Belief and Communication in Tax Compliance: An Experiment

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Laboratory experiments are becoming popular for researchers working on tax compliance. In these experiments, participants are invited to the laboratory and are given or allowed to earn income. Then they are asked to report these incomes, which are private information for them at this stage, in order to be reduced by a certain ratio. Then, some of the participants are selected randomly and audited. In case of underreporting, underreporter has to pay the reduction amount and a fine. These stages represent a taxation process by keeping other determinants external, such as tax morale.

Previous experiments show that audit frequency and magnitude of fine are effective in compliance. On the other hand, compliance is negatively correlated with marginal tax rate (see Fonseca & Myles, 2011 for a review).

Another observation from previous experiments is that participants behave accordingly to what they believe as the social norm. In other words, tax compliance increase as participants believe that compliance is the norm, and vice versa (see Alm, 2011). In this paper, we are testing how individuals believe what others believe and behave in a taxation experiment. Additionally, we let participants to communicate each other and share their opinions about others' behaviour.

In the experiment, participants are first allowed to earn their experimental individual income. In the second stage, they are asked to report these incomes. Participant are aware of that they can report any amount, that these reported incomes would be reduced by a certain ratio, and that there would be an audit. In the next stage, there is an audit with a certain probability. If the audited participant is found non-compliant, then s/he has to pay the full reduction plus a fine, otherwise nothing changes. Participant's earning is:

 $e_i = m_i - t * r_i + f * (m_i - r_i)$

In the equation above, m_i represents participant's earning, t represents the tax rate, r_i is the reported income and f is fine multiplier. If participant reports his/her full income $(r_i = m_i)$, then the earning is $(1 - t) * m_i$. If s/he underreports and is not audited, then the earning is larger than this amount. If s/he underreports and is audited, then s/he has to pay the full tax plus a fine which is a multiple of the evaded amount. Notice that fine part of the equation is applied when the participant is audited and found underreporter.

In our experiment, control treatment is the base experiment stated above. In control treatments, we add new features: in *belief* treatment, participants are asked to guess the compliance rate and guesses of the compliance rate of the whole group before they report their income. This guess is incentivised, i. e. participants earn experimental income if their guess is correct, and therefore we expect participants would reveal their actual belief about the group belief and behaviour. In communication treatment, participant are allowed to send a message to another participant about his/her belief about group behaviour. After seeing the message, participants will guess the compliance rate and report their income.

This experiment aims to test how belief and sharing beliefs shape the behaviour in a tax compliance setting. Since other factors are controlled, any difference between treatments can be attributed to the feature in question. Below we present our hypotheses:

H_{01} = Participants behave according to what s/he believes how others behave

H_{02} = Communication does not affect the behaviour of participants

In the first hypothesis, we test whether belief about others' behaviour determines the compliance decision. This can be tested with a regression where compliance decision is explained by belief about group compliance. The second hypotheses tests the effect of communication on social norm, thus compliance decision. Here we make treatment tests for control and communication groups.

The experiment is scheduled in April 2017 at Hitit University. Participants will be Public Finance undergraduate students, and experimental income will be converted to class grades fort the final exam of a selected lecture. The results of the experiment will be reported at the conference.

References

Alm, J. (2011), "Testing Behavioral Public Economics Theories in the Laboratory", Tulane Economics Working Paper Series.

Fonseca, M. & G. Myles (2012), "A Survey of Experiments on Tax Compliance", HM Revenue and Customs Research Report 198.

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Özyerden and Yereli (HITU and HU) Belief, Communication, Tax Compliance







- Models of Allingham and Sandmo (1972) and Yithzaki (1974)
- Optimizing an Expected Utility Function

 $EU = (1-p) * U(W - \theta X) + p * U(W - \theta X - \pi(W - X))$

where p is probability of audit, W actual income, X reported income, θ tax rate, and π is fine

 Model tells us X rises with higher p and/or π, Higher θ decreases X, If π is proportional to W – X, then higher θ increases X (Yithzaki, 1974)

Income Stage

Subjects earn or given income

Report Stage

Subjects are asked to report their incomes

- Reports will be reduced by a certain ratio
- Any amount can be reported

Audit Stage

 $\mathsf{Subject}(\mathsf{s})$ selected randomly, and in case of a revealed underreporting, a fine imposed

- First experiment by Friedland, Maital and Rutenberg (1978)
- Higher p, higher compliance (elasticity between .1 and .2)
- Higher π , higher compliance (e < .1)
- Higher marginal heta, less compliance (e \sim -.5)
- For more, see Torgler (2002), and Alm (2011)

Social Norm

- Another important observation is the importance of social norm
- Elster (1989) defines it: "[p]attern of behavior that is judged in a similar way by others and that therefore is sustained in part by social approval or disapproval"
- "[I]n the context of tax compliance, the existence of a social norm suggests that an individual will comply as long as he or she believes that compliance is the social norm; if noncompliance becomes pervasive, then the social norm of compliance disappears." (Alm, 2011)
- Social norm can be affected (learned, changed, etc.) by interaction
- We designed an experiment where subjects can reveal their beliefs about how other subjects behave, and can share these beliefs with other subjects

- In addition to the Base design, we added 4 treatments
- In *Pre-Belief* and *Post-Belief* treatments, we asked subjects to declare their beliefs about other subjects' average report ratios
- They declare before they report their incomes in the former, and declare after they report in the latter
- In *Pre-Communication* and *Post-Communication* treatments, we asked each participant to share her belief with another subject
- They share before they report their incomes in the former, and share after they report in the latter
- Subjects repeated each treatment 5 times (except trials)
- Neutral instructions (tokens, forward, deduction, extra deduction)
- p differs, $\theta = 0.4$, $\pi =$ half of the unreported amount (plus full tax)

- It was meant to be a proper experiment, but turned out to be a pilot
- Experiment was conducted at Hitit University Faculty of Economics Computer room at April 21st in 3 sessions
- Around 100 student subjects (who are Department of Public Finance students and registered to the "Turkish Economy" course) invited
- They are told that they would earn up to 12 points for the final exam of "Turkish Economy" (incentivised)
- Only 24 subjects registered, 8 subjects invited for each session
- 5, 7, and 6 subjects showed up in each session, respectively
- In the first two sessions, subjects played *Base*, *Pre-Belief*, and *Post-Belief* treatments; in the last session subjects played *Pre-Communication* and *Post-Communication* treatments

| Stages | Base | Pre-Belief | Post Belief | Pre-Communication | Post-Communication |
|-------------------|------|------------|-------------|--------------------------|--------------------|
| Income Generation | 1st | 1st | 1st | 1st | 1st |
| Belief | - | 2nd | - | - | - |
| Communication | - | - | - | 2nd | - |
| Report | 2nd | 3rd | 2nd | 3rd | 2nd |
| Belief | - | - | 3rd | - | - |
| Communication | - | - | - | - | 3rd |
| Results | 3rd | 4th | 4th | 4th | 4th |

Table: Stages in each Treatment

Experiment Room



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• z-Tree (Zurich Toolbox for Readymade Experiments) (Fischbacher, 2007) version 3.6.7 used to programme experiment

Screenshots-1

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| Variable | Obs | Mean | Std. Dev. | Min | Max |
|--------------|-----|-----------|-----------|-----|-----|
| Base | 65 | . 3541635 | . 3303193 | 0 | 1 |
| PreBelief | 60 | . 2909195 | .352773 | 0 | 1 |
| PostBelief | 60 | . 2805239 | . 3463738 | 0 | 1 |
| PreCommuni~n | 30 | . 3531784 | . 3986063 | 0 | 1 |
| PostCommun~n | 30 | .4379219 | . 4401833 | 0 | 1 |

Table: Average Report Ratios

We found no difference in means between Pres and Posts (Paired Belief t=0.3337, Communication t=-1.6482) (Only Post-Communication higher at 10%)

- < A > < B > < B >

When combined;

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|--------------|-----|-----------|-----------|-----|-----|
| Base | 65 | . 3541635 | . 3303193 | 0 | 1 |
| Belief | 120 | .2857217 | . 3481552 | 0 | 1 |
| Communicat~n | 60 | . 3955502 | . 4185229 | 0 | 1 |

No significant difference between *Base* and *Communication*, Difference between *Base* and *Belief* significant at 10%

Results-3

Belief vs Own Report (correl. coeff. = 0.5477)



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Results-4

Effect of Communication



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| Subject ID | Pre-Audit | Post-Audit | Change |
|------------|-----------|------------|--------------|
| 1 | 0.326 | 0.190 | \Downarrow |
| 2 | 1 | 0.980 | \Downarrow |
| 4 | 0.210 | 0.125 | \Downarrow |
| 7 | 0.156 | 0.033 | \Downarrow |
| 8 | 0.229 | 0.375 | ↑ |
| 9 | 0.625 | 0.429 | \Downarrow |
| 10 | 0.027 | - | - |

Table: Effect of Audit in Base Treatment

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- A first step to a proper experiment
- Experiment should include: Strangers, monetary incentives, experimental econ Lab, large sample size, etc.

Thank You!

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