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Media negativity bias and tax compliance: Experimental evidence
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Media negativity bias and tax compliance: Experimental evidence[*]

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Abstract

We study the impact of the media negativity bias on tax compliance. Through a framed laboratory experiment, we assess how the exposure to biased news about government action affects compliance in a repeated taxation game. Subjects treated with positive news are significantly more compliant than the control group. Instead, the exposure to negative news does not prompt any significant reaction compared to the neutral condition, suggesting that participants may perceive the media negativity bias in the selection and tonality of news as the norm rather than the exception. Overall, our results suggest that biased news provision is a constant source of psychological priming and plays a vital role in taxpayers' compliance decisions.

Keywords: tax compliance, media bias, taxation game, laboratory experiment.

JEL Classification: C91, D70, H26, H31.

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1 Introduction

Economists have traditionally modeled tax compliance as the outcome of a rational choice between risky assets in a portfolio (Becker, 1968; Allingham and Sandmo, 1992). This approach does not fully explain the compliance behavior of individuals, as moral and social dynamics also drive individual reporting decisions (Andreoni et al., 1998; Hallsworth et al., 2017; Bott et al., 2019). Previous research suggests that taxpayers' satisfaction with government action is a critical driver of their propensity to comply. If citizens believe that the government does not spend their taxes well, they may want to reciprocate by refusing to pay their full tax liability (Spicer and Lundstedt, 1976). If, instead, the belief prevails that institutions use taxes to fund public goods and services adequately, taxpayers will be more willing to comply (Alm et al., 1993). Even when they do not receive a full public good equivalent of their payments, citizens may be intrinsically motivated to honestly declare their income as if a "psychological contract" with tax authorities was in force (Fehr and Gächter, 1998; Frey and Feld, 2002; Frey et al., 2004). According to Feld and Frey (2007), such a contract holds as far as citizens perceive the political process as fair and the policy outcomes as legitimate, resulting in a stronger willingness to contribute to the welfare of the community.

These perspectives imply a vital role for information about government action and the fairness of the political process. The media's coverage of economic and policy issues, however, is far from being balanced. The communication literature agrees that mass media tend to over-report negative news as they generate stronger psychophysiological reactions in the audience (Soroka et al., 2019), and they better fit the public's preference for negative contents (Agirdas 2015). The negativity bias has proved particularly pronounced in the presentation of political (Cappella and Jamieson, 1997; Kepplinger et al., 2012; Le Moglie and Turati, 2019) and economic news (Garz 2014; Soroka et al., 2018). Given the role of information in shaping the public's opinion about public institutions, research on tax compliance should address the impact of the media negativity bias. However, empirically studying how the media affect citizens' willingness to pay their taxes is challenging in many respects. Existing surveys do not provide information about the possible bias of the news consumed by the public, and the use of survey data entails endogenous sample selection and treatment assignment that prevent ascertaining causality.

To address these issues, we design a framed laboratory experiment (Alm, 2012) that allows us to analyze how exposure to biased news affects compliance in a repeated taxation game. Experimental

manipulations consist of news tickers reporting top stories about public finance and policy issues that run on subjects' screens during the game. Using a between-subjects design, we contrast tax compliance outcomes under three conditions: negative, positive, and neutral news provision. The negative treatment reflects the media negativity bias that the communication literature credits with being the status quo in the supply of news about public finance and policy issues (e.g., Soroka et al., 2018; Soroka et al., 2019). Compared to the neutral treatment, the negative news condition seems not to affect tax compliance, suggesting that participants likely perceive the media negativity bias as the norm rather than the exception (Cappella and Jamieson, 1997; Kepplinger et al., 2012; Garz, 2014; Elejalde et al., 2018; Soroka et al., 2019). As the selection and tonality of news deviate from the status quo resulting in positive content, participants become significantly more compliant than the control group. The effect is economically sizable: subjects treated with good news reported a 23 percentage points higher compliance rate than those exposed to negative or neutral news. Overall, our results reveal that how the media present public finance and policy issues is a crucial determinant of tax compliance, suggesting that biased news is a constant source of psychological priming that may prevent the public sector from fully exploiting its tax revenue potential.

Our paper bridges two strands of literature. The first comprises the economics of tax compliance, which has been approached from many perspectives (see Andreoni et al., 1998; Alm, 2012 and Alm, 2019, for a review). We focus on the moral and social perspective on taxpayers' behavior, which has linked compliance to the efficiency and fairness of public institutions (Tyler, 1990; Smith, 1992; Alm et al., 1993; Feld and Frey, 2007; Murphy and Tyler, 2008; van Dijke and Verboon, 2010; Hallsworth et al., 2017; De Neve et al., 2021; Koessler et al., 2019). These studies implicitly assume a critical role for information. We clarify this role and add to the literature by showing the compliance implications of biased information about government action and public finance issues. More in general, our findings improve the understanding of the psychological and social drivers of compliance, also including peer effects (Alm et al., 2017b), cultural traits (Alm et al., 2017a), trust in institutions (van Dijke and Verboon, 2010; McKee et al., 2018), social norms (Lefebvre et al., 2015; Becchetti et al., 2017; Abraham et al., 2017) corruption (Rotondi and Stanca, 2015; Alm et al., 2016), fairness concerns (Alesina and Angeletos 2005; Gualtieri et al., 2019; Sabatini et al., 2020), and intrinsic motivations (Luttmer and Singhal, 2011; 2014; Calvet Christian and Alm, 2014; Dwenger et al. 2016; Cerqueti et al., 2019).

The second strand of literature studies how media bias affects economically relevant behavior

such as voting (DellaVigna and Kaplan 2007; Chiang and Knight 2011), civic-mindedness (Durante et al. 2019), crime perceptions (Mastrorocco and Minale 2018), and consumption behavior (Nguyen and Claus 2013), just to name a few. There is growing evidence that the media may also have an impact on tax compliance. Garz and Pagels (2018) show that the media coverage of celebrities' tax issues causes an increase in the number of self-denunciations. Kasper et al. (2015) use a survey experiment to show that exposure to news that presents Austrian tax authorities as trustworthy leads to stronger trust in authorities and higher intended compliance. Cyan et al. (2017) find that TV and newspaper ads can improve individual attitudes towards tax compliance in Pakistan. We contribute to this field by focusing on a specific type of bias, the negativity bias, and revealing a so far unexplored outcome of this phenomenon. Our experimental approach also adds to the communication literature that studies the media negativity bias (Cappella and Jamieson, 1997; Garz 2014; Trussler and Soroka 2014; Soroka et al. 2018; Soroka et al. 2019), by suggesting that the systematic tendency of the media to focus on negative news may entail hidden social costs connected to the government's inability to meet its revenue objectives.

The rest of the paper proceeds as follows. Section 2 briefly discusses the related literature and presents our hypotheses. Section 3 describes our experimental design and procedures. Section 4 presents our results. We discuss our findings and their possible policy implications in Section 5 and conclude in Section 6.

2   Media negativity bias and tax compliance

A vast literature documents that media report bad news at a pace that does not mirror reality (Soroka, 2012). The coverage of negative events does not accurately reflect their actual distribution in real life, resulting in a distortion bias (Altheide, 1997; Entman, 2007). For example, crime reporting follows a different trend than the real indicators of crime (Lawrence and Mueller, 2003). The same holds for the involvement of minorities in riots (Entman, 1994), political scandals (Cappella and Jamieson, 1997; Semetko and Schoenbach, 2003), episodes of corruption (Soroka and McAdams, 2015), transport accidents (van Der Meer et al., 2019), and long-term socio-economic trends (Harrington, 1989; Gibson and Zillmann, 1994; Kollmeyer, 2004). Empirical studies document that the negativity bias is stronger in the news making of issues related to politics and economic policy (Hester and Gibson, 2003; Kepplinger et al., 2012; Lengauer et al., 2012; Elejalde et al., 2018). Cross-disciplinary literature identified various sources of the media negativity bias. Communication studies

emphasize that newsworthiness is linked to negativity across all subjects (Lawrence and Mueller, 2003; Soroka, 2012). Negative events are unambiguous, unexpected, and occur over a shorter time than positive news, which are more often gradual, potentially boring, and less appealing (Pinker, 2018). Many authors suggest that the disproportionate reporting of negative stories is a result of the media's attempt to attract public attention and gain followers (Hamilton, 2011; Pinker, 2018). Trussler and Soroka (2014) show that newsstand magazine sales increase by roughly 30 percent when the cover is negative rather than positive. A growing body of evidence in psychology illustrates the human tendency to prioritize negative over positive news content. Soroka and McAdams (2015) show that negative increases arousal and attentiveness compared to positive content in controlled environments. Soroka et al. (2019) document that experimental subjects are more physiologically activated by negative than positive news stories, suggesting that humans may be neurologically or physiologically predisposed towards focusing on negative information. This cognitive bias may have evolutionary origins rooted in the fact that the usefulness of negative information outweighs the benefits of positive information in survival-related decisions (McDermott et al., 2008; Soroka et al., 2019). Overall, this literature suggests that the media negativity bias is driven by the public's stronger demand for negative content. As a result, negativity has grown to become among the most dominant selection criteria of media logic (e.g., Lawrence and Mueller, 2003; Keung and Lee, 2015), causing a systematic difference in the degree of negativity between the real world and media content (Soroka, 2012).

The negativity bias is particularly pronounced in Central-Eastern Europe, where the media are facing the challenge of regaining public trust, devastated by their role of serving the state under real-socialism (Rose, 1994; Sztompka, 2000; Trifonova Price, 2019). In the Czech Republic, where we carried out our experiment, trusting the institutions, including media and journalists, was long seen as naïve (Sztompka, 2000; Volek and Urbániková, 2017). After 1989, public trust in the media has been partially restored but experienced a new decline after the economic crisis in 2008 (Newman et al., 2018). In recent years, the Czech media market has experienced significant ownership concentration with control shifting towards domestic tycoons, resulting in increasing polarization and a tendency to put the public sector in a bad light. According to the Digital News Report 2020 (Newman et al., 2020), these developments caused a further decline in trust in the media, which fell among the lowest in Europe. Moreover, positive presentations of public policy outcomes and, in general, of the State's role in the economy still tend to prompt skepticism among the public (Volek

and Urbániková, 2017). As a result, Czech media had to emphasize negative content further to gain attention and trust, especially regarding the state's intervention in the economy.

A policy-relevant outcome of the negativity bias lies in the public's perception of the negative events' distribution in real life. The public is led to think that over-represented events outnumber "normal" events in real life (Soroka, 2012; Soroka, 2014;van Der Meer et al., 2019). For example, Mastrorocco and Minale (2018) show that exposure to tv channels over-representing minorities in the coverage of crime episodes increases concerns about crime and raises votes for parties campaigning against minorities.

Following the literature summarized above, the Czech public could see bad news about public policy outcomes as the norm rather than the exception. As a result, the behavioral response of the experimental subjects exposed to the negative condition may not necessarily differ from that of participants involved in the neutral condition. We then expect the following result from the laboratory experiment:

Hypothesis 1: Tax compliance may not significantly differ between subjects exposed to the negative and the control condition.

With the "positive treatment", we aim to study whether a deviation from the media's status quo, resulting in the exposure to good news about the public sector, may increase compliance across experimental subjects. There is field evidence that providing taxpayers with factual information about the use of tax revenues may increase income self-reporting and tax compliance. Hallsworth et al. (2017) show that mentioning in tax reminders specific services that recipients were likely to have used themselves markedly raise the likelihood of individuals paying their declared tax liabilities in the United Kingdom. Bott et al. (2019) show that Norwegian taxpayers targeted with messages stressing the societal benefits of taxation self-report significantly higher amounts of foreign income. De Neve et al. (2021), instead, show that treating taxpayers with factual data about how tax revenues are spent does not increase compliance in Belgium. Invoking tax morale, instead, seems counterproductive in a payment reminder experiment.

Though less externally valid than a field experiment, our laboratory setting allows us to treat subjects with more specific information about public policy outcomes. Instead of factual information, as in De Neve et al. (2021) and Bott et al. (2019) or moral messages, as in Hallsworth et al. (2017), we administer news tickers reporting top stories about public finance and policy issues. Stories basically

6

focus on successful projects carried out by the public sector (see Appendix A for the complete list of stories in the three alternative treatments). The motivation of this approach lies both in our interest in the impact of the media bias and in evidence that anecdotal messages are much more salient than factual information and prompt more significant reactions in taxpayers (Alesina et al., 2018). We differentiate from previous studies on tax morale and tax compliance by focusing on the role of the media and exploiting messages that contrast with the negative climate characterizing the media's representation of the public sector in the Czech Republic. Instead of proposing neutral information about the destination of public expenditure (as in Bott et al., 2019, and De Neve et al., 2021), we provide subjects with specific examples of successful public projects funded with tax revenues. Such examples are provided in the form of news stories. By proposing the first experiment of this kind in a post-communist country, our work allows us to study tax compliance in a setting characterized by historically low trust in the media and marked negativity bias in the representation of the public sector. Two mechanisms may stimulate the willingness to comply of experimental subjects treated with positive news. First, compliance may be a matter of reciprocity (Fehr and Gächter, 1998; Feld and Frey, 2007). Examples of successful public expenditure may raise citizens' trust in institutions and confidence that the state will spend their taxes well, making them more willing to pay their entire tax liability. Second, evidence of how tax revenues increase public welfare may make taxpayers more concerned with fairly contributing to the well-being of the community. The very fact of deviating from the status quo resulting from the "positive treatment" may also strengthen the mechanisms, given the specific features of the Czech Republic, a post-communist country with historically low trust in institutions. The positive perception of how public institutions work may trigger reciprocity attitudes towards fellow citizens in general and, therefore, the other participants in the experiment. This issue is widely debated in the political science literature on procedural justice, which provides evidence that fair and efficient policies strengthen citizens' trust in institutions that spill-overs on generalized trust, i.e., trust towards fellow, unknown, citizens. Kumlin and Rothstein (2005), Rothstein and Stolle (2008), and Newton et al. (2018) argue that well-functioning government institutions stimulate cooperative behavior and the willingness to comply with rules because people's views of the society around them and of their fellow human beings are partly shaped by their perception of the efficiency and fairness of state institutions. Based on World Values Survey data, Letki (2006) finds that citizens are law-abiding to the extent to which democratic and bureaucratic institutions are perceived to perform well, concluding that the

trustworthiness of efficient institutions influences individual attitudes and behavior. Kydd (2000) and Delhey and Newton (2005) suggest that the behavior of public institutions signals to citizens about the moral standard of the society in which they live, thereby informing their behavior in everyday strategic interactions. According to Rothstein and Stolle (2008), the mechanism relies on the belief that institutions do what they are supposed to do in a fair, reasonably efficient, and unbiased manner, which leads to thinking there is a limited chance of people getting away with treacherous actions. These beliefs may give people a good reason to refrain from cheating behaviors such as tax evasion.

In light of the arguments summarized above, we pose the following hypothesis:

Hypothesis 2: The subjects exposed to positive news are more likely to report their income correctly.

In each treatment, we made individuals earn their endowment under two different configurations as a robustness check to rule out the possibility of confusing the effect of media bias with that of the origin of income. In the first configuration, participants earned their income through a real effort task. In the second, experimenters exogenously endowed participants with an amount of money. The literature offers no clear evidence on the differential role of earned versus endowed money in tax compliance. Previous studies found that windfall gains weaken negative reciprocity (Danková and Servátka, 2015) and increase the propensity for charitable giving (Carlsson et al., 2013) and risk taking (Rudisser et al., 2017). By contrast, Luccasen and Grossman (2017) found that giving to charity or philanthropic institutions increases when the endowment is earned in a real-donation experiment. Several authors (Boylan and Sprinkle, 2001; Clark, 2002; Boylan, 2010a) found no difference in the tax compliance of subjects who earned money or were exogenously endowed. Still, when the tax rate increased, participants with earned money increased their compliance, whereas those with endowed money evaded more (Boylan and Sprinkle, 2001 and Boylan, 2010a). Some experiments suggest that the impact of the source of income also depends on time, with compliance declining with the interaction between effort and the number of rounds (e.g., Durham et al., 2014). Boylan (2010a) found that participants with earned money were more compliant than those bene-fiting from windfall money before an audit but decreased their compliance after the audit, while the reverse was true for those with endowed money. Other authors found that participants who earn their income through a moderate effort are more likely to comply than those who performed high

effort tasks or were exogenously endowed (Bühren and Kundt, 2013; Kirchler et al., 2009). Overall, the available evidence is not conclusive, and we do not have a definite hypothesis on how the origin of income may affect compliance. Instead, the two configurations mainly serve as a robustness check to disentangle the role of media bias from that of a possible confounding factor.

3 Experimental design

To circumvent the selection and endogeneity problems arising in the analysis of naturally occurring data, we designed a framed laboratory experiment (Harrison and List, 2004; Alm, 2012) where we targeted three distinct randomly determined groups of participants with two main treatments respectively based on the exposure to *negative* (T_{NEG}) and *positive* (T_{POS}) media bias. A third control group received a *neutral* (T_{NEU}) treatment characterized by the absence of any salient bias. Experimental manipulations consisted of news tickers reporting top stories about public finance and policy issues that ran on subjects' screens during a repeated taxation game (Alm et al., 2015; Alm and Malézieux, 2020).

As explained in Section 2, we made individuals receive their endowments under two different configurations. In the first endowment configuration, participants earned income by working on a structured series of conventional real-effort tasks (C_{RE}) and were rewarded based on their performance.[1] We calibrated the piece rates to generate a framed endowment $I \in (8,500; 50,500)$ EMU compatible with the nominal distribution of income in the Czech Republic.[2] In the second configuration, subjects exogenously received an endowment in the form of windfall money (C_{WF}) drawn for the actual endowment distribution generated in the real-effort sessions. Finally, participants played a conventional taxation game (Malezieux, 2018) in groups of four subjects in a partner-matching protocol.

The game was repeated for five rounds. Subjects received information about their earnings at the end of each round. The final payment consisted of the sum of the earnings obtained in the five rounds (Charness et al., 2016). Each round of the taxation game was partitioned into three sequential stages. (i) The first stage concerned the individual income (I) generation. (ii) In the

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[1]Subjects were asked to work for 2 minutes on each one of the following tasks: matrix-counting task (Abeler et al., 2011), anagram task (Charness and Villeval, 2009), adding-to-10 task (Mazar et al., 2008), and a stroop-color test (Scarpina and Tagini, 2017).

[2]The exchange rate was 200 experimental monetary units (EMU) for one Czech Crown (CZK), with 5,000 EMU $\approx$ 1 EUR.

second stage, we asked participants to self-report their income ($0 \leq R_i \leq I_i$) to establish their tax liability. We then taxed the declared income at a flat rate $t = 0.15$ as for the personal income tax rate in the Czech Republic. All the experimental parameters of our framed lab experiment are modeled on the Czech case (Czech General Financial Directorate, 2016).

Tax audits took place between the second and third stages. The probability of receiving an audit was $p = 0.05$. Tax cheaters were exposed to a fine equal to the unpaid tax multiplied by a penalty factor $\alpha = 10$. The intense penalty factor is intended to model the severe consequences that tax evaders face after conviction.[3] The parameter α is always kept constant across all treatments and all rounds[4].

(iii) In the third stage, participants learned about taxation outcomes and anonymized[5] audit results. Subjects could also see the amount of taxes overall paid by the group. To model the utility generated by the consumption of the public good funded through the taxation scheme, each participant received a share of the total tax revenue $b = 0.125$.[6] As a result, the payoff function was:

$$\pi_i (1 - p) = I_i - tR_i + \sum_{i=1}^{4} btR_i \qquad (1)$$

for subjects who did not receive the audit, and:

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[3]According to Czech law, tax evasion entails a pecuniary penalty and imprisonment from 3 months to 3 years. The rationale for our choice of the intense penalty factor is explained in Alm et al. (1999) "A penalty multiplier of 5 or 25 times unpaid taxes may seem relatively large, since actual penalties for income tax fraud are currently 75 percent of unpaid taxes plus the unpaid taxes. However, it is important to recognize that the discovery of income tax fraud in one year leads to investigation of potential fraud in previous years. Further, when interest penalties and, more significantly, legal costs are also considered, a penalty multiplier far in excess of 5 does not seem unreasonable. Finally, a large penalty multiplier captures the type of catastrophic loss that the detection of evasion often brings". In theory, subjects could incur a bankruptcy-like scenario in any given round of the experiment. In such a case, experimenters told participants that they would set their earnings to 0 EMU (Schram and Onderstal, 2009), but losses would not be carried forward to the following rounds. However, this scenario occurred only in 2 percent of the total cases.

[4]Given our parametrization, $I \geq tR + \alpha t(I - R); R \geq \frac{\alpha tI - I}{(\alpha - 1)t}$, to expect any positive earning in a given round, a risk-neutral agent should report an amount (R) that equals at least 37 percent of the actual individual income (I). Reporting 36 percent or less of the actual income would imply a net loss in case of an audit. The 37 percent lower bound serves as a reference point for potential gains and losses (net profit = 0) in the round. Given the existence of loss aversion, we assume that risk-neutral and risk-averse individuals would be more likely to declare their actual income, whereas risk-seeking and risk-loving individuals would be more likely to report 36 percent or less of their actual income.

[5]See Casal and Mittone (2016) concerning the role of anonymity in income reporting games.

[6]The limited redistribution of tax revenues is relatively standard in tax evasion games (e.g., Webley, 1991). The redistribution factor b has been found to be positively correlated with tax compliance (see Malezieux, 2018 for a review of the literature). In our design, it serves to model Okun's concept of redistribution as a "leaky bucket" (Okun, 1975). Redistribution may shrink society's resources as it undermines incentives and entails deadweight losses related to structural inefficiencies in the tax collection and public transfers systems. According to Okun's metaphor, redistributing resources is like transferring water in a leaky bucket. Consistently with this hypothesis our experiment also did not redistribute revenues from tax penalties to model the need to fund the auditing and redistribution system.

$$\pi_i\left(p\right) = I_i - tR_i + \sum_{i=1}^{4} btR_i - \alpha t\left(I_i - R_i\right) \tag{2}$$

for participants targeted with a tax inspection.

Throughout the three stages of the game, a series of 15 news headlines rotated in six seconds intervals at the bottom of participants' screens . The main treatment manipulation consisted of randomly assigned headlines with a systematically biased tone (positive, negative, and neutral) to each distinct experimental group of subjects. Under the positive treatment, participants regularly saw positive news about the efficient use of the government budget (for example, State Housing Department Fund will provide advantageous loans, or Governmental program supporting science centers and generous grants successful: best minds returning home). In the negative treatment that aimed at reproducing the real-world media negativity bias, subjects saw headlines reporting negative news on the ineffective or inappropriate use of public funds (for example, National debt increased to CZK 1.68 billion, or Low civil servant efficiency decreased the Czech Republic's competitiveness; down to 46th in global ranking). In the neutral treatment (baseline condition), the news reported about public events of general interest with very neutral contents (for example, The World Dog Show in Crufts is hosting 28 thousand dogs). Appendix A reports the complete list of headlines in detail and provides a link to video capture of the the implementation.

A focus group of ten Ph.D. students in political sciences (five males, five females) at Masaryk University selected the news headlines and qualitatively classified their tone into three categories. Building on computational linguistics methods (Taboada et al., 2011), we then quantitatively assessed the sentiment gradient of the different corpora of headlines through the algorithm developed by Repustate.com (Cieliebak et al., 2013). The algorithm delivers a rating between -1.000 and -0.051 if the tone is negative, -0.050 and 0.050 for neutral news, and between 0.051 and 1.000 for positively-toned news. In our experiment, the rating was -0.750 for the negative treatment, 0.010 for the neutral treatment, and 0.870 for the positive treatment.[7]

A total of 220 subjects, recruited via Hroot (Bock et al., 2014), participated in the experiment in fall 2016.[8]

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[7]In order to deliver a reliable rating, the algorithm needs to process at least 100 words. Given this constraint, we provide the general score for the three corpora of headlines – negative, positive, neutral – while we cannot rate the individual headlines. Please refer to Appendix A for the complete list of translated headlines in detail.

[8]The size of the subject pool was defined targeting similar lab-based experimental studies focusing on tax evasion

After showing up at pre-scheduled session times, subjects were seated at individual cubicles equipped with computers. Seats were randomly assigned. Sessions took place at the Masaryk University Experimental Economics Laboratory (MUEEL) in Brno, Czech Republic. The language of the experiment was Czech (full translated instructions and screenshots are reported in the appendixes). We programmed and implemented the experiment using zTree (Fischbacher, 2007). Sessions lasted about 60 minutes, including a post-experimental questionnaire, and the average payoff was approximately 10 EUR (250 CZK, including the show-up fee).[9] Table 1 reports descriptive information about the composition of the experimental sessions by main experimental treatments (neutral, negative, positive) and endowment configurations (real-effort, windfall).

...::: insert TABLE 1 about here ::...

4   Results

In this section, we first report about the balancedness of several sample dimensions across experimental groups (Section 4.1). We then analyze how the exposure to biased news affects participants' taxation behavior considering three main outcome measures. Preliminary, we address the overall level of tax revenue generated under the three different treatments (Section 4.2) and the share of full compliers (Section 4.3). Then, we develop our analysis examining in depth the effect of our three main treatments on the normalized compliance rate – the ratio between the amount reported and the actual income – (Section 4.4). This index represents our most encompassing outcome measure. Offering results from additional Double-Hurdle regression models (Cragg, 1971; Engel and Moffatt, 2014), Section 4.4.1 blends together – adopting an integrated framework – the sets of analysis discussed in the previous sub-sections.

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issues (Heinemann and Kocher, 2013; Castro and Rizzo, 2014; Bernasconi et al., 2014; Casal et al., 2016; Fochmann and Wolf, 2019).

[9]In PPP, 1 EUR in the Czech Republic is equivalent to 1.45 EUR in Germany, as reference EURO country.

4.1 Randomization check

Table 2 reports the mean values and randomization checks ($p - values$ according to Chiapello, 2018) of some conventional individual characteristics elicited with a standard post-experimental questionnaire (gender, age, field of studies, religious and political attitudes, and the individual degree of risk aversion).[10] Most of these individual characters are uniformly balanced across experimental *treatments* (neutral, negative, positive) and endowment *configurations* (real-effort, windfall). In the following parametric analysis (Tables 3 and 4), we will also consider this specific array of covariates to control for the few non-perfectly balanced characteristics.

...::: insert TABLE 2 about here ::...

4.2 Tax Revenues

We start by investigating tax behavior focusing on the overall level of tax revenues generated under the main treatment conditions. By construction, this measure (tR_i), directly depends on the level of self-reported income. While the actual average income was balanced by design across treatments (Table 2), our analysis reveals that the average tax revenues generated under the *positive* treatment systematically differed from the other two treatment conditions. The average tax revenue generated in the *neutral* and the *negative* treatment equals 3,501.01 (std. dev. 2,303.07) and 3,498.15 (std. dev. 2,364.57) EMU, respectively. The overall effect size index (Cohen, 1988; Ellis, 2010) assessing the difference between these average amounts, turns out to be very small (Cohen's $d = 0.01$/ very small effect size; $p - value = 0.94$, MWU-test). Under the *positive* treatment, average tax revenues jump to 4,261.95 (std. dev. 2,344.99) EMU. The differential effect registered under the *positive* treatment is meaningful in its effect size and highly statistically significant compared to the level of tax revenues observed in the *neutral* and the *negative* treatment (Cohen's $d = 0.33$/ medium effect size; $p - value < 0.01$, MWU-test).[11]

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[10]We elicit individuals' attitudes towards risk through a conventional multi-lottery choice task (Attanasi et al., 2018). A continuous index, ranging from 0 to 1, captures the increasing gradients of risk version: 0 indicates risk proneness, 1 high risk aversion.

[11]The analysis shows that the effect of the *positive* treatment on tax revenues is sizably different from those detected under the other conditions. The same differential effect holds for the share of full compliers (Section 4.3) and compliance rate (Section 4.4). Given the number of subjects involved in our experiment – which is in line with several

This descriptive difference is confirmed by the plots of the tax revenue distributions reported in Figure 1. The cumulative density function (CDF) associated with the *positive* treatment "first-order" dominates the CDFs observed under *neutral* and *negative*. The plot of kernel density functions (KDF) reported in Figure 2 corroborates this finding revealing an overall well-behaved "inverted U-shape" pattern that only for the *positive* treatment results to be significantly negatively skewed towards higher levels of tax revenue ($p-value < 0.01$, Kolmogorov-Smirnov test for equality of distributions) compared to the other two distributions.

...::: insert FIGURE 1 about here ::...

...::: insert FIGURE 2 about here ::...

The higher level of tax revenues generated under the *positive* treatment is confirmed by the parametric analysis reported in Table 3. Since the average aggregate measures stem from repeated observations at the group and individual level, in order to take into account such inter-dependencies, this parametric analysis relies on estimates from panel two-way mixed models with random effects accounting for both potential individual dependencies over rounds and intra-group correlations (see Corazzini et al., 2015; Corazzini et al., 2020).

$$Y_{it} = \beta_0 + \beta_1 T_{NEG} + \beta_2 T_{POS} + \beta_n [configurations; controls]_{it} + v_i + \varepsilon_{it} \qquad (3)$$

In the baseline model (Column 1 of Table 3), we regress tax revenues against the two main treatment dummies for the *negative* (T_{NEG}) and *positive* (T_{POS}) treatment – with the constant term capturing the *neutral* condition – and we control for the configuration of the endowment generation process (dummy C_{RE}, real-effort). On average, the subjects exposed to the *positive*

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other experiments on tax evasion (e.g., Heinemann and Kocher, 2013; Castro and Rizzo, 2014; Bernasconi et al., 2014; Casal et al., 2016; Fochmann and Wolf, 2019), a post-hoc power analysis (Faul et al., 2007) detected *power* < 0.80 for the statistically insignificant differences ($\alpha > 0.10$) between the *neutral* and the *negative* conditions. The analysis suggests that to achieve conventional levels $\alpha = 0.05$ and $\beta = 0.20$, a sample size $N > 1,000$ would be required. The complementary analysis of Cohen's d effect size allows us to provide a more comprehensive interpretation of the outcomes whose tests display unconventional β values (Cohen, 1988; Ellis, 2010). Given the small values of the Cohen's d, the effect sizes would be negligibly different between the *negative* and the *neutral* condition also assuming conventional levels for α and β, suggesting that tax compliance does not significantly differ between subjects exposed to negative news and the control condition.

treatment generate a level of tax revenues that is 784 EMU higher ($p-value < 0.05$) compared to the levels observed under the *neutral* and the *negative* condition. The coefficient for the *negative* treatment is small in magnitude and not statistically significant. In the saturated model (Columns 2), we also control for individual income, the fact of having received an audit in previous rounds as well as the fact of having being sanctioned (Mittone et al., 2017), period dummies, idiosyncratic risk aversion, and an array of standard demographics (gender, age, the field of studies, as reported in Table 2). In all models, the coefficient capturing the *positive* treatment turns out to be positive, sizable in magnitude, and systematically statistically significant. On average, subjects exposed to positive news generated higher tax revenues of approximately 700 EMU higher ($p-value < 0.05$) than those exposed to negative or neutral news. As expected, this outcome is positively associated with the level of income. The gender dummy, included in demographic controls, suggests a marginally lower outcome measure in the male population[12]. Round-specific dummies do not highlight any salient dynamic pattern. A relatively higher level of tax revenues is detected in the end-game round. The coefficient associated with the real-effort configuration dummy (C_{RE}) is weakly statistically significant in the reduced-form specification (Column 1) and turns statistically insignificant in the fully saturated model (Column 2). We do not observe any robust statistical difference in tax revenues generated by subjects who earned their income performing the real-effort task and those who exogenously received their endowment in the form of windfall money[13] (captured in the constant term of the regression). Table 5 in the Appendix replicates the same analysis restricting the sample excluding full tax evaders ($R_i = 0$). The main treatment effect remains qualitatively unaffected by the adoption of such restriction.

...::: insert TABLE 3 about here ::...

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[12]This result is in line with recent ad-hoc gender studies by Bruner et al. (2017); D'attoma et al. (2020).

[13]This finding adds to the mixed evidence on the role of the source of income. Some studies show that the degree of effort required in experimental tasks could affect compliance behavior (e.g., Boylan and Sprinkle, 2001; Boylan, 2010b; Durham et al., 2014). Other works find no difference between the behavioral response of subjects who earned their income or were exogenously endowed by experimenters (e.g., Kirchler et al., 2009; Bühren and Kundt, 2013). As Malezieux (2018) highlights, the mixed evidence could be caused by interaction effects with other variables like audit probability, tax rate, or gender. We discuss these aspects more in depth in Section 4.3.

4.3 Share of full compliers

We now analyze the effect of biased news on the share of full tax compliers. In Figure 3, we plot the shares of full tax compliers under the three treatments. Under the *neutral* and the *negative* treatment the proportion of full compliers ranges in the tight interval between 35 and 40 percent (Cohen's $d = 0.15$ suggesting a small effect size; $p-value = 0.06$, X^2). Under the *positive* treatment, approximately 60 percent of the subjects duly reported their actual income (Cohen's $d = 0.51/$ medium effect size; $p-value < 0.01$, X^2). This difference is evocative but not fully statistically accurate, as these shares stem from repeated observations at the group and individual levels.

Regressions in Table 3 (Columns 3 and 4) corroborate this descriptive evidence following the panel two-way mixed model framework introduced in Section 4.2. Given the large number of data points, we rely on a more intuitively interpretable linear probability approach for this outcome. In the baseline model, we regress the full tax compliance outcome − = 1 if tax compliance $(R_i = I_i)$, = 0 if tax evasion $(R_i < I_i)$ − against the two main treatment variables: *negative* (T_{NEG}) and *positive* (T_{POS}) , with the constant term capturing the *neutral* treatment. In all models, the coefficient of the *positive* treatment dummy turns out to be positive, sizable in its magnitude, and highly statistically significant. On average, the share of full compliers is 23 percentage points $(p-value < 0.01)$ higher under the *positive* treatment than under the *negative* or *neutral* condition. In all specifications, we control for the configuration of the income generation process. When fairness considerations are salient, endowing participants with windfall money may inflate their other-regarding behavior, thereby creating a so-called "house money effect" (Danková and Servátka, 2015). In principle, this could lead to higher compliance, thereby biasing our estimates. In our analysis, the coefficient associated with the real-effort dummy (C_{RE}) is never statistically significant and always has a small size. We do not detect any systematic difference in the fraction of full tax compliance between subjects who earned their income performing the real-effort task and those who exogenously received their endowment in the form of windfall money. This lack of difference reassures us that we are not confusing the effect of media bias with that of the origin of income. This finding is consistent with previous evidence of a limited or null difference in the behavior of subjects endowed with house money or earning income through real-effort tasks (Boylan and Sprinkle, 2001; Clark, 2002; Boylan, 2010a; Bühren and Pleßner, 2014). Still, as the tax rate did not change across rounds in our experiment, we cannot fully compare our results to those in Boylan and Sprinkle (2001) and Boylan (2010a), who found that compliance increases with tax rates in participants with earned

money and decreases in those with endowed income. Under the real-effort task, compliance tends to slightly increase in the second and third rounds before declining in the following rounds. Still, the coefficients of the interaction term between the real-effort dummy and round dummies are never statistically significant and always small in size. This result is inconsistent with previous evidence that compliance declines with the interaction between effort and the number of rounds (Durham et al., 2014). However, our experiment is not entirely comparable to Durham et al. (2014), who studied the effect of the origin of income jointly with that of the decision context. Differently from Boylan (2010b), we find that experiencing surveillance does not significantly change compliance, as participants' behavior is similar before and after an audit. Overall, design and treatment differences may undermine the comparability of our findings with previous evidence, as the impact of income sources was never addressed jointly with that of media bias. In the saturated model, we also control for individual income, the fact of having received an audit and sanction in previous rounds, period dummies, idiosyncratic risk aversion, and an array of standard demographics. The gradient of full compliance is increasing in the income level and, as expected, positively affected by higher individual risk aversion. Round-specific dummies highlight a significantly higher share of full tax compliers observed in the last round of the interaction. The substantial similarity of the effect sizes between the *neutral* and the *negative* conditions supports the interpretation that participants may perceive the media negativity bias as the norm rather than the exception, consistently with the prevailing view in the media negativity bias literature (Cappella and Jamieson, 1997; Garz 2014; Trussler and Soroka 2014; Soroka et al., 2018; Soroka et al., 2019).

...::: insert FIGURE 3 about here ::...

4.4 Tax compliance rate

The tax compliance rate captures a normalized intensive margin for taxation behavior. Following the recent literature (Guerra and Harrington, 2018; Jacquemet et al., 2020), we define the tax compliance rate as the ratio between the amount declared and the available income ($\frac{R_i}{I_i}$). Compliance rate equal to one means that the subject is a full tax complier. When the ratio is equal to zero, he is a full tax evader. The index allows for all the continuous values within the two extremes. The average

compliance rate is 0.62 for the *neutral* treatment and 0.64 for the *negative* one (Cohen's $d = 0.03/$ small effect size; $p - value = 0.35$, MWU-test). These averages are statistically comparable and in line with the experimental literature on tax compliance and public goods (Bosco and Mittone, 1997; Alm, 2012; Andrighetto et al., 2016; Casal et al., 2016; Zhang et al., 2016; Alm et al., 2017a; Guerra and Harrington, 2018). The compliance rate jumps to 0.77 under the *positive* treatment. The differential effect induced by the *positive* treatment is meaningful in its size and highly statistically significant compared to the average level of tax revenues observed in the *neutral* and the *negative* treatment (Cohen's $d = 0.38/$ medium effect size; $p - value < 0.01$, MWU-test).

The descriptive difference is confirmed by the plots of the compliance rate distributions reported in Figure 4. The cumulative density function (CDF) associated with the *positive* treatment "first-order" dominates the CDFs observed under the *neutral* and the *negative* conditions ($p - value < 0.01$, Kolmogorov-Smirnov test for equality of distributions). Figure 5 shows the plot of kernel density functions (KDF), which complements the analysis showing very similar distributions for the *neutral* and the *negative* treatments accompanied by a significantly different distribution – especially in terms of excessive negative skewness combined with positive kurtosis – generated under the *positive* treatment ($p - value < 0.01$, Kolmogorov-Smirnov test for equality of distributions).

...::: insert FIGURE 4 about here ::...

...::: insert FIGURE 5 about here ::...

The parametric analysis confirms the higher tax compliance rate observed under the *positive* treatment – based on panel two-way mixed estimations with random effects accounting for both potential individual dependencies over rounds and intra-group correlation – introduced in Section 4.2. In the baseline model (Table 3, Column 5), we regress the individual compliance rate against the two main treatment variables: negative (T_{NEG}) and positive (T_{POS}) - with the constant term capturing the neutral treatment. In all models, the coefficient of the *positive* treatment dummy turns out to be positive, sizable in magnitude, and highly statistically significant. Subjects exposed to positive news had a compliance rate 13 percentage points ($p - value < 0.01$) higher than those exposed to *negative* and *neutral* news. In all specifications, we control for the configuration of the

18

income generation process. Also for this outcome, the coefficient associated with the real-effort dummy (C_{RE}) is never statistically significant and always has a small size. In more saturated models (columns 5-6), we also control for individual income, the fact of having received an audit and sanction in previous rounds, period dummies, idiosyncratic risk aversion, and an array of standard demographics. The compliance rate is decreasing in the level of income and, as expected, positively affected by higher levels of individual risk aversion. Round-specific dummies highlight a significantly higher compliance rate in the last round of the interaction. Table 5 in Appendix B replicates the analysis excluding full tax evaders from the sample ($R_i = 0$). The main treatment effect holds qualitatively unaffected after the adoption of such restriction.

As for the dynamics of taxation decisions over the five rounds, Figure 6 clearly indicates how the average compliance rate was relatively stable across rounds. The compliance rate under the *positive* treatment clearly dominates the one in the other two conditions in each round. While the fluctuations over rounds observed under the *neutral* and the *negative* conditions are relatively smooth, the positive last-round effect detected in the parametric analysis appears to be driven by subjects exposed to positive news.

...::: insert FIGURE 6 about here ::...

As far as it concerns the heterogeneity "across-groups", we analyze the plots of the kernel density functions depicting the average compliance rate at the group level, by treatments. Figures 7, 8, and 9 in Appendix C.1 show that density functions are strictly unimodal and light tailed for all the treatments, and the masses of the frequencies always concentrate around the respective mean values. The average compliance rates in the different treatments are not influenced by groups of outliers or by polarized dynamics.

The similar compliance rate observed under the *neutral* and the *negative* conditions, as well the higher performance registered under the *positive* treatment appear to be rooted in the gradient of "within-group" heterogeneity. In Appendix C.2, Figure 10 (Panels, A, B, C) displays the average individual compliance rate over the five rounds, by group and treatment (sorted by magnitude). Under the *positive* treatment only nine percent of the subjects exhibits an average compliance rate smaller than 0.2 – which is highly correlated with repeated full tax evasion decisions. Under the *neutral* and the *negative* conditions, the share of participants with a compliance rate smaller than

0.2 significantly increases to 15 and 20 percent, respectively. In all the three treatments, free riders are randomly spread across groups and not concentrated in specific clusters. At the same time, we observe a complementary pattern concerning the share of high contributors. While under the *positive* treatment 60 percent of subjects exhibit a compliance rate higher than 0.8, which is highly correlated with repeated full tax compliance decisions , this share significantly decreases to 40 percent under the *neutral* and the *negative* conditions. Mirroring the case for free riders, high/full compliers are homogeneously distributed in the different groups.

4.4.1 Double-Hurdle estimation

Following recent inputs by Alm et al. (2017a) and Guerra and Harrington (2018) in the analysis of laboratory-generated data about the cultural determinants of tax evasion, we replicate the previous panel two-way mixed analyses adopting a Double-Hurdle (DH) approach. This class of models, introduced by Cragg (1971) and computationally developed by Engel and Moffatt (2014) for experimental applications, allow a combined estimation of the two distinct processes underlying the decision to comply and, for tax cheaters, the amount of the evasion (see Alm et al., 2017a, Section 5.2, and Guerra and Harrington, 2018, Section 3.2). In this setup, the key outcome measure is always the tax compliance rate, defined as the ratio between the amount declared and the available income ($\frac{R_i}{I_i}$). A compliance rate $= 1$ means that the subject is full tax complier, with 0 meaning full tax evasion. The first hurdle is interpretable as a probability model. It focuses on the binary decision to engage in a certain degree of tax compliance ($R_i > 0$) and is particularly suited to capture the effect of media bias occurring at the extensive margin. The second hurdle, interpretable as a censored Tobit model, determines the compliance gradient for subjects who chose to engage in tax compliance. Therefore, it captures the effect occurring at the intensive margin ($\frac{R_i}{I_i}|(R_i > 0)$).

Focusing the attention on our main coefficients of interest representing the exogenous experimental variations, the battery of Double-Hurdles models displayed in Table 4 well maps and integrates the different results described in Sections 4.1, 4.2, and 4.3. Subjects exposed to the *positive* treatment are significantly more likely to engage in – at least partial – tax compliance (H1 columns). This effect is always statistically significant and sizable in its magnitude. The coefficient is relatively stable across the two alternative specifications characterized by different arrays of control variables. Coefficients associated with the negative treatment are never statistically significant at any conventional level. When we consider the second hurdle (H2 columns), we do not detect any significant

differential treatment effect on the intensive margin of the compliance rate. The results of this combined analysis indicate that the positive average effect observed under the *positive* treatment (both in terms of absolute tax revenues and normalized compliance rate) is relatively more influenced by the higher degree of engagement in tax compliance (comparative reduction in the frequency of substantial tax evaders) in the group of subjects exposed to *positive* news.

...::: insert TABLE 4 about here ::...

5   Discussion

Our study provides the first experimental evidence that biased information about government action and public finance affects tax compliance, suggesting that news headlines are a constant source of psychological priming. In the experiment, priming participants with positive news induced a significant change in their compliance rate. The exposure to negative news, instead, failed to elicit a behavioral response. This result must be interpreted in light of the lack of statistical power detected under the neutral and the negative condition. Though a common issue in the empirical analysis of experimental data, limited power increases the risk of mistaking a false negative for a true negative, concluding there is no effect when the treatment actually has an impact (Type 2 error). A narrower focus on the magnitude of the effects helps us to put this null result into perspective. The Cohen's d analysis reveals that the outcomes of the neutral and the negative treatment would be negligibly different in size even in the case of full power. The substantial similarity of the two effects suggests that negative news may match what participants routinely expect to see on headlines regarding the public sector. Having in mind the caution required by the lack of statistical power, this interpretation would be in line with evidence that a negativity bias systematically pervades political (Kepplinger et al., 2012; Lengauer et al., 2012; Elejalde et al., 2018) and economic (Garz, 2014; Soroka et al., 2018) news making. This phenomenon is demand-driven, as it is likely a product of a human tendency to be more attentive to negative news content (Soroka et al., 2019), and generates a sort of 'spiral of cynicism' (Cappella and Jamieson, 1997), in that the public's demand for sensational news strengthens the incentive for providing negative contents in journalists and newsmakers (Soroka et al., 2019). The historical background of the Czech Republic (Volek and

Urbániková, 2017; Newman et al., 2020), and the recent spreading of anti-establishment narratives (Wettstein et al., 2018; Couttenier et al., 2019) have further exacerbated the negativity bias in reporting about the efficiency and fairness of public institutions.

Overall, the differential effect of the exposure to positive news and the substantial similarity of the size effects under the neutral and the negative conditions suggest focusing the interpretation on the positive treatment. In this case, our setup allows us to detect a statistically significant effect that is sizably different at the conventional level from those detected under the other conditions.

Contrary to intuition, which suggests that a piece of negative news could be more salient than a good one, our results show that exposing participants with authentic, concise information about the appropriate use of tax revenues may lead to higher compliance. This result is consistent with previous evidence that politeness in expressing a difference of opinions in social media is more salient than online incivility, and therefore prompts a stronger behavioral response across participants in a trust game (Antoci et al., 2019). Our findings are also consistent with field studies showing that compliance is affected by unselfish (e.g. moral and social) motives (Hallsworth et al., 2017; Bott et al., 2019). However, our treatment is remarkably different from that administered by (Hallsworth et al., 2017), (De Neve et al., 2021), and Bott et al. (2019) in the field, making our results not fully comparable. The field works in (Hallsworth et al., 2017), (De Neve et al., 2021), and Bott et al. (2019) randomly treat taxpayers by including moral or fairness-related communications in reminder letters. Messages aim to recall that tax revenues serve to fund various types of public expenditure or that most citizens properly self-report their income. Instead, we treat experimental subjects with anecdotal stories about specific successful public-sector projects in the spirit of Alesina et al. (2018). Finally, our result is consistent with studies suggesting that increasing the perceived trustworthiness of the public sector may raise citizens' trust in institutions and compliance (Kasper et al., 2015)

The effect of positive news is not only highly statistically significant and economically sizable but even robust to further manipulation in terms of whether participants earned their money based on a real effort task or the exogenous decision of experimenters. This evidence indicates that the bias of information about public finance and policy matters more than the source of taxpayers' income. The analysis of the intensive margin of evasion also suggests that, once individuals have decided to cheat on taxes, the effect of the negativity media bias does not differ substantially in size, which is always negligible, and significance across the *neutral* and the *negative* condition. Thus, in the first stage of taxpayers' decision to comply, the bias of news about public finance seems to play a major

role. From an economic perspective, the results of our experiment suggest that the satisfaction of taxpayers with the functioning of the public sector and the use of tax revenues is a critical driver of their compliance decisions. Citizens may feel intrinsically motivated to honestly declare their entire tax liability to the extent to which they perceive the outcomes of public policy as fair and legitimate as if a sort of psychological contract with tax authorities was in force (Feld and Frey, 2007). The belief that the government does not spend well citizens' taxes may encourage them to reciprocate by refusing to pay their entire tax liability (Spicer and Lundstedt, 1976). If, instead, the belief prevails that the government uses its tax revenue to fund public goods and services adequately, taxpayers will be more willing to comply (Alm et al., 1993), even if they do not personally receive a full public good equivalent of their payments (Frey and Feld, 2002; Frey et al., 2004; Feld and Frey, 2007). Theories of the psychological contract imply a crucial role for information about public policy. However, citizens' awareness of the efficiency and fairness of public institutions does not only depend on the government's ability to fairly and adequately communicate about its use of tax revenues. It also relies on the media's presentation of the efficiency and fairness of public institutions. Freedom in the provision, selection, and tone of information about the government is a cornerstone of democracy, and we do not advise any form of governmental interference with the media's freedom of expression and critique. Our results instead suggest that more substantial attention to impartially reporting – also – good news (Iggers, 1999) may ultimately strengthen the psychological contract between taxpayers and the state by allowing the public sector to fully exploit its tax revenue potential, which could, in turn, be conducive to improvements in the provision of public goods and services.

6 Conclusion

In this paper, we designed a framed laboratory experiment to study how the media bias in reporting about public finance and policy issues affects tax compliance in a repeated taxation game. The striking result of our study is that even minimal exposure to authentic news about the appropriate use of tax revenues by the public sector has a statistically significant and economically sizable effect on compliance. This finding suggests that what is at stake in taxpayers' reporting decisions may not be merely the rational choice between risky assets in a portfolio under the constraint of tax audits and penalties. Instead, individuals may tend to reciprocate the behavior they observe in the government, and more in general in public institutions, as if they were bounded to them by a

psychological contract (Frey and Feld, 2002; Feld and Frey, 2007). If citizens believe the government is pursuing its objectives with efficiency and fairness, they may be more intrinsically motivated to pay their taxes to contribute to the welfare of the community. Theories of the psychological contract do not explicitly point out the crucial role of communication and information in nudging taxpayers' behavioral responses based on reciprocity. In our experiment, we highlighted and clarified this role. Overall, our results reveal that biased news can be a constant source of psychological priming influencing tax compliance decisions. The systematic tendency of the media to focus on negative news entails hidden social costs related to the government's inability to fully exploit its tax revenue potential and meet its fiscal goals, with detrimental effects on the efficient provision of public goods and services. Our results suggest the relevance of testing the role of negative and positive news in the field, especially in transition countries characterized by limited trust in the media and public institutions. If confirmed, our findings suggest that treating taxpayers with anecdotal evidence about successful public sector projects could provide policymakers with effective and relatively inexpensive tools to promote tax compliance.

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Tables

Table 1: Summary Table: by *treatments* / *configurations*

	Variations	Subjects	Obs.	% Males	Age
Experimental treatments	T_{NEU}	48	240	0.48	22.33 (2.31)
	T_{NEG}	84	420	0.37	22.72 (1.61)
	T_{POS}	88	440	0.35	22.32 (1.77)
Endowment configurations	C_{RE}	116	580	0.33	22.59 (1.59)
	C_{WF}	104	520	0.45	22.79 (1.15)
	Total	220	1,100	0.39	22.48 (1.85)

Notes: Std. dev. reported in parentheses.

Table 2: Randomization check, by *treatments / configurations.*

	min-max	T_{NEU} (a)	T_{NEG} (b)	T_{POS} (c)	$\Delta(a-b)$	$\Delta(a-c)$	$\Delta(b-c)$	$C_{WF}(d)$	C_{RE} (e)	$\Delta(d-e)$
Age	18-31	22.333 (2.328)	22.726 (1.616)	22.330 (1.779)	-0.393 [0.256]	0.003 [0.992]	0.397 [0.128]	22.356 [2.113]	22.595 [1.593]	-0.245 [0.342]
Male	dummy	0.479 (0.505)	0.369 (0.485)	0.352 (0.480)	0.110 [0.219]	0.127 [0.151]	0.017 [0.820]	0.452 [0.500]	0.328 [0.471]	0.124 [0.059]
Econ edu	dummy	0.771 (0.425)	0.607 (0.491)	0.591 (0.494)	0.164 [0.056]	0.180** [0.035]	0.016 [0.829]	0.596 [0.493]	0.672 [0.471]	-0.076 [0.242]
Left party	dummy	0.208 (0.410)	0.274 (0.449)	0.284 (0.454)	-0.065 [0.407]	-0.076 [0.338]	-0.010 [0.881]	0.269 [0.446]	0.259 [0.440]	0.011 [0.859]
Religion beliefs	dummy	0.354 (0.483)	0.345 (0.478)	0.330 (0.473)	0.009 [0.918]	0.024 [0.774]	0.016 [0.829]	0.327 [0.471]	0.353 [0.480]	-0.027 [0.680]
Risk aversion	$[0,..,1]$ (§)	0.502 (0.122)	0.551 (0.180)	0.555 (0.137)	-0.049 [0.097]	-0.052** [0.029]	-0.004 [0.885]	0.544 [0.164]	0.539 [0.143]	0.005 [0.811]
Income (EMU)	8,500; 50,500	37,114.93 (9,029.56)	36,318.02 (7,519.36)	36,965.10 (9,227.27)	796.91 [0.225]	-149.831 [0.839]	647.076 [0.261]	39,315.44 (4,505.44)	34,451.32 (1,0485.87)	-4,864.1*** [0.001]
Obs.		240	420	440	660	680	860	520	580	1,100
N.		48	84	88	132	136	172	104	116	220

Notes: Std. deviations reported in parentheses. Balance checks *p*-values according to Chiapello (2018) reported in square brackets: * $p<0.10$; ** $p<0.05$; *** $p<0.01$.
(§) Individual risk aversion is elicited through a conventional multi-lottery choice task. A continuous index, ranging from 0 to 1, captures the increasing degree of risk version: 0 indicates high risk propensity, 1 high risk aversion (re-scaled).

Table 3: Panel two-way mixed models with random effects

Outcome:	(1) Tax revenues	(2) Tax revenues	(3) Full compliance	(4) Full compliance	(5) Compliance rate	(6) Compliance rate
T_{NEG}	9.050	0.463	0.073	0.050	0.0143	-0.001
	(349.2)	(332.2)	(0.071)	(0.072)	(0.0582)	(0.059)
T_{POS}	783.70**	671.7**	0.246***	0.228***	0.139**	0.120**
	(346.4)	(330.7)	(0.071)	(0.0717)	(0.0577)	(0.0594)
C_{RE}	-500.40*	-93.16	-0.019	-0.0526	0.001	-0.0180
	(260.7)	(249.4)	(0.053)	(0.0542)	(0.043)	(0.0448)
Income		0.092***		0.001***		0.001**
		(0.006)		(0.0001)		(0.0004)
Round #2		-38.10		-0.0398		-0.00384
		(123.8)		(0.0303)		(0.0223)
Round #3		71.99		0.0233		0.00810
		(122.9)		(0.0301)		(0.0221)
Round #4		-54.08		-0.00292		-0.0181
		(133.1)		(0.0326)		(0.0240)
Round #5		311.6**		0.0609**		0.0468**
		(125.4)		(0.0308)		(0.0226)
Inspection		-122.6		-0.0387		-0.00547
lagged		(372.8)		(0.0910)		(0.0671)
Sanction		-395.4		0.0115		-0.0543
lagged		(296.7)		(0.0725)		(0.0534)
Risk aversion		235		0.439**		0.238*
		(104.5)		(0.177)		(0.144)
Demographics	no	yes	no	yes	no	yes
Constant	3,751***	917.8	0.335***	0.287	0.626***	0.806***
T_{NEU}	(307.5)	(1,590)	(0.0628)	(0.352)	(0.0513)	(0.284)
ll	-9,851.42	-9,682.43	-529.83	-514.34	-205.2	-196.78
$p > \chi^2$	0.007	0.001	0.002	0.001	0.001	0.001
Obs.	1,100	1,100	1,100	1,100	1,100	1,100
Groups	55	55	55	55	55	55

Notes: Panel two-way models with random effects - clusters: group, individual.

Std. errors in parentheses, * $p<0.10$; ** $p<0.05$; ***$p<0.01$.

Table 6 replicates this analysis balancing the group numerousness for the neutral treatment deterministically resampling the observations for the T_{NEU} condition.

Table 4: Double-Hurdle estimation.

Outcomes:	(1)		(2)	
	H1	H2	H1	H2
T_{NEG}	0.0357	-0.542	0.0115	-0.527
	(0.058)	(0.514)	(0.061)	(0.501)
T_{POS}	0.140**	0.205	0.118*	0.223
	(0.056)	(0.609)	(0.062)	(0.598)
C_{RET}	-0.0185	0.881*	-0.0200	0.887*
	(0.044)	(0.462)	(0.045)	(0.458)
Income		no		yes
Inspection lagged		no		yes
Sanction lagged		no		yes
Risk aversion		no		yes
Period dummies		no		yes
Demographics		no		yes
Constant	0.628***	1.794***	0.678**	1.770***
T_{NEU}	(0.051)	(0.460)	(0.276)	(0.446)
χ^2overall	13.71		24.75	
Pseudo R^2	0.132	0.115	0.134	0.108
Obs.	1,100	1,100	1,100	1,100

Notes: Panel Double-Hurdle estimations

Std. errors in parentheses, * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Figures

Figure 1: Cumulative density function: Tax revenues, by treatments.
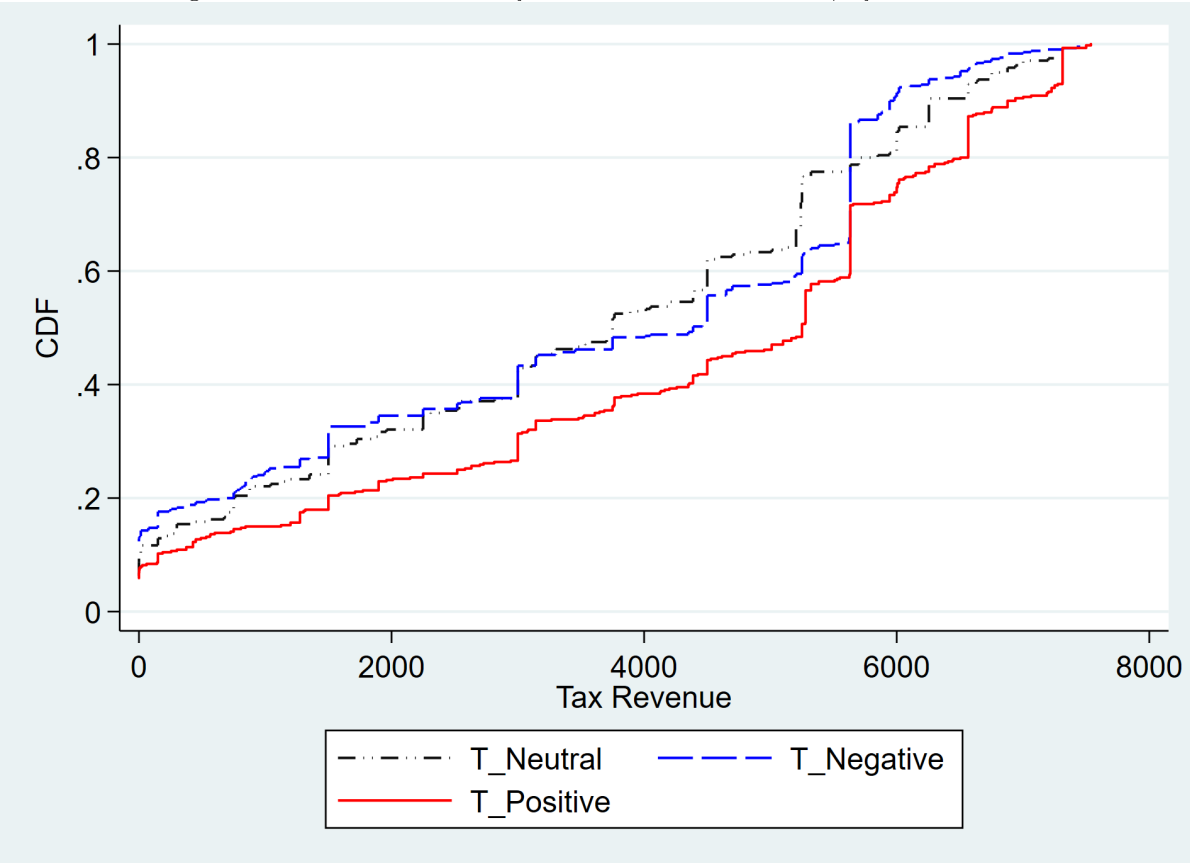
Figure 2: Kernel density function: Tax revenues, by treatments.
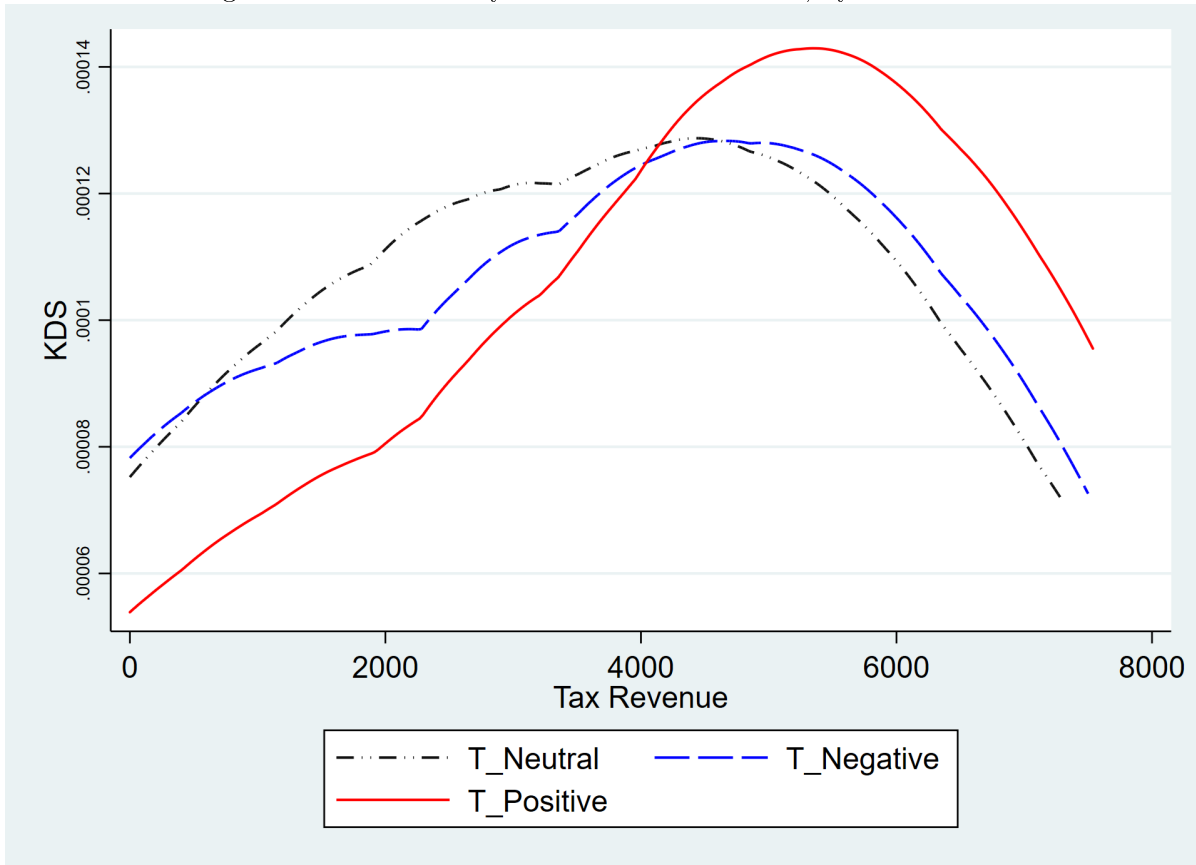
Figure 3: Share of full compliers, by treatments.
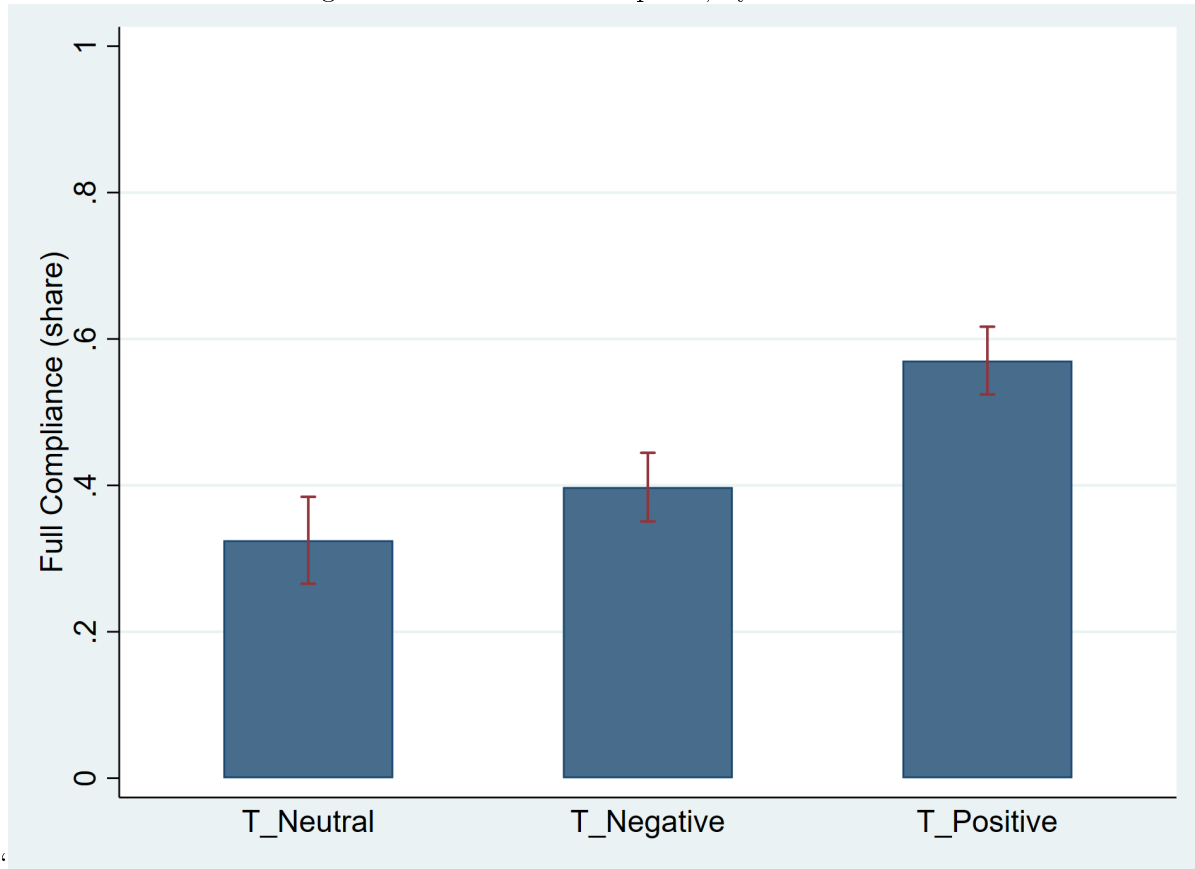
Notes: Error bars based on the standard deviations of the means (red T-shaped bars).

Figure 4: Cumulative density function: Tax compliance rate, by treatments.
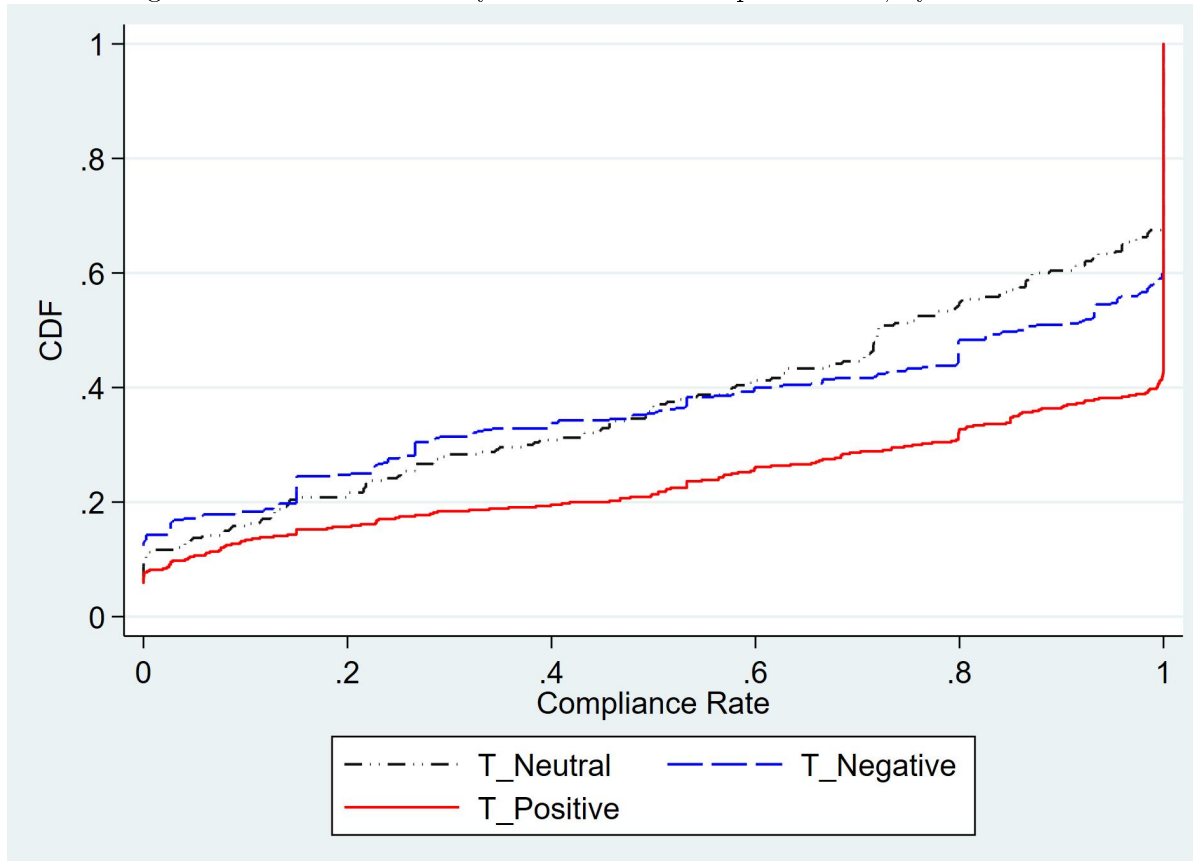
Figure 5: Kernel density function: Tax compliance rate, by treatments.
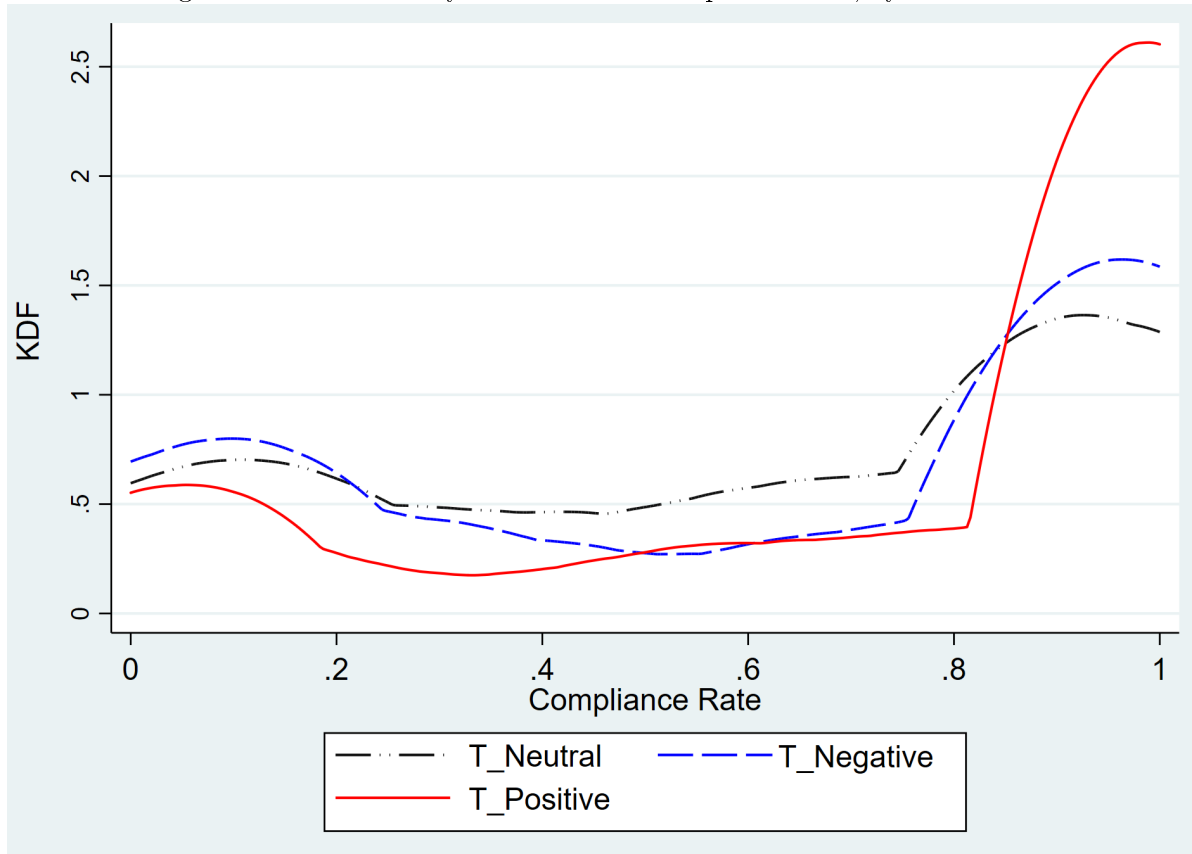
Figure 6: Average compliance rate over periods, by treatments.
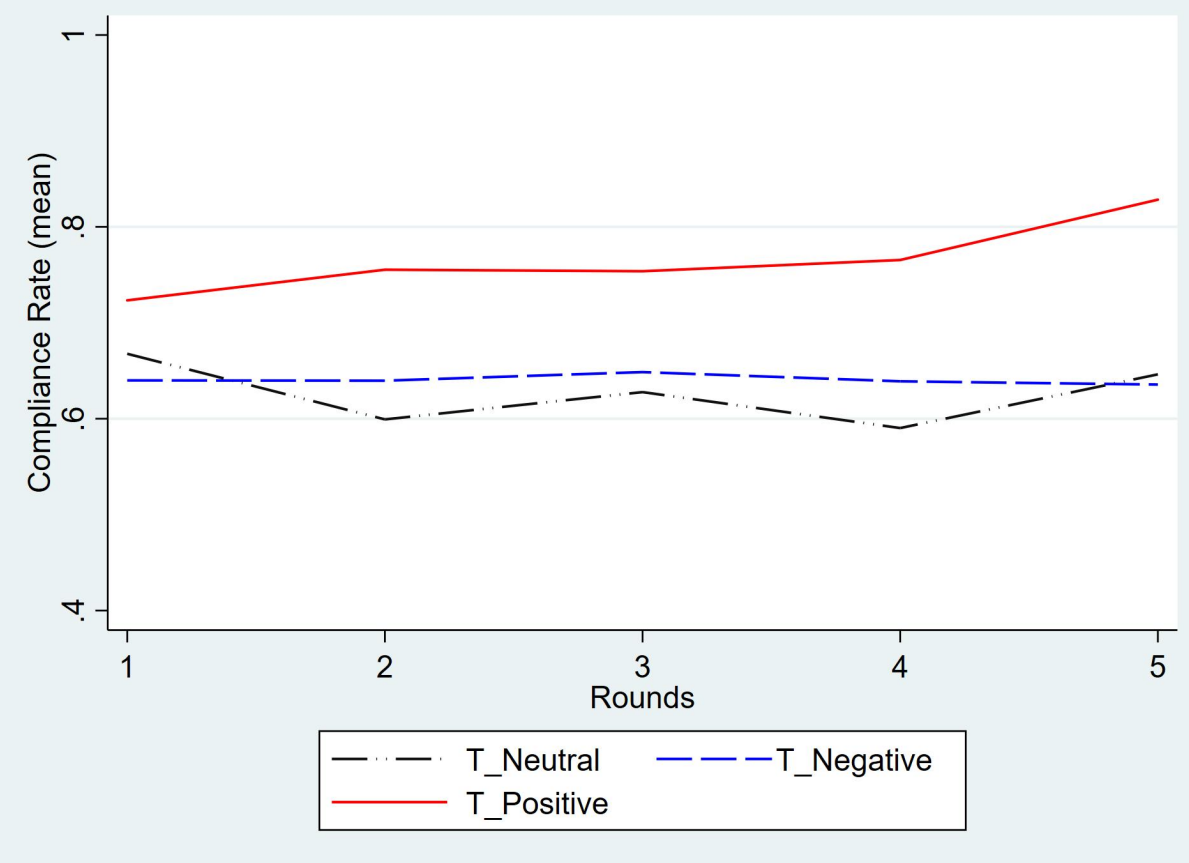
— Online Appendix —

[A] Headline news:

i) Negative treatment (T_{NEG}) – **Repustate.com sentiment rating = -0.750 (negative range: -1.000, -0.051)**

- National debt increased to CZK 1.68 billion.

- Each Czech citizen owes CZK 160,000.

- Bill for 2013: Czech Railways exceeded budget by CZK 2 billion.

- Public employment service in chaos. Disbursement of benefits not working.

- Low civil servant efficiency decreased the Czech Republic's competitiveness; down to 46th in global ranking.

- Due to illegal acquisition of locomotives, Czech Railways to pay a fine of CZK 25 million.

- Proposed budget criticized: Government not saving, only choking off investments.

- Eurovia could get a 72 million contract from the ministry without a tender.

- The public sector is being unscrupulously milked, warns SIS. Leopold Cerný: ProMoPro is a textbook example of tunneling with the state's assistance.

- Water leaking into Blanka tunnel. Grand opening in December jeopardized.

- Tenders organized by entrepreneurs themselves; civil servants just observers.

- Deputies met for only hours and three-quarters did not attend the meeting.

- Overpriced hospital equipment means the Czech Republic to return CZK 163 million to the EU.

- Ministry of Defense declassified an audit revealing overpriced warehouse security.

- Reconstruction of D1 at Velká Bíteš may be delayed up to year, says head of RSD.

ii) Positive treatment (T_{POS}) – **Repustate.com sentiment rating = +0.870 (neutral range: +0.051,+1.000)**

- South Bohemian Hospitals achieved efficient operations.

- Investment of CZK 818 million brings increased comfort and modern medical technologies to patients in Czech hospitals.

- Governmental program supporting science centers and generous grants successful: Best minds returning home.

- Foreign experts confirm top-class research at CEITEC.

- State housing development fund can provide advantageous loans to renovate housing estates thanks to new CZK 600 million project.

- During Q1, public employment service financially supported retraining of 14 173 job applicants. Unemployment rate fell by 1.3%.

- During Q1, public employment service granted CZK 972 million to support employment of disabled.

- Bikeway system to connect three regions in autumn with completion of construction in Zlín Region.

- Czech Republic's economy is the 26th freest - improvement of 3 places.

- State financing ground-breaking research on bowel cancer. New research center to be established in Prague.

- State agency CzechInvest successfully introduced several Czech startups in San Francisco.

- The campaign to attract tourists a success, says state agency CzechTourism. Year-on-year increase in foreign visitors to the Czech Republic 18.5

- Departments keeping operating costs low. This has decreased state budget deficit.

- Compensation paid out for delayed trains has fallen. Czech Railways trains running on schedule. 24

iii) Neutral treatment (T_{NEU}) − **Repustate.com sentiment rating = +0.010 (neutral range: -0.050,+0.050)**

- The International Space Station could be replaced by a base on the Moon.

- Gray cars, unobtrusive star in sales. Popularity of white color begins to decline.

- Skier Strachova finished fifth in Flachau.

- Volkswagen Beetle celebrates 70 th anniversary.

- Car speed will not be measured in km / h but in bit / s.

- Activision Blizzard Studios will be led by Stacey Sher.

- Actor Javorský plays Burian, Novotný plays Marvan.

- An asteroid flew through the Solar system.

- The winner of the Grand Prix of Architects 2015 was the Cottage by the Lake by FAM Architekti.

- World dog show Crufts started.

- Fish oil, wine and swimming. Stašová revealed the secret of her figure.

- Hunters moved hare from a strictly guarded area of Temelín power plant.

- Magnesia Litera 2015: The book of the year is Poet Martin Reiner.

- Singer Hana Zagorova finally in the Hall of Fame!

- Tesla's first SUV has wings. Electricity will cover over 400 kilometers.

Experimental animation: videos - http://bit.ly/388jDgL

Note: Due to technical issues, time measures were not consistently recorded across rounds/sessions and approximately 25 percent of the data points were not reliably coded during the flow of the sessions. Embracing a very descriptive approach based on the limited set of reliable time-stamps, we can say that on average in each round subjects spent approximately 30 seconds watching the banners. During this interval, they were exposed to 5 different pieces of news before submitting their decisions.

[B] Further regressions

Table 5: Panel two-way mixed models with random effects, $|R_i > 0$

Outcomes:	(1) Tax revenues	(2) Tax revenues	(5) Compliance rate	(6) Compliance rate
T_{NEG}	299.3	318.4	0.0689	0.0588
	(325.7)	(302.4)	(0.0541)	(0.0552)
T_{POS}	798.6***	725.6**	0.145***	0.132**
	(320.2)	(298.2)	(0.0532)	(0.0545)
C_{RE}	-709.4**	-217.2	-0.0251	-0.0366
	(243.3)	(227.6)	(0.0404)	(0.0415)
Income		0.103***		0.01***
		(0.00570)		(0.001)
Round #2		-47.49		-0.00654
		(116.0)		(0.0210)
Round #3		129.5		0.0175
		(115.6)		(0.0209)
Round #4		5.741		-0.00694
		(125.8)		(0.0228)
Round #5		316.5***		0.0416*
		(118.0)		(0.0214)
Inspection lagged		-112.8		-0.00716
		(334.3)		(0.0605)
Sanction lagged		-397.1		-0.0442
		(297.3)		(0.0538)
Risk aversion		1,822**		0.356***
		(739.7)		(0.133)
Demographics	no	yes	no	yes
Constant T_{NEU}	4,061***	-1,237	-1.563***	0.460*
	(285.8)	(1,408)	(0.0251)	(0.253)
ll	-8,967.47	-8,753.85	-75.503	-83.717
$p > \chi^2$	0.001	0.001	0.01	0.01
Obs.	1,007	1,007	1,007	1,007

Notes: Panel two-way models, with random effects - clusters: group, individual.

Std. errors in parentheses, * $p<0.10$; ** $p<0.05$; ***$p<0.01$.

This analysis replicates Table 3 dropping from the account full tax evaders ($R_i = 0$).

Table 6: Panel two-way mixed models with random effects, resampling for *Neutral* groups.

Outcomes:	(1) Tax revenues	(2) Tax revenues	(3) Full compliance	(4) Full compliance	(5) Compliance rate	(6) Compliance rate
T_{NEG}	9.350	-7.819	0.0731	0.0505	0.0143	-0.00121
	(285.3)	(280.0)	(0.0580)	(0.0593)	(0.0482)	(0.0506)
T_{POS}	784.3***	661.5**	0.246***	0.227***	0.139***	0.119**
	(281.9)	(277.7)	(0.0573)	(0.0588)	(0.0477)	(0.0502)
C_{RE}	-513.0**	-99.98	-0.0221	-0.0576	-0.00107	-0.0198
	(233.6)	(229.2)	(0.0475)	(0.0486)	(0.0395)	(0.0414)
Income		0.0893***		0.001**		0.001***
		(0.006)		(0.0005)		(0.0001)
Round #2		-86.10		-0.0565**		-0.0138
		(112.3)		(0.0277)		(0.0202)
Round #3		47.831		0.0176		0.000450
		(111.7)		(0.0275)		(0.0201)
Round #4		-117.2		-0.0136		-0.0314
		(120.6)		(0.0297)		(0.0217)
Round #5		279.9**		0.0440		0.0378*
		(115.0)		(0.0283)		(0.0207)
Inspection lagged		-112.8		-0.0312		-0.00155
		(373.7)		(0.0917)		(0.0671)
Sanction lagged		-357.1		0.0397		-0.0419
		(256.9)		(0.0631)		(0.0462)
Risk aversion		1,067		0.388**		0.200
		(752.0)		(0.164)		(0.134)
Demographics	no	yes	no	yes	no	yes
Constant	3,758***	1,370	0.336***	0.398	0.627***	0.866***
T_{NEU}	(227.2)	(1,368)	(0.0462)	(0.301)	(0.0384)	(0.244)
ll	-11,998.547	-11,798.68	-652.487	-633.367	-250.464	-240.929
$p > \chi^2$	0.0026	0.0000	0.0002	0.0000	0.0184	0.0104
Obs.	1,340	1,340	1,340	1,340	1,340	1,340
Groups	67	67	67	67	67	67

Notes: Panel two-way models, with random effects - clusters: group, individual.

Std. errors in parentheses, * $p<0.10$; ** $p<0.05$; ***$p<0.01$.

This table replicates the main analysis reported in Table 3, balancing the numerousness for the neutral treatment

deterministically resampling the observations for the T_{NEU} condition.

Rebalanced groups numerousness : $T_{NEU}=$ #24; $T_{NEG}=$ #21; $T_{POS} =$#22.

[C.1] Between-groups heterogeneity

Figure 7: Kernel density function: Average compliance rate at group level, *neutral* treatment.
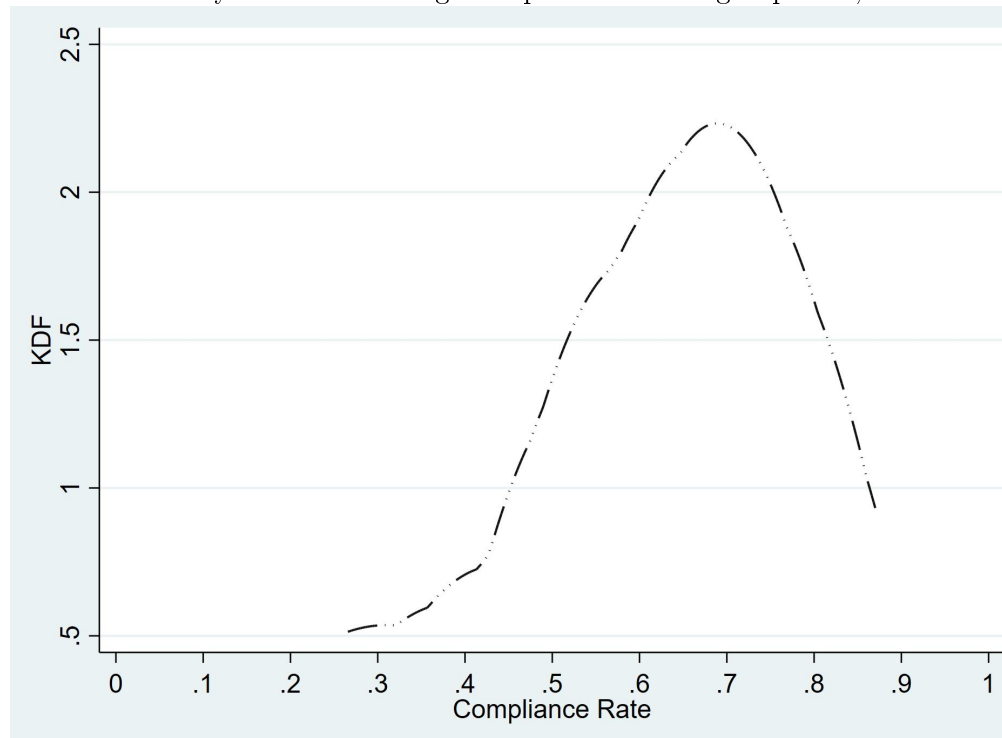
Figure 8: Kernel density function: Average compliance rate at group level, *negative* treatment.
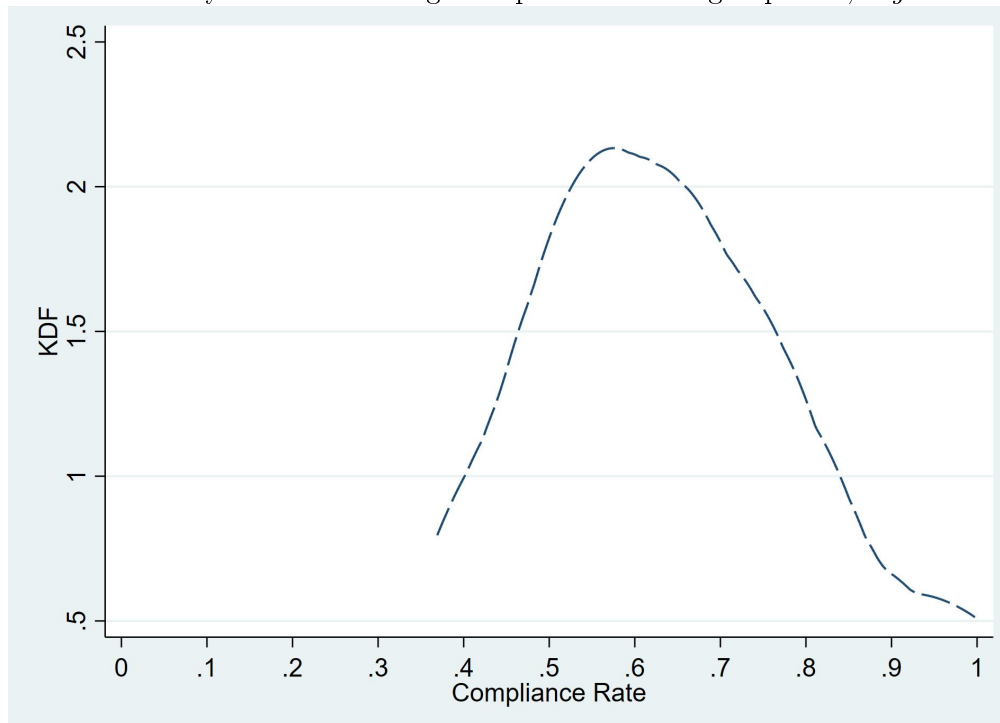
Figure 9: Kernel density function: Average compliance rate at group level, *positive* treatment.
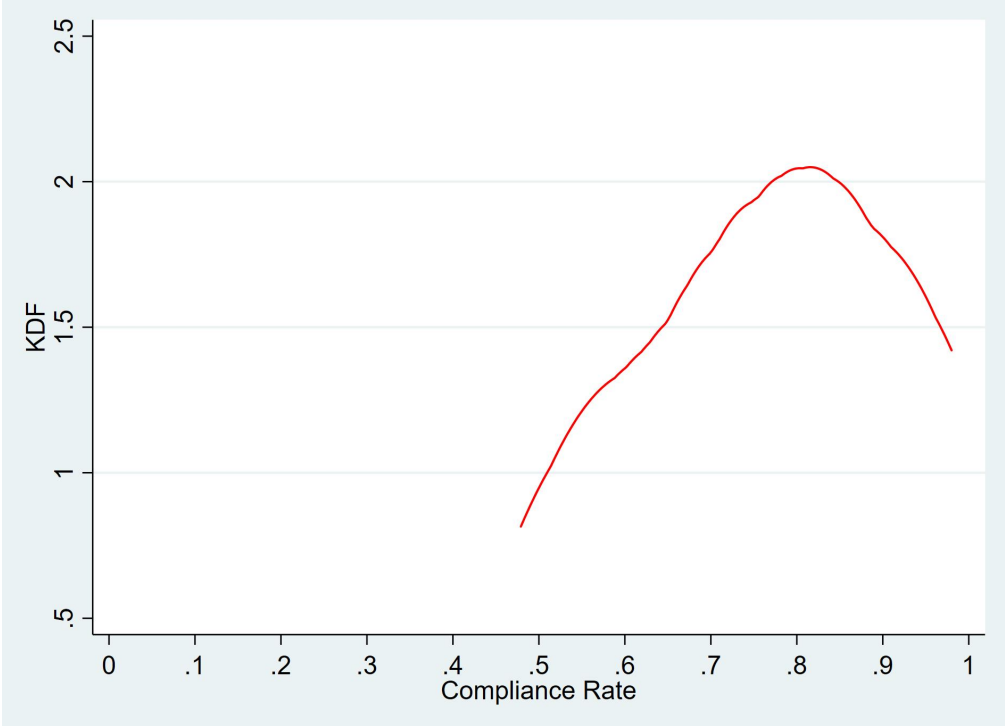
[C.2] Within-group heterogeneity

Figure 10: Individual average compliance rate, by groups.

:::::: **Panel A: *Neutral* treatment** ::::::

:::::: **Panel B: *Negative* treatment** ::::::

:::::: **Panel C: *Positive* treatment** ::::::
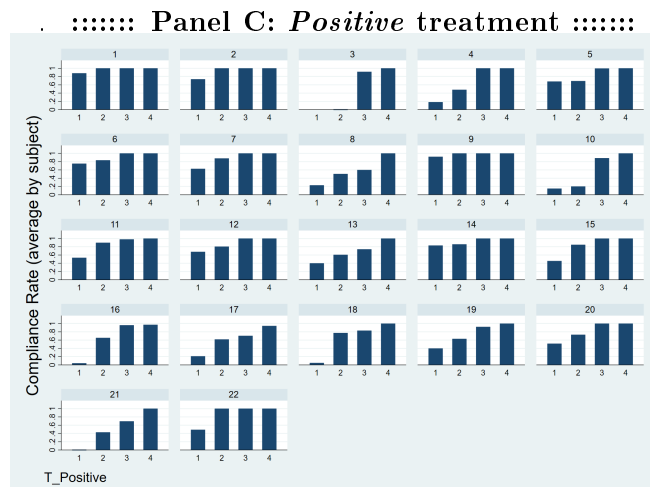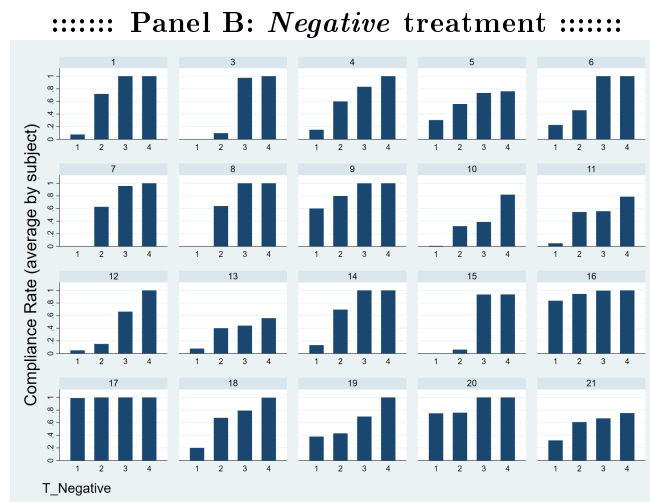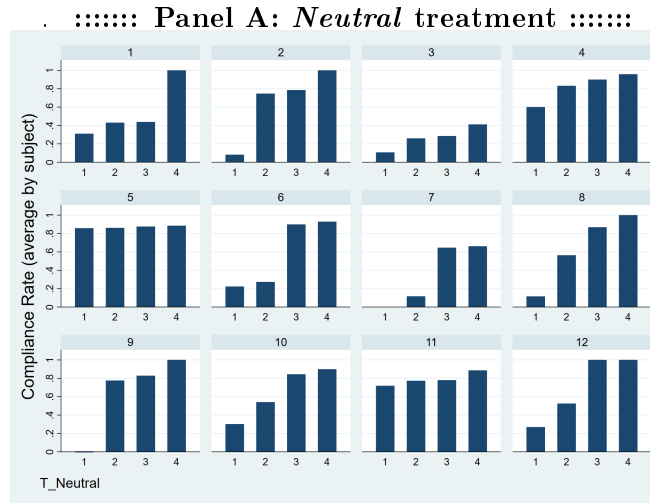
[D] Instructions and Screenshots

Each session followed the same protocol. Subjects were randomly seated in the laboratory, and experimental instructions were provided on the screen. After reading the general instructions, subjects answered comprehension questions. Following the standard experimental guidelines, in case of an incorrect answer, the subject received a warning message asking them to reconsider the answer. The subject could not proceed to the next question until they answered correctly. Research assistants addressed any question/doubt that arose from participants in private. Each session lasted approximately one hour, including participants' payments. The language of the experiment was Czech. In this Appendix, we provide a translation of the original instructions without a reverse translation check. The instructions are for the real-effort task configuration. The instructions for the windfall money configuration did not contain the real effort task, and subjects were told that they would receive a random income between 8,500 and 50,500 EMU.

[D.1] General Instructions

Translation of the screen:

- **WELCOME TO TODAY'S EXPERIMENT**

- **Before we begin, please pay attention to the following information:**

- Your decisions in the experiment are anonymous.

- You will receive real money for the experiment. Your earnings during the experiment will be calculated in Experimental Monetary Units (EMU). EMU will be converted into Czech crowns at the end of the experiment.

- Please do not communicate with anyone during the experiment. Do not use mobile phones or other electronic devices except the computer you are seated at. Do not express your decisions in any way to others. In the case of communication attempts, we may exclude you from the experiment without payment.

- During the experiment, please perform only the tasks that you will be prompted through text on your screen. Do not use any keyboard shortcuts.

- If you have any questions or issues, please raise your hand and wait for the administrator to approach you.

Figure 11: General Instruction - Welcome Screen

VÍTÁME VÁS NA DNEŠNÍM EXPERIMENTU

Před začátkem věnujte, prosím, pozornost následujícím informacím:

Vaše chování v rámci experimentu je anonymní.

Za experiment získáte skutečné peníze. Vaše výdělky v průběhu experimentu budou počítány v experimentální měně (EMU). Experimentální EMU budou na konci experimentu přepočteny na české koruny.

Během experimentu, prosím, s nikým nekomunikujte, nepoužívejte mobilní telefony či jiná elektronická zařízení, vyjma počítače u kterého jste usazeni. Nedávejte žádným způsobem najevo svá rozhodnutí. V případě pokusů o komunikaci Vás můžeme z experimentu vyloučit bez nároku na odměnu.

V rámci experimentu provádějte, prosím, výhradně úkoly, ke kterým budete vyzváni prostřednictvím textu na Vaší obrazovce. Nepoužívejte žádné klávesové zkratky.

Narazíte-li na nejasnost či problém, přihlaste se a vyčkejte příchodu administrátora.

[D.2] Real Effort Tasks

Instructions:

- You will complete five different tasks in the experiment. The time limit for each task is **120 seconds**. Before each task, you will be instructed of what needs to be done to complete it successfully. You will be entitled to a wage in EMU for correctly solved tasks. The amount will depend on how successfully and quickly you have solved the task. If you solve the task 100% correctly within the time limit, you will receive a **50,000 EMU** wage. If you manage to solve the whole task before the time limit, you will be rewarded with a bonus in addition to the wage: for every 10 seconds remaining until the end of the time limit, you will receive 250 EMU.

- Only correct answers will be counted. If you solve the given task at 0% (i.e. completely unsuccessfully), you get a minimum wage of **8,500 EMU**.

- After each task, you will be acquainted with the wage, and then you will be asked to declare your income for taxation. The rules for paying tax will be the same at all times, and you will be (repeatedly) reminded with them whenever you declare your income. Your final income for each task will then be your net wage (wage minus tax paid).

- At the end of the experiment, you will be paid. Each participant in the experiment will receive **50 CZK** as a participation fee. One of the five tasks will be randomly selected for payment; your net wage from this task will be converted into Czech crowns (the exchange rate is **1 CZK = 200 EMU**) and paid in cash. The resulting payoff will be rounded to the nearest five crowns.

- **EXAMPLE**

- Your task is to complete a logical series of numbers. You will receive a wage of 50,000 EMU for the correct completion of the number series. (This wage does not in any way enter into your final profit. This is only a test task.)

- **1, 1, 2, 3, 5, 8, 13, ...**

Figure 12: General Instruction - Real Effort Tasks

INSTRUKCE

V rámci experimentu budete plnit pět různých úkolů. Časový limit na každý z úkolů je **120 vteřin**. Před každým úkolem budete informován(a), co je třeba učinit pro jeho úspěšné splnění. Za správně vyřešené úkoly Vám bude náležet mzda v experimentální měně EMU, jejíž výše bude záviset na tom, jak velkou část úkolu (a jak rychle) zdárně vyřešíte. Vyřešíte-li v časovém limitu zadání správně na 100 %, připadne Vám mzda ve výši **50000 EMU.** Pokud stihnete celý úkol vyřešit před vypršením časového limitu, budete navíc ke mzdě odměněn(a) bonusem: za každých 10 vteřin zbývajících do konce časového limitu získáte 250 EMU.

Započítány budou pouze správné odpovědi. V případě, že daný úkol vyřešíte na 0 % (tzn. zcela neúspěšně), získáváte minimální mzdu ve výši **8500 EMU.**

Po každém úkolu budete seznámen(a) s výší mzdy a následně budete vyzván(a) k vyplnění a podání daňového přiznání. Pravidla pro odvedení daně budou po celou dobu stejná a budete s nimi (opakovaně) seznámen(a) vždy v okamžiku, kdy budete mít za úkol podat daňové přiznání. Váš výsledný příjem za každý úkol pak bude Vaše čistá mzda (mzda minus odvedená daň).

Na konci experimentu Vám bude vyplacena odměna. Každý účastník experimentu obdrží **50 Kč** jako odměnu za účast. Současně bude losem vybrán jeden z pěti absolvovaných úkolů; Vaše čistá mzda z tohoto úkolu bude přepočtena na české koruny (směnný kurz je **1 česká koruna = 200 EMU**) a vyplacena v hotovosti. Výsledná výplata bude zaokrouhlena na celé pětikoruny.

PŘÍKLAD

Vaším úkolem je doplnit logickou řadu čísel. Za správné doplnění číselné řady získáte mzdu 50000 EMU. (Tato mzda žádným způsobem nevstupuje do Vašeho konečného zisku. Jedná se pouze o zkušební úkol.)

1, 1, 2, 3, 5, 8, 13, ...

OK

Instructions for the Alphabet Task:

- Your task will be to **sort five words in ascending alphabetical order (A-Z).** Next to each of the words, you can click on the button with the serial number in the table. For example, for **"Albatross"**, click on the number **"1"**, for **"Bananas"** on the number **"2"**, for **"David"** on the number **"3"** etc. In the column immediately next to the sorted word, textual information will appear about where you assigned the word.

- You will receive a reward for each word correctly entered. When you have finished sorting the words in one set, press **"Next "** to move to the next words set.

- You can sort a total of 10 sets of five words in the task. The wage for correctly sorting all sets within the time limit is 50,000 EMU. You can increase the amount by a time bonus.

- The time limit for the task is 120 seconds.

Figure 13: Alphabet Task

Instructions for the Matrix-Counting Task:

- Your task will be to **count how many ones there are in the table.** Enter the calculated value in the field below the table and confirm pressing the **"Next "** button to go to the next table. You will get a wage for each correctly counted table.

- You can count a total of 8 tables within this task. The wage for all correct answers within the time limit is 50,000 EMU. You can increase the amount by a time bonus.

- The time limit for the task is 120 seconds.

Figure 14: Matrix-Counting Task
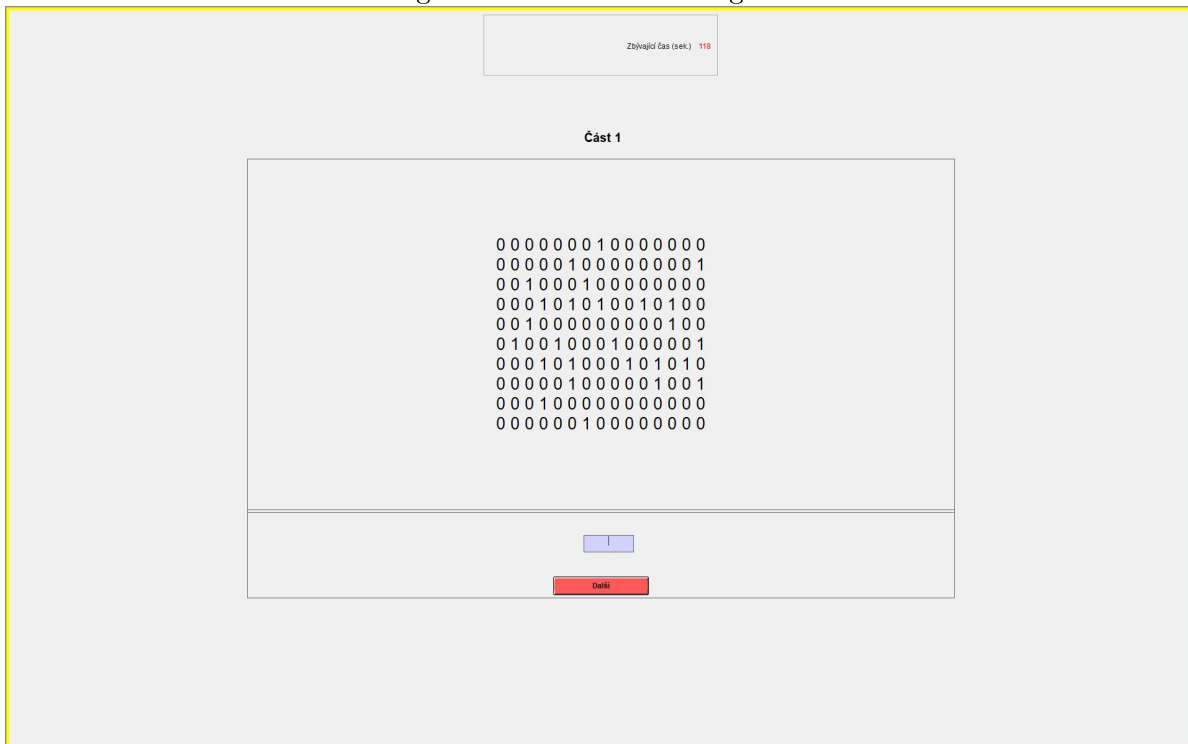
Instructions for the Anagram Task:

- Your task will be **to create one Czech word from four letters** (e.g. OROJ = JARO). Type this word in the box below the letters. It is possible to create precisely one word from each set of letters.

- You will receive a reward for each correctly identified word. Once you find the word, type it in the box below the letters, click the **"Next"** button, and move on to the next set of letters.

- There is a total of 20 words in a task. The wage for the correct composition of all words within the time limit is 50,000 EMU. You can increase the amount by a time bonus.

- The time limit for the task is 120 seconds.

Figure 15: Anagram Task
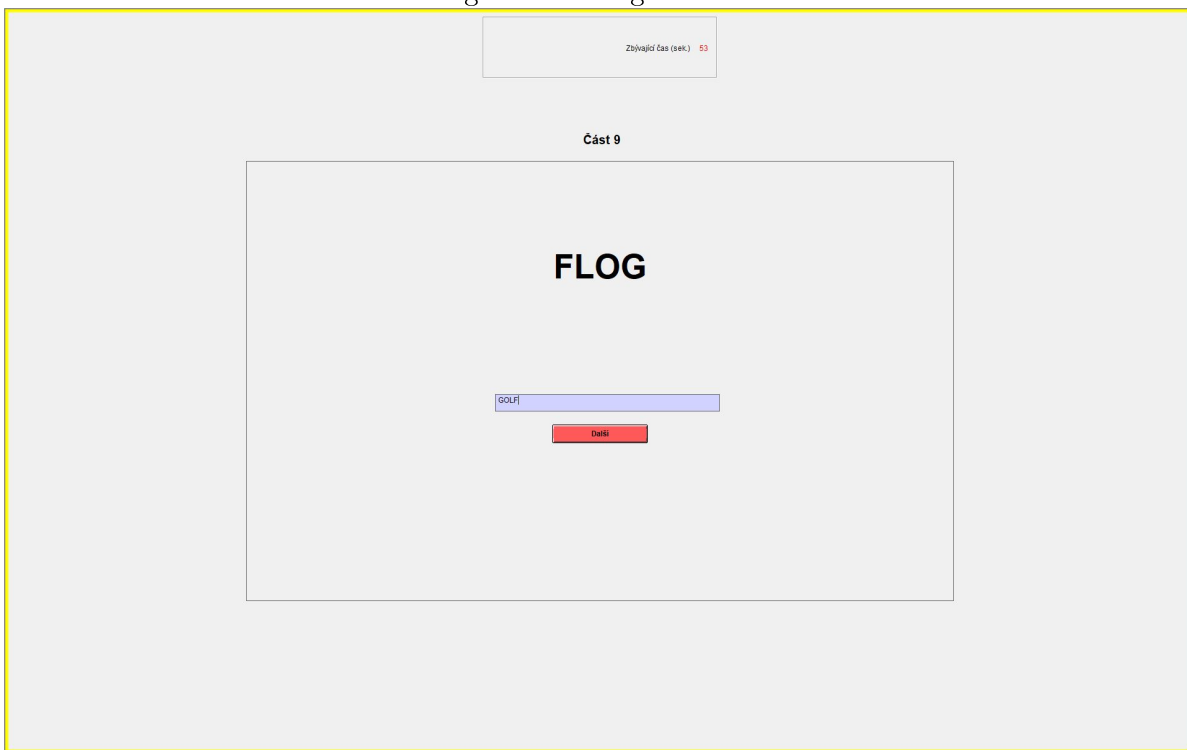
Instructions for the Adding-To-10 Task:

- Your task will be to look for a **pair of numbers the sum of which is 10.00.** There is precisely one pair of numbers with the sum of exactly 10 in each table. Once you find such pair, mark both numbers by clicking (the clicked numbers turn red). (If you want to deselect a number, click it again.) After clicking two numbers, press the **"Next"** button to move to the next set of numbers. You will be rewarded for each pair identified, and you will not be penalized for incorrect answers.

- You can count a total of 10 assignments within a task. The wage for all correct answers within the time limit is 50,000 EMU. You can increase the amount uploaded by a time bonus.

- The time limit for the task is 120 seconds.

Figure 16: Adding-To-10 Task

Instructions for the Stroop Task:

- On the next screen we will show you words written in different colors. There will always be a set of colored buttons below each word. Your task is to **to select the button whose color is the same as the color in which the word is written**. The wage depends on the number of correct answers.

- You will be rewarded for each color correctly identified , and you will not be penalized for incorrect answers.

- The task consists of 100 words. The wage for all correct answers within the time limit is 50,000 EMU. You can increase the amount by a time bonus.

- The time limit for the task is 120 seconds.

Figure 17: Stroop Task

[D.3] Taxation Game

- **Taxation:**

- Your income will be taxed at a rate of 15%. The amount of taxes you pay depends on the amount you declare (i.e. enter it into the computer).

- The taxes are also paid by 3 other participants from the four-member group to which you were randomly assigned at the beginning of today's experiment (the composition of this group will remain unchanged at all times).

- The total tax revenue of your group will be distributed so that each member of the group (including you) will receive **1/8** of it.

- The tax administration then performs a random inspection on the correctness of the taxes paid. The probability that you will be checked is **1/20** (i.e. out of 100 people, five will be checked on average). This probability is the same for everyone and for the duration of the experiment.

- If the inspection finds that the declared amount does not match your wage for the given task, a penalty will be imposed. The amount of the penalty is **ten times** the tax arrears. If the amount of the penalty is higher than your wage in the given round, you will end up with zero (not negative) profit. It is not possible to go into the red numbers during the experiment. In addition, the penalty **does not apply** to your share of the joint tax revenue. Therefore, even if you reach zero as a result of your decisions, you can still keep the amount you received as part of your group's tax revenue distribution.

- **Example 1:** In a given round, you have been rewarded with 20,000 EMU for completing the task. You decide to declare wage of 10,000 EMU to the tax administration. You will pay a tax of 15% on this income, i.e.1,500 EMU. The total tax revenue of your group is 8,000 EMU. (That is, you and the other three participants together paid 8,000 EMU in taxes.) From this revenue, you (and everyone else in the group) will receive 1/8, i.e. 1,000 EMU. For a given round, you get a total of **19,500 EMU (= 20,000 - 1,500 + 1,000)**. There was no tax audit for you.

- **Example 1b:** In the case of the above example, if you are selected for the inspection, you will be caught not having reported your actual income. If you had reported the entire income of EMU 20,000 truthfully, the tax paid would have been EMU 3,000. Since you paid only 1,500 EMU, "you owe" the tax administration 1,500 EMU, and you have to pay a penalty of 15,000 EMU (= 1,500 * 10). In the given round (after checking) you get **4,500 EMU (= 20,000 - 1,500 - 15,000 + 1,000)**.

Daněni:

Vámi získanou mzdu zdaníte sazbou ve výši 15%. Výše Vámi zaplacené daně se odvíjí od částky, kterou přiznáte (tj. vložíte do počítače).

Daň odvádějí rovněž další 3 účastníci ze čtyřčlenné skupiny, do které jste byl(a) náhodně přiřazen(a) na počátku dnešního experimentu (složení této skupiny zůstane neměnné po celou dobu).

Celkový daňový výnos Vaší skupiny bude rozdělen tak, že každý člen skupiny (včetně Vás) z něj získá **1/8.**

Daňová správa následně provádí namátkovou kontrolu správnosti odvedených daní. Pravděpodobnost, že budete zkontrolován(a) právě Vy, je **1/20** (tzn. ze 100 lidí jich bude průměrně zkontrolováno pět). Tato pravděpodobnost je shodná pro všechny a po celé trvání experimentu.

Zjistí-li kontrola, že Vámi přiznaná částka se neshoduje s Vaší mzdou za daný úkol, bude Vám uloženo penále. Výše penále je rovna **desetinásobku** nedoplatku daně. Pokud by výše penále byla vyšší než Vaše mzda v daném kole, skončíte s nulovým (nikoliv záporným) ziskem. V průběhu experimentu není možné se dostat do mínusu. Penále se navíc **nevztahuje** na Váš podíl na společném výnosu daně. I když se tedy v důsledku svých rozhodnutí dostanete na nulu, stále můžete disponovat částkou, kterou jste získal (a) v rámci rozdělování daňového výnosu Vaší skupiny.

Příklad 1: V daném kole jste za splnění úkolu získal(a) odměnu 20000 EMU. Rozhodnete se daňové správě nahlásit příjem 10000 EMU. Z tohoto příjmu odvedete daň ve výši 15 %, tzn. 1500 EMU. Celkový daňový výnos vaší skupiny je 8000 EMU. (Tzn. Vy a a další tři účastníci jste dohromady na daních odvedli 8000 EMU.) Z tohoto výnosu Vy (i každý další ve skupině) získáte 1/8, tzn. 1000 EMU. Za dané kolo tedy získáváte celkem **19500 EMU (= 20000 - 1500 + 1000).** K daňové kontrole u Vás nedošlo.

Příklad 1b: Pokud jste v případě výše uvedeného příkladu vybrán(a) ke kontrole, ukáže se, že jste nenahlásil(a) celý svůj skutečný příjem. Kdybyste byl(a) nahlásil(a) pravdivě celý příjem ve výši 20000 EMU, odvedená daň by byla 3000 EMU. Vy jste odvedl(a) pouze 1500 EMU, "dlužíte" tedy daňové správě 1500 EMU a musíte zaplatit penále ve výši 15000 EMU (= 1500 * 10). V daném kole (po zkontrolování) tedy získáváte **4500 EMU (= 20000 - 1500 - 15000 + 1000).**

Zpět   Pokračovat

[D.4] Control Questions

- To make sure you understand the instructions correctly, please complete the following exercises:

- You earned 50,000 EMU in that round. What is your final income per round if:

- (a) You report the full actual amount of EMU 50,000. At the same time, it turns out that the total tax revenue in your group (i.e. the total taxes paid) is 8,000 EMU.

    - Tax paid by you (15% of the declared amount): ......
    - Your share of the group's tax revenue (total group revenue / 8): ......
    - Your total income per round (= your wage - tax paid + your share of the group's tax revenue): ......

- (b) You choose to report only 20,000 EMU. The inspection will NOT take place. At the same time, it turns out that the total tax revenue in your group (i.e. the amount of taxes paid) is 8,000 EMU.

    - Tax paid by you (15% of the declared amount): ......
    - Your share of the group's tax revenue (total group revenue / 8): ......
    - Your total income per round (= your wage - tax paid + your share of the group's tax revenue): ......

- (c) You choose to report only 20,000 EMU. The inspection will take place at your place. At the same time, it turns out that the total tax revenue in your group (i.e. the total tax paid) is 8,000 EMU.

    - Tax paid by you (15% of the declared amount): ......
    - The tax should have been correctly paid in the amount of (see example (a)): ......
    - Tax arrears: ......
    - Penalties paid by you (= tax arrears times 10): ......
    - Your share of the group's tax revenue (total revenue / 8): ......
    - Your total income per round (= your wage - paid tax - penalty + your share in the group's tax revenue): ......

Figure 19: General Instruction - Control Questions

Note: If the participant did not answer the question correctly, he/she received a pop-up message for each given question highlighting the issue. In case the participant had needed an explanation or a hint for the answer, he/she could have raised his/her hand and the experimenter or research assistant approached him/her and answered any question privately. Out of the whole, only a few subjects needed and advice more than once.

Translation of the screen:

- Maximum number of completed entries for this task: **.....**

- Number of entries you answered in this task: **.....**

- Number of correctly entered entries: **.....**

- Incorrect entries: **.....**

- Task completed **.....** seconds before the end of the time limit and you get a bonus **.....** **EMU**.

- Based on your success in completing the task, you are entitled to a wage in the total **.....** **EMU**.

- *Banner at the bottom: Treatment manipulation. See Appendix A for the headline news.*

Figure 20: Taxation Game - Real Effort Task Results
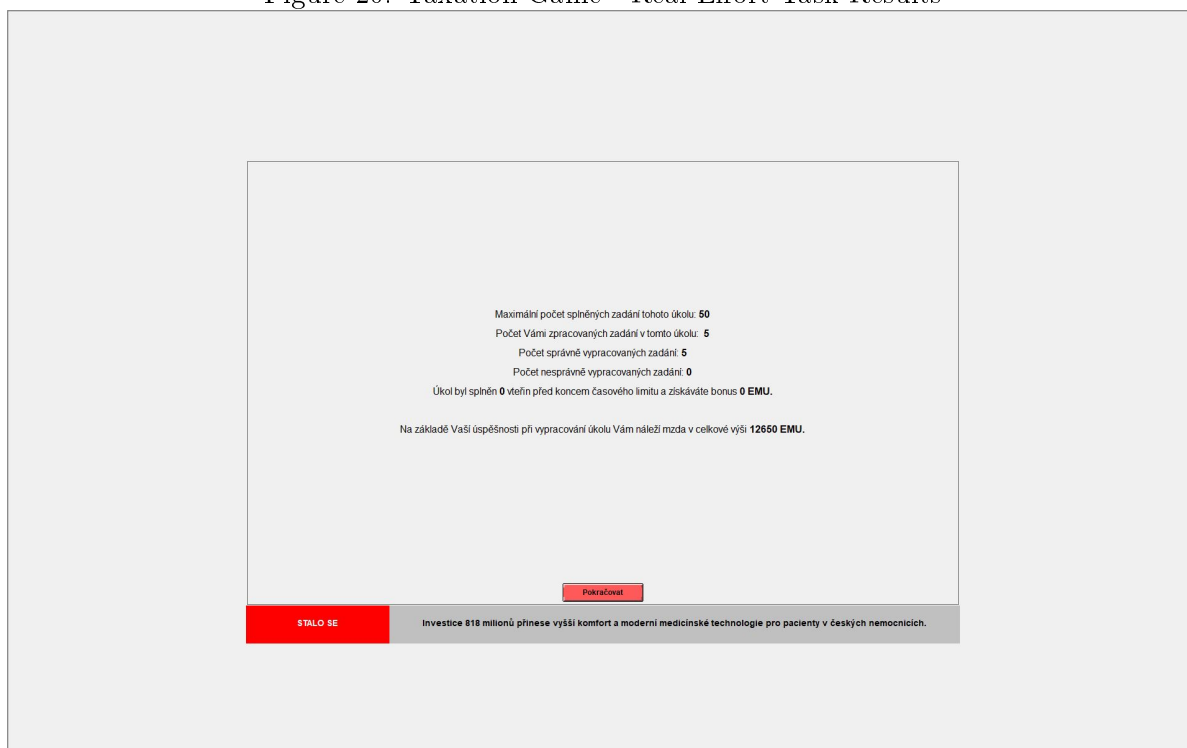
Translation of the screen:

- You will now report your income for tax purposes. You will be deducted 15% tax from the reported income. The probability that the tax administration will inspect your tax return is 1/20.

- If it is found during the audit that the reported income does not match your earnings for the given task, you will be imposed a penalty in the amount of ten times the tax arrears. This penalty does not apply to the share of the group's joint tax revenue.

- The wage you earned for completing the task: **..... EMU**

- The amount of income you report for tax purposes: ....

- *Banner at the bottom: Treatment manipulation. See Appendix A for the headline news.*

Figure 21: Taxation Game - Tax Compliance Decision

Translation of the screens:

- The wage you earned for the task: ..... **EMU**

- Tax paid by you: ..... **EMU**

- Income you declared for tax purposes: ..... **EMU**

- Your share of the group's tax revenue: .... **EMU**

(a) Taxpayer not inspected

- The tax audit **did NOT take place** for you. Your final income for this task is ..... **EMU**.

(b) Taxpayer inspected

- The tax audit **did take place** for you. A tax arrears of ..... **EMU** were found.

- Penalties you pay: ..... **EMU**

- Your final income for this task is ..... **EMU**.

- *Banner at the bottom: Treatment manipulation. See Appendix A for the headline news.*

Figure 22: Taxation Game - Tax Compliance Results
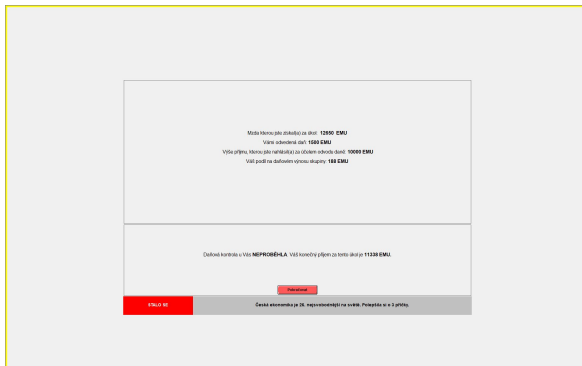
(a) Taxpayer not inspected   (b) Taxpayer inspected
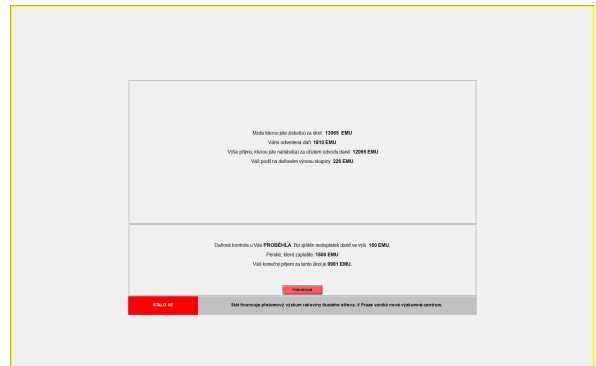
[D.5] Risk Elicitation

Risk Elicitation Task:

- Indicate to which degree you would rather choose option A or B . This part does not effect your financial reward for the experiment.

- *first line:* A: 10% chance to win 60 CZK , 90% chance to win 48 CZK | B: 10% chance to win 115 CZK, 90% chance to win 3 CZK

Figure 23: Risk Elicitation Task

[D.6] Final Questionnaire

- Gender: [male; female; other]

- Age: [numerical value]

- Faculty of: [Law; Medicine; Science; Arts; Education; Economics and Administration; Informatics; Social Studies; Sport Studies; not Masaryk University]

- Nationality: [Czech; Slovak; other]

- What country have you lived in for the last three years? [in the Czech Republic; in the Slovak Republic; in another country]

- What was the size of the municipality in which you have lived at the age of 16? [less than 3000 inhabitants; 3000 - 50 000 inhabitants; more than 50 000 inhabitants]

- Are you religious?: [yes; no]

- Do you have work experience: [as a self-employed person; as a part-time employee; as a full-time employee; as a "summer job"; I have no work experience]

- Who long is your work experience?: [0-3 years; 3-5 years; more than 5 years]

- What social classification best applies to your father? [management; state employee; employee - manual; employee - non-manual; businessman; free enterprise [lawyer, doctor, pharmacist, etc.]; unemployed; other]

- What social classification best applies to your mother? [management; state employee; employee - manual; employee - non-manual; businessman; free enterprise [lawyer, doctor, pharmacist, etc.]; unemployed; other]

- In politics, people sometimes talk about the right and the left. Where would you place yourself on this scale? [left-right scale 1-11]

- Have you ever attended a charity event? [as an organizer; as a participant; as a donor within the collection; as a volunteer; other]

- In your opinion, the tax burden is in the Czech Republic is: [rather low; just right; too high]

- If you did not declare the right amount of your salary, what led you to do so? [text answer]

- If you declared the right amount of your salary, what led you to do so? [text answer]