Does providing information on government spending alter taxpayer beliefs and compliance? Evidence from a large-scale field trial in Belgium

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1   Introduction

This field trial explores the potential impact of introducing a pie-chart with relative spending across the major categories of public goods and services at the beginning of the tax reporting process. At the end of the filing process the taxpayer is invited to fill out a survey. In this Pre-Analysis Plan we will discuss the analysis of both the compliance and the survey data.

This experiment ties in with a previously registered trial that studied the impact of introducing nudges in the context of reminder letters for late filing as well as late tax payments. The nudges tested included statements referring to public goods provision, social norms of compliance or penalties for non-compliance. In that trial non-compliance refers to delays in filing or payment and these are the outcomes considered.

2   Experimental Design

This experiment was run on the universe of taxpayers who filed their taxes online in Belgium in 2017 for fiscal year 2016.

Randomization was conducted based on the last two digits of the national identity number of the titular in the household. Half of the taxpayers were assigned to the treatment and half to the control group. The treatment group (national id numbers ending in 01-48) was shown a pie chart that stated the percentage of public expenses that fall in each of eleven categories of public goods and services. The control group (national id numbers ending in 49-97) was presented with the pie chart after it had submitted the tax declaration.

The treatment group was further divided into four sub-groups of equal size. The first group was presented only with the pie chart and the three other groups introduced a message to the pie chart treatment - a social norm message, a loss-aversion frame to the provision of public goods and tax compliance, and a statement making penalties for non-compliance explicit.

Taxpayers were also invited to respond to a survey at the end of the tax reporting process that gauged (1) taxpayer satisfaction; (2) taxpayer appreciation of public goods and services; (3) tax fairness; (4) tax morale; (5) belief about own understanding of tax spending categories; (6) detailed beliefs about actual tax spending categories; and their (7) tax spending preferences by way of a priority ranking of spending categories. Individuals in the control group only got to see the information pie-chart after having been invited to respond to the survey.

3 Data Set Description

The data sets we will use were provided by the Belgian tax administration. Administrative data on taxpayer compliance and survey data were supplied in separate data sets and obtained from different sources. They are described separately below.

3.1 Compliance Data

The unit of observation is the household.

The data contains the following individual demographic characteristics of the tax payer (titular):

- year of birth
- sex
- language
- region
- marital status
- number of dependent children

- number of dependent persons

- number of dependent siblings and parents

The data contains the following information from the tax declaration that has been aggregated at the household level:

- taxable income pre-check

- taxable income post-check

- total tax due pre-check

- total tax due post-check

- remaining tax due pre-check

- remaining tax due post-check

The following information is available at the individual level where 1/3 stands for titular and 2/4 for partner and amounts are as declared by the taxpayer (pre-check):

- 1250/2250: salary

- 1258/2258: professional expenses (salaried employees)

- 1600/2600: profits (self-employed category 1)

- 1606/2606 + 1620/2620: professional expenses (self-employed category 1)

- 1650/2650: profits (self-employed category 1)

- 1657/2657 + 1675/2675: professional expenses (self-employed category 1)

- 1384: expenses for child care (nursery)

- 1390/2390/1392: maintenance allowance paid

- 1394: donations

- 3317: expenses for isolation of roof

- 3364/4364: expenses for services cheques (Flanders & Brussels)

- 3366/4366: number of purchased services cheques (Wallonia)

These tax declaration items are available for the current and the previous tax year.

3.2   Survey Data

The data set contains information about the following individual level characteristics:

- year of birth

- sex

The survey responses to the following 10 questions are available:

1. On a scale of 1 to 10, to what extent do you find it easy to submit your tax return via Tax-on-Web?

2. On a scale of 1 to 10, how satisfied are you with the content and functions of Tax-On-Web?

3. On a scale of 1 to 10, how would you recommend Tax-On-Web to friend (s) or colleague (s)?

4. On a scale of 1 to 10, to what extent are you satisfied with the general tax system?

5. On a scale of 1 to 10, to what extent do you value the public services where (your) tax money is used for?

6. On a scale of 1 to 10, to what extent do you agree with the way your tax money is currently being spent?

7. On a scale of 1 to 10, to what extent do you think citizens should be completely honest when completing their tax return?

8. On a scale of 1 to 10, to what extent do you have a good idea of where your tax money goes?

9. Please add the following budget categories with the percentage of tax payable to you to these public services (total = 100%):

   - General government management (public debt, public services, basic research, foreign economic assistance, etc.)
   - Defence
   - Public order and safety
   - Economics
   - Environmental protection
   - Housing and common facilities
   - Recreation, culture and religion
   - Education
   - Health
   - Social protection (elderly, sickness and disability, family and children, unemployment, ...)

10. If you had the opportunity to give your preference in terms of budget priorities, in which order would you spend the following categories on your tax money? Please place numbers from 1 (highest priority) to 10 (lowest priority) next to the following categories: same 10 categories as in previous question

4 Balance Checks

We will run balance checks verifying comparability of the treatment and the control group in terms of demographic characteristics and amounts declared in the previous tax year (as described in Section 3). This information is obtained from the Compliance Data set which has a more comprehensive set of variables.

We will run Ordinary Least Squares regressions

$$X_i = \alpha + \beta T_i + \epsilon_i \tag{1}$$

where X_i is one of the taxpayer characteristics and T_i is a dummy variable equal to 1 if the taxpayer was assigned to a group that saw the pie chart before filing and filling the survey, equal to 0 otherwise. We will use heteroskedasticity robust standard errors.

5 Treatment Effect Estimation

5.1 Compliance

- Outcomes

  We will use taxable income and total tax due as the main outcomes of interest that are at the household level. We will concentrate on the pre-check amounts and look at the post-check amounts in case we observe differences between the treatment and control groups in the pre-check data.

  In the analysis on specific items in the declaration we will concentrate on those that are not pre-filled / for which the administration has no prior information.

  We have grouped the line items available into four categories.

- Profits for self-employed - 1600/2600 + 1650/2650
- Professional expenses for self-employed - 1606/2606 + 1620/2620 + 1657/2657 + 1675/2675
- Professional expenses for the salaried workers - 1258/2258
- General expenses - 1390/2390/1392 + 1384 + 3317

We will analyse the effects of the treatment on the individual line items in the cases in which we observe significant treatment effects on the aggregated outcomes outlined above.

- **Treatment**

  We will define a treatment dummy variable equal to 1 for all taxpayers who saw the pie chart before filing their tax declaration, equal to 0 otherwise. If we find any meaningful differences between the treatment and the control group in terms of compliance we will then look at the effects of individual nudges as described in Section 2. Here, to correct for multiple hypotheses testing, we will report both the unadjusted p-value of the coefficient of the treatment variables, and the p-value adjusted for control of the False Discovery Rate (Benjamini and Hochberg, 1995).

- **Controls**

  We will select the controls to be included in the regressions based on Lasso regressions where we will consider the same variables as the ones outlined in the balance checks. Specifically, we will follow (Belloni *et al.*, 2014). We will first identify controls that are useful in predicting the treatment dummy and such that are useful in predicting the outcome and finally use the union of the selected variables as controls in our analysis.

- **Sample**

  The sample considered will vary with the outcome variable. In particular, for outcomes that are defined only for the self-employed individuals, we will limit the analysis to this sub-sample of taxpayers.

- **Regression Equation**

  We will run the following Ordinary Least Squares regressions when analysing the compliance data

$$Y_i = \alpha + \beta T_i + \gamma X_i + \epsilon_i \tag{2}$$

where outcomes, treatment and controls are as specified above. We will use heteroskedasticity robust standard errors.

- Heterogeneous Effects Analysis

  We will use random forest (Athey and Imbens, 2017) in the heterogeneous effects analysis and consider variables included in the balance check.

5.2 Survey Responses

- Outcomes

  As questions 1-3 reflect satisfaction with the online system, we do not expect that the pie chart treatment has any effect on them.

  We will consider answers to questions 4, 5 and 7 as separate outcomes.

  We will use as an outcome the standardized sum across spending categories of the absolute deviation between the stated and the true allocation when analyzing answers to question 9. We will consider question 8, which reflects perceived knowledge, as an outcome only if we find meaningful differences between the treatment and control group in terms of actual knowledge of the way taxes are spent.

  Responses to question 10 will be analyzed similarly to question 9 but in terms of rankings rather than percentages. Answers to question 6, which reflects overall agreement with the way taxes are spent, will be considered as an outcome only if we find an effect on preferences as reflected in question 10.

- Treatment

  We will define a treatment dummy variable equal to 1 for all taxpayers who saw the pie chart before filling the survey, equal to 0 otherwise. If we find any meaningful differences between the treatment and the control group in terms of survey responses we will then look at the effects of individual nudges as described in Section 2.

- Controls

  We will use a gender dummy as well as dummies for age categories (30 and below (omitted), 31-40, 41-50, 51-60, 61+) as controls.

- Regression Equation

  We will run Ordinary Least Squares regressions when analysing the survey data.

$$Y_i = \alpha + \beta T_i + \gamma X_i + \epsilon_i \tag{3}$$

  where outcomes, treatment and controls are as specified above. We will use heteroskedasticity robust standard errors.

- Heterogeneous Effects

  The heterogeneous effects analysis in this case is limited by the set of demographic characteristics we have for the survey respondents - gender and age.

References

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