the Polish state finance has proved to be not better than two other ways of presenting the SO_2 emission problem. This finding is in line with the above-cited research results by Severson and Coleman (2015) who examined, among others, the effect of the economic efficiency frame. Although the membership in the EU is important for the majority of the Poles and the financial penalties that could be imposed by the EU on Poland are quite often used in the public discussion as a bugbear, underlining this financial aspect in the context of the SO_2 emission abatement policy has not come out to be more effective than other frames.

The findings of the study do not suggest that highlighting pollution consequences for nature or state finance does not matter to the society but rather that there are better types of 'nudges' in the environmental policy that appeal to the personal aspects of environmental problems like the impacts on the human health. The similar interference can be drawn from studies by Scannell and Gifford (2013) and Wiest et al. (2015) who indicated that local framing of climate change (i.e. underlining consequences near to the people) was more convincing than global framing.

Conclusions

The behavioural, environmental economics combines the best of two disciplines: the normative power of traditional environmental economics together with a more realistic description of individual behaviour from psychology and other human and social sciences (Croson, Treich, 2014, p. 346). It should help to understand why people do not respond to environmental policy measures, as predicted by neoclassical economic theory and to improve environmental policy design (Pasche, 2013, p. 1).

The findings of this study support the assumption that psychological considerations may have a significant influence on people's attitude towards environmental policy. Individuals tend to support environmental policy instruments and voluntary action the most when the SO_2 pollution problem is framed in the context of consequences for human health. These inferences are rather not surprising, taking into account the fact that health is among the life aspects most prized by people.

The results of our study allow us to draw a conclusion that highlighting the impact of environmentally damaging behaviour on people's health by the regulators and other organizations involved in the environmental protection may increase the public support for the imposition of environmental policy instruments and may encourage voluntary actions aimed to protect the environment.

The study is not free from limitations regarding especially the sample that is confined to the students of one university. It could be extended by including other groups in terms of age, educational background and profession, e.g. managing directors in companies exerting a significantly negative impact on the environment and being subject to the environmental regulation. The research relates to the assessment of support only for emission fees, emission trading, and bearing higher heating costs in the context of SO_2 excessive emission problem under three specific framings. Other environmental problems such as climate change and other instruments of environmental policy could also be investigated regarding the perception and support for these instruments among different stakeholders taking into account a variant framing.

In the author's opinion, the behavioural aspects of environmental policy are interesting topics and require further investigation. They could provide additional insights into how psychological considerations influence different decision-makers regarding their environmentally damaging or desirable behaviours and help the regulators to design more effective environmental policy.

Acknowledgements

This research received financial support from the resources granted to the Faculty of Management of the AGH University of Science and Technology as part of the subsidy for the maintenance of the research potential.

Literature

- Baciak, M., Warmiński, K., Bęś, A., 2015. Oddziaływanie wybranych gazowych zanieczyszczeń powietrza na rośliny drzewiaste. Leśne Prace Badawcze, 76(4), 401-409, DOI: 10.1515/frp-2015-0039.
- Carlsson, F., Johansson-Stenman, O., 2012. Behavioral Economics and Environmental Policy. Annual Review of Resource Economics, 4, 75-99, DOI: 10.1146/annurey-resource-110811-114547.
- Carpenter, S.M., 2018. Framing Effects. In: Vonk, J., Shackelford, T. (Eds.), Encyclopedia of Animal Cognition and Behavior. Springer, Cham, DOI: 10.1007/978-3-319-47829-6_1571-1.
- Cason, T.N., Raymond, L., 2011. Framing Effects in an Emissions Trading Experiment with Voluntary Compliance' In: Isaac, R., Norton, D. (Eds.), Experiments on Energy, the Environment, and Sustainability (Research in Experimental Economics, 14). Emerald Group Publishing Limited, Bingley, 77-114, DOI: 10.1108/S0193-2306(2011)0000014006.
- Cooper, E.J., 2017. To Nudge or Not to Nudge: Promoting Environmentally Beneficial Behaviors. Bard Center for Environmental Policy.
- Croson, R., Treich, N., 2014. Behavioral Environmental Economics: Promises and Challenges. Environmental and Resource Economics, 58(3), 335-351, DOI: 10.1007/s10640-014-9783-y.
- Czap, N.V. et al., 2013. Smiley or Frowney: The Effect of Emotions and Empathy Framing in a Downstream Water Pollution Game. International Journal of Economics and Finance, 5(3), 9-23, DOI: 10.5539/ijef.v5n3p9.
- EEA, 2013. Air Quality in Europe 2013 report. EEA Report No 9. European Environment Agency.
- Fung, T.K.F., Brossard, D., Ng, I., 2011. There Is Water Everywhere: How News Framing Amplifies the Effect of Ecological Worldviews on Preference for Flooding Protection Policy. Mass Communication and Society, 14(5), 553-577, DOI: 10.1080/15205436.2010.521291.
- Garcia-Sierra, M., Van den Bergh, J.C.J.M, Miralles-Guasch, C., 2015. Behavioural economics, travel behaviour and environmental-transport policy. Transportation Research Part. D: Transport and Environment, 41, 288-305, DOI: 10.1016/j. trd.2015.09.023.
- GUS, 2017. Jakość życia w Polsce w 2015 r. Wyniki badania spójności społecznej. GUS, Warszawa.
- Hausman, D.M., Welch, B., 2010. Debate: To Nudge or Not to Nudge. The Journal of Political Philosophy, 18(1), 123-136, DOI: 10.1111/j.1467-9760.2009.00351.x.
- Mossler, M.V. et al., 2017. How does framing affect policy support for emissions mitigation? Testing the effects of ocean acidification and other carbon emissions frames. Global Environmental Change, 45, 63-78, DOI: 10.1016/j.gloenvcha.2017.04.002.

- Nash, J.R., 2006. Framing Effects and Regulatory Choice. Notre Dame Law Review, 82(1), 313-372.
- OECD, 2017. Tackling Environmental Problems with the Help of Behavioural Insights. Policy Highlights. OECD Publishing, Paris.
- Olejniczak, K., Śliwowski, P., 2014. Nadchodzi rewolucja? Analizy behawioralne w interwencjach publicznych. In: Haber, A., Olejniczak, K. (Eds.), (R)ewaluacja 2. Wiedza w działaniu. Polska Agencja Rozwoju Przedsiębiorczości, Warszawa, pp. 13-45.
- Pasche, M., 2013. What Can be Learned from Behavioural Economics for Environmental Policy?. Jena Economic Research Papers, 2013-020, p. 1-22.
- Scannell, L., Gifford, R. 2013. Personally Relevant Climate Change: The Role of Place Attachment and Local Versus Global Message Framing in Engagement. Environment and Behaviour, 45(1), 60-85, DOI: 10.1177/0013916511421196.
- Schubert, C., 2017. Green Nudges: Do They Work? Are They Ethical?. Ecological Economics, 132, 329-342, DOI: 10.1016/j.ecolecon.2016.11.009.
- Schuldt, J.P., Konrath, S.H., Schwarz, N., 2011. "Global Warming" Or "Climate Change"? Whether The Planet Is Warming Depends On Question Wording. Public Opinion Quarterly, 75(1), 115-124, DOI: 10.1093/poq/nfq073.
- Severson, A.W., Coleman, E.A., 2015. Moral Frames and Climate Change Policy Attitudes. Social Science Quarterly, 96(5), 1277-1290, DOI: 10.1111/ssqu.12159.
- Shogren, J. 2012. Behavioural Economics and Environmental Incentives. OECD Environment Working Pape, 49. OECD Publishing, Paris, p. 1-32, DOI: 10.1787/5k8zw-bhqs1xn-en.
- Singh, S.P., Swanson, M., 2017. How issue frames shape beliefs about the importance of climate change policy across ideological and partisan groups. PLoS ONE, 12(7), e0181401, 1-14, DOI: 10.1371/journal.pone.0181401.
- Spence, A., Pidgeon, N., 2010. Framing and communicating climate change: The effects of distance and outcome frame manipulations. Global Environmental Change, 20(4), 656-667, DOI: 10.1016/j.gloenvcha.2010.07.002.
- Tversky, A., Kahneman, D., 1981. The Framing of Decisions and the Psychology of Choice. Science, 211, 453-458, DOI: 10.1126/science.7455683.
- Van de Velde, L. et al., 2010. The importance of message framing for providing information about sustainability and environmental aspects of energy. Energy Policy, 38(10), 5541-5549, DOI: 10.1016/j.enpol.2010.04.053.
- Van der Heijden, J., Kosters, M., 2015. From mechanism to virtue: Evaluating Nudgetheory. RegNet Working Paper, 80. Regulatory Institutions Network, pp. 1-21.
- Van der Linden, S.L et al., 2015. The Scientific Consensus on Climate Change as a Gateway Belief: Experimental Evidence. PLoS ONE, 10(2), e0118489, 1-8, DOI: 10.1371/journal.pone.0118489.
- Van der Linden, S.L. et al., 2014. How to communicate the scientific consensus on climate change: plain facts, pie charts or metaphors?. Climatic Change, 126(1-2), 255-262, DOI: 10.1007/s10584-014-1190-4.
- Venkatachalam, L., 2008. Behavioral economics for environmental policy. Ecological Economics, 67(4), 640-645, DOI: 10.1016/j.ecolecon.2008.01.018.
- Wieczorkowska, G., Wierzbiński, J., 2007. Statystyka. Analiza badań społecznych. Wydawnictwo Naukowe SCHOLAR, Warszawa.
- Wiest, S.L., Raymond, L., Clawson, R.A., 2015. Framing, partisan predispositions, and public opinion on climate change. Global Environmental Change, 31, 187-198, DOI: 10.1016/j.gloenvcha.2014.12.006.