ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Bachelor Thesis: International Bachelor of Economics and Business Economics (IBEB)

Correcting Beliefs and Shaping Policy: Enhancing Support for Educational Equality, experimental evidence.

Name student: Jakub Hasiak

Student ID number: 618605

Supervisor: Andrea Pogliano

Second assessor: Victor Gonzalez Jimenez

Date final version: 21/07/2024

Abstract

This study aims to reduce education inequality by assessing policy preferences and fairness beliefs. It is motivated by the Polish academic system and how it affects society by creating political thrust and promoting more affluent citizens. The outcome is captured by doing an experimental survey consisting of two groups: the control group, which receives no additional information, and the treatment group, which receives statistical information about current education inequality in Poland. This influx of knowledge is meant to elicit awareness about fairness in the respondent's mind. The study then collected results and performed a statistical analysis of 3 policy preferences and belief outcomes. It concludes that, on average, people are more likely to accept policy statements about lowering gasoline prices and subsidizing students from poor families when comparing treatment and control groups. The opposite happens in policy implicating support only for students with the best grades, as in this case, respondents will be less likely to agree with that policy after receiving treatment. Also, given treatment, people consider education fairness less equal than they thought before receiving intervention.

Contents

1. Introduction

1.1 Importance of education

Education is considered a valuable and effective way to invest in the future. For decades, a country with an excellent education system has been viewed as a powerhouse in the global landscape. This is especially evident when innovation occurs. It can boost GDP, improve quality of life, or even change the outcome of a war. Reflecting on the past, many of them changed our perspective on how things work, and some we still use to this day.

In ancient times, Sumerians invented the wheel, which tremendously improved transportation by manufacturing carts or battle chariots. More importantly, it helped mechanise the craft and agricultural sectors (such as crop irrigation and horse traction). In 1439, Johannes Gutenberg transformed our entire communication system by inventing the printing press. In 1781, James Watt patented a steam engine, which lowered the cost and simplified the large-scale production of commodities. The list continues, and some may argue that these inventions do not directly affect good education. However, according to GI Zhirnova and SG Absalyamova (2013), “Higher education is the core of innovative performance”, so it is safe to speculate that above-mentioned investors had access to good education.

Additionally, decent quality education is a cornerstone of sustainable development goals (SDG). SDGs are a set of 17 goals established by the United Nations in 2015, and their goal is to tackle critical world problems such as poverty, inequality, climate change, and environmental degradation by 2030. Nazar, R., Chaudhry, I. S., Ali, S., & Faheem, M. (2018) argue that the best way to address these struggles and stimulate progress is to educate our society by providing an excellent and equal education system. An educated society will foster more mindful and intuitive decisions in future challenges and a higher quality of life.

These two instances exemplify how immensely important the educational system is. Providing proper space for inventors or preparing society for future challenges are just a tiny percentage of what education is used for. Inventions can completely change and improve countries or just our daily lives by making us more efficient in those tedious tasks and more accurate in those difficult ones. Also, eloquent pupils will help our future society act rapidly and instinctively when any crisis arises by preventing potential collateral damage.

1.2 Opportunity differences

As important as education is, access to it is even more critical. Even if a country has a brilliant education system and only selected people have a means of entry, it will not work as efficiently as intended. Usually, opportunity differences arise due to social or financial status, which means that only those wealthy and influential have a chance for a decent education. As unacceptable as it is, it is the reality of many poorer countries. Paper from 2010 by Charlot, O. and Decreuse, B. *"Over-education for the rich, under-education for the poor: A search-theoretic microfoundation",* infers that less talented wealthy individuals crowd out poor talented ones from schooling. Since the market is segmented by education, not ability, rich people will get accepted to better jobs than poor. This example captures flaws in our schooling system. Kids' future should not be solely determined by the financial possibilities of their parents. The authors argue that the only solution to that problem is to improve society's education and implement adequate labour market policies.

1.3 Inaccurate beliefs

Often, people are unwilling to accept policies unaligned with their agenda or beliefs. Some of them would not comply with a policy even if it changes the lives of millions, only because they disagree with it (Ejelöv & Nilsson 2020). This is why educating people before implementing policy is so important. A study conducted by Meirick, P. C., & Wackman, D. B. (2004) concluded that considering political elections, adults make, on average, more normatively better decisions when they have prior knowledge of the topic. The authors suggested that the influx of knowledge about the current political situation narrowed educational gaps between the control and treatment groups. It is a promising lead for educators to overcome societal inequalities.

1.4 Research question

This study will hitchhike on the idea mentioned above of influence of added information on beliefs and policy choices and investigate:

How can correcting beliefs affect support for a policy that promotes equalizing chances of rich and poor in the education system?

This study investigates how dispelling myths affects public support for policies meant to level the playing ground for rich and poor students regarding educational opportunities. It aims to comprehend how views about policy actions will change when faced with actual inequalities in data.

Through experimental design, it will distribute a message containing true information about poor families and their educational challenges. By analyzing participants' responses to this information, the study aims to uncover how factual corrections influence attitudes towards educational policies designed to reduce socioeconomic disparities.

1.5 Social relevance

Answering the research question might help mitigate some fundamental societal struggles of unequal academic success or inadequate policies. It will shed light on people's beliefs, policy preferences and what affects them. Not only it can be used as an effective tool to educate society on their (sometimes) inaccurate ideas, but more importantly, it also can be used to push policies to life. Effective policies play a pivotal role in shaping societal norms, fostering economic stability, and promoting equitable opportunities for all members of society. They can perform efficient changes in society and not worry about randomness of the results. With proper econometrics teams who analyse the effect of the policy before implementing it and motivated elected representatives, millions of lives can be improved by introducing new laws that would significantly reduce education inequality.

1.6 Scientific relevance

Previous studies have shown acknowledgement and deep understanding of the association between education and income inequality. Papers by Charlot, O. and Decreuse (2010) or Meirick, P. C., & Wackman, D. B. (2004) are viewed as groundbreaking on the topic and can be taken as an inspiration in future research. However, their research overlooks how altering public perceptions and beliefs about inequality can influence policy support, which can make their conclusions inaccurate. Moreover, Charlot, O. and

Decreuse (2010) use data collected on an aggregate level, which might indicate a lack of control over some variables, as it is unsure how they are obtained. Additionally, the variables may need to align more perfectly with the research question, creating spurious results or relationships. This could lead to many biases regarding the reliability and validity of that research.

Given this context, this paper will try to acknowledge these inaccuracies. This study distinguishes itself by filling this knowledge gap with a novel survey aimed at Polish participants. It offers a culturally particular viewpoint that has yet to be widely available in the European and international scene. It adds a new perspective to the discussion by examining the attitudes of the Polish public and how belief corrections might influence policy support. Also, it will focus on the intricate relationship between beliefs and policy choices, zooming in on the change in people's beliefs before and after the experiment. Allowing to extract full effect of beliefs.

1.7. Paper outline

Following the introduction, the paper will review where the design of the experiment is coming from and explain which parts were used as inspiration. Next, it will go through a detailed summary of each survey question, providing rationale behind each. Then, there is an analysis plan, with all methods used to obtain the results. Following that, the study will go through data collection and results section. To close the paper, I will conclude it briefly and discuss potential limitations and potential suggestions for future research.

1.8 Polish background

The experimental group in this sample will be fully Polish, and the topic for this research was heavily motivated by the current state of the Polish education system. I want to highlight how financial inequalities of the opportunity might be affecting Polish society. To give context, I will briefly go through the most evident examples of inequalities that need changes; otherwise, the opportunity gap will continue to grow.

Beginning with the most important exam for Polish students is the Matura exam, its written around the age of 18, it determines access to higher education and future career opportunities. Based on exam

results, one collect points in specific courses, like biology or mathematics, based on those selected to higher education institutions. For instance, to get into medicine school, you would have to achieve around 80% in both advanced Chemistry and Biology. On top of passing all elementary ones, students must pass Math, Polish and English. However, disparities in access to resources or preparation for the exam among different socioeconomic groups may contribute to unequal outcomes and perpetuate existing educational inequalities. Instances of that are access to good private schools, which tend to have better discipline and care for their pupils or tutoring, both limited for poorer families due to financial constraints.

Furthermore, the limited access to higher education among certain socioeconomic groups perpetuates income disparities, hindering problems in Polish society like social mobility and reinforcing socioeconomic stratification. *"Role of Age and Education as the Determinant of Income Inequality in Poland: Decomposition of the Mean Logarithmic Deviation"* (E. Wędrowska, J. Muszyńska 2022) confirmed an association between the level of education and the average income in Poland. Based on the obtained results, it can be concluded that the education level of the household remains an important determinant of household income inequality in Poland.

This inequality is often a cause of friction in the Polish political scene, where people are getting increasingly polarized due to their financial status (Bovens, M., & Wille, A. (2021). This polarization becomes evident in the policies promoted by political parties before elections. The two largest parties in the scene target opposite social-class groups, promoting subsidies to the poorest and lowering entrepreneurship taxes. This process amplifies disagreement within Polish communities, leading to decreased trust, communication, and support among citizens, ultimately fostering conflict and misunderstanding. It is often addressed as Poland A and B, which in colloquial language represent division of Polish regions by their GDP, social status, culture, public infrastructure, and industry development. Poland "A" symbolizes part of the nation of higher development status, and Poland "B" of lower. This separation highlights how income inequality undermines the Nation unity by constantly setting its own citizens against one another. Conflicted nations are less economically efficient, leading to lower quality of life (Le, Bui and Uddin, 2022). This research aims to address the lower inequality that arises from different opportunities for individuals.

These examples are evidence that Poland needs immediate changes. A possible solution to these disparities is understanding people's beliefs and what policies they prefer. This would unlock the Polish

government's ability to support those in the country who need it the most. The results of this research might be crucial to ease the political friction between two financial 'camps' and lower education disparity, allowing every Pole to have equal chances of academic success.

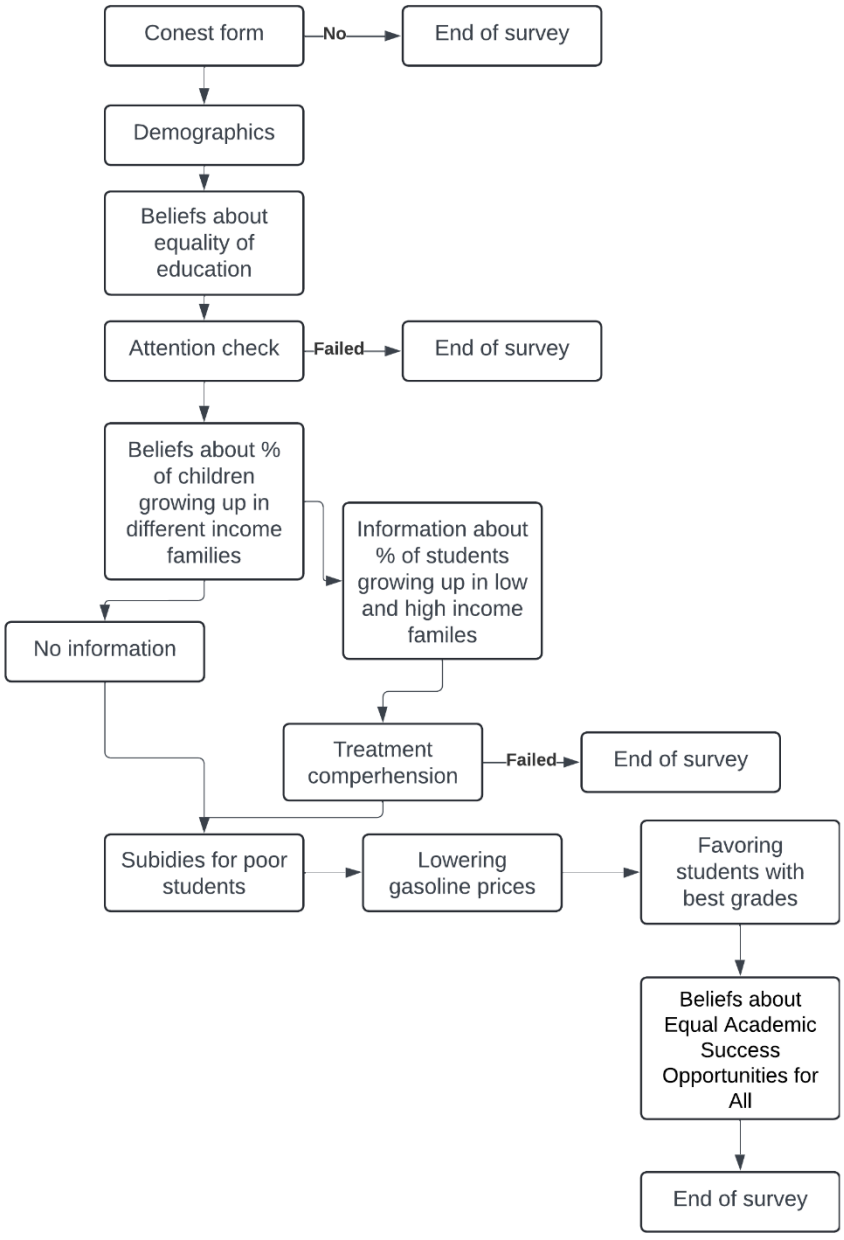
2. Methodology

Policy relevance has been growing considerably over the last 2 decades, and with it, the number of possibilities people will go for. This makes measuring policy preference challenging for many researchers. Thus, it is crucial to understand the people's beliefs, which are the mechanism behind them. To assure accurate research, this paper will build its experimental design on respectable paper from 2021 *"Designing Information Provision Experiments"* by Haaland et.al. It provides best-practice recommendations for measuring beliefs, designing information interventions, and dealing with potential confounds. Additionally, it extensively discusses how to handle an online survey and recruit respondents, which helped the paper ensure a reliable and valid way for the experiment. Using this insight an experimental online survey was created (see Appendix).

The survey will be distributed through various social media channels. Online surveys allow data collection most efficiently, with the only downside being a need for more control over truthfulness and engagement. For that, Instagram and Facebook messenger will be used, as these are the two most commonly used methods of communications in Poland. To ensure the reliability of this study, a minimum of 50 responses for each treatment and control group must be collected, considering the rule of thumb: "The more, the better". 100 responses in total ensure that the analyzed group is large enough and the effect is not random. The survey will be created on Qualtrics, an online platform used to create, distribute, and analyze surveys and collect data. Randomization is going to be done using the Qualtrics randomization system so that every other person will receive the treatment on average. This will help mitigate omitted variable bias, enhancing the validity of the study's findings.

The main demographic target of this research is Polish society; hence, this survey, originally made in English, has been translated and distributed in Polish. As the English level in Poland is exceptionally high, the terms and ideas used in the survey are sophisticated. Making it available in the citizens' mother tongue allows for understanding due to language problems. However, for the purpose of this paper, the answers and questions have been translated and will be referred to in English.

FIGURE 1. FLOWCHART OF THE SURVEY EXPERIMENT.



2.1 Consent form

Before the survey started, each participant was informed that the questionnaire is research conducted by Erasmus University Student, as a part of his bachelor thesis, would be fully anonymous and that they could

abort at any time without any consequences. The participants mark “Yes, I agree” or leave the page, as answers without consent will not be considered.

2.2 Demographics

The survey begins with a set of demographic questions to establish the profile of respondents. Among those questions are about age, gender, residency, level of education finished, and political compass. Answers to these questions will lay foundation for the control variables. As, the survey has only been sent to polish people, the residency question asks, if one currently lives in Poland or not. The education question asked what level they finished, and left participants with 7 education level options to choose from, ranging from “below high school” to “PhD”. Options were generalized so that almost any niche education path could be captured in the answer without confusion. Next, respondents were asked to assess their political views. Each out of 5 answers, grasping vague definition of it, such as “very liberal”, “liberal”, “Neutral”, “conservative”, “very conservative” and 6th answer, acknowledging all people that politics are either uninteresting or delicate matter - “prefer not to say”.

This procedure helps us distinguish the effect of our study. The hypothesis is that young and liberal people might be more likely to answer positively for the outcome questions without the treatment. That is why it is crucial to establish this basic information and later correct it in the results.

2.3 Pre-treatment beliefs elicitation

Before the treatment, some people's beliefs are in line with what the experiment expects them to believe after receiving treatment. In these cases, the intervention becomes obsolete, as it does not affect respondents in the intended way, and the results should not be taken as an effect of it. The following two questions will examine what participants think of education opportunities in Poland before the treatment. I want to see if people's beliefs have changed after some of them were exposed to the treatment. The paper asks the respondents, “How equal is the current educational system in terms of financial opportunities?” with 5 answers, going from “very unequal” to “equal”. Next, we ask - “Have you or anyone close to you experienced difficulty accessing educational opportunities due to financial constraints?” These two inquiries are here for people to take a moment and contemplate whether the educational

system is equal or not; have they experienced some form of uneven opportunities? The paper anticipates that people who think the system is fair or have experienced equal education in their past will be less willing to accept policies trying to narrow the educational inequality gap.

2.4 Attention check

In questionnaires sent to participants, subjects sometimes need to read the questions and carefully click through the survey. This means many random answers compromise the results of research studies. To prevent these instances and get an accurate response out of 5 possible interest descriptions, the question asks to answer, “moderately interested” or “very interested”. The wrong answer to this question is a lack of comprehension, reading skills, or interest; all these are strong enough evidence to infer a lack of honesty or quality in their answers. We deem that allowing such an answer to be part of the research will debunk its internal validity. Hence, all those who picked different answers were not considered in the final response analysis.

2.5 Prior beliefs

Another measure of prior beliefs starts with short information. It states that the following four questions will ask them to use a slider to assign the percentage of children ending up in university to each financial group in Poland. It also mentions that the data comes from the Central Polish Statistical Office, known for being a reliable source of data in Poland. In the questions, the income is going to be given as Netto. After that, a forceful response of “I have read and understood” follows.

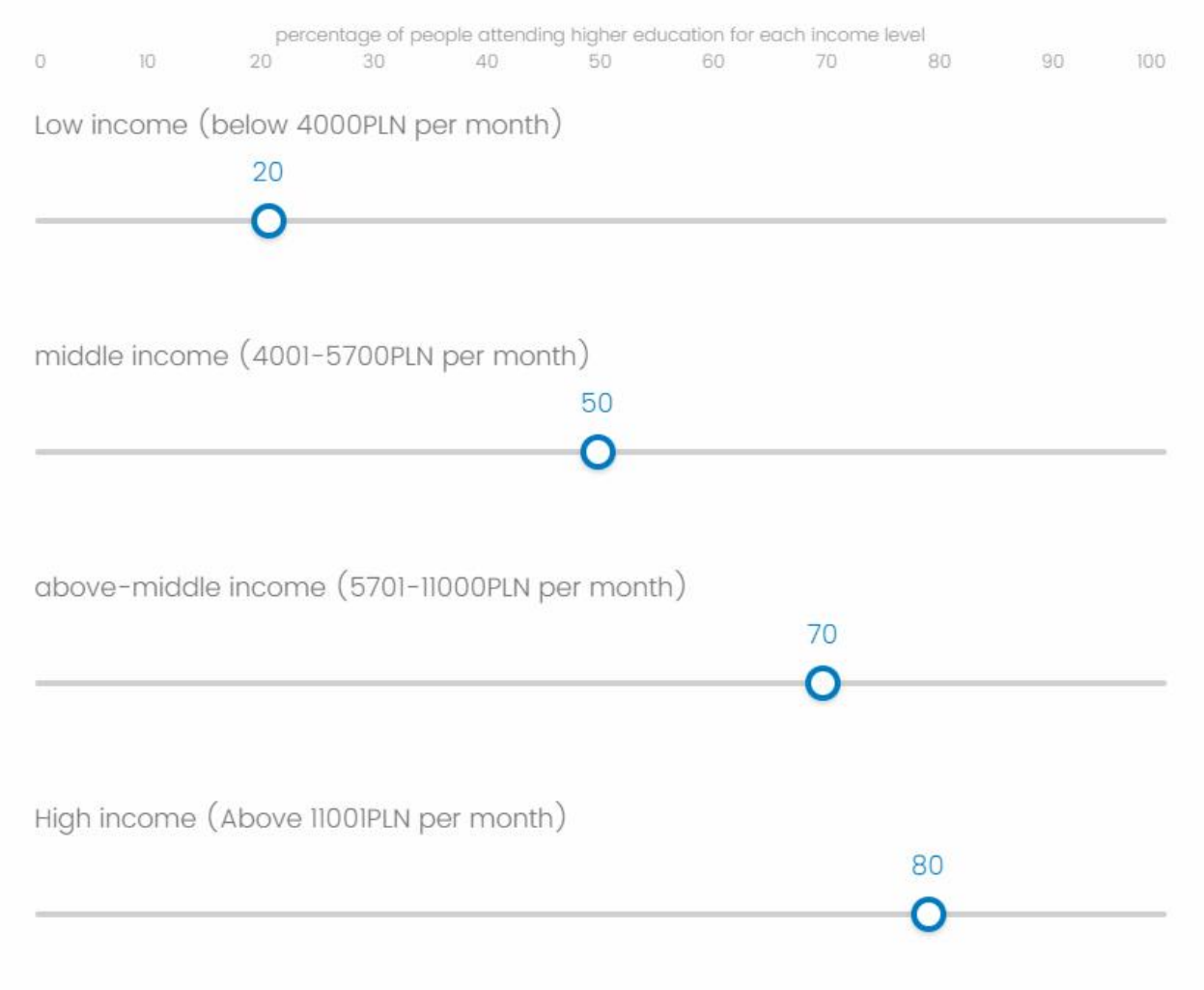
The following four questions are built in the same way. Each presents a slider with the financials of different socioeconomic classes in Poland on the left. The numbers from 0-100 and the explanation above say, “percentage of children going to university”. Each of the four questions asks about different classes in Poland, starting from “low income” (below 4000PLN per month), middle income (4001-5700PLN per month), above-middle income (5701-11000PLN per month) and High income (Above 11001PLN per month). Participants had to use sliders to assign a percentage of children they thought went to the university from different financial groups. There was a page break between each question to make it easier to only think about one group at a time. The concept of these questions is to let participants take

some time and contemplate how much money each class has and then, with this amount of money, how many kids have the possibility to go to university.

2.6 Treatment

At this point, half of the respondents are receiving treatment, and half are not. Those who do will see two additional inquiries. First, provide a picture with all sliders from the previous four questions combined (see Fig. 2), but this time, their task is not to assign the percentage but to analyze. Sliders are now put onto positions taken from the Main statistical office of Poland, with the correct percentage of children attending university from each financial class. They must analyze and compare their picks to official ones and think about the differences in their choices and the official statistics. Next, after the page break, there is a treatment comprehension check. Participants are given multiple-choice questions with four options. Each has a different percentage of kids from low- and high-income families that ended up in university. Their task is to mark the option that matches the information provided by the picture. Picking the wrong answer means not comprehending crucial survey information and cannot be accepted for final analyses. Such answers have been deleted.

FIGURE 2. INTERVENTION GIVEN TO THE TREATED GROUP



2.7 Outcome

After getting the treatment or not, all respondents are given short information about the following three questions, which this study will use as the outcome variables. This message stresses the importance of their choices, as it says that if the majority is in favor, the study executor will raise a petition and propose it to the current government. Also, it provides more clarity by explaining that the next three questions will show them a statement, and they must choose how much they agree or disagree with it. It included statements regarding the Polish education system and the geo-political scene, asking people what they think of subsidizing poorer students, lowering gasoline prices and favoring only pupils with the best grades. First, present this statement: "Government should implement subsidies for working students from

low-income families", next: “Government should focus on lowering gas prices", and last: “Government should prioritize financial students with the best grades”. For each, they have 5 options ranging from “I strongly disagree” to “I strongly agree” to reflect their preferences. All three were phrased like a potential government policy, so they aimed to see what people agreed with after being treated and not being treated.

2.8 Posterior beliefs

After the page break, the last question appeared to respondents. With only two possible answers and a short text, participants were asked if everyone has equal academic success or not, where one corresponds to agreeing and 0 with disagreeing with the given statement. This approach aimed to encourage respondents to critically reflect on their views regarding educational equity, potentially revealing underlying biases or inconsistencies in their initial responses. The study anticipates that people unconsciously have changed their beliefs by thinking more about the topic throughout the questionnaire or by the treatment.

3. Data collection and analysis

The data collection lasted around three weeks; 105 responses were collected. Six of these did not pass interest or comprehension checks and, thus, have been considered invasive towards this study's accuracy. With 99 data points, data has been cleared and prepared for statistical analysis. Most multiple-choice variables have been changed into binary ones. Number one represents “I strongly agree” and “I agree” or any form of response compliance. Zero signifies neutrality or disagreement (“I strongly disagree;” “I disagree”). Continuous variables have remained unchanged.

Variable “Age” captures the age of respondents; “Gender” is 1 for males and 0 for females (there were no other answers picked). “Residency” is 1 if one currently lives in Poland and 0 otherwise. “Education” and “Political” range from 1-6; in the case of education, 1 means that high school has been finished, and every after represents a higher educational background. Similarly, in the political question, 1 represents far left and 6 stands for far-right beliefs. ‘Equality’ and ‘Constraints’ are binary variables. ‘Equality’ equals 1 if an individual believes that the Polish educational system is “fair”, and ‘Constraints’ equals 1 if the individual has experienced financial constraints as a barrier to education. Variables ‘Lincome’, ‘Mincome’,

‘AMincome’ and ‘Hincome’ are all continuous, ranging from 0-100%, and represent -income families according to respondents. The pre-treatment belief control variable was created by subtracting ‘Lincome’ from ‘Hincome’, making ‘HvsL’, which showed the magnitude of inequality, as the higher it was, the bigger the difference was in people’s heads between high- and low-income families. Lastly, variable ‘interaction’ is an interaction between variables ‘treatment’ and ‘Equality’; using it in our regression allows us to see if the effects come from treatment or stem from pre-existing beliefs of inequality/equality in education.

After intervention or lack of it, we gathered data for outcome variables - ‘Policy 1’, ‘Policy 2’, and ‘Policy 3’. A value of 1 means that people agree with the statements, and post-treatment beliefs- ‘Pbeliefs’— equaled 0 if the respondent disagreed with the given statement. Then using statistical program STATA analysis was performed. The study performed the Mann-Whitney U test, reported in Tables 2 and 4, to assess the balance between the control and treatment groups.

With the above-mentioned variables, the following logit regressions have been performed for Tables 3 and 5:

$$Y_i = \alpha_0 + \alpha_1 Treatment + \epsilon$$

$$Y_i = \alpha_0 + \alpha_1 Treatment + \alpha_2 Equality \times Treatment + \epsilon$$

$$Y_i = \alpha_0 + \alpha_1 Treatment + \alpha_2 Equality \times Treatment + \alpha_3 Age + \alpha_4 Gender + \alpha_5 Residency + \alpha_6 Education + \alpha_7 Political + \alpha_8 Equality + \alpha_9 Constraints + \alpha_{10} HvsL + \epsilon$$

4. Results

First, I provide two balance tests, each containing an overview of the variables' distribution within the treatment (T=1) and control groups (T=0). After that, there will be two forms of regression, one with a simple correlation of outcome and treatment and the other with a correlation of those two and all control variables. The last result will have two bar charts depicting the change of beliefs with and without treatment on all three outcome questions. Results will be depicted in tables (Tables 1 to 5) and graphically (Figure 3).

4.1 The treatment and control group balance test

Table 1. provides an overview of the variables of the treatment group and control group. The first group has 49 observations, whereas the second has 50. Both have a mean age of around 30 years old. The treatment group has a higher male percentage than the control group, with 55% and 48%, respectively. Two groups have the same percentage of people stationed currently in Poland. Number 3 is the mean of education in both groups, representing that, on average, they finished higher education. Variables 'political' and 'constraints' are comparable between the treatment and control groups. In "equality", 94% of positive responses in the control group and 86% in the treatment group. More noticeable differences can be seen in variables that capture respondents' beliefs about how important income is in sending children to higher education establishments. Responses related to low income (income), and High-income (Hincome) are larger in the treatment group, and middle-income (income) and above-middle income

(AMincome) are larger in the control group. Z values for all variables (4 columns) are larger than 0.05, meaning none significantly differ between the control and treatment groups.

TABLE 1. BALANCE TEST OF CONTROL AND TREATMENT GROUP

variables	Mean T=0	Mean T=1	P >|z|	Mean all
Age	29.74	29.88	0.53	29.81
Gender	0.48	0.55	0.48	0.52
Residency	0.82	0.82	0.96	0.82
Education	3	3	0.9	3
Political	2.6	2.55	0.48	2.58
Equality	0.06	0.14	0.17	0.1
Constraints	0.44	0.43	0.91	0.44
Lincome	32.34	26.59	0.03	29.47
Mincome	50.5	46.61	0.27	48.56
AMincome	66.92	69.44	0.73	68.18
Hincome	79.5	81.43	0.84	80.47

Note: Significance levels: $*p < 0.05$, $**p < 0.01$, $***p < 0.001$. 99 total observations, 49 for treatment and 50 for the control group.

4.2 Outcome changes with and without treatment

Figure 3 and Table 2 shed light on policy compliance changes before and after each outcome variable's treatment. Three bars on the left side represent outcomes without the intervention, and those on the right depict outcomes with treatment. The results of policy 1 changed by 3%, decreasing from 0.78 to 0.75; policy 2 had a more significant drop of 15%, from 66% to 51%. This can suggest that treatment without control variables negatively impacts policy 1 and 2 outcomes. This trend becomes positive as the outcome of policy 3 for those without treatment equals 0.48 and after treatment rises to 0.59. Additionally, after performing Mann-Whitney U tests, the z values are at least 0.05, which means that outcomes with and without treatment are not significantly different among all Policies.

FIGURE 3. BAR CHART OF CHANGES IN THE MEANS OF OUTCOME VARIABLES WITH AND WITHOUT TREATMENT.

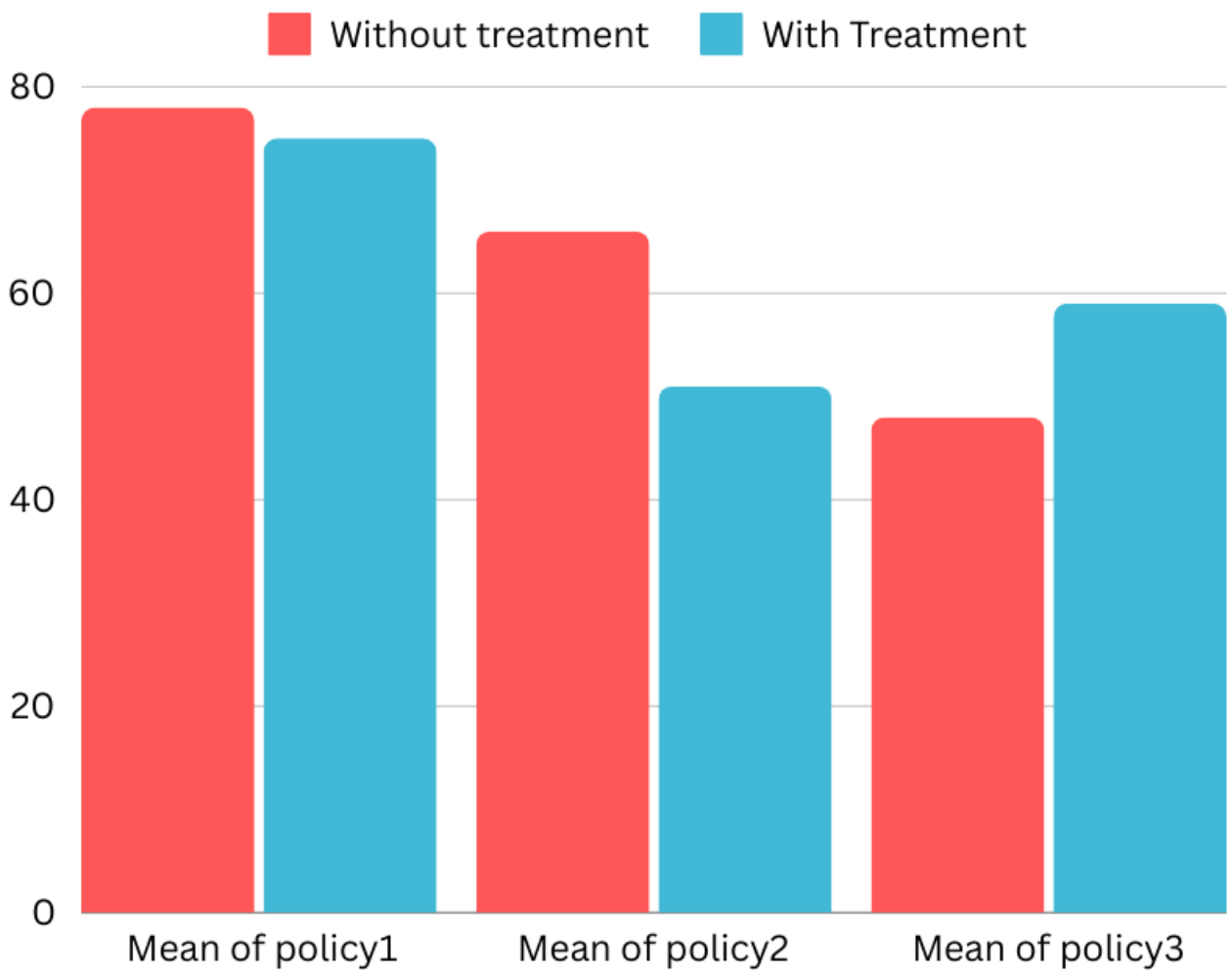


TABLE 2. POLICY MEANS COMPARISON AND MANN-WHITNEY U TEST RESULTS.

Variables	Mean T=0	Mean T=1	P>|z|
Policy1	0.78	0.75	0.77
Policy2	0.66	0.51	0.13
Policy3	0.48	0.59	0.27

Note: Significance levels: $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

4.3 Change of Beliefs

Table 3 presents a logit regression of treatment on posttreatment with three different versions: beginning with no control variables, then adding an interaction term of Treatment and Education equality as a control variable and ending with all control variables. The 'Equality' variable has been omitted due to multicollinearity.

The coefficients' values are 0.45, 0.46, and 0.49, respectively. All three have a negative sign. This indicates that receiving treatment (T=1) is associated with a decrease in the probability of the outcome variable being 1. This means that people in the treatment group are less likely to comply with the statement, "Does everyone in Poland have an equal opportunity to succeed academically?" However, none of the coefficients are statistically significant at any significant level.

TABLE 3. LOGIT MODEL OF POST-TREATMENT BELIEFS, TREATMENT, AND CONTROL VARIABLES

	Post-treatment beliefs		
Models	1	2	3
Treatment	-0.45	-0.46	-0.49
Treat x Equality		0.09	0.38
Age			0.05*
Gender			0.76
Residency			0.26
Education			-0.21
Political			0.07
Constraints			0.45
HvsL			-0.01
Constant	0.08	0.08	1.55
Observations	99	99	99
Pseudo R^2	0.00	0.00	0.12

Note: Significance levels: $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

Additionally, Table 3 assesses whether there is a statistical difference between a change of beliefs with and without treatment by performing the Mann-Whitney U tests. The z value—0.27 is larger than the largest significance level. This means that there is no significant difference between the post-treatment beliefs with and without treatment.

TABLE 4. POST-TREATMENT BELIEFS COMPARISON OF MEANS AND MANN-WHITNEY U TEST RESULTS

Variables	Mean T=0	Mean T=1	P>|z|
Post-treatment beliefs	0.48	0.59	0.27

Note: Significance levels: $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

4.4 Logit regression results

Table 2 depicts logit regression between treatment and Policies 1, 2, and 3. Results for policy 1 are in models 1-3, models 4-6 are responsible for the results of policy 2, and models 7-9 represent the results of policy 3. There are three models for each policy. Progressively adding more control variables. First, it

shows logit regression of treatment and outcome. The second is to add the interaction of treatment and Education equality (Treat x Equality) as a control variable. The third one adds variables 'Age', 'Gender', 'Residency', 'Education', 'Political', 'Equality', 'Constraints' and 'HvsL'.

Outcomes for response to subsidising poor students (policy 1) are as follows: In the first model, the coefficient is negative. This means that receiving a treatment (T=1) is associated with a decreased probability that the respondent complied with the given policy (Y=1). Adding the interaction as a control variable changes the sign of the coefficient to positive, and now receiving the treatment is positively associated with the probability of agreeing with policy implications. Similarly, the last model, 3, with all control variables, also yields a positive coefficient, meaning that when treatment equals 1, the probability of the respondent agreeing with the statement representing policy 1 increases. However, the coefficients are insignificant at any level of the p-value.

The second set of models (4-6) has results for Policy 2. If the outcome equals 1, it means the respondent agrees with the policy suggesting lowering gasoline prices. All coefficients for that outcome are negative. This implies that the probability of disagreeing with the policy statement increases after receiving treatment. These coefficients are the same in the second and last models (5 and 6) and lower in the first model of the set (model 4). Again, all outcome coefficients are higher than 0.05, indicating no significance.

Following that, there are results for Policy 3 (models 7-9) on the right side of the table. These policy outcomes were gathered by a survey, where respondents answered if the government should financially support only those students with the best grades. Contrary to policy 2, all coefficients are positive. This means that the treatment is positively associated with the probability of complying with the statement given in Policy 3, so if treatment equals 1, that probability increases. The values of coefficients are the same in the first two models (7 and 8) and increase in the last one (model 9). They are statistically insignificant, as their p-value is larger than 0.05

TABLE 5. LOGIT REGRESSION BETWEEN TREATMENT AND POLICIES OF INTEREST.

	Policy 1			**Policy 2**			**Policy 3**		
Model	1	2	3	4	5	6	7	8	9
Treatment	-0.03	0.03	0.02	-0.15	0.09	-0.09	0.11	0.11	0.12
Treatment xEquality		-0.38	-0.3		-0.42	-0.12		-0.02	-0.25
Age			0			0			0
Gender			-0.16			-0.13			0.15
Residency			-0.05			0.32			0.06*
Education			-0.03			0			-0.03
Political			0			0.03			0.07
Equality			-0.04			-0.11			0.34
Constraints			0.06			0.16			0.09
HvsL			0			0			-0.02
Const	0.78	0.78	0.94	0.66	0.66	0.5	0.48	0.48	0.17
Observations	99	99	99	99	99	99	99	99	99
R^2	0	0.05	0.42	0.02	0.06	0.19	0.01	0.01	0.16

Note: Significance levels: $*p < 0.05$, $**p < 0.01$, $***p < 0.001$. Models 1-3 present the results of policy 1. Models 4-6 show the results of policy 2. Models 7-9 depict the results of policy 3.

5. Conclusions and limitations

5.1 Research idea and execution

The benefits of quality education extend far beyond the classroom. Excellent quality education is not only beneficial for various “short-term” goals like knowledge of crucial historical events or the ability to solve algebra, but what is important is their long-term effects. These effects, to some, might sound a bit too philosophical or even spurious. However, with increasingly equal and better education, illiteracy decreases, and people are more capable at work, meaning they can be more effective at their daily work. Additionally, society becomes more aware of their health, and thus, the expected lifetime increases (McMahon & Appiah, 2002). All these things combined, and more, make our society grow stronger, leading to a more prosperous and resilient community (Filmer, 2017).

This research hypothesized that children from more affluent families have better education opportunities. They can afford tutoring or private school, which greatly affects their academic results. Unlike poorer families, who sometimes must unwillingly choose ‘worse’ education or rely only on self-study. This research tried to tackle this topic by assessing what people believe about education inequality. If they believe it is fair for everyone, can this be changed? If they think of it as not equal, can it be enhanced? This was tested by providing statistical information about inequality in the current educational system. It analysed if the belief itself can be altered and, if so, how it affects their policy attitudes.

It used experimental surveys to verify people's awareness of inequality and seek potential change in beliefs. A treatment group receives information about the difference in family income and the percentage of kids they send to higher education establishments, and a control group receives nothing. For instance, the treatment group can see that 80% of children from high-income families will attend universities and only 20% from low-income families. The research question asks if this disparity will make respondents more eager to accept policies promoting support for low-income families to equalize their chances of education success.

If this survey allows us to infer causality, future policymakers will be able to create feasible plans to equalize educational opportunities and thereby improve the whole system.

5.2 Summary of the results

With little over 100 responses to the survey and its statistical analysis, the results are promising. The study analyzed how treatment influences change in belief and policy preferences.

I found that, after receiving the intervention, people's beliefs changed. Respondents from the treatment group are less willing to agree that everyone has equal academic chances than those from the control group. This is especially evident for people who previously encountered education inequality ('Equality x Treatment' =1). Then, I focused on assessing the relationship between treatment and policy preferences. Using logit regression, the study found that the probability of accepting the statement of policy 1 decreases when there are no control variables and increases with control variables. For policy 2, those treated are more likely to accept the statement – "Government should focus on decreasing gasoline prices "in all three variations of the regression. The treatment group in all models of policy 3 regressions is more willing to accept its implications than the control group. The results of Policy 1 and 3 are changing in different directions than expected. For instance, the outcome of policy 1 equals 1 if people agree with the given statement - "Government should implement subsidies for working students from low-income families", and the paper anticipated that people with treatment should be more willing to support students from poorer families. This can be explained by poorly designed survey questions, nudging people in unintended ways or statistical errors that happened during regression analysis.

5.3 Final remarks

The above-mentioned results show a promising effect of providing information about inequality on people's beliefs and willingness to accept certain policies. It can be the first step for policymakers in any country. Such actions might open the door for extensive reforms meant to improve Poland's educational system's quality by raising public awareness and support. This might entail better teacher preparation programs, more fair access to educational resources, and greater support for schools located in impoverished communities. In the end, these initiatives would support the creation of a more welcoming and productive learning environment and aid in reducing educational gaps.

However, it is worth mentioning that even though these results show the potential for growth of

education quality in Poland or other similar countries, the limitations of this study must be named. Inaccuracies or biases in the results can lead to significant financial losses or social harm for the government, which is the effect of this study. The survey via which the experiment was distributed cannot be considered flawless, and we cannot infer pure causality from it. Each question was carefully prepared to minimise any misinterpretation and errors. However, it can unintentionally influence respondents due to unobserved characteristics, such as personal biases or socio-economic status, thereby creating noise in the results. Additionally, it was distributed to random individuals using popular social media platforms; however, the people who engaged with it and completed the survey possessed certain characteristics that prompted their interest and participation. This makes it less externally valid and more likely for selection bias to occur, potentially skewing the demographic representation of the sample. Due to randomization, OVB is fine. Besides that, things like measurement errors, random answers, or spillover effects most probably biased this paper's outcome, affecting the findings' accuracy and reliability.

Regardless of all these limitations, this study laid solid foundations for answering the question of whether providing information about education inequality causes people to be more eager to accept policies supporting low-income families and alters people's beliefs about education inequality. By educating people about the disparities in educational opportunities and mobilizing support for policies aimed at equalizing opportunities, this research can contribute to reducing inequality and alleviating political friction in Poland.

However, considering all the limitations and time spent on this research, treating it only suggestively rather than as a concrete answer to inequality problems is advisable. Further research must be conducted with more resources and time to enhance its quality and accuracy. I suggest focusing on a larger sample to increase external validity and working on existing data with trained professionals to reduce statistical errors and enhance the robustness of the findings. Future research should also consider longitudinal studies to observe changes over time and better understand the causal relationships within the data. By addressing these areas, future studies can provide more accurate and comprehensive insights into the research questions at hand.

References

Bovens, M., & Wille, A. (2021). Education, Inequality, and Political Behavior.

Charlot, O., & Decreuse, B. (2010). Over-education for the rich, under-education for the poor: A search-theoretic microfoundation. *Labour Economics*, *17*(6), 886-896.

Citéco. (n.d.). The origins. Retrieved from https://www.citeco.fr/10000-years-history-economics/the-origins

Domański, Henryk. (2017). Związek wyników egzaminu maturalnego z pochodzeniem społecznym i regułami merytokracji. Edukacja. 142. 10.24131/3724.170305.

Ejelöv, E., & Nilsson, A. (2020). Individual Factors Influencing Acceptability for Environmental Policies: A Review and Research Agenda. Sustainability.

Firsova, I. A., Lukashenko, I. V., & Azarova, S. P. (2020). The socio-economic importance of education in a knowledge-based economy. In *Frontier Information Technology and Systems Research in Cooperative Economics* (pp. 231-238). Cham: Springer International Publishing.

Le, T., Bui, M., & Uddin, G.S. (2022). Economic and social impacts of conflict: A cross-country analysis. *Economic Modelling*.

Meirick, P. C., & Wackman, D. B. (2004). Kids voting and political knowledge: Narrowing gaps, informing votes. *Social Science Quarterly*, *85*(5), 1161-1177.

Sedlak & Sedlak. (2023). Wynagrodzenia osób z różnym wykształceniem w 2022 roku. wynagrodzenia.pl. From https://wynagrodzenia.pl/artykul/wynagrodzenia-osob-z-roznym-wyksztalceniem-w-2022-roku

Tomescu-Dubrow, I., Słomczyński, K. M., Domański, H., Dubrow, J. K., Sawiński, Z., & Przybysz, D.

(2018). *Dynamics of class and stratification in Poland* (p. 296). Budapest, Hungary:: Central European University Press.

University of Warsaw. *Educational system in Poland*. From https://welcome.uw.edu.pl/before-you-arrive/educational-system-in-poland/

Falch, R. (2022). How do people trade off resources between quick and slow learners?. *European Economic Review*, *150*, 104285.

Statistics Poland. (n.d.). *Wskaźnik 4.1.1 - Odsetek dzieci i młodzieży osiągających co najmniej minimalny poziom biegłości w czytaniu i matematyce, według płci*. https://sdg.gov.pl/statistics_glob/4-1-1/

Central Examination Commission. *Mapa Egzaminów*. https://mapa.wyniki.edu.pl/MapaEgzaminow/

Lee, I., & Tipoe, E. (2023). Sources of educational inequality and redistributive behaviour: Experimental evidence.

Hojda, P., Roszkowska, S., & Trojak, M. (2022). What drives labour market success? Empirical analysis of university graduates in Poland.

Wędrowska, E., & Muszyńska, J. (2022). Role of age and education as the determinant of income inequality in Poland: decomposition of the mean logarithmic deviation. *Entropy*, *24*(6), 773.

Yarnal, B. (1996). The policy relevance of global environmental change research.

Haaland, I., Roth, C., & Wohlfart, J. (2023). Designing information provision experiments. *Journal of economic literature*, *61*(1), 3-40.

Zhirnova, G. I., & Absalyamova, S. G. (2013, September). Global innovation gap and quality of education. In *2013 International Conference on Interactive Collaborative Learning (ICL)* (pp. 144-145). IEEE.

Nazar, R., Chaudhry, I. S., Ali, S., & Faheem, M. (2018). Role of quality education for sustainable development goals (SDGs). *International Journal of Social Sciences*, *4*(2), 486-501.

Appendix

Fairness and redistribution

Start of Block: Default Question Block

Q1 Thank you for considering participation in this survey! Please read the following consent statement and indicate your agreement.

Consent Statement: By selecting "I agree", you consent to participate in this survey and acknowledge that your responses will be used for research purposes. Your responses will remain confidential and anonymous, ensuring that no identifying information is linked to your answers. Participation is entirely voluntary, and you may withdraw at any time without any penalty.

- ○ I agree (1)

Page Break

Q2 What is your age?

_____

Q3 What is your gender?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)

Q4 Are you currently living in Poland?

- No (1)
- Yes (2)

Q5 What education did you finish?

- ○ Less than high school (1)
- ○ High school graduate (2)
- ○ Some college (3)
- ○ 2 year degree (4)
- ○ 4 year degree (5)
- ○ Professional degree (6)
- ○ Doctorate (7)

Page Break

Q6 Where would you put yourself on politcal spectrum?

- Extremaly liberal (1)
- Somewhat liberal (2)
- neutral (3)
- somewhat conservative (4)
- Extremaly conservative (5)
- Prefer not to say (6)

Q7 How equal is current educational system in terms of financial opportunities?

- very equal (1)
- equal (2)
- somewhat equal (3)
- not very equal (4)
- not equal at all (5)

Q8 Have you or anyone close to you experienced difficulty accessing educational opportunities due to financial constraints?

- yes (1)
- no (2)

End of Block: Default Question Block

Start of Block: Block 1

Q9 In questionnaires like this, sometimes there are subjects who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please choose “slightly interested” or “very interested” as your answer in this question.

- ○ Not at all interested (1)
- ○ Slightly interested (2)
- ○ Moderately interested (3)
- ○ Very interested (4)
- ○ Extremely interested (5)

End of Block: Block 1

Start of Block: Block 3

Q10 The next questions will focus on educational opportunities across different income groups. The exact earnings of each group will be displayed next to a slider. In each question, the earnings are assigned to a specific socio-economic group and represent net income. The data comes from 2022 and is provided by the Central Statistical Office (GUS).

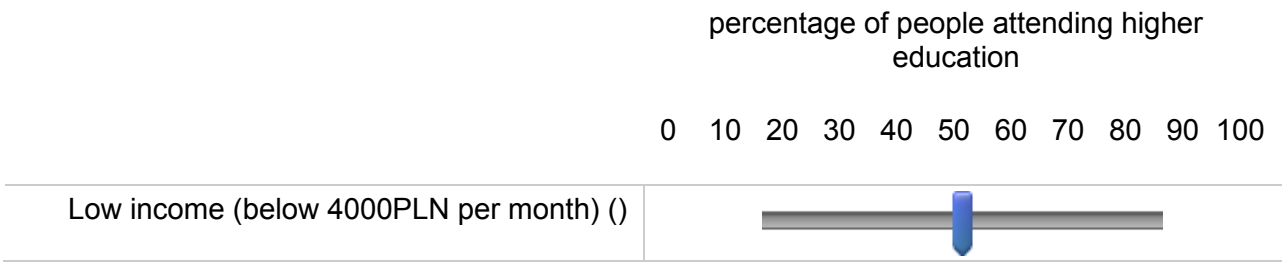
Consider what percentage of children from each income group choose to pursue higher education.

- ○ I have read and understood this text (1)

Page Break

Q11 Out of 100 children from low income families, how many end up attending university?

Please use the slider to assign the percentage.



Page Break

Q12 Out of 100 children from middle income families, how many end up attending university?

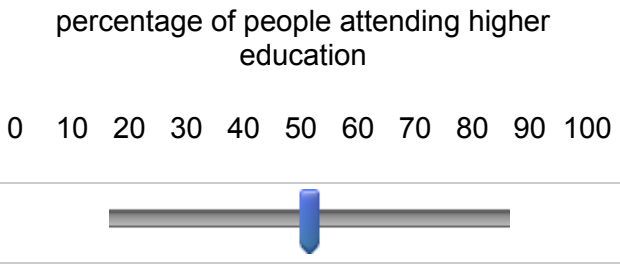
Please use the slider to assign the percentage.

	percentage of people attending higher education 0 10 20 30 40 50 60 70 80 90 100
middle income (4001-5700PLN per month) ()	

Page Break

Q13 Out of 100 children from above-middle income families, how many end up attending university?

Please use the slider to assign the percentage.



above-middle income (5701-11000PLN per month) ()	

Page Break

Q14 Out of 100 children from high income families, how many end up attending university?

Please use the slider to assign the percentage.

	percentage of people attending higher education 0 10 20 30 40 50 60 70 80 90 100
High income (Above 11001PLN per month) ()	

End of Block: Block 3

Start of Block: Block 4

Q15 Picture below represents data from Polish central statistical office with percentage of people from each income group that attend higher education.

Please inspect it carefully, see how much it differed from your picks.

Page Break

Q16 Comperhension check

Think of low income and high income families, which fact is true?

- ○ 20% children from low income families, attend higher education and 80% from high income families (1)
- ○ 40% children from low income families, attend higher education and 60% from high income families (2)
- ○ 50% children from low income families, attend higher education and 50% from high income families (3)
- ○ 55% children from low income families, attend higher education and 45% from high income families (4)

Page Break

Q17 Next three questions are part of a petition started on change.org, please read them carefully and answer honestly.
If majority of respondents agree/disagree with the statement, the petition will be pushed to government.

Remember! Your voice matters and have the power to change future of Poland.

- ○ I read and understood this text (1)

Page Break

Q18 How much do you agree with this statement:

"Government should implement subsidies for working students from low income families"

Lower numbers indicate less agreement, while higher numbers reflect stronger agreement.

- ○ Strongly disagree (1)
- ○ Disagree (17)
- ○ Neutral (18)
- ○ Agree (19)
- ○ Strongly agree (20)

Page Break

Q19 How much do you agree with this statement:

"Government should focus on lowering gas prices"

Lower numbers indicate less agreement, while higher numbers reflect stronger agreement.

- ○ Strongly disagree (1)
- ○ Disagree (17)
- ○ Neutral (18)
- ○ Agree (19)
- ○ Strongly agree (20)

Page Break

Q20 How much do you agree with this statement:

"Government should prioritize financially students with the best grades "

Lower numbers indicate less agreement, while higher numbers reflect stronger agreement

- ○ Strongly disagree (1)
- ○ Disagree (17)
- ○ Neutral (18)
- ○ Agree (19)
- ○ Strongly agree (20)

Page Break

Q21 Does everyone in Poland has an equal opportunity to succeed academically?

- ○ yes (1)
- ○ no (6)

End of Block: Block 4