The link between corruption and tax evasion - an experimental investigation

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1 Motivation

2 Experimental Design and Procedure

3 Results

4 Conclusion

Outline

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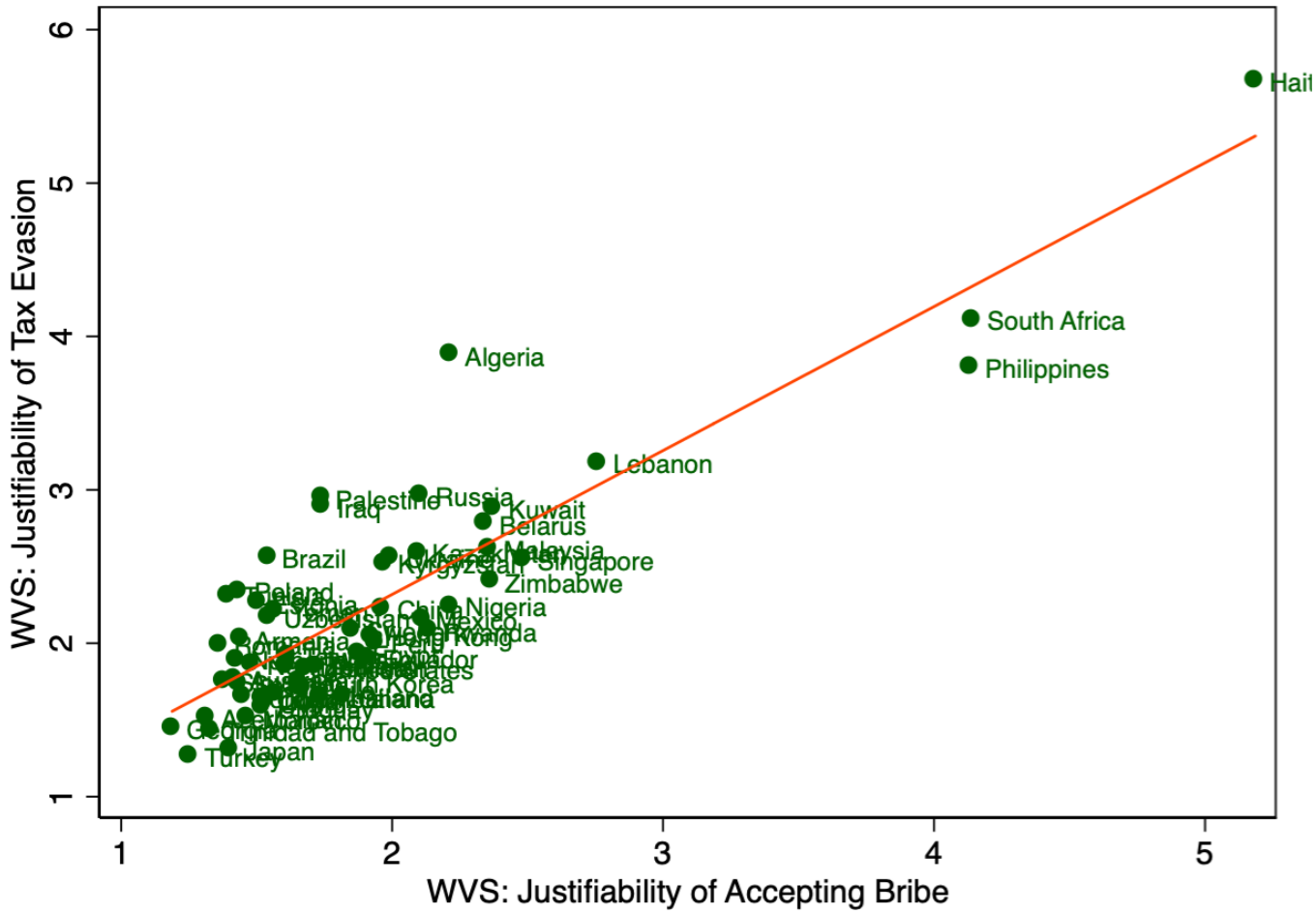
Motivation

"All rulers who have come so far, they spend money on themselves ... the way our ruling elite spends money, how will anyone pay tax? People don't pay taxes, because they see how our ruling elite spends that money [on themselves]. I promise that I will protect the people's tax money. We will cut all of our expenses."

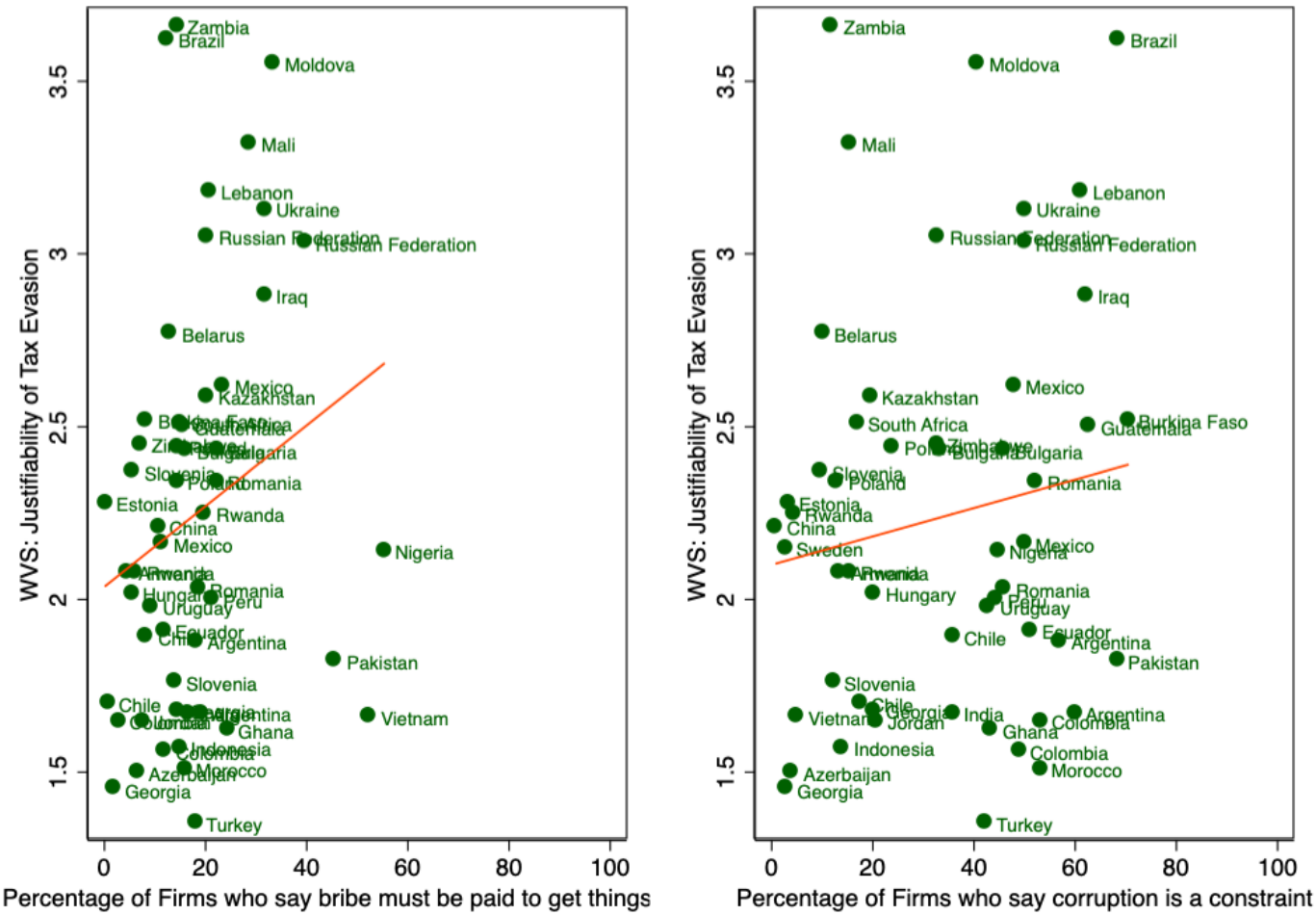
Imran Khan, (then) Prime Minister - Elect of Pakistan after his 2018 election victory

Motivation



$$J_{TaxEvasion} = 0.44(0.14)^{**} + 0.94(0.07)^{**} J_{BribeDemand}$$

Motivation



$$J_{TaxEvasion} = 2.03(0.14)^{**} + 0.01(0.01)^{*} FirmExp_{BribeDemand}$$

$$J_{TaxEvasion} = 2.10(0.15)^{**} + 0.004(0.004) FirmConstraint_{Corruption}$$

Motivation

- Alingham and Sandmo (JPubE, 1972) uses a Beckerian framework: Evasion decreases with probability of detection or penalty.
  - individuals pay taxes because of economic consequences of evading
- Tax compliance cannot be wholly explained by the level of enforcement
  - Invoke social preferences to explain tax evasion
  - Pay taxes because
    - It is the right thing to do
    - Care about the public good
- If people pay taxes, in part, because **they care about the public good** that is created, then **in the circumstance when the public good may not be created, do they evade taxes?**
- Can corruption be a reason for why taxes may be evaded?
- Chander and Wilde (1992), Besley and McLaren (1993), Hendriks, Keen and Muthoo (1999), Acconcia, D'Amato and Martina (2003).

Literature

- Alm, Martinez-Vazquez, McClellan (JEBO, 2016): Corruption of tax officials is correlated with tax evasion. Higher bribes are correlated with higher evasion.
  - Observational data (World Enterprise Data) makes it hard to make any causal inferences
  - studies corruption among tax officials
- Bjorn Jahnke (EJPE, 2017): Afrobarometer data to show corruption diminishes tax moral and trust in the tax department. Effect diminishes with prevalence of bribery.
- Can this question be studied using lab based strategic games?
  - Laboratory corruption games do impose moral costs (Banerjee, EE, 2016) and the qualitative inferences are externally valid (Armantier and Bolly, EJ, 2012)
  - Laboratory experiments on tax compliance are externally valid and behavioral responses of students are similar to those of non-students. (Alm, Bloomquist and McKee, EI, 2018).

Research Questions of Interest

- Does corruption causally lead to more tax evasion?
  - Yes
- Does corruption increase in the presence of tax evasion?
  - Yes
- Does corruption and/or tax evasion have an effect on how much effort people put in?
  - **No**
- Cross domain effect of penalty
  - Does penalty on corruption diminish tax evasion?
    - **No**
  - Does penalty on tax evasion diminish corruption?
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Experimental Design

- Subjects are divided in **groups of three**
- Roles are randomly assigned: **2 Citizens and 1 Public Official**
- Citizens perform in a real effort task
  - Count the number of 0s in a sequence of ten digits of 0s and 1s
  - Time limit: 90 secs
  - Example: 1 0 1 0 0 0 0 0 1 1
- Earnings Stage:
  - Citizens: 100M for every correctly solved sequence (Actual Income).
  - Public Officials: 2000M as salary

Experimental Design

- Taxation Stage
  - Citizens are taxed @40% of Reported Income
    - Citizens report an income in the taxation stage
    - Actual Income is private information
  - **Tax Evasion is the amount underreported i.e. Actual Income - Reported Income**
- Public Officials receive the gross tax revenue per group
- Public Officials decide **how much to embezzle** from the gross tax revenue
- The net tax revenue is used to create a public good to be enjoyed by both Citizens
  - Multiply the net tax revenue by 1.6 and divide equally between the two Citizens

Experimental Design - Public Good

- A public good game embedded within tax evasion framework.
- Suppose the Embezzlement is 0. Then this is a simultaneous game.
- **Simultaneous Game:**
  - C1 contributes 1 as tax, C2 contributes 1 as tax. Tax Revenue is 2 and each gets back 3.2/2=1.6 . Should C2 contribute if C1 contributes 1?
    - If she contributes 0 then she has 1 in her private account. Public good is 1.6 . Her share of public good is 0.8. So total earning is 1.8.
  - Answer: No.
  - **Nash Equilibrium: Contributions are 0 for each.**
- **Sequential game:**
  - If Citizens pay taxes, best strategy for PO is to embezzle everything. Knowing this Citizens should contribute 0.
  - **SPNE: Contributions are 0 for each, Embezzlement is Total Revenue**

Experimental Design - T3 (Baseline)

			Treatment 3
			Citizens: real effort task, actual earning determined
			⬇
			Citizens: Report Earnings (Underreport)
			⬇
			Taxes transferred to Public Officials
			⬇
			Public Officials: Embezzlement
			⬇
			Public Goods created and shared with Citizens

Experimental Design - T1 and T2

	Treatment 1	Treatment 2	Treatment 3
	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined
	⬇	⬇	⬇
	Citizens: Report Earnings (Amt. Underreported)	Citizens: Tax Evasion disallowed	Citizens: Report Earnings (Amt. Underreported)
	⬇	⬇	⬇
	Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials
	⬇	⬇	⬇
	Public Officials: Embezzlement disallowed	Public Officials: Embezzlement decision	Public Officials: Embezzlement decision
	⬇	⬇	⬇
	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens

Experimental Design - T0

Treatment 0	Treatment 1	Treatment 2	Treatment 3
Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined
⬇	⬇	⬇	⬇
Citizens: Tax Evasion disallowed	Citizens: Report Earnings (Amt. Underreported)	Citizens: Tax Evasion disallowed	Citizens: Report Earnings (Amt. Underreported)
⬇	⬇	⬇	⬇
Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials
⬇	⬇	⬇	⬇
Public Officials: Embezzlement disallowed	Public Officials: Embezzlement disallowed	Public Officials: Embezzlement	Public Officials: Embezzlement
⬇	⬇	⬇	⬇
Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens

Experimental Design - Treatment Effects

Treatment 0	Treatment 1	Treatment 2	Treatment 3
Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined
⬇	⬇	⬇	⬇
Citizens: Tax Evasion disallowed	**Citizens: Report Earnings (Amt. Underreported)**	Citizens: Tax Evasion disallowed	**Citizens: Report Earnings (Amt. Underreported)**
⬇	⬇	⬇	⬇
Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials
⬇	⬇	⬇	⬇
Public Officials: Embezzlement disallowed	Public Officials: Embezzlement disallowed	**Public Officials: Embezzlement**	**Public Officials: Embezzlement**
⬇	⬇	⬇	⬇
Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens

Experimental Design: Audit Treatments

Treatment 3	Treatment 4	Treatment 5	Treatment 6
Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined	Citizens: real effort task, actual earning determined
⬇	⬇	⬇	⬇
Citizens: Report Earnings (Amt. Underreported)	Citizens: Report Earnings (Amt. Underreported)	**Citizens: Report Earnings (Amt. Underreported)**	**Citizens: Report Earnings (Amt. Underreported)**
⬇	⬇	⬇	⬇
Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials	Taxes transferred to Public Officials
⬇	⬇	⬇	⬇
Public Officials: Embezzlement	**Public Officials: Embezzlement**	Public Officials: Embezzlement	**Public Officials: Embezzlement**
⬇	⬇	⬇	⬇
Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens	Public Goods created and shared with Citizens
	⬇	⬇	⬇
	20% chance of audit, 150% penalty: Tax Evasion	20% chance of audit, 150% penalty: Embezzlement	20% chance of audit, 150% penalty: Tax Evasion and Embezzlement

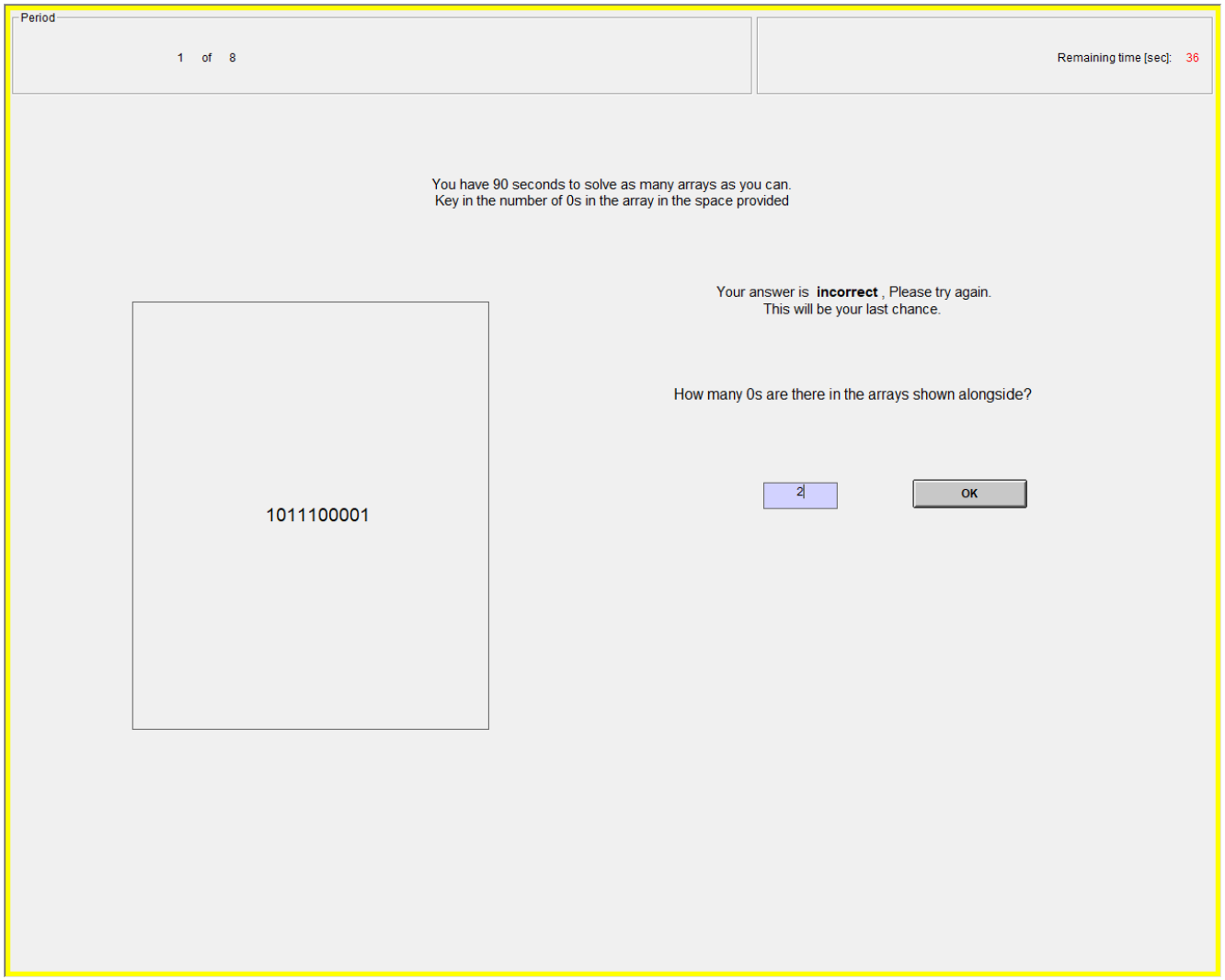
Experimental Design: Outcomes

- Effort: Number of sequences solves
- Amount of income underreported by Citizen: Actual Earnings - Reported Earnings
- Amount of Embezzlement by Public Official
- Other auxiliary variables
  - Citizen's belief about the amount underreported by the other Citizen
  - Citizen's belief about the amount embezzled by the Public Official
  - Public Official's belief about the average amount underreported by the Citizens
  - Belief elicitation was incentivized
- Holt and Laury - Risk Aversion Measure
- Post experimental survey based questionnaire

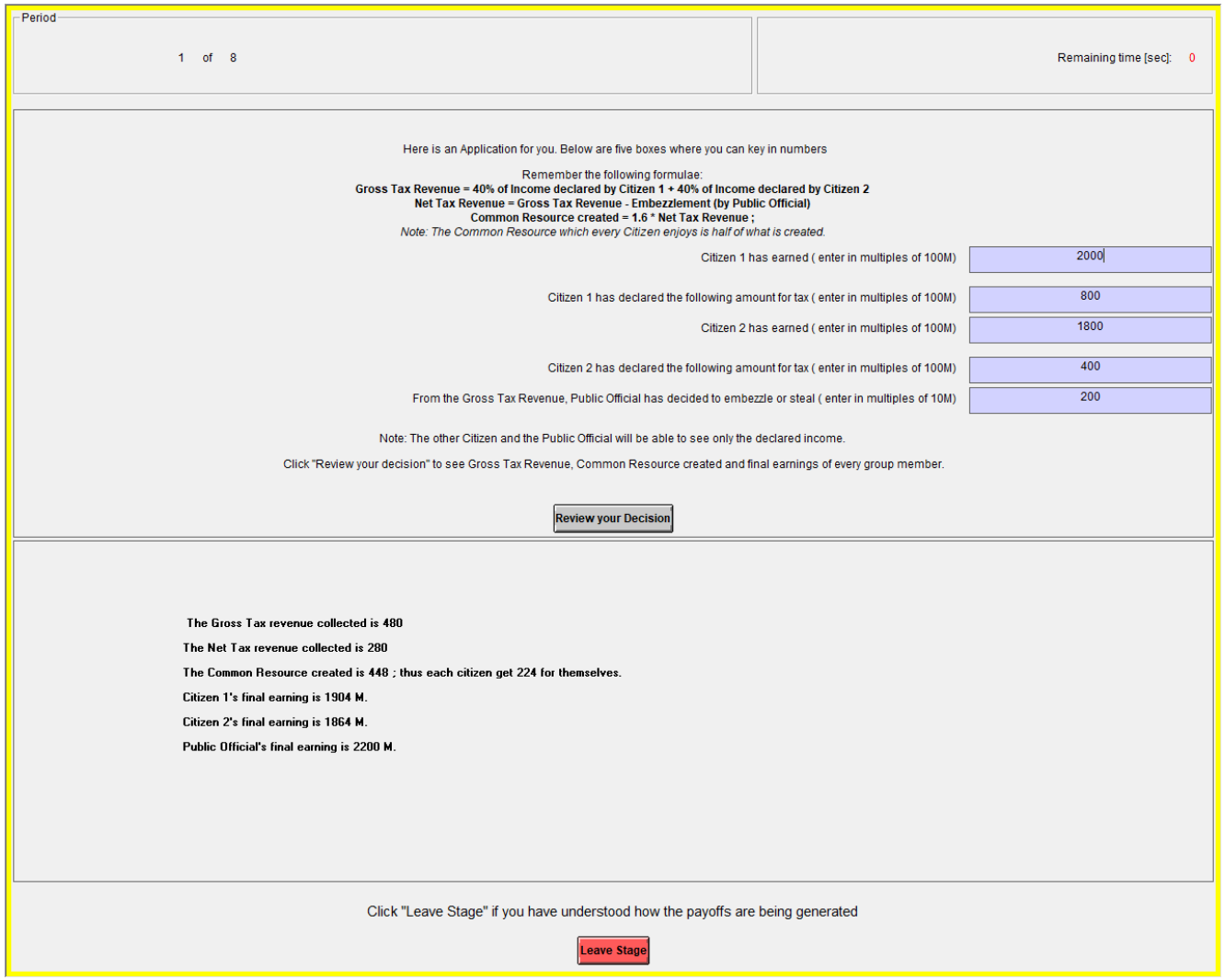
Experimental Procedure

- The experiment was coded up in zTree.
- Conducted in a large private university in India.
- Total number of subjects: 484
- Exchange Rate: 1 Mohor = Rs. 0.10
- Participation Fee: Rs. 50. Average earnings: ~ Rs. 250 (PPP$ 18)
- Informed Consent obtained before the subjects began the experimental session.

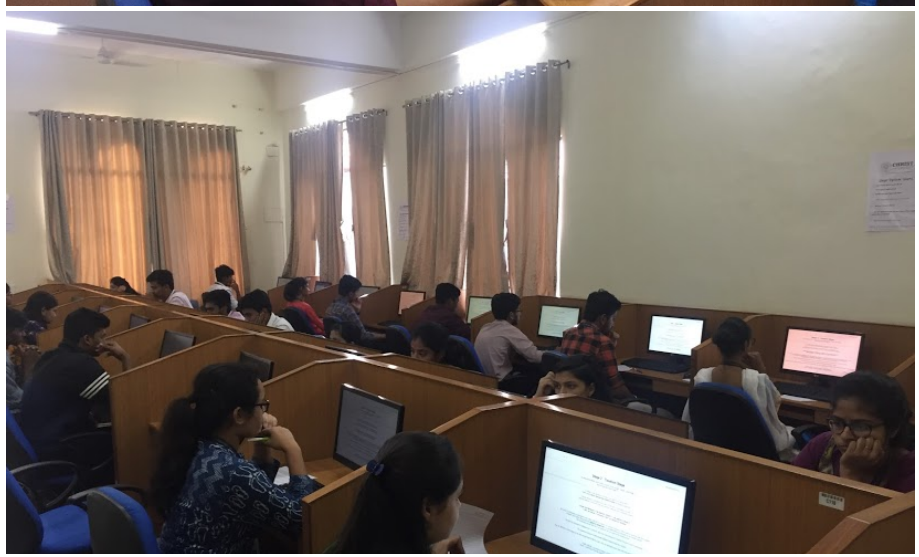
Screenshot: Task



Screenshot: Application



Photographs of sessions



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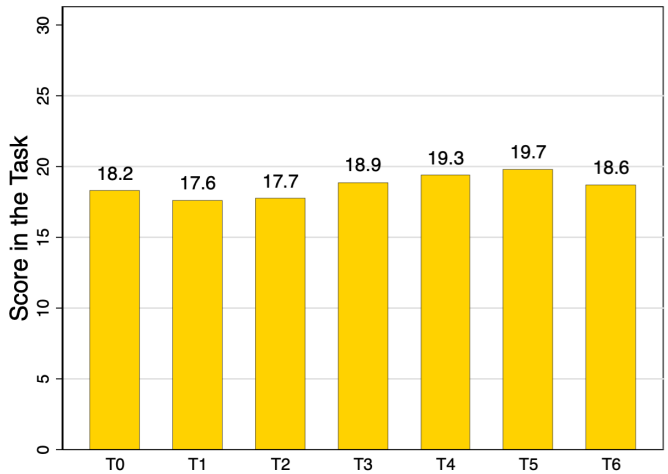
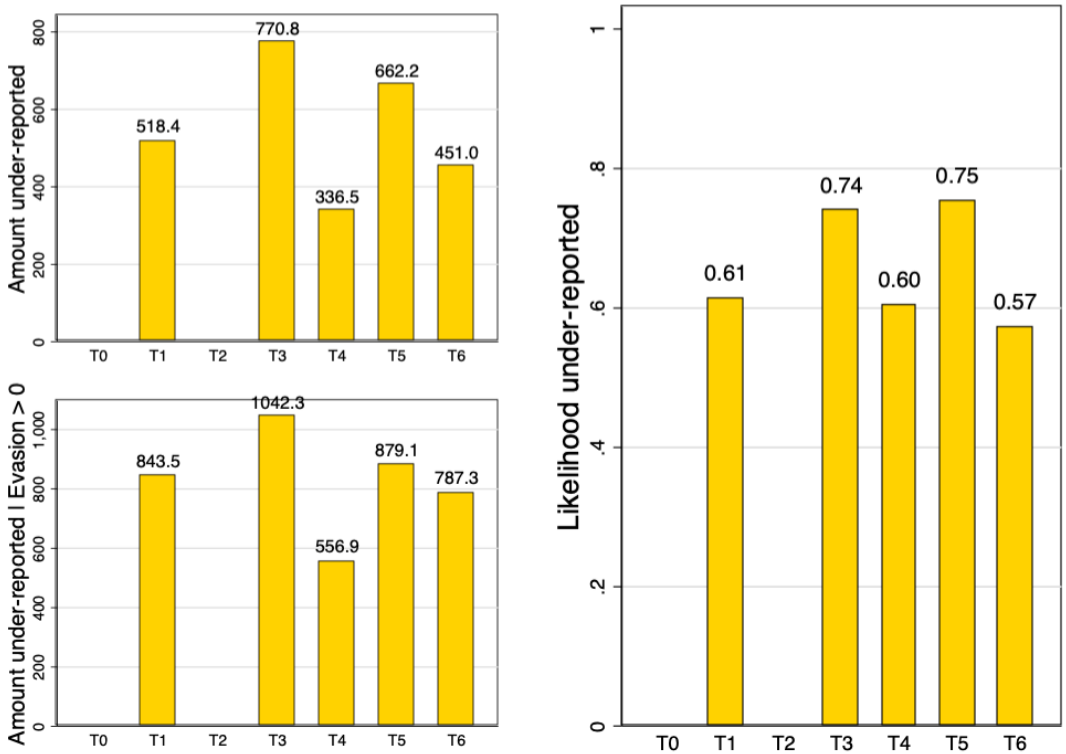
Tax Evasion or Embezzlement on Effort



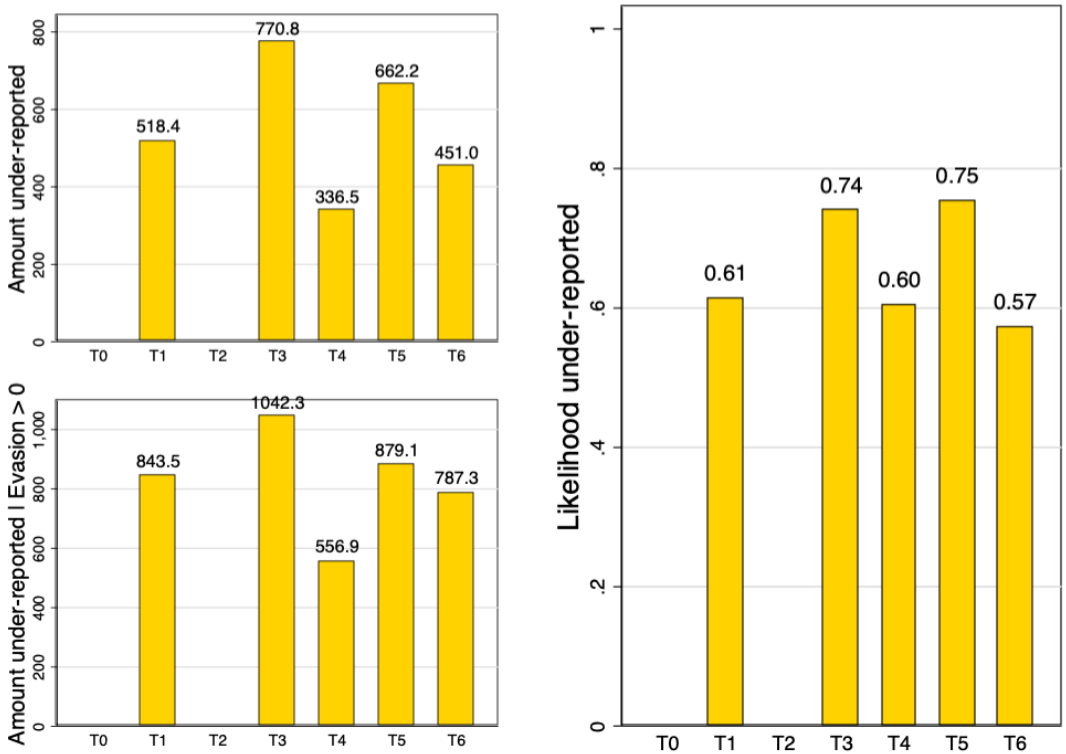
- Effort in T0 - Effort in T1 = 0.66 (clustered t-test, p-value=0.29)
- Effort in T0 - Effort in T2 = 0.55 (clustered t-test, p-value=0.43)
- **Result 1: Effect of tax evasion or embezzlement on effort provision is 0**

Effect of Embezzlement on Tax Evasion



- Amount underreported is 518.4 in T1 and 770.8 in T3 (clustered t-test, p-value=0.04).
- Conditional on underreporting, the amount underreported is 843.5 in T1 and 1042.3 in T3 (clustered t-test, p-value<0.01).
- **Result 2.1: Possibility of embezzlement increases tax evasion**

Effect of Embezzlement on Tax Evasion



- Likelihood of underreporting is 61% in T1 and 74% in T3 (clustered ranksum, p-value<0.01)
- **Result 2.2: Possibility of embezzlement increases the likelihood of tax evasion**

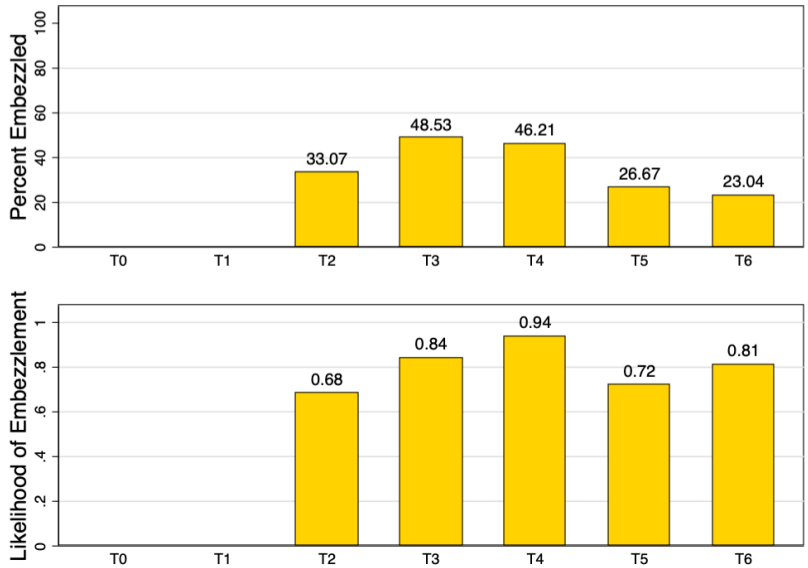
Effect of Embezzlement on Tax Evasion

Table 1: Regression results of underreported income and fraction of individuals underreporting income.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Underreported income			I(Underreported Income>0)		
treat1	-252.43**	-252.43**	-370.66***	-0.13*	-0.13*	-0.18*
	(117.49)	(117.69)	(142.15)	(0.07)	(0.07)	(0.09)
treat4	-434.38***	-434.38***	-503.62***	-0.14*	-0.14*	-0.15*
	(100.85)	(101.02)	(115.64)	(0.07)	(0.07)	(0.08)
treat5	-108.65	-108.65	-224.28	0.01	0.01	-0.01
	(126.05)	(126.26)	(150.60)	(0.07)	(0.07)	(0.08)
treat6	-319.79***	-319.79***	-422.59***	-0.17**	-0.17**	-0.16**
	(115.50)	(115.70)	(125.88)	(0.07)	(0.07)	(0.08)
Constant	770.83***	686.75***	1,968.62***	0.74***	0.75***	1.10***
	(90.48)	(90.18)	(530.74)	(0.05)	(0.06)	(0.33)
Period FE		Yes	Yes		Yes	Yes
Demographic Controls			Yes			Yes
Observations	1,464	1,464	1,098	1,464	1,464	1,098
R-squared	0.053	0.068	0.106	0.025	0.026	0.030

Robust standard errors in parentheses

Effect of Tax Evasion on Embezzlement



- Embezzlement in T2 is 33.07% while that in T3 is 48.53% (clustered t-test, p-value=0.08)
- Likelihood of embezzling in corruption is 68% in T2 and 84% in T3 (clustered ranksum test, p-value=0.06)
- **Result 3: Possibility of tax evasion increases embezzlement**

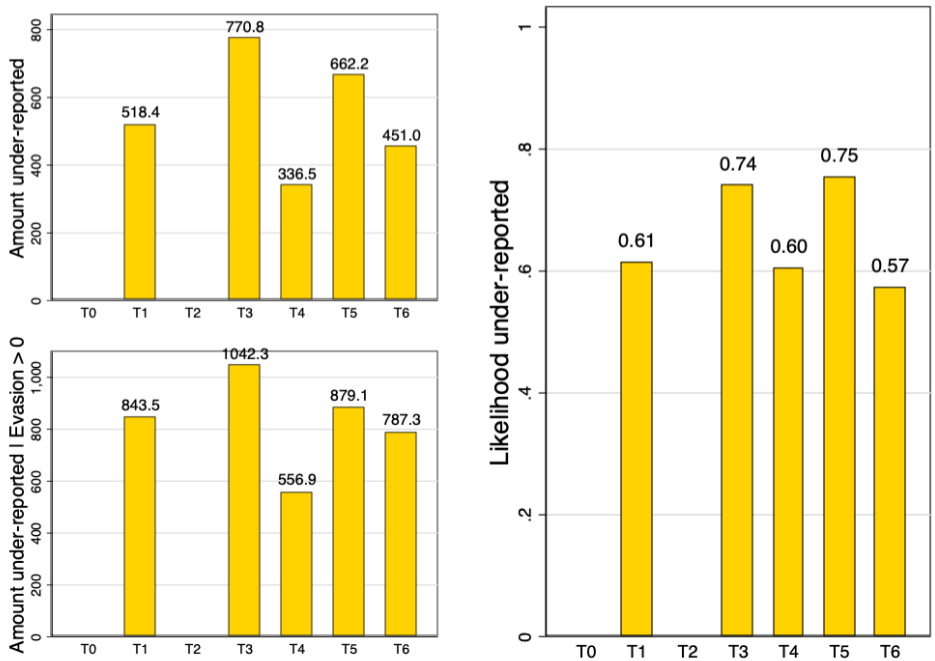
Effect of Tax Evasion on Embezzlement

Table 2: Regression results on embezzlement

	(1)	(2)	(3)	(4)	(5)	(6)
	Percentage of Tax Revenue					
VARIABLES	Embezzled			I(Embezzlement>0)		
treat2	-15.46*	-15.46*	-19.70**	-0.16*	-0.16*	-0.1
	(8.75)	(8.78)	(9.54)	(0.09)	(0.09)	(0.10)
treat4	-2.32	-2.32	-5.18	0.1	0.1	0.13
	(8.41)	(8.44)	(9.97)	(0.07)	(0.07)	(0.10)
treat5	-21.86***	-21.86***	-25.26***	-0.12	-0.12	-0.06
	(7.82)	(7.85)	(9.24)	(0.08)	(0.08)	(0.09)
treat6	-25.49***	-25.49***	-23.95***	-0.03	-0.03	0.04
	(7.40)	(7.42)	(8.38)	(0.07)	(0.07)	(0.08)
Constant	48.53***	45.85***	16.84	0.84***	0.88***	0.13
	(6.07)	(6.18)	(63.96)	(0.05)	(0.05)	(0.55)
Period FE		Yes	Yes		Yes	Yes
Demographic Controls			Yes			Yes
Observations	732	732	564	732	732	564
R-squared	0.088	0.104	0.121	0.051	0.06	0.065

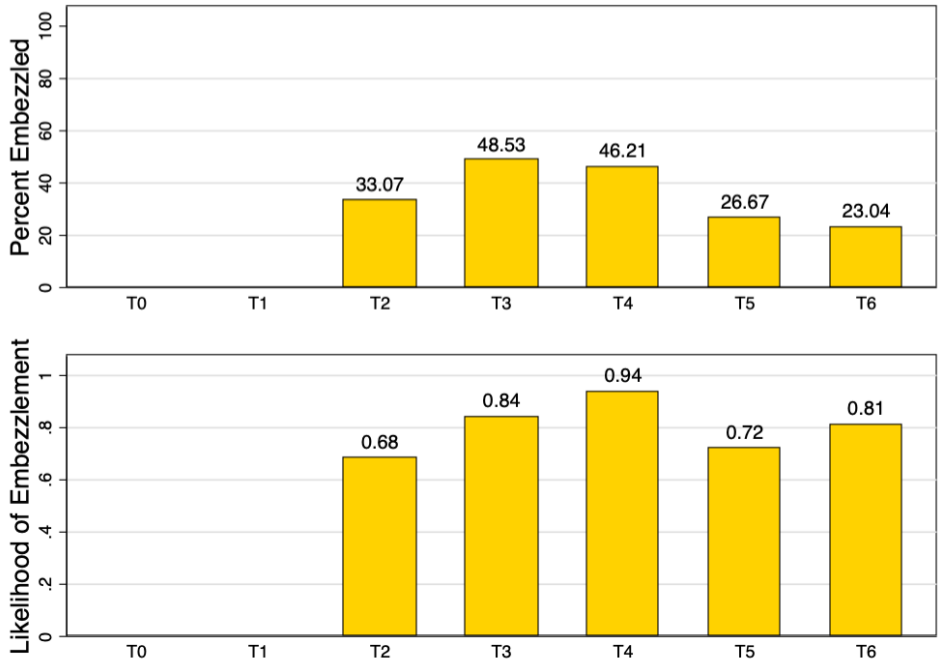
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Auditing Embezzlement on Tax Evasion



- Amount underreported in T4 is significantly lower than in T3 (clustered t-test, p-value<0.01)
- Amount underreported in T5 is 770 in T3 is 662 (clustered t-test, p-value$=0.39$)
- No difference in likelihood of tax evasion.
- **Result 4.1: Cross domain penalty on embezzlement does not have an affect tax evasion**

Auditing Embezzlement on Tax Evasion



- Percentage embezzled in T5 is significantly lower than that in T3 (clustered t-test, p-value<0.01)
- Percentage embezzled is 46.21% in T4 and 48.53% in T3 (clustered t-test, p-value$=0.79$)
- **Result 4.2: Cross domain penalty on tax evasion does not have an affect embezzlement**

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Key Takeaways

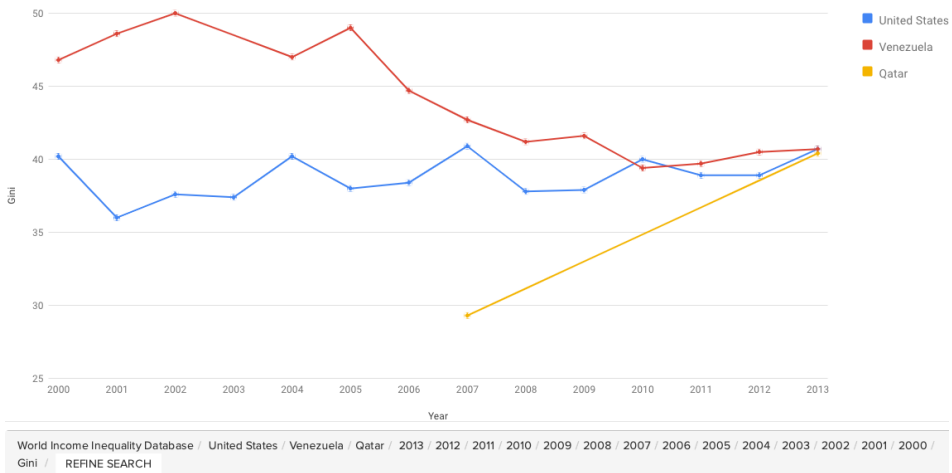
- Established a causal link between tax evasion and corruption
  - possibility of corruption increases amount underreported by the Citizen for tax purposes
  - possibility of tax evasion increases amount embezzled by Public Officials
- No evidence of spillover of penalty from one domain to the other
- Implications: Citizens' tax evasion decision is driven not just by the amount of money that they may not get back due to embezzlement
  - penalty on embezzlement would have led to decrease in tax evasion
- Behavioral Economics at work : suggestive evidence of "moral license" of wrong doing from one domain to another.

Key Takeaways

- Design of a treatment which can potentially identify this "behavioral" result - T7
  - Suppose an "administrative cost" on the gross tax revenue is imposed
  - The "administrative cost" would be generated from the empirical distribution of the amount embezzled by the Public Official.
  - In strategic terms T7 and T3 are identical for the Citizens
    - T7 - "administrative cost" which is not being chosen by the PO and PO does not privately benefit from it.
    - T3 - "embezzlement" which is being chosen by the PO and PO is privately benefitting from it.
  - Comparison of Tax Evasion in T3 and T7 : tax evasion is strategic or behavioral!
- Important implications
  - Cost of corruption is underestimated
  - Generalized culture of unethical behavior in society has to be improved: piece meal attempts may not work

Behavioral Development Economics

- Behavioral Development Economics: Applications of psychology in the context of development
- Kremer, Rao and Schilbach (2019): Handbook of Behavioral Economics



  - Changes matter more than levels
- Effect of inequality on different aspects of society can be better understood through the lenses of behavioral economics.

Thank You !

For more on my research please visit **www.ritwikbanerjee.in**

Acknowledgement

Priyoma Mustafi

KC Adaina