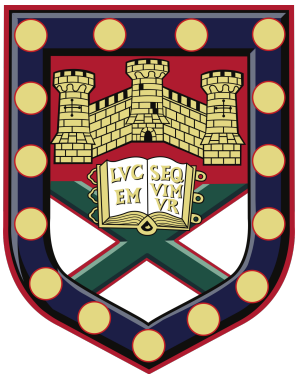
Essays on Public Policy and Corruption: Experimental Evidence



Lutfi Rahman Rahimi

Department of Economics
University of Exeter

This dissertation is submitted for the degree of
Doctor of Philosophy in Economics

December 2020

I would like to dedicate this thesis to my loving parents, without their sacrifices I wouldn't be where I am now ...

Declaration

Thesis Title: Essays on Public Policy and Corruption: Experimental Evidence.

Submitted by Lutfi Rahman Rahimi to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Economics, July 2020.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other university.

Part 2 of the thesis includes chapters on Citizen's and Public Official's bribery. The data for these chapters are collected in collaboration with Hannes Titeca from the Economics Department, University of Exeter. We have followed the University of Exeter's guidelines, Chapter 11 of Quality Assurance Manual (Presentation of Thesis for Degrees in the Faculty of Graduate Research, Section 2.1, C) and Code of Good Practice in the Conduct of Research.

This dissertation contains fewer than 60,000 words including appendices, bibliography, footnotes, tables and equations and has fewer than 50 figures.

(signature).....

Lutfi Rahman Rahimi
December 2020

Acknowledgements

I thank my supervisors, Dr Miguel Fonseca and Dr Simone Meraglia, for their never ending support and encouragement over the course of my whole PhD. Without their support, I could not have completed this project and I owe them a substantial debt of gratitude.

I would like to acknowledge my family for always standing by me, under very difficult circumstances. The project is completed because of their sacrifices and love. I could not have persevered throughout this project without the values they have instilled in me. I am also grateful to the affections and hospitality of the Quadros Flores family in the final months of the project who hosted me in Porto, during the Covid-19 pandemic lock-down.

I thank the entire Economics Department at the University of Exeter for introducing me to the world of academia. My appreciation also goes to the PGR support staff at Exeter University's Business School for providing me with the assistance and funding necessary to undertake my research.

A very special thanks goes to the following faculties: Dr Brit Grosskopf, Dr Jack Rogers, Dr Sebastian Kripfganz, Dr Surajeet Chakravarty, Dr David Reinstien, Dr Todd Kaplan, Dr Carlos Cortinhas, Dr Julian Neira and Dr Cecilia Chen.

Finally, I would like to thank my friends from Hope Hall: Hannes Titeca, Lia Quadros Flores, Dr Lorenz Adams, Dr Haytem Troug, Dr Cliff Li, Dr Bing Chao, Dr Melinda Szoc, Ali Akaak, Dr Wan Mohd Adzim, Dr Juliana Langgat, Alexandra Smith, Ashley McCrea, Cevdet Acu, Mohamed Adel, Nicholas Lacourse, Elif Soytoprak, Ernil Sabaj, Josep Pinyol and last but not the least, Loula Renaudeau.

Abstract

Part one

Experiments in Part I of this thesis study the effects of taxed and untaxed income windfalls on effort supply and tax evasion decisions. Traditional economic view within the utility maximisation framework suggests that labour supply decreases if the share of unearned income (i.e. windfalls) goes up. This has been questioned in the emerging literature from field experiments on cash transfers. It is suggested that effort or labour supply responses to cash windfalls are contextual and more nuanced. Reallocation of effort supply, the size and nature (lottery, permanent or transitory) of the windfall are among the factors that is important in determining this response. On the other hand, little or no theoretical discussion exists on tax evasion responses to income windfalls as financial incentives.

I find that effort supply reduces significantly in response to cash windfalls in a lab-in-the-field experiment from Afghanistan. The response is elastic and effort provision decreases as the share of windfall increases. Subjects are endowed with cash windfalls and must choose either to provide effort by solving puzzles to earn additional income or opt out. They could choose to opt out at any point during the effort provision without losing any of their earnings. In addition, I find that effort provision is less responsive when the first dollar of subject's earnings is not taxed. There exists a specific type of tax aversion such that subjects lower their effort provision if their windfall is taxed. In both experiments, effort supply is lowered via an income effect but there are additional tax-induced effects from taxing subject's windfalls after the transfer has taken place. The finding on tax-induced effects are novel contribution in this study.

Similarly, in the second part of the experiments subjects had to declare their labour income and windfalls for tax purposes depending on the experiment. Tax evasion

increases but the respond is not drastic to either types of windfalls. However consistent with previous experiments on tax evasion, two types of behaviour emerge: compliers and evaders, and the share of those complying is higher than that of evaders.

More interestingly, I find that the most productive individuals evade the highest in both experiments. This is a robust finding such that breaking down the data into terciles: the average productive individuals evade less, and the least productive individuals evade the least. This is a novel contribution in the study of tax evasion. It is possible that the most able individuals consider taxes more disruptive and attach higher subjective value to their hard-earned income. This finding captures the evasion levels observed for wealthy individuals or legal entities who are consistently looking for loopholes to evade or avoid paying taxes.

Part two

The purpose of the experiments in Part II of this thesis was to explore the effects of introducing a fast track option that is legal on the level of administrative corruption or bribery rates. The literature suggests that there are both moral and legal concerns. However, in societies where corruption is normalized, the low likelihood of punishment makes legal concerns negligible. In such 'corruption trap', moral concerns are the determining factor. Timely bureaucracy in public services, common in low-income countries, may give way to corruption but it can be minimized if preferential treatment is offered institutionally.

In experiments in Part II of this thesis I study supply and demand for bribes separately. I observe that subjects as citizens are willing to pay extra to avoid bribery when presented with a legal channel to access services. Subjects go through a real effort task and must wait to get paid unless they choose either the cheaper bribe or the more expensive legal channel. Additionally, the bribe may imply a negative externality on one other subject as it increases the latter's waiting period. When that is the case, subjects as citizens are less willing to choose the bribe option and prefer the more expensive legal channel. In sum, people are willing to bribe but less so when a legal channel is available or when it harms other people.

On the public official's, I observe that introducing a more expensive legal channel does not prevent them accepting bribes. The public official's strategic concerns remain at large and the motive to maximise private gains overruns moral concerns in the

experiment. This finding echoes some of the findings from field experiments on this issue. Therefore, additional measures are needed to constrain public official's who prioritise their private gains. These measures may include centrally supervised fast track options where the cost of monitoring is lower or reduced human interaction by adopting electronic procedures.

I use a novel structure for the experimental design in which individuals (citizens or public officials) are fully accountable over whether bribery is enforced or not. In previous designs, it would be up to the official to enforce the bribe and ultimately carry the weight of imposing the negative externality on other citizens. Outcomes could be interfered by confounds such as fear of punishment for breaking the law, conditional cooperation i.e. the need to reciprocate when offered a bribe, and the competing bias i.e. getting competitive upon the opportunity to interact with other players. Thus, with the non-dynamic framework, subjects are not assigned roles and are left to decide solely based on their preferences, with no further strategic concerns.

The pool of subjects is composed of low GDP per capita countries where bribery is understood to be widespread. This is further supported by empirical evidence from corruption perception measures such as CPI, WGI, BPI and ICRG. In accordance, in my experiments subjects coming from countries associated with higher levels of CPI are also found to be the most corrupt. Believing that others will accept bribes makes one more propense to similarly engage in corruption. Consequently, (effective) communication relative to observed and perceived corruption rates, when low, could further dampen corruption – however, the opposite could also be true. Governments should take this into account when choosing the information to be shared in anti-corruption campaigns.

Table of contents

List of tables

List of figures

Part I

Windfalls, Effort Supply and Tax Evasion

Chapter 1

Introduction

How does income windfalls from the government or any other source affect individual's supply of effort? If an effect exists, how does taxing those transfers matter for effort responses? This subject has long been debated in several disciplines and economics is no exception. Those who say it lowers supply of effort argue that the transfer produces a lazy worker and demotivate hardworking citizens (Robins, 1985; Hum & Simpson, 1991; Bibler et al., 2019; Cesarini et al., 2017; Bø et al., 2019). Those who think otherwise argue that provision of cash windfalls (or any other cash transfer) brings about a new work attitude, which ultimately leads to improved well-being (Imbens et al., 2001; Banerjee et al., 2017; Picchio et al., 2017; Baird et al., 2018; Gilbert et al., 2018).

Combined with the above, is the subject of tax evasion behaviour, i.e. what are the effects of income windfalls on reporting income for tax purposes? However, rarely have the two subjects been studied together. Taxpayers are the same people who provide effort/labour and make an earning. If their effort supply is responsive to cash windfalls, it also naturally follows to investigate whether taxing windfalls matter for evasion decisions. This is best exemplified by inheritance taxes or a tax on lottery winnings. Furthermore, agents have different productivity levels, are their evasion responses all the same or do they differ in some fundamental way? In part one of this thesis, I discuss and provide evidence from a lab-in-the-field experiments designed to answer these questions.

From a taxation perspective, cash windfalls or direct transfers to recipients are either taxable or untaxed by the tax authority. Examples include lottery winnings, inheritance, social welfare schemes (unemployment benefit, universal credit, etc...) and other conditional or unconditional government transfers. Nowadays, almost all the governments practice some form of cash transfer programme. There is a growing belief in economics that direct cash transfer (windfalls) is a better tool in the fight against poverty than most non-direct transfers, for more see Baird et al., (2018). In general, I define taxable windfalls such that taxpayers are required to report them for tax purposes also, thus they have the opportunity to evade paying, whereas untaxed windfalls are those with no evasion opportunities. I investigate the effects of these two types of income windfalls.

In economics, the effects of financial incentives (windfalls) on labour supply is traced via income and substitution effects. There is a consensus among labour economists that leisure is a normal good. In a standard labour supply model, substitution effect explains the change in the demand for leisure due to changes in the relative price for leisure i.e. holding labour earnings unchanged, increasing windfall levels will increase the relative price of leisure, which leads to lower consumption. On the other hand, income effect captures the change in the purchasing power or consumption of the agent. For instance, increasing windfall levels increases the agent's feasible set or purchasing power parity. This leads to higher consumption of leisure and less work. These are two opposing forces and the net effect of these two should be studied empirically.

Lab experiments within labour economics have studied many aspects of effort decisions. Earlier experiments have looked at a variety of work incentives. These include studying the effects of different wage schemes (such as piece rate pay vs fixed amounts), motivational crowding-out effects of monitoring regimes, distributional models of non-self-interested agents, reciprocity in incomplete contracts and relative performance (tournaments). For a full review of literature on this (see Camerer & Weber, 2013; Charness & Kuhn, 2011). Windfalls as an incentive for work has rarely been studied in the lab context. One of the obstacles is the scarcity of funds involved in carrying out lab experiments, to capture windfall effects. Windfall effects on labour supply responses are either short term or persist over long periods of time. Given the nature of lab experiments, my findings capture short term effort responses as I don't follow up with the participants beyond the lab setting.

On the other hand, the impact of windfalls on work incentives has been studied as part of large social/field experiments. While findings from these experiments have brought several new insights and directed policy debates, they are mixed and confounded. For a full review of field experiment on transfers see Baird et al., (2018) and Banerjee et al., (2017) with a focus on findings from developing and less developed countries. Social/field experiments studying work incentives are often multidimensional in design and attempt to study more than just labour supply of subjects. They usually take place in more developed countries. It is therefore difficult to disentangle a clean effect of windfall on supply of effort.

Several other issues accompany social/field experiments such as, randomisation not being ensured and due to complexity, there is a lack of ability to control factors that may also cause variations in labour supply responses. For example, it is not possible to control movement of individuals/households in and out of the areas where experiments take place. Moreover, the samples chosen for the experiments are not representative and are usually drawn from the poorest end of the income distribution, making inferences about the general population problematic.

Running experiments within labour economics is beneficial in that it allows a tight control and therefore manipulation power over the factors that may affect labour supply, which is normally measured using effort supply (Charness & Kuhn, 2011). Therefore, I will be using these two terms interchangeably. Large amount of data is available on labour market outcomes that is often circumstantial; that makes it difficult to study relationships or disentangle causal effects.

In this lab-in-the-field experiment, I overcome some of the challenges mentioned above. I run the experiment in a less developed economy where the experimental monetary stakes are high (greater than their estimated average daily income). This makes it possible to study windfalls in a lab setting. Besides flexibility, running lab-in-the-field experiments have several other advantages in mimicking features of the 'real-world' in a controlled environment. It allows better representative sampling instead of focusing on the poorest end of the distribution as in the social experiments which could convey a specific type of behaviour. Lab experiments allow complete randomisation (Kangas et al., 2019). In a controlled environment, the factors that may cause additional variations are kept constant, thus allows to cleanly test and disentangle the windfall-induced

effect on labour supply. In doing so, I abstract away from the confounding factors associated with social and field experiments.

Understanding factors that affect effort supply in the labour market is important. There is a direct link between individual effort supply (intensive margins) and productivity in an economy. Understanding the impact of windfalls on productivity is key interest to policymakers. There is an emerging literature that study the effects of cash transfers on labour market outcomes such as searching or finding a job, attend job training programme, number of hours worked (Banerjee et al., 2017; Alzúa et al., 2013). Understanding the effects of the cash transfers on labour supply leads to better decisions on how to design welfare programmes. It helps improve the system by making it more efficient, and target specific objectives. Such as increasing effort supply in cost-neutral manner. For example, if windfalls cause short term fluctuations in effort supply, increasing the base salary will lead to better and higher effort levels on average than bonuses.

Tax evasion is a hidden activity and therefore difficult to observe or/and study in the field. Lab experiments have pioneered in this area and many aspects of tax evasion have been explored, for a full review (Alm, 2019; Mascagni, 2018). However, the question of windfall effects on evasion and specifically on the evasion of different productive agents remains unanswered. Therefore, a lab-in-the-field experiment has several contributions to make in this regard: first, where individuals have equal access to evasion and equal chance of being detected, evasion can be directly observed and measured. Decisions are money-incentivised and therefore have real consequences for the individual's final payoffs, especially with the high stakes involved in this experiment.

Knowing the windfall-induced effects on tax evasion of labour income (hard-earned income), if any, brings new insights into our understanding of individual's tax evasion decision making process. Previous studies have shown that evasion induces a double-loss mechanism: it reduces government revenues and has a negative impact on honest taxpayers, for a review of the literature on this (Alm et al., 2016). The study has been carried out in a less developed country where rule of law is fundamentally different compared to a more developed country. In doing so, it brings new insights on whether tax evasion behaviour follows similar patterns to those of more developed countries or not. Although tax collection is quasi-voluntary, but an element of enforcement is always present.

In addition to this, understanding the behaviour of agents with different productivity levels with regards to tax evasion decisions is important. Productive agents may have different subjective valuation of their incomes compared to less productive agents. Understanding this brings new insights and allows devising effective policy measures more suited to different segments of the workforce.

I run two experiments to investigate the questions raised in this chapter. The methodology is based on lab-in-the-field experimental designs that are common in labour economics and tax compliance. In experiment one, I test the effects of a taxable windfall on effort supply of subjects and consequently on their tax evasion decisions. The second experiment tests the effects of an untaxed windfall. Within each experiment, there are three treatments: zero, low and high levels of windfall that subjects are exposed to, resulting in a within-subject design.

Each session consisted of 12 paying rounds and in each round participants were allocated randomly with an equal and exogenous probability, to one of the three windfall treatments. They undertook a real-effort task to earn more income. In experiment one, they had to declare their windfall and labour earnings from the real effort task separately for tax purposes, whereas in the second experiment, subjects had to report their labour income only.

Income windfalls reduced effort supply of subjects, and the reduction in effort increased with levels of cash endowment, in both experiments. When the windfall is taxable, this significantly demotivates effort provision compared to untaxed windfall. In other words, the effort provision decisions are less responsive when the first dollar of subject's income is not taxed. This indicates that effort provision is sensitive to whether windfalls are taxed or not.

With these results, I find that there is a pronounced aversion to taxing income once it has been given to the subjects irrespective of it being earned through effort or a windfall. In both experiments, effort supply is lowered due to an income effect such that upon receiving additional windfall, subject's feasible set or potential purchasing power expands (even if temporarily in the lab). As a result they provide less effort. The usual income and substitution mechanisms explains the labour supply reductions upon receiving windfalls. However, when the windfalls are taxed there is an additional

tax-induced effect that reinforces the previous effects. As mentioned earlier, these findings echo short term responses rather than long term.

Subject's tax evasion behaviour shows minimal responses to taxed windfalls and no changes to untaxed windfalls. Consistent with evasion behaviour in the context of more developed economies, two types of dominant behaviour emerge: a lot of evaders and a lot of compliers (Choo et al., 2016). Moreover, there are less evaders than compliant taxpayers in both experiments. However, subjects in the taxable windfall experiment are more dispersed.

The most able individuals i.e. the most productive members evade the most. This pattern is consistent as we move down the ladder of productivity from most to least productive, for all taxpayers. There is no distinction whether the windfall was taxed or not, the behaviour above remained consistent. A possible explanation could be that those who consider themselves most able consider paying taxes more disruptive, as they prefer to keep most of their income for themselves hence risking getting caught. This result captures the evasion levels observed for the wealthier individuals or legal entities who are constantly seeking loopholes to pay less taxes.

Chapter 2

Literature Review

2.1 Labour/Effort supply

Labour or effort supply has been studied from several angles. The findings in part one of the thesis contributes to the emerging experimental literature on the effects of windfalls on labour/effort supply.

The relationship between uncompensated wages (windfalls) and effort has been found to result in a backward-bending labour supply curve in the study of animal behaviour, one of the first experiments in this field (Battalio & Kagel, 1985). On incomplete contracts, experiments were used to test efficiency wage theory (Akerlof, 1982; Akerlof & Yellen, 1988, 1990). In the gift-exchange game literature the role of reciprocity was explored between wages and effort (Fehr et al., 1993). These experiments have been replicated several times since then, and most have found that a positive reciprocity exists between wage offers and labour supply (Charness & Kuhn, 2011).

Through these studies several factors has been found to be important for supply of effort. Increasing piece rate pay increases effort supply (Swenson, 1988; Sillamaa, 1999; Dickinson, 1999). It was found that low piece rate pay reduces supply of effort, however it was also found that not paying at all induced higher levels of effort than low wages (Gneezy & Rustichini, 2000). This is somewhat counter-intuitive and interesting contribution in this area. It clearly signals that wages are not the only reason why effort supply may change.

Earnings were found to be reference dependent, such that each worker has a subjective reference point, depending on the context, this could be daily, monthly and so on. Once the earnings reach the reference point, a satiation is obtained for the earner and this affects further supply of effort. This is related to Tversky and Kahneman's (1979) reference-dependent preference theory. Evidence of this behaviour is abundant in experimental findings, for instance it was found that effort levels were affected by subject's expected earnings for the session in the lab (Abeler et al., 2011). This is a type of reference point that can be observed and engineered in the lab. The debate on reference points is also discussed in the non-experimental literature especially labour supply of taxi drivers (Camerer et al., 1997), as an application of mental accounting for money earned vs money unearned (Thaler, 1999).

While motivation to work is shown to be sensitive to changes in income taxes (Rick et al., 2018) but it depends on redistribution and government interventions. If the state's performance and expenditure seem justified for the agent, their effort supply is not reduced. This is important for this experiment, as I find that there are 'tax aversion' effects on motivations to work. Tax aversion is a non-financial incentive, primarily the notion comes from psychology where it is loosely defined as when individuals avoid paying taxes by travelling longer distances or waiting longer in the queues (McCaffery & Baron, 2006; Sussman & Olivola, 2011).

Several mechanisms have been identified on how tax aversion operates, first, it is argued that subjects decouple tax payments from public services that they receive in turn (Mettler, 2011). Second, the feeling of lack of control over how tax revenues are spent, leads to lower levels of effort (Lamberton, 2013). A third channel is when labour supply decreases in response to falling net-wage (after tax-wage) (Kessler & Norton, 2016). The third channel is the most relevant to the findings in this section, that will be discussed in more details as the results are explained.

The experiments in this part were carried out in Afghanistan, a less developed economy. Less developed countries may be different from more developed ones due to the composition of the economy. Substantial underemployment, tight labour markets, high agriculture and informal employment sector are the most prominent features. Thus, this study finds that provision of effort is re-adjusted substantially after receiving cash windfalls in the laboratory. However, whether this behaviour persists beyond the laboratory or not is beyond the scope of the study. Below, I review the most

relevant literature emerging out of developing economies on the effects of cash transfer programmes on labour supply of villagers. Cash transfers is a form of windfall gain to agents.

In a field experiment from Malawi, Ambler and Godlonton (2019) test short term labour supply responses to income given (windfalls) or conditioned income on effort. They found that windfall gains allowed individuals to temporarily re-allocate labour supply away from household work. Whether the effects of the experiment persisted over time, was not studied. This resembles the effort supply response in my experiments.

A meta-analysis of 16 basic income trials (12 nations both developed and less developed) found no evidence of significant reductions in average hours worked per week or labour participation rates in response to basic income/windfall handouts (Gilbert et al., 2018). One possible explanation for the no significant result is perhaps that they have aggregated results from several heterogeneous social/field experiments. The design and context of the 16 experiments differ from one another significantly and aggregating labour supply measures may produce spurious results.

Another study re-examined the results of seven means tested randomised control trials (RCT) in seven countries, also concluded that there were "no systematic" cash windfall effects on hours worked (Banerjee et al., 2017). Some of the studies are from counties like Brazil, Honduras, Mexico etc... which overlaps with the studies used in the meta-analysis by (Gilbert et al., 2018) mentioned above. On a closer inspection of the individual experiments aggregated for this re-examination shows slightly different picture. These findings vary by country and experiment. Even Banerjee et al. (2017) state that the number of hours worked declined in absolute numbers but find that the overall effect when accounting for the re-allocation of the labour supply shows that the quality of life has improved.

Studies on cash transfer programmes can be divided into two types: ones that discuss labour market outcomes and others that focus on non-labour market outcomes. Numerous studies have looked at the effect cash windfalls on non-labour market outcomes as well as labour market outcomes. For a survey of literature on this see Baird et al., (2018). With all this, results are mixed and further research is needed to highlight other aspects of effort supply.

Though less pertinent, the experiments in this study contribute to a broader literature on the effects of social protection policies in the form of negative income tax (NIT) or any credit transfer and wealth shocks in the form of lottery winnings or inheritance on effort provision. One of the windfalls was taxable and the other wasn't taxed in this part of this thesis, motivates short term responses to windfall gains through inheritance that is taxable and lottery winnings that aren't taxed. The social experiments often have boarder dimensions that also tries to study supply of labour. Direct country comparisons are difficult given the differences in methodology and contexts, but social experiments have resulted in mixed findings.

A survey of the data from four negative income tax (NIT) experiments in the US between 1968-1972 showed that male labour supply declined by two weeks and female labour supply declined by three weeks per employment year (Robins, 1985). However, using the same surveys, Burtless (1986) argued that it was under-reporting of labour supply earnings that contributed to labour supply decreases and not the windfall effects. In the development literature this is referred to as "price effect" (Baird et al., 2018). The concept refers to the fact that individuals may under-report income to make sure they remain eligible for the cash awarded through the scheme. All the four NIT experiments were conditional and three of them were means tested. Therefore, it is possible that the decrease in labour supply was overstated.

The labour supply reductions were found to be heterogeneous, nuanced and often depend on factors such as gender, non-wife income, young children, this was found in an Annual Guaranteed Income experiment in Canada and the US (Hum & Simpson, 1991). Recent study of the same experiment show that there is evidence of wage increases for those who received the transfers in the Canadian experiment (Calnitsky & Latner, 2017). The Finnish government's experiment to provide a 'universal basic income' which targeted the unemployed individuals for a period of two years. During this time, their employment status was monitored as well as other outcomes. The full result of the study has not been released yet but preliminary results show that individual's employment did not change significantly over the two year period (Kangas et al., 2019).

Another natural experiment that resembles the universality feature of the windfall in this study, is the cash transfer to all citizens in Alaska's Permanent Fund Dividend (PFD). Evidence shows that $1000 increase in per person disbursement of cash leads

to only 0.2% contraction in labour market on annual basis (Bibler et al., 2019). The authors argue that giving out cash to all citizens will lead to a "positive demand shock" in the short term and the higher demand for goods and services leads to higher employments. The increase in demand for labour is interpreted as the direct effect of cash windfall in the study of PFD. On the other hand, looking at hours worked alone shows a 0.9 hours reduction per week following the cash disbursements. The experimental findings in my study abstracts away from exploring positive demand effects or changes in other socio-economic aspects. It studies the clean effects of windfall provision on short term effort provision.

The findings from lottery winners are also mixed and there is no consensus, work effort of winners declined in the US (Imbens et al., 2001) and Netherlands (Picchio et al., 2017) but changed very little in Sweden (Cesarini et al., 2017). The caveat here is that studying responses to lottery winnings does not represent a typical response to unearned incomes. Inheriting large sum of money affects the recipient's work effort too. This is referred to as "the Carnegie Effect" which accurately captures the inter-generational wealth shocks (Doorley & Pestel, 2020; Cahuc et al., 2014). In Norway recipients lowered their work effort substantially (Bø et al., 2019), people retired early (Bloemen, 2011), dropped out of labour markets (Bloemen & Stancanelli, 2001; Holtz-Eakin et al., 1993). It is noteworthy that some studies did not find any wealth effects (Joulfaian & Wilhelm, 1994).

It is evident that results from social/field experiments and lottery winners vary by country and by experiment. There are several reasons behind the heterogeneity. I will suffice with the following: more than half of the studies did not have a control group and no randomisation was carried out in allocating subjects into the trials. This confounds results of these trials and further inferences. Invoking experimental methods to study short term windfall effects will not suffer from most of the field experiment challenges and produce less noisy data.

2.2 Tax evasion

In the last two decades, experimental evidence alongside findings from the field on tax evasion has explored new insights and shifted policy direction. However, in the discussion on determinants of tax compliance, little attention has been given to income windfalls effects (financial incentives).

Important factors that alter tax evasion of individuals can be generalised into two types, (1) deterrence measures such as fines, audits, probability of detecting under-reporting, monitoring/supervision. There is both laboratory (Alm, 2012) and field experimental (Slemrod et al., 2001; Kleven et al., 2011) evidence that these measures are relevant for tax evasion. Increasing audit probabilities lowers evasion levels and higher audit rates have stronger effect on self-employed workers (i.e. those with the opportunity to evade). These studies have also found that third-party reporting and monitoring plays an important role in evasion decisions.

(2) Another class of factors important for paying taxes is non-pecuniary measures. Evidence show that if an agent belongs to a circle of compliant taxpayers, they seem to be more compliant and vice versa (Frey & Torgler, 2007; Lefebvre et al., 2015). Intrinsic motivations defined as tax morale and religiosity are shown be positively correlated to tax compliance (Torgler & Schneider, 2009; Halla, 2012; Dwenger et al., 2016). Finally lack of information or false perceptions such as perceived probability of audits is also important for tax evasion decisions (Erard & Feinstein, 1994). This argument comes from the work of Tversky and Kahneman, where they show agents overestimate the probability of risky events (Tversky & Kahneman, 1974).

Early economic models of tax evasion primarily focused on the importance of fines and audits (Allingham & Sandmo, 1972; Srinivasan, 1973). In practice both amounts of fine and probability of being audited are very low in most countries[1]. The question to explain why tax evasion/compliance levels are so high in most developed economies moved beyond economic variables and looked into tax morale, subjective knowledge of economic variables (e.i. perceived audit probabilities) and notions of fairness (i.e. re-distributive and procedural). For a full survey of economic deterrents that are

[1]For example, audit probability was estimated at 1% in the US (Andreoni et al., 1998) and fines rarely exceed 40% of the evaded tax.

important for tax compliance (Mascagni, 2018; Alm, 2019). For a review of the factors beyond economic variables (Kirchler et al., 2008; Muehlbacher et al., 2008).

The impact of financial incentives (windfalls namely) on tax evasion is not known. If windfalls affect individual supply of effort, it may also affect their decision how much of those earnings to report for tax purposes. Therefore as a contribution to this field, the experiments in part one of the thesis investigates the effects of windfalls on labour income reporting decisions (tax evasion) of subjects.

In principle, studying sources of income vis-à-vis compliance relates to the discussion on sunk costs, property rights and house money (Arkes & Blumer, 1985; Thaler & Johnson, 1990; Loewenstein & Issacharoff, 1994; Davis et al., 2010). Individuals tend to associate higher value to the same object obtained with performance rather than luck. The argument is that investing effort in an object or activity (money in this case) leads to sunk costs and a sense of property right (Durham et al., 2014). Within the context of tax evasion, this implies that 'hard earned' income should be evaded more, and taxpayers should be reluctant to give it away (as taxes).

On the other hand, a competing hypothesis later emerged that argued sunk costs lead to risk-averse decisions in tax evasion contexts such that taxpayers don't want to lose more of their hard-earned income, thus the 'reverse sunk cost' term was coined by (Muehlbacher et al., 2008). The implication of the competing argument is that tax evasion/compliance of hard-earned income is higher compared to that of windfalls. Windfalls are different from earned income in at least one fundamental way; no or little effort is spent achieving them. It is this very feature that increases the proclivity to spend them more rapidly than other assets/cash (Arkes et al., 1994). The experiments in this part contributes to this discussion as, it looks at evasions for windfalls and labour earnings separately.

Chapter 3

Experimental Design

I run two experiments: taxed windfalls and untaxed windfalls. Subjects in the taxed windfall experiment were only allocated to a cash windfall that was taxable whereas subjects in the second experiment were allocated to an untaxed cash windfall. Each windfall had three treatments: zero, low and high. The exposure to three treatments were randomised. There were 215 individuals in each experiment giving a total sample of 430 participants. Each treatment was played 4 times leading to 860 observations per treatment. All subjects were exposed to all treatments in a within-subject design, which boosts the statistical power of the tests and estimates (Charness et al., 2012).

This paper is primarily interested in two questions: effort supply and tax evasion responses in the presence of taxed and untaxed windfalls. The design ensures independence of exposure and exogenous allocation of subject to each treatment to allow for the error term to be uncorrelated with the variables of interest (Wooldridge, 2010). Demand effects were minimised by reducing experimenter contact during the sessions, and by explicitly stating that the project was funded by a UK institution and answers provided had no bearing on other subjects nor on the experimenters.

3.1 Experimental procedures

The experimental currency was tokens and the exchange rate for 1 token was set to 25 Afghanis (AFN) (an equivalent of £0.30). Subjects in treatment zero received no

tokens, in low received 15 tokens and those in high treatment received 30 tokens as windfall. They could earn more labour income by completing a real-effort task where they were paid at piece rate. Payoffs in the experiment were solely determined by individual decisions and no interaction was allowed between subjects.

Each experiment had 12 sessions, the first experiment took place between August and November 2017 and the second experiment was carried out between November and December 2018. Sessions were held at different times during the day to minimise self-selection biases. Recruitment emails asked subjects to take part in a decision-making experiment. There was no mention of labour supply, tax evasion or compliance.

Following Fortin et al., (2007) and others, these parameters were kept constant: audit probability of 5% and a penalty amount equal to 25% of the evaded tax if under-reporting was discovered plus the unpaid tax liabilities. The tax rate in the experiment was 35% of the reported income. These values were set to mimic tax parameters in most common developing economies.

3.2 Afghanistan and subject recruitment

The subject pool used in both experiments were part-time students who also had daytime jobs from Rana University, a privately-owned institution in Kabul, Afghanistan. To highlight the importance of the findings of this study, it is essential to have an overview of Afghanistan's economic background. The population of the country is approximately 32.2 million people of which over 25% live in the capital, Kabul (NSIA, 2018; Nassif et al., 2018).[1] Afghanistan is in the bottom of the index for low income countries and estimates showed that its GDP per capita was £372.2 in 2019 (IMF, 2019).

According to Survey of the Afghan People in 2019 households were divided into three monthly income categories: low income category where 23.9% of respondents had an income less than £50 (5,000 AFN), average income category where 65.8% had an income of £50 – £203 (5,001–20,000 AFN) and high income households where only 9%

[1]It is important to note that there has never been a census in Afghanistan; all figures are estimates and the 32.2 million people are the most common figure used regularly by the World Bank and other international agencies in the country.

reported incomes greater than £203 (< 20,000 AFN) (Akseer et al., 2019). Average household size in Afghanistan is estimated to be 7 persons (NSIA, 2018), this gives an idea of the daily average incomes.

The minimum amount paid in the experiment was £2 for 70 minutes which resemble the high end of the average daily income. The first novelty of this study is that the monetary stakes were high and the incentivised decisions within the experiment has sizeable consequences. This adds to the validity of the results produced. The second novelty is that the subject pool used in the experiment are part-time students who also had jobs outside the university. This is an important distinction from previous experimental studies on tax evasion and/or labour supply. The common criticism to lab experiments is the extensive use of students who have not had a job or experienced paying taxes yet. The subject pool in this experiment negates both of those criticisms.

3.3 Overview of a single round

A single round in the experiments involved six stages[2]. The first three stages were repeated 12 times in each session, whereas stages four to six were only played once. The experiments were carried out using z-Tree (Fischbacher, 2007). Once participants arrived, they were randomly assigned to booths by drawing a number from an urn. After reading out the instructions to them, hard-copy of the instructions was given too.

Stage one: Cash windfalls, small sticker cards labelled as 'variable tokens' were given to each participant that could be easily peeled to see the amount of cash windfall received for that particular round in the session. The three manipulations were 0, 15 or 30 tokens. Subjects were asked to peel the card and record their windfall earnings in the space provided in z-Tree. They were told that they may or may not receive the 'variable tokens' in the following rounds. Participants could not lie in this stage.

Stage two: Real effort task or Opt out, subjects were asked to either take part in a real effort task to earn more income or opt out to move on to the next stage of the experiment. The real effort slider task used in this experiment was developed by (Gill & Prowse, 2012), in it, 48 sliders are positioned at different points on the

[2]A full description of all the instructions can be found in Appendix A for taxed windfall experiment 5.1, and untaxed windfall experiment 5.2.

screen; subjects must move each slider to the middle position. They were paid at piece rate of 1 token per correctly positioned slider. Participants had two minutes to do this task in each round. For those who opted out, the real effort task was skipped, and they moved to stage three directly. This could be done at any point during the real effort task without affecting the earnings from the task. This was done to capture those who were not willing to provide effort (L=0). Real effort tasks have been widely used as proxy for labour supply in the experimental literature (Doerrenberg & Duncan, 2014). As pointed out in (Charness & Kuhn, 2011), hours worked and labour supply are isomorphic and share many characteristics, therefore the puzzles are a good proxy. Most importantly, the task is meaningless for the experimenter, so this controls for any experimenter demand-effects that may skew the results.

Stage three: Income reporting, subjects were informed of their total earnings and were asked to report their earnings for tax purposes. In the taxable windfall experiment, they were asked to report their real effort and windfall earnings separately. They could report earnings between zero to their gross income. Whereas in the untaxed windfall experiment, subjects were asked to report earnings from the real effort task only. At the end of each round, participants saw their total earnings and total tax deductions individually. This is important because not knowing about the wages of other participants (relative pay), the subsequent levels of effort remains unaffected (Greiner et al., 2011; Clark et al., 2010).

Stage four: Risk aversion, I use the risky asset investment task developed by (Gneezy & Potters, 1997). Each participant was given 4 tokens and could invest part or all of it in an account. In this specific stage, each token was worth 25 Afghanis ($0.37). With a probability 0.5, the invested amount is successful and gives a return of 2.5 times the invested amount or with a probability of 0.5 pays back nothing. The uninvested portion and the outcome of this lottery is then added to the final payoff of the participants. This gives a risk aversion index scaled 1 to 4 with 4 being risk neutral/loving and 1 being most risk averse.

Stage five: Personality measures, a questionnaire about individual characteristics and personal traits was carried out including eliciting participant's tax morale and attitude toward the government. I use a modified version of big five model that encompasses one question per personality developed by (Woods & Hampson, 2005).

The characteristics include emotional stability, agreeableness, extraversion, openness, and conscientiousness.

Stage six: Payments, subjects were told that at the end of each session the final earnings will be calculated using the average of three randomly chosen rounds. This was done to avoid choosing a bad round for payment, creating wealth effects, satiation, or irrational decisions see (Blumkin et al., 2012; Doerrenberg & Duncan, 2014). An assistant experimenter was designated as the cashier at the exit door of the lab, where participants were taking their payment sheets for payments. They were paid in private and walked away.

3.4 Models and experimental hypothesis

To motivate the hypothesis, I use predictions of the following two theoretical models: static labour supply model (Sapsford & Tzannatos, 1993; Aaberge & Colombino, 2014) and Allingham-Sandmo model of tax evasion (Allingham & Sandmo, 1972).

1. ***Static labour supply model***, a risk averse agent makes a labour supply decision proxied by total number of hours worked h, taking the wage rate w, total number of hours T, and non-labour income G as given. The agent must choose between hours worked and leisure. Formally the agent solves the following problem:

$$\max_{h} E\left(U\right) = U\left(wh + G, T - h\right) \tag{3.1}$$

where $Y = wh + G$ and $T = h + l$. I assume that $U(wh + G, T - h)$ is increasing in leisure (l) and income (Y) (i.e. decreasing in h). The model assumes that leisure and consumption are normal goods.

The first order condition is:

$$\frac{dU}{dh} = wU_Y^{'}(wh + G, T - h) - U_l^{'}(wh + G, T - h) = 0 \tag{3.2}$$

$$w = \frac{U_l^{'}}{U_Y^{'}} = \frac{MU(leisure)}{MU(income)} \tag{3.3}$$

The conditions for the existence of an interior solution is provided in the Appendix 5.7 for brevity of exposition. Performing standard comparative statics then gives the following results.

$$\frac{dh}{dG} = -\frac{wU_Y^{'} - U_l^{'}}{w(wU_Y^{'} - U_Y^{''}) - (wU_l^{'} - U_l^{''})} \lessgtr 0 \tag{3.4}$$

Equation 3.4 outlines the standard income effect on hours worked/labour supply (measured in effort supplied in my experiment) in the following manner: if leisure is normal good then the term $U_l^{'} > 0$ which means the equation 3.4 is strictly negative $\frac{dh}{dG} < 0$. This is informs my first two hypothesis:

Hypothesis 1 *Effort decreases with provision of windfalls, irrespective of whether the windfall is taxed or untaxed.*

In accordance with model predictions above, optimal level of effort supply adjusts by the following mechanism. When individuals receive an additional cash windfall, it increases their net income, via an income effect, the person will demand less effort and more leisure. At the same time, receiving a cash windfall leads to a change in the relative price of effort-leisure consumption (via substitution effect) such that demanding the same level of effort as before will lead to further increases in earnings, meaning that individuals should not lower their effort supply.

The income and substitution effects are exerting opposing effects on effort supply, with the additional windfall-induced effect, the first hypothesis states that effort supply will decrease in the presence of both taxable and non-taxable windfalls. The same argument could be put differently, effort supply critically depends on different types of technologies, and how elastic these types of technologies are in the presence of a windfall. I anticipate effort supply to be highest in the treatment with no windfall, and effort supply to decrease as windfall amounts increase in both experiments.

As a corollary from hypothesis 1, it follows that:

Hypothesis 2 *Effort supply is higher for subjects in the untaxed windfall treatment compared to taxed windfall.*

In addition, there is psychological and experimental evidence on tax aversion (McCaffery & Baron, 2006; Sussman & Olivola, 2011), arguing that subjects suffer heuristics and fail to make extensive use of information available to them. They wait longer queues or travel longer distances to avoid paying taxes. Several channels have been identified through which tax aversion operates; subjects decouple tax payments from public services received (Mettler, 2011), feeling lack of control over fiscal spending (Lamberton, 2013) and falling net-wages that lead to reduction in effort supply (Kessler & Norton, 2016). In my experiment the falling net-wages in the after-tax state operate via taxing windfall income.

2. ***Allingham-Sandmo tax evasion model***, an agent must decide how much income to declare to the tax authority when tax rate (τ), fine rate (f), and detection probability (p) are given. Formally the agent solves the following problem:

$$\max_x E[U] = (1-p)U(Y) + pU(Z) \tag{3.5}$$

where income in the two states are: $Y = w - \tau x$ and $Z = w - \tau x - f(w - x)$. The share of income declared for tax purpose is x whereas w is the wage rate.

The first order condition is:

$$\frac{dU}{dx} = -\tau(1-p)U_Y^{'} - (\tau - f)pU_p^{'} = 0 \tag{3.6}$$

It is straightforward to show that an interior solution to this problem exists. These are provided in the Appendix 5.8 for brevity of exposition. Differentiating3.6 with respect to w and solving for dx/dw, I obtain:

$$\frac{dx}{dw} = -\frac{1}{D}\tau(1-p)U_Y^{'}\left[-R_A(Y) + (1-f)R_A(Z)\right] < 0 \tag{3.7}$$

Such that $D = \tau^2(1-p)U^{''}(Y) + (\tau - f)^2 pU^{''}(Z)$. In equation 3.7 with decreasing absolute risk aversion, the sign of the bracketed term depends on the value of f; such that if $f > 1$ then $\frac{dx}{dw} > 0$.

Using Arrow-Pratt measures of absolute risk aversion $R_A(Y) = -\frac{Y_Y''}{U_Y'}$ and relative risk aversion $R_R(Y) = -\frac{U_Y'' Y}{U_Y'}$, allows to rewrite the comparative statics in terms of risk aversion. Assuming that w is the earnings from real-effort, then $w^* \geq w + G$ and accounts for the windfall income. A closer inspection shows that the fraction of declared labour earnings vary as wages change, formally:

$$\frac{(dw/dx)}{dw^*} = -\frac{1}{w^2}\frac{1}{D}\tau(1-p)U_Y'[-R_R(Y) + R_R(Z)] \tag{3.8}$$

If the net effect of the windfall income increases total wealth, with decreasing relative risk aversion, equation3.8 shows that the fraction of actual income reported also decreases. This gives my third hypothesis:

Hypothesis 3 *Tax compliance falls with provision of windfall income.*

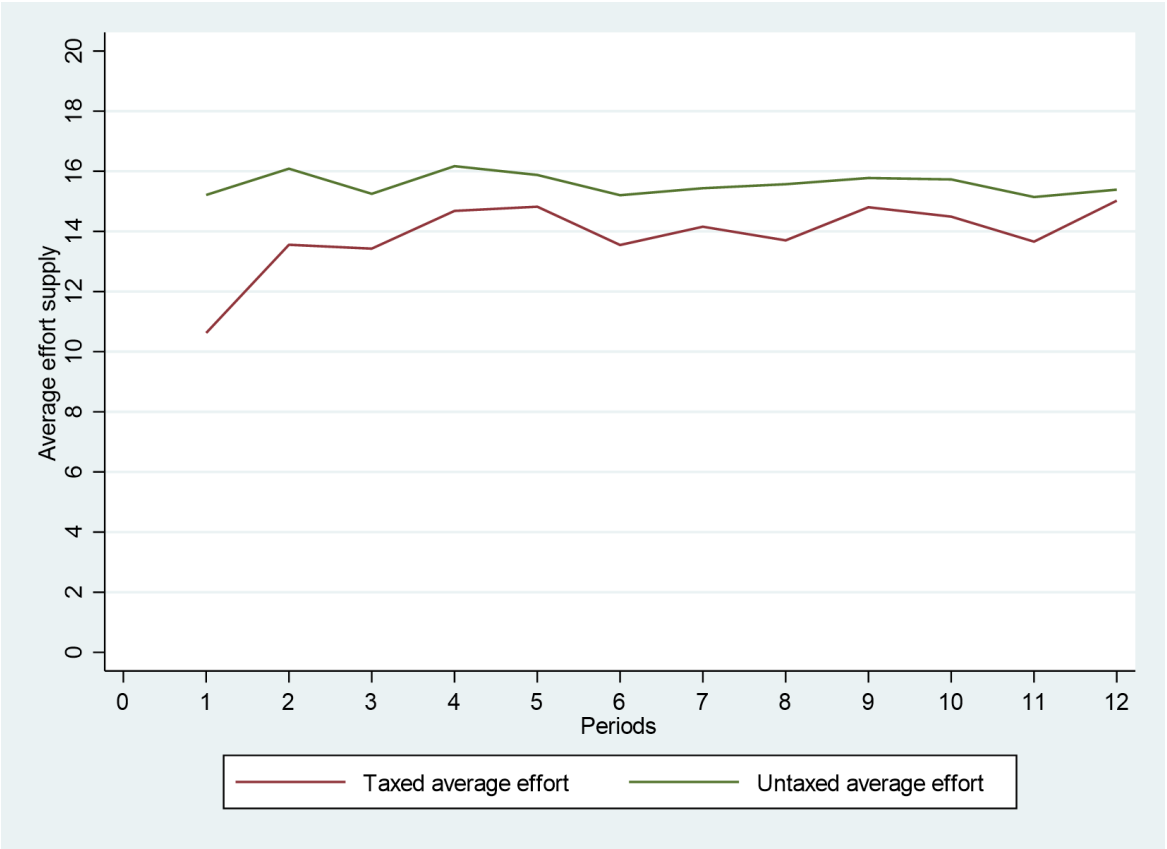
Chapter 4

Effort Supply and Tax Evasion Decisions

4.1 Effort supply and windfalls

Effort supply is directly observed and measured by the number of correctly slider puzzles solved in the real effort task. Figure 4.1 shows effort aggregated for all subjects over 12 periods. There is little or minimum learning effects throughout the real-effort task except in round one of the taxed windfall experiment. Absence of learning effects shows that the slider puzzles are good measures/proxies for studying effort supply and with repetition subjects did not develop better skills in performing them in this experiment, as was originally claimed by the developers (Gill & Prowse, 2012).

Fig. 4.1 Learning effects



4.1.1 Summary statistics

Table 4.1 presents summary statistics on characteristics of the participants such as age, gender, risk aversion, big five personality traits and their answers to the survey questions about their attitude toward the government and paying taxes. For example, the question about tax morale was similar the questions used in the World Values Survey (Minkov, 2012). The average age of the participants were 22.23 in the taxed windfall and 25 years old in the untaxed windfall experiment. While 61% were male subjects in the former, only 54% were male in the latter experiment. I carry out a two sample independent means test to compare the differences between these characteristics, the p-values are reported in the last column. This allows me to see if the two samples are homogeneous for the results to be compared with one another. For now, I postpone this discussion for the section on analysis of taxed vs untaxed effort supply.

Table 4.1 Summary statistics

Variables	Untaxed windfall	Taxed windfall	P-value
Age	25.00	22.23	0.0000
	(3.105)	(2.243)	
Male	0.54	0.61	0.0000
	(0.500)	(0.489)	
Risk aversion	2.46	3.00	0.0000
	(0.890)	(1.030)	
Audited	0.06	0.03	0.2905
	(0.239)	(0.165)	
Caught	0.00	0.01	0.0280
	(0)	(0.0962)	
Extraversion	4.68	4.46	0.0034
	(2.784)	(2.706)	
Agreeableness	6.78	6.13	0.0000
	(2.402)	(2.633)	
Emotional stability	5.00	4.43	0.0000
	(2.869)	(2.849)	
Conscientiousness	4.12	3.78	0.0000
	(2.727)	(2.662)	
Openness	5.80	5.33	0.0000
	(2.668)	(2.696)	
Attitude toward the government	5.43	5.32	0.2222
	(3.164)	(3.144)	
Lack of trust in the government	4.20	4.22	0.7711
	(2.934)	(2.820)	
Knows evasion	6.18	5.80	0.0000
	(3.168)	(3.012)	
Tax morale	6.83	7.20	0.0000
	(2.715)	(2.605)	
Average Earnings	£10.3	£5.8	
	(2.3)	(2)	
Number of subjects	215	215	

Note: Mean coefficients; Standard errors clustered at the participant level. ***, **, *: $p < 0.01, p < 0.05, p < 0.10$, respectively.

4.1.2 Average treatment effects

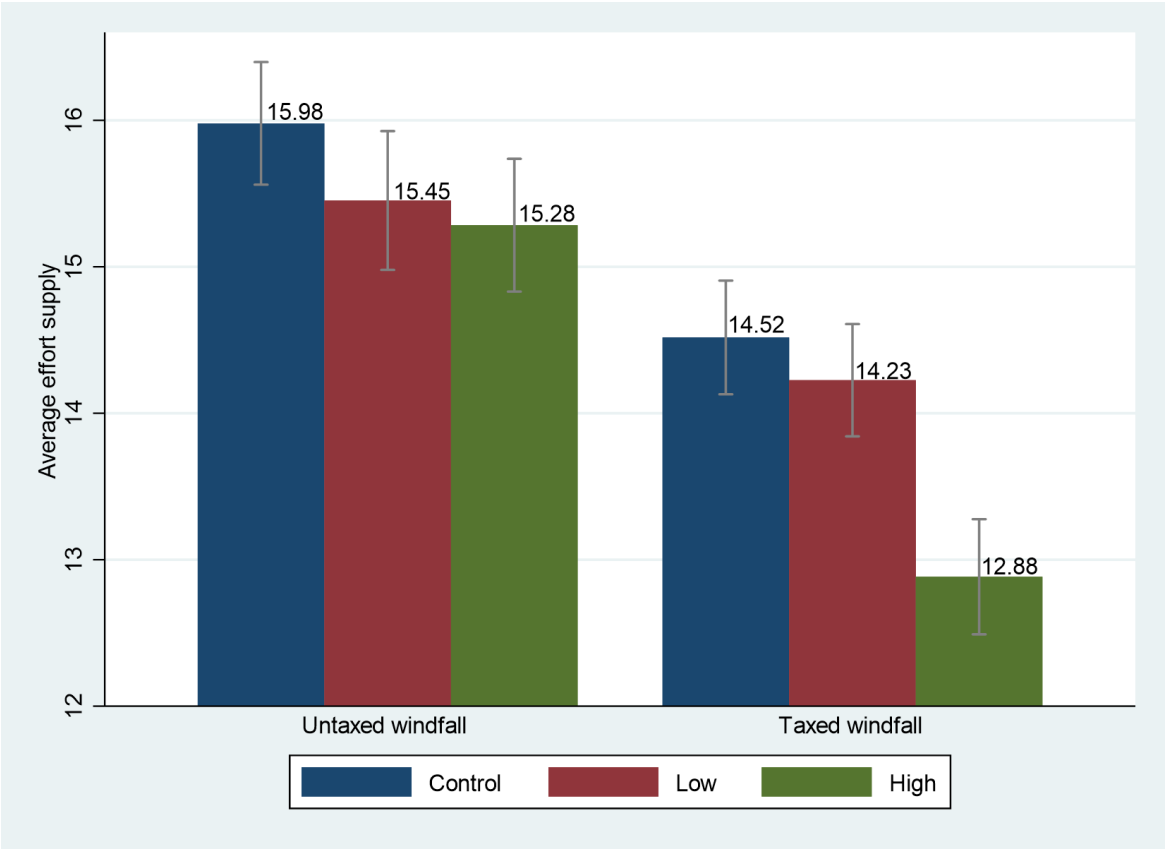
Average effort supply in the taxed and untaxed windfall experiment is summarised in Figure 4.2. I begin comparing differences in the averages between treatments (zero, low and high). In doing so, I employ a paired t-test (dependent means test). With a large sample size, test results are asymptotically valid, see Appendix 5.3 for histograms and box-plots showing the underlying normal distribution. Any differences in the paired t-tests will be considered as treatment effects.

For the taxed windfall, supply of effort falls drastically when the amount of windfall increases from none in the control treatment to high (p-value = 0.000). Similarly, I observe significant reductions when comparing high to low treatment (p-value = 0.000). However, the decline in effort provision is statistically insignificant between low and the control (p-value = 0.2944). In sum, the level of effort provided in high treatment is significantly lower than that of subjects in both other treatments who received lower levels of windfall.

For the untaxed windfall experiment, the test of averages reveals that effort provision in high treatment (p-value = 0.0273) is substantially less than that of the other two treatments. However, this is only significant at 5% level, whereas the difference between the control and the low treatment is statistically insignificant. The averages are observable in Figure 4.2.

The reason why there is no treatment effect between low and control group in both experiments, is perhaps a 'stake size' issue. Nevertheless, I do further regression analysis controlling for other factors in the subsequent section which will produce more robust results.

Fig. 4.2 Average effort supply of taxed and untaxed subjects



4.1.3 Dynamics of effort supply

Testing for the simultaneity of effort and compliance

Given the nature of the research question in this paper and thereafter the experimental design to study effort supply and tax evasion decisions jointly, it may give rise to a potential endogeneity problem. Such that in the experiment, effort supply decisions were followed by tax reporting decisions and the series of decisions were repeated for 12 periods. Investigating whether windfalls have influenced effort/labour supply and tax evasion (income reporting) makes it difficult to determine whether effort decisions affect reporting decisions and/or vice versa. In other words, this simultaneity bias makes it difficult to determine the direction of the effect between the two choice variables. To further explore this issue, consider the following points:

Under a specific assumption, one could argue that subsequent effort supply decisions in the experiment may depend on tax reporting. That assumption is: if a subject calculates in his/her mind the optimal level of effort to supply and tax amount to evade before the start of each round, and then executes that plan, a kind of simultaneous two-dimensional optimisation. If true, this would give rise to a simultaneity bias or endogeneity problem.

However, given the recent developments in behavioural economics, I argue that a simultaneous two-dimensional optimisation is unlikely for several reasons. The alternative assumption I propose is that each subject thinks about how much effort to supply myopically, completely ignoring what their tax reporting decision should be, and then decide how much to evade conditional on the effort supply (sequential decision-making that doesn't involve two-dimensional optimisation). I make the case for sequential decision-making with the following three arguments:

First, experimental evidence on 'bounded rationality' suggest that subjects in reality do not optimise but rather satisfice by resorting to mental shortcuts (Rubinstein, 1997). Therefore, making a simultaneous two-dimensional optimisation to be carried out mentally highly unlikely.

Second, cognitive evidence on individual multi-tasking abilities points in the same direction that efforts diverted into one task reduces the quality and time-spent thinking about the other task significantly (Paridon & Kaufmann, 2010; Spink et al., 2008; Schöttner, 2008).

Finally, in addition to the above, I provide evidence for the claim that subjects in the experiment made their effort decision independently of their compliance decision. To do this, I conducted a 2SLS analysis where in the first stage I instrumented labor income compliance using tax morale as instrumental variable. In the second stage, I regress effort on estimated compliance and the treatments. If the decision to comply is done simultaneously with effort, one should observe a significant coefficient on the compliance variable in the second stage regression. In both cases, the coefficient on labour income is non-significant in either specification, supporting my conjecture.

There exists empirical evidence that tax morale is significant for tax evasion (Choo et al., 2016; Torgler, 2006) but the same cannot be said for tax morale and effort. The assumption is that there is no or little correlation between effort provision and

the instrument i.e. $cov[L_{it}, Z_{it}] = 0$. To my knowledge, there are no empirical and/or theoretical studies that has found evidence linking the IV used here to labour supply choices. The regression passes all the weak IV tests with tolerable degree of bias, see Table 4.2.

Table 4.2 Test of sequentiality

First stage estimates		
DV: Labor income compliance	Taxable Windfall	Untaxed Windfall
Tax morale	0.019**	0.022***
	(0.008)	(0.007)
Low	-0.016	0.011
	(0.011)	(0.011)
High	-0.007	-0.005
	(0.011)	(0.012)
Constant	0.353***	0.270***
	(0.063)	(0.054)
F test of excluded instruments	$F(1, 214) = 5.14$	$F(1, 214) = 9.16$
p-value	0.024	0.003
Second stage estimates		
DV: Effort Supply	Taxable Windfall	Untaxed Windfall
Labour income compliance	15.867	-1.167
	(11.182)	(6.097)
Low	-0.030	-0.513***
	(0.237)	(0.195)
High	-1.527***	-0.701***
	(0.275)	(0.191)
Constant	6.669	16.472***
	(5.499)	(2.612)
Kleibergen-Paap LM statistic	4.744	9.380
Kleibergen-Paap LM p-value	0.029	0.002
Cragg-Donald Wald F statistic	34.947	69.157
Weak ID test critical values: 10% maximal IV size	16.38	16.38
N	2,580	2,580

*Note: Kleibergen-Paap LM statistic is an under-identification test; the Cragg-Donald Wald F test is a weak identification test. I report the statistic and the critical value for 10% maximal IV bias. Standard errors clustered at the participant level. ***, **, *: $p < 0.01, p < 0.05, p < 0.10$, respectively.*

Determinants of effort supply

With the assumption from the sub-section above, I use a random effects GLS estimator to estimate treatment effects for effort supply. A Hausman test fails to find systematic difference in the estimated coefficients by a fixed effects model, therefore a random effects model is deemed more suitable.

With n=430 subjects, each playing 12 periods while being exposed to each treatment condition 4 times, I obtained a short-balanced panel dataset with few time periods and many individuals where all individual units are observed in all time periods $T_i = T$ for all i. Consistency condition of the estimator requires that sample-selection process must be random, and errors must not be correlated with regressors. Those are ensured in the experimental design.

The Random Effects GLS model estimated here takes the following form:

$$Effort_{it} = \beta_0 + x_{it}^{'}\beta_1 + z_{it}^{'}\beta_2 + \alpha_i + u_{it}$$

The model estimates *Effort* supply of individual $i(i = 1, 2, 3....430)$ in period $t(t = 1, 2, 3...12)$. β_0 is the intercept independent of individual and period effects. β_1 is the vector shows the estimated coefficients of the explanatory variables. $x_{it}^{'}$ is the K-dimensional vector of explanatory variables (windfall levels: low, high and tax treatment effects and their interactions). $z_{it}^{'}$ is the individual characteristics which do not vary over time. $\alpha_i + u_{it}$ is the error term with two components both are iid$(0, \sigma^2)$, individual-specific error α_i that does not vary over time, and a remainder u_{it} which is uncorrelated with respect to individual i and period t. Both components are mutually independent and independent of all the regressors. A simple OLS does not consider this error structure thus the reason for the use of generalised least squares (GLS) estimator.

The dependent variable Effort supply is continuous and takes values between 0 and a theoretical maximum of 48 (the number of sliders). However, the maximum value was never reached, rendering the need to use truncated models. Zero treatment where subjects do not receive any windfall is used as the benchmark. Table 4.3, summarises the results of this regression.

For taxed windfall starting with model (1), the level of effort supplied significantly decreases with more windfalls; low treatment (-0.292^{*}) and high treatment (-1.634^{***}). Thus, the labour supply of subjects in high compared to low has also declined (-1.342^{***}), that is the difference between the coefficients in high and low treatments. This finding is strongly significant and robust. Estimations in model (2) controls for risk aversion, age, gender and period. The signs are still negative but the difference between low and zero treatments is no longer significant (-0.197), however,

Table 4.3 Determinants of effort

	Taxed Windfall		Untaxed Windfall		All
DV: Effort	(1)	(2)	(3)	(4)	(5)
Low	-0.292*	-0.197	-0.527***	-0.532***	-0.527***
	(0.156)	(0.159)	(0.188)	(0.198)	(0.188)
High	-1.634***	-1.586***	-0.695***	-0.698***	-0.695***
	(0.179)	(0.181)	(0.192)	(0.191)	(0.192)
Low×Taxed windfall					0.235
					(0.244)
High×Taxed windfall					-0.938***
					(0.262)
Taxed windfall					-1.462***
					(0.507)
Risk aversion		0.735**		0.528	
		(0.340)		(0.405)	
Age		-0.030		0.119	
		(0.152)		(0.121)	
Male		0.898		0.720	
		(0.660)		(0.751)	
Period		0.190***		0.002	
		(0.030)		(0.021)	
Constant	14.517***	11.148***	15.979***	11.305******	15.979***
	(0.345)	(3.702)	(0.371)	(3.172)	(0.371)
N	2,580	2,580	2,580	2,580	5,160
R^2	0.01	0.05	0.002	0.01	0.03

Note: Standard errors clustered at the participant level. ***, **, *: $p < 0.01, p < 0.05, p < 0.10$, respectively.

it is still significant for the high treatment (-1.586^{***}). This is clear evidence that effort supply decreases significantly with taxed windfall endowments.

For untaxed windfalls model (3), effort provision is substantially lower for both treatments compared to that of subjects in the control group. In low treatment subjects provide (-0.527^{***}) points less effort and in high treatment the reductions were by (-0.695^{***}) points. Similarly in model (4) when I control for risk aversion, age, gender and period, the signs and the significance do not change. Again, this is clear evidence that windfalls lead to negative effort supply responses. In light of these findings, I report the following result:

Result 1. *Supply of effort declines with higher levels of windfall in both taxed and untaxed windfalls.*

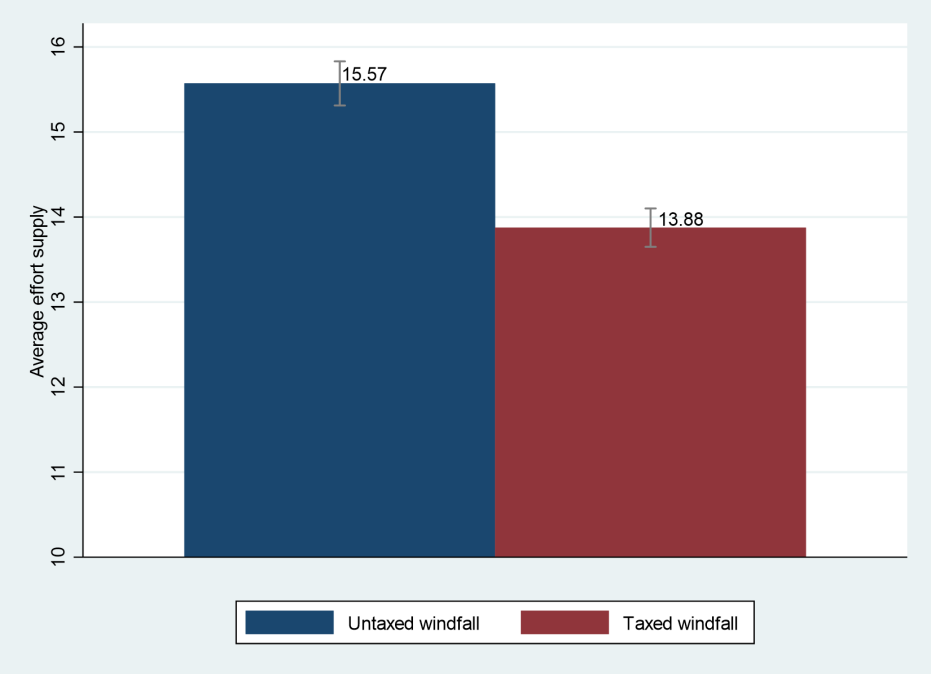
Consistent with the theoretical predictions as hypothesised, I find that real effort supply in the lab significantly decreases when subjects are endowed with windfalls (taxed or untaxed). Income and substitution effects are the usual mechanisms through which this effect is explained. Income effect dominates and subjects substitute away toward leisure. This leads to lower effort supply in the short run within the laboratory context. The results are consistent and robust. As an example, these results are in line with findings from social experiments (Robins, 1985), study of lottery winners (Picchio et al., 2017) and the conditional cash experiment from Malawi (Ambler et al., 2019).

Moreover, the results from Alaska's Permanent Fund Dividend (PFD) study showed that following a windfall disbursement, labour supply was reduced by 0.9 hours per week. This finding particularly resembles, what I find in the lab with subjects who receive a windfall. Yet considering the positive demand shocks created in the aftermath of the windfall disbursement during the year, they find that benefits of the PFD outweighs the costs incurred due to the fall in labour supply (Bibler et al., 2019). A lab experiment abstracts the discussion on "positive demand shocks". This doesn't permit me to comment on whether the short term responses observed in the lab to cash windfalls persist overtime and for how long. Nonetheless, I find experimental evidence that effort decisions are sensitive to windfalls in the lab. Effort levels are reduced as windfall increases.

Tax effects

Figure 4.3 shows that average effort supply for subjects in the untaxed windfall is much higher than that of taxed windfall. This difference points to the idea that taxing windfalls has consequences for subject's effort supply.

Fig. 4.3 Average effort supply by tax treatment



Although, the observable characteristics measured for subjects in both experiments does not show complete homogeneity. Using a parametric t-test (two sample independents means test), I compared differences in these characteristics for the two groups, p-values are reported in Table 4.1: Summary statistics[1]. Of these characteristics the treatments were similar across audit, caught, extraversion, attitude toward the government, and lack of trust in government. They were different across age, gender, risk, risk aversion, agreeableness, emotional stability, conscientiousness, openness, tax morale and knowledge of evasion.

If we accept the groups are not very dissimilar, the analysis on the differential effects of taxing and not taxing the windfall becomes possible. In addition, from observations of

[1] A Wilcoxon ranksum test (Wilcoxon, 1992), the non-parametric counterpart to the t-test produces identical results.

the averages in Table 4.1, it is evident that some of the differences are not drastic. For instance, there are a few more males in untaxed windfall experiment than the taxed. At worst, when I compare tax effects, the differences will give a noisy result, where caution is advised.

With the assumption above, model (5) presents the pooled data for both experiments in Table 4.3.

There is a negative coefficient on taxed windfall (i.e. tax treatment effect) indicating that supply of effort falls by (-1.462^{***}) points when the windfall is taxed. Even though subjects explicitly knew there was a flat tax regime in the experiment, there is a strong tax treatment effect on effort provision. In addition to that, I interact low and high treatments with the tax treatment dummy, I find negative significant results for those in high and taxed windfall treatment (-0.938^{***}). With this in mind, I report the following finding:

Result 2. *Average supply of effort is substantially lower when windfall is taxed compared to untaxed windfalls.*

There may be a behavioural mechanism such as 'tax aversion' that causes this difference. The windfall was not earned, and subjects knew it was a flat tax on an amount they had spent no effort to achieve. The sense of ownership of the income once transferred to a participant crowds-out the idea whether it was earned or not, ultimately leading to 'tax aversion' behaviour. The idea that taxpayers suffer from a 'net wage illusion' proposed by (Fochmann & Weimann, 2013) does not apply to this finding. The concept of net-wage illusion suggests that taxpayers provide more labour in response to higher gross income with higher tax rates compared to equivalent wage reductions that result in the same net wage under both cases. The context of their finding is different and answers a different question.

Aversion to taxes leads to decreases in labour supply if a new tax is introduced. The theoretical grounds for tax aversion come from the works of (McCaffery & Baron, 2006; Sussman & Olivola, 2011). They discuss that average person suffers from heuristics and biases in thinking. Agents fail to integrate parallel tax systems or make extensive use of information (even when readily available) to decide about the end-state allocations. Individuals wait much longer in the queue or travel further distances to avoid paying taxes. Evidence of this was found experimentally in (Kessler & Norton, 2016).

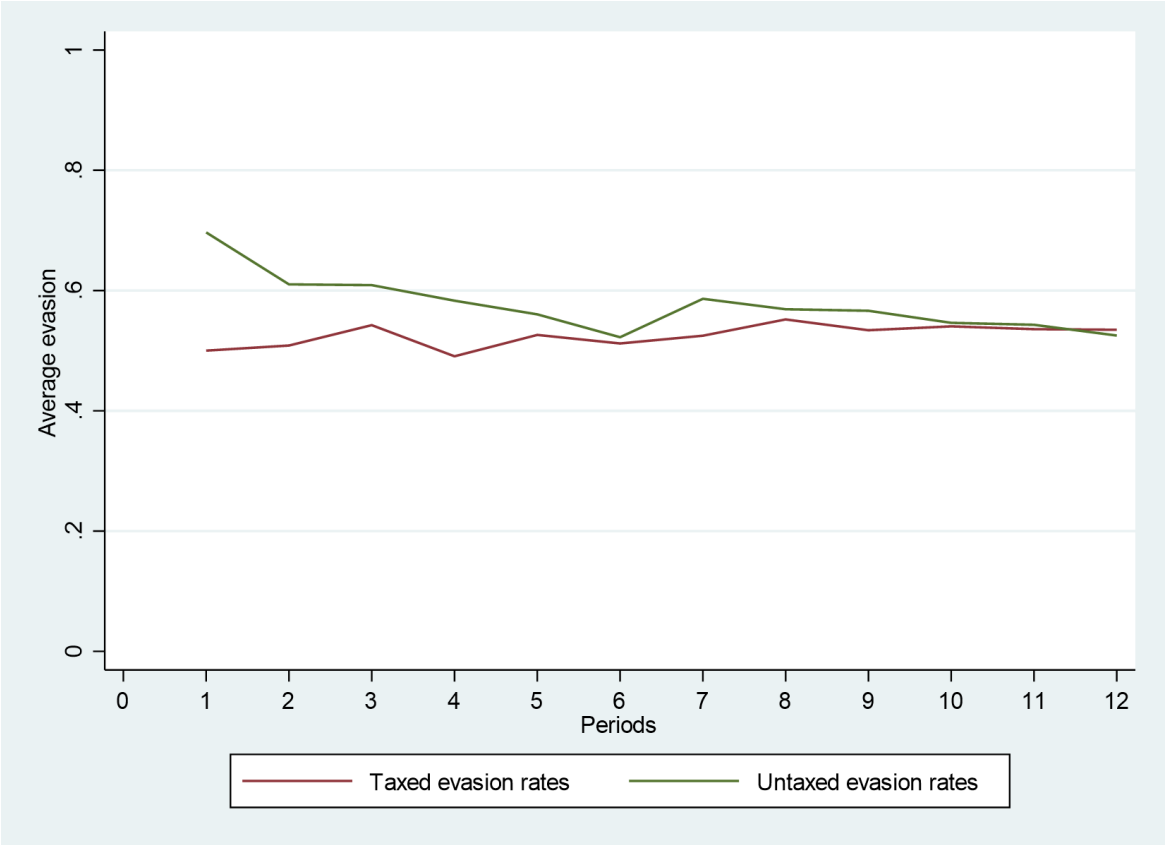
Model (2) estimates for the taxed windfall treatment shows that the sign for risk aversion is positive and significant (0.735**). Those who are more risk averse provide more effort. One way to explain this is that risk aversion acts as incentive to work harder via indirect mechanisms. Studies on the relationship between risk aversion and labour market outcomes predict that risk averse individuals have lower probability of changing their jobs, have lower reservation wage or attend on the job training (Pissarides, 1974; Pannenberg, 2007). However, this finding is not robust in my estimates.

4.2 Tax evasion and windfalls

Tax evasion is defined as one minus the ratio of reported labour income to actual labour income earned via solving puzzles in the experiments. Financial incentives are the taxed and untaxed windfalls in the two experiments. For the taxed windfall experiment only, I also define windfall evasion as one minus the ratio of reported windfall to actual windfall income. Therefore, the term tax evasion refers to evasion of labour earnings alone, where much of the discussion is dedicated.

Figure 4.4 shows average evasion for taxed and untaxed windfalls aggregated over 12 rounds. Tax evasion for untaxed windfall is higher than that of the taxed windfall group with the highest difference in rounds 1 and 2. Thereafter, the differences begin to converge and completely disappear by round 12.

Fig. 4.4 Tax evasion by windfall type



4.2.1 Averages analysis

I use a parametric paired t-test to carry out the test of differences between evasion averages. Given the large sample size, it meets the assumptions of the parametric tests[2]. Under taxed windfall, tax evasion is not different between treatments (zero, low and high). I find no statistically significant deviations for average evasions when windfall levels change from zero to low (p-value = 0.4354); or low to high (p-value = 0.6774), or zero to high (p-value = 0.7119).

Since the windfall endowed in this experiment was also taxable, there are substantial differences in windfall evasions between high and low treatments. The associated p-value = 0.0000 and those in high treatment evade significantly less than those in low treatment. For the same experiment, there is significant evidence that subject's tax evasion (that is subject's labour income tax evasion) is much higher than their windfall evasion but only in high treatment (p-value = 0.000). Whereas the difference is not significant for low treatment (p-value = 0.2328).

Result 4. *Subjects evade labour earnings more than their windfall earnings only in the high treatment.*

This result may be driven by a behavioural response. There are two competing hypotheses in this regard: investing time and effort in obtaining the labour income leads to 'sunk costs' and 'property right' hence making taxpayers reluctant to handover their hard-earned income to as taxes (Arkes & Blumer, 1985). I find evidence in support of this hypothesis. Evasion of labour earnings were much higher than those of windfalls at least in the high treatment. A competing hypothesis argued that because of investing time and effort in obtaining labour income subjects might show a 'reverse sunk cost' behaviour toward evasion from fear of losing more of their income if under-reporting is uncovered (Muehlbacher et al., 2008). There is no evidence in my data to support the latter hypothesis.

For those in the untaxed windfall, I find no differences in tax evasion between treatments (zero, low and high). There is no statistical evidence to show differences in tax evasion between treatments, zero to low (p-value = 0.4571), zero to high (p-value = 0.8818)

[2]I do carry out non-parametric counterpart tests for robustness however the results are not reported here.

and low to high (p-value = 0.3714). These differences are small and clearly observable in the Table 4.4.

Table 4.4 Evasion averages

Evasion averages	Taxed windfall		Untaxed windfall
	Tax Evasion	Windfall Evasion	Tax Evasion
Zero	0.52		0.58
	(0.434)		(0.372)
Low	0.53	0.56	0.57
	(0.428)	(0.472)	(0.374)
High	0.52	0.43	0.58
	(0.425)	(0.455)	(0.370)
N	2567	2567	2567

Note: Windfall evasion is one minus ratio of reported windfall gains to actual windfall
Tax evasion is one minus ratio of reported labour earnings to actual earnings
Mean coefficients; sd in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2.2 Dynamics of tax evasion

The analysis of averages is not very robust and only tests for significant differences in the means (or medians for the non-parametric case). More robust regression analysis is needed to test the direction and magnitude of the effects while controlling for other factors.

Tax evasion is bound between zero and one. Mass points are observed at each end of the distribution, see Appendix 5.4. Therefore, Generalised Linear Squares (GLS) and Ordinary Least Squares (OLS) approaches produce biased and inconsistent estimates. A Tobit model is appropriate for this purpose, the dependent variable is censored from below and above (Tobin, 1958). Employing an OLS approach in this case treats all the observations as actual values and not as lower (upper) limits of tax evasion. This leads to inconsistent estimation of the coefficient of interest (Cameron & Trivedi, 2010)

To account for this, I use a two-limit random effects Tobit model such that: e_{it}^{*} is the observed evasions and potentially a censored version of e_{it}. I assume that $e_{it} = e_{it}^{*}$

when $0 < e_{it} < 1; e^*_{it} = 0$ if $e_{it} < 0$ and $e^*_{it} = 1$ if $e_{it} > 1$.

$$e^*_{it} = x_{it}\beta + z_{it}\gamma + v_{it} + \epsilon_{it}$$

Where e^*_{it} is observed tax evasion that takes values between 0 to 1. X is a vector of treatment variables (low and high windfalls, with zero windfall being the benchmark) for individual i (with i = 1, 2, . . . , 215) in period t (with t = 1, 2, . . . , 12). β is a vector of coefficients of interest to be estimated; v_{it} and ϵ_{it} are both i.i.d $N(0, \theta^2)$, uncorrelated to the treatment variables and independent of each other. Z_{it} is a vector of control variables used for robustness purposes and γ is the vector of estimated coefficients.

The results for this regression is presented in Table 4.5. In one of the experiments taxpayer's first dollar is taxed irrespective of the type of earnings. In the second experiment the marginal tax rate on the first dollar of earnings is zero due the untaxed windfall endowment.

Evasion in the taxed windfall experiment partially increases for those in low treatment compared to control group. The estimated coefficient shows that tax evasion goes up by (0.0593*) points. This impact is robust for all specifications. On the other hand, tax evasion of subjects in the untaxed windfall does not respond in both treatments.

Result 5. *There is partial evidence that tax evasion increases in response to financial incentives in the taxed windfall experiment.*

The relationship between tax evasion and financial incentives (windfalls) seems obscure at first. One way to explain this is through the falling net-wages argument. Once the transfer is made to subjects, they no longer distinguish between earned and unearned income. Therefore, they see their net wages falling after a tax. This instigates the behaviour to re-adjust the losses via evading their earnings where possible. Of course, the assumption here is no third-party reporting, the result is applicable to self-employed individuals and contexts where voluntary reporting is possible.

Table 4.5 Dynamics of tax evasion

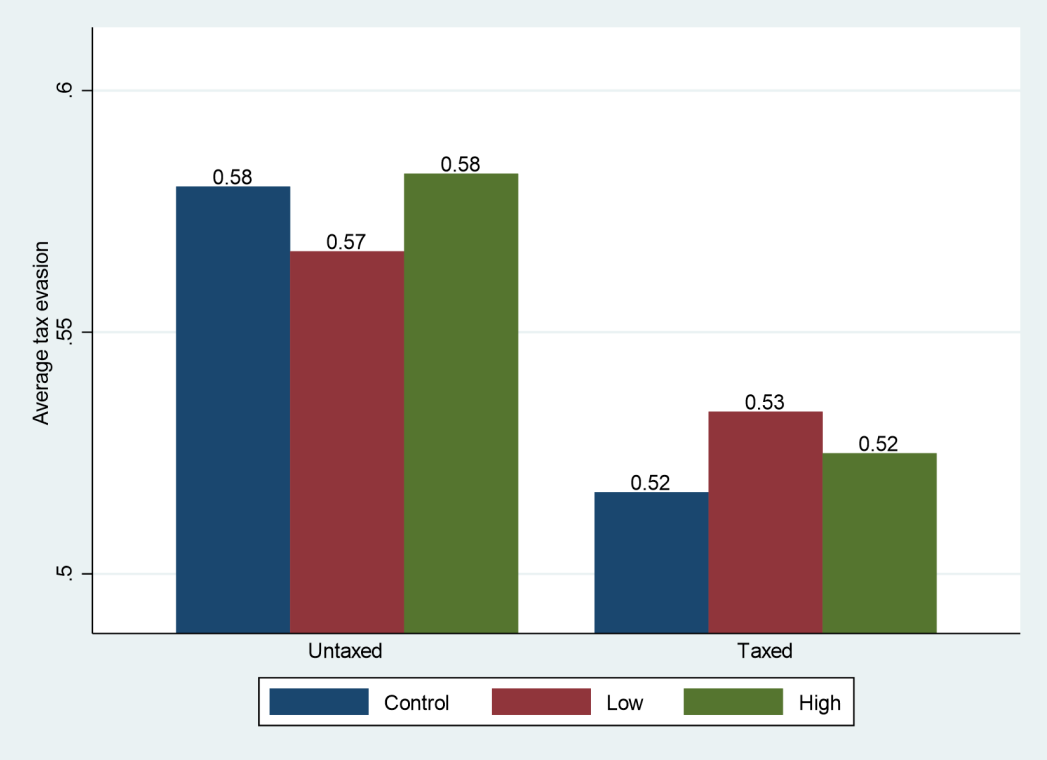
DV: Tax evasion	Untaxed windfall		Taxed windfall	
	(1)	(2)	(3)	(4)
Low	0.0252	0.0253	0.0592*	0.0593*
	(0.0169)	(0.0169)	(0.0333)	(0.0333)
High	0.0254	0.0257	0.0106	0.0115
	(0.0161)	(0.0160)	(0.0339)	(0.0339)
Period	-0.0124***	-0.0124***	0.00916**	0.00906**
	(0.00199)	(0.00199)	(0.00398)	(0.00398)
Audited	-3.012	-2.944	0.122	0.126
	(64.99)	(38.13)	(0.110)	(0.110)
Caught	3.080	3.011	0.0892	0.0829
	(64.99)	(38.13)	(0.133)	(0.133)
Effort	0.0203***	0.0204***	-0.00556	-0.00511
	(0.00157)	(0.00157)	(0.00423)	(0.00423)
Risk aversion	0.00140	-0.0142	0.152**	0.172**
	(0.0329)	(0.0322)	(0.0766)	(0.0763)
Attitude toward the govt.	0.00670	0.0110	0.0390	0.0287
	(0.00953)	(0.00959)	(0.0272)	(0.0279)
Tax morale	-0.0227*	-0.0154	-0.0423	-0.0483
	(0.0118)	(0.0123)	(0.0347)	(0.0342)
Lack of trust in govt.	0.00364	0.00147	0.0597**	0.0623**
	(0.0101)	(0.0101)	(0.0286)	(0.0285)
Knows evasion	0.00204	0.00245	0.00242	0.0117
	(0.00996)	(0.0102)	(0.0271)	(0.0276)
Believes pays all taxes	0.0156	0.0184	0.0165	0.00805
	(0.0118)	(0.0116)	(0.0322)	(0.0321)
Age	-0.0148	-0.0121	-0.0292	-0.0269
	(0.00926)	(0.00911)	(0.0351)	(0.0352)
Male	-0.0539	-0.0520	0.115	0.0619
	(0.0595)	(0.0581)	(0.160)	(0.160)
Extraversion		-0.00824		0.0382
		(0.0108)		(0.0319)
Agreeableness		0.00312		-0.00523
		(0.0135)		(0.0307)
Emotional stability		0.0303***		-0.0345
		(0.0102)		(0.0302)
Conscientiousness		-0.0191*		-0.0649**
		(0.0107)		(0.0312)
Openness		-0.00852		0.0380
		(0.0118)		(0.0289)
Constant	0.801***	0.688**	0.441	0.468
	(0.276)	(0.294)	(0.901)	(0.906)
Observations	2,577	2,577	2,539	2,539
Number of subjects	215	215	215	215
Log Likelihood (LL)	-1274.3	-1268.0	-1698.7	-1695.4

Standard errors clustered at the individual level in parenthesis
Coefficients are average marginal effects
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2.3 Tax evasion; analysis of tax vs untaxed windfalls

The tax evasion response to taxed windfall is different to untaxed windfall. All evasions are higher when the windfall is not taxed, this can be see in Figure 4.5. This statement is true for all treatments in the taxed vs untaxed windfall too.

Fig. 4.5 Tax evasion; taxed vs untaxed Windfalls



As discussed in Table 4.1: Summary statistics, the two groups in taxed and untaxed windfall is not completely homogeneous. To recall, using a parametric two sample independent means test, I compared the two groups. Treatments are identical in some dimensions and no in others. With this level of heterogeneity, the following analysis on tax effects will be noisy.

Under the assumption that the groups are semi-homogeneous, I compare tax evasion using a paired t-test (a dependent means test) in each windfall level for the two groups[3]: zero (p-value = 0,0013), low (p-value = 0.0882) and high (p-value = 0.0028). There is evidence of statistically significant differences between the averages. This suggests

[3]This is because of the within-subject design where all subjects were exposed to all treatments.

there is a tax effect, even though this was a flat tax regime on the unearned windfall. This finding should be treated with caution, as I run a regression analysis on the tax effects which controls for all other factors. The full results are presented in Appendix 5.5. I find no significant tax evasion responses to tax treatment.

The following findings (result 6-10) from regression Table 4.5 are not new, they have been studied or discussed in previous studies. For a review of those literature (Alm, 2019). Model (1) estimates that tax morale lowers evasion levels but only for subjects in the untaxed windfall experiment. The estimated coefficient is (-0.0227^{*}). This is not robust, when controlled for other factors, especially the big five, the significance disappears. I find that conscientiousness decreases tax evasion for both windfall experiments. The estimated coefficient for conscientiousness is (-0.0191^{*}) and (-0.0649^{*}) for taxed (model 2) and untaxed (model 4) respectively. Both are significant only at 10% and robust. Conscientiousness is the trait of being diligent or taking obligations towards others seriously (Torgler, 2007).

Result 6. *Subjects with higher conscientiousness has lower tax evasion rates in both experiments.*

Lack of trust in the government increases tax evasion. Subjects in the taxed windfall treatment who say they do not trust the government report lower and lower levels of their labour earnings. i.e. their evasion increases by (0.0623^{**}) points (model 4). Attitude toward the government is determined by the level of services a state provides to its citizens. In a way it measures the public opinion toward the government, given that the level of satisfaction with government performances are usually low in majority of least developed countries, it is no surprise that subjects in Afghanistan share the same opinion toward their government. Their evasion increases as their trust in government falls.

Result 7. *Lack of trust in the government increases tax evasion in the taxed windfall experiment.*

Finally, those who indicate higher levels of emotional stability in the untaxed windfall treatment, evade more of their tax liabilities. The estimated coefficient is obtained in model 2, (0.0303^{***}). This is robust and significant at 1% test. However, the same variable is not significant for taxed windfall subjects.

Result 8. *Those with higher emotional stability show higher tax evasion in the untaxed windfall.*

I find that putting in more effort increases tax evasion in the untaxed windfall but not in the taxed windfall. Evasion is increased by (0.00204^{***}) points (model 2). This is significant at 1% and robust for all specifications. This is because hard working individuals or the most productive individuals value each unit of effort differently to those in lower productivity levels. Therefore, their tax evasion level increases as they know they will compensate by working harder the next round even if they get caught and fined. Tax evasion of different productivity levels are discussed in the next section.

Result 9. *Tax evasion increases with respect to effort supply only when the windfall is not taxed.*

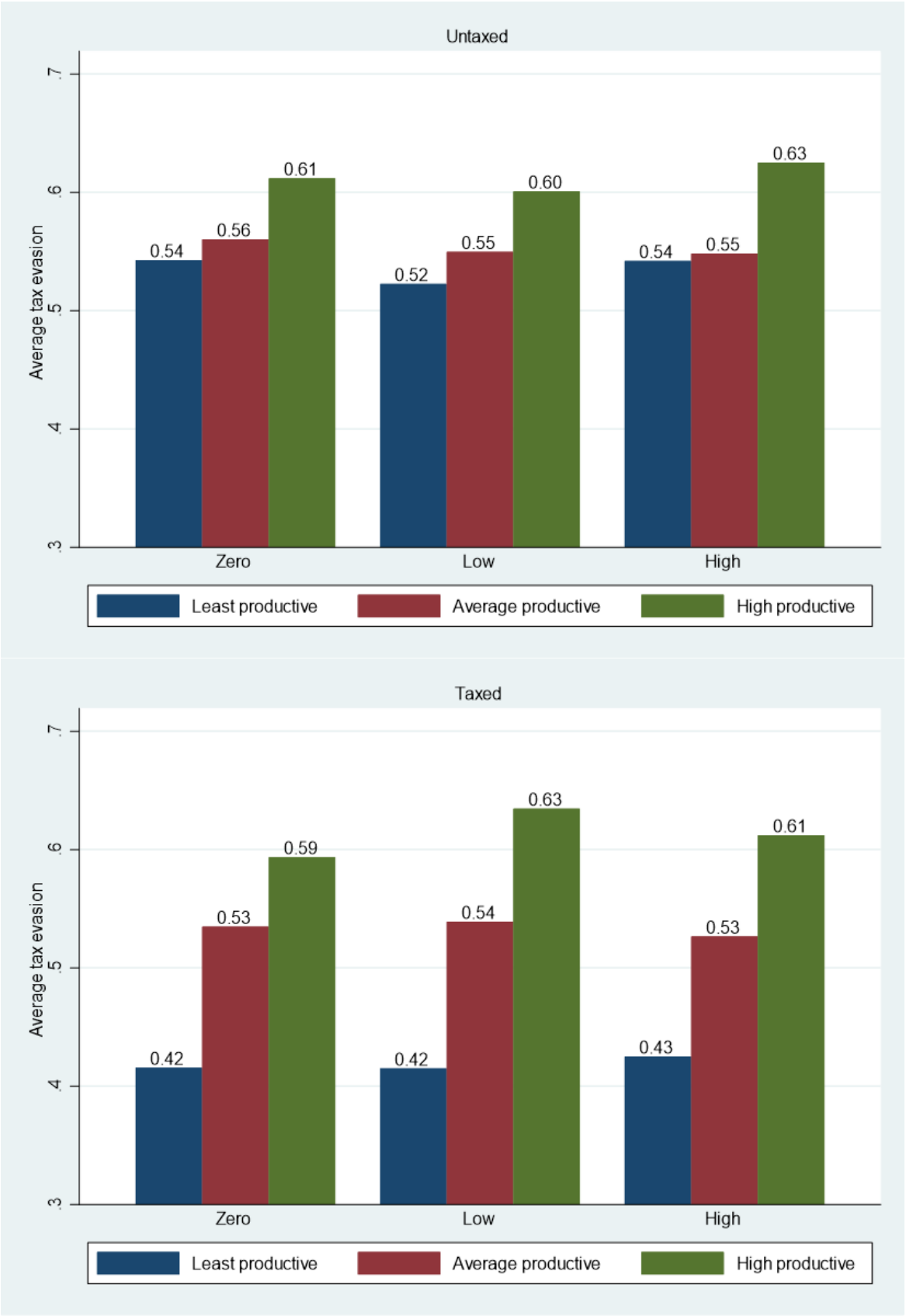
Reporting one's labour income is sensitive to their preference toward risk. Model (4) estimates that risk neutral/loving individuals have higher (0.172^{**}) tax evasion. This is only true in the case of the taxed windfall treatment. The more risk averse an individual, the lower their evasion rates, as evading taxes is a risky decision. Although the probability of detection was although 5% in the experiment, that seems to make a difference for those with different risk attitudes.

Result 10. *Tax evasion of risk neutral/loving individuals is higher in the taxed windfall treatment but not in the untaxed windfall treatment.*

4.2.4 Tax evasion and productivity levels

I divide subjects to three categories based on their productivity level: high, average, and least productive groups measured by their average effort provision in the real effort task. Doing so separates the most able individuals from the least, allowing to study differences in their tax evasion behaviour. Observing evasion averages for taxed and untaxed windfalls in Figure 4.6, there is a consistency in tax evasion behaviour with productivity levels: The most productive group of individuals evade the most, followed with the average productivity level and then the least productive individuals have the least evasion.

Fig. 4.6 Average tax evasion by productivity levels



Carrying out a paired t-test for the taxed windfall, I find that tax evasion increases as the productivity levels increase. In the zero-windfall treatment, I find differences between the least vs average (p-value = 0.0014), least vs high (p-value = 0.0000) and average vs high (p-value = 0.1003) productivity groups. These results are significant at 1%, 5% and almost 10% level, respectively. In the low-windfall treatment, I find that differences in tax evasion decisions are also significantly different as we move up the productivity ladder (p-value = 0.0008; 0.0000; 0.0061) respectively. Similarly, for those in high-windfall treatment, evasion differences increase as we move toward the most productive group in the experiment. The associated p-values are (0.0055; 0.0000; 0.0142) respectively.

To carry out a more robust analysis, using a two-limit random effects Tobit panel model similar to the one outlined in Section 4.2.2, I obtain the results in Table 4.6. First, I pool the data for all treatments and look at productivity effects, as well as treatment effects. Then using each treatment on its own, I examine differences in productivity level of subjects. This way, I examine more robustly if the differences in average tax evasions observed in Figure 4.6, are statistically important. Table 4.6 only presents the results for taxed windfall treatment. The tax evasion of the least productive category is used as the benchmark.

Model (1) in the pooled data shows tax evasion partially increases for subjects with an average level of productivity by (0.331^{*}) point when compared to the least productive group. This is only significant at 10%. However, tax evasion substantially increases for subjects in the high productive category compared to the least productive category (0.657^{***}). This is significant at 1% test and robust with various specifications.

Splitting the data by windfall treatments and examining tax evasion decisions by productivity tercile reveals interesting results. There is a consistent result across all windfall treatments, as productivity levels increase, tax evasion increases. For instance take treatment low: model (3) shows tax evasion for average productivity level is higher by (0.353^{*}) points compared to least productive and consequently evasion of high productive subjects is higher by (0.704^{***}) points than the benchmark.

Result 11. *Tax evasion increases substantially with productivity levels when the windfall is taxed.*

Table 4.6 Tax evasion taxed windfalls by productivity levels

DV: Tax evasion	Pooled	Zero	Low	High
Low	0.0606*			
	(0.0334)			
High	0.0200			
	(0.0332)			
Average productivity	0.331*	0.460**	0.353*	0.299*
	(0.187)	(0.195)	(0.187)	(0.172)
High productivity	0.657***	0.747***	0.704***	0.572***
	(0.190)	(0.200)	(0.192)	(0.175)
Period	0.00826**	0.0103	0.00111	0.0102
	(0.00393)	(0.00674)	(0.00822)	(0.00655)
Extraversion	0.0407	0.0515	0.0289	0.0253
	(0.0308)	(0.0322)	(0.0307)	(0.0281)
Agreeableness	-0.00388	-0.00889	0.0143	0.0109
	(0.0295)	(0.0306)	(0.0295)	(0.0271)
Emotional stability	-0.0409	-0.0473	-0.0349	-0.0365
	(0.0290)	(0.0303)	(0.0290)	(0.0267)
Conscientiousness	-0.0817***	-0.0885***	-0.0883***	-0.0683**
	(0.0303)	(0.0318)	(0.0305)	(0.0280)
Openness	0.0362	0.0216	0.0532*	0.0240
	(0.0282)	(0.0293)	(0.0280)	(0.0258)
Tax morale	-0.0677**	-0.0865**	-0.0628*	-0.0664**
	(0.0333)	(0.0347)	(0.0332)	(0.0306)
Believes pays all taxes	0.00784	-0.00373	0.00266	0.00653
	(0.0309)	(0.0320)	(0.0311)	(0.0283)
Attitude toward the govt.	0.0138	0.0181	0.0229	0.00482
	(0.0271)	(0.0282)	(0.0269)	(0.0248)
Trust in govt.	0.0342	0.0402	0.0274	0.0297
	(0.0284)	(0.0295)	(0.0284)	(0.0261)
Age	-0.0254	0.0109	-0.0296	-0.0449
	(0.0338)	(0.0348)	(0.0338)	(0.0310)
Risk aversion	0.130*	0.125	0.0781	0.108
	(0.0738)	(0.0786)	(0.0739)	(0.0680)
Knows evasion	0.0194	0.0249	0.00607	0.0255
	(0.0267)	(0.0276)	(0.0267)	(0.0245)
Audited	0.130	-0.115	-0.0603	0.429*
	(0.110)	(0.207)	(0.193)	(0.222)
Male	0.0267	0.0261	0.0871	0.0121
	(0.155)	(0.160)	(0.154)	(0.142)
Caught	0.0748	0.210	0.209	0.175
	(0.133)	(0.263)	(0.227)	(0.277)
Constant	0.548	-0.109	0.760	1.105
	(0.869)	(0.906)	(0.867)	(0.798)
N (Observations)	2,539	847	847	845
Number of subjects	215	215	215	215
Log likelihood (LL)	- 1689.7	-705.3	-630.2	-696.5

Standard errors clustered at the individual level in parentheses
Coefficients are marginal effects
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

For those whose windfalls were not taxed Figure 4.6, using a paired t-test of significance, I find that tax evasion increases with increasing level of productivity. In the zero-windfall treatment, the difference between the least and the average to high productive group is statistically important. The p-value are (0.0236; 0.0799) respectively. However, the differences between the least and the average productive group is insignificant (p-value = 0.6384). For low-windfall treatment, the difference is only significant between the least and the average to high productive category (p-values = 0.0099; 0.0822) respectively. The difference between the least and the average productive subjects is insignificant (p-value = 0.4781). Similarly, the difference in tax evasion of the high-windfall treatment between the least and average to high productive subjects is significantly different (p-value = 0.0030; 0.0085) respectively. Yet the difference between the least and the average productivity groups is not significantly (p-value = 0.8675).

Although it is tempting to draw conclusions from the tests above, however, a regression analysis similar to Table 4.6 has been carried out for the untaxed windfall experiment, those results are less interesting and can be seen in Appendix 5.6. The most interesting result is comparing tax evasions for least productive subjects to most productive ones. For example, tax evasion consistently increases for high productive subjects, except for the coefficient in model (6) all other estimates are significant at 10% or 5% levels.

Result 12. *Tax evasion increases sluggishly with productivity levels when windfall is untaxed.*

The economic rationale behind the fact that highly productive subjects evade more than less productive ones might be found in differences in their marginal utility of additional labour income.

By evading more of their labour income the most productive group shows that they value utility to their earnings more and are reluctant to hand it over as taxes. These subjects consider themselves more able and attach more value to their earnings. When windfall earnings are transferred to subjects and if the assumption that post-windfall transfer state, subjects do not strictly distinguish between the sources of their income is true, taxing those windfall earnings will reinforce the evasion behaviour more compared to the situation when the windfall is not taxed. In other words, there exists a tax-induced windfall effect on evasion decisions.

4.3 Concluding Remarks

4.3.1 Effort supply

Handing out cash in the form of a windfall or any other transfer will lower supply of effort. This is simply because agents find it relatively cheaper to substitute work for leisure in the short run. In the two experiments, I observe that agents with higher windfall endowment reduce their labour/effort provision even further. A limitation of testing windfall effects on labour/effort supply in the lab is that it abstracts away from other social changes such as 'positive demand shocks' or 'systematic differences in the lifestyle' of the cash recipients. This is where findings from field experiments and social experiment make contributions. The upside is that a lab experiment provides clearer results and controls for confounds.

Taxing the windfall after being transferred to the agent has a direct impact on their level of effort provision. This might be driven by tax aversion such that agents do not have a strict separation in their sense of ownership after the windfall is transferred to them. Individuals have limited information processing capability and suffer heuristics when optimising. Taxing any portion of their combined earnings will negatively disrupt and disincentivise their effort provision. Interpreting tax liabilities is considered simply as losing income and that is demotivating, thus lowered levels of effort provision is observed in the experiment.

In other words, taxing individuals first dollar, irrespective of the tax system has a knock-on effect on their subsequent effort supply choices. Thus, providing disincentive to provide full effort, compared to a situation where individual's first dollar of earning is not taxed. Responses to taxed windfalls are less drastic and the decline in effort supply is smaller in magnitude too.

There are several limitations that are applicable in the case of experimental results as every other research methodology. The most important limitation in the case of findings in this experiment is whether the effort response to taxed and untaxed windfalls are sustained over long periods or not. As mentioned earlier, the study takes place in the lab and does not account for other socioeconomic factors that may take much longer to have an impact on individuals labour supply behaviour. If we distinguish between

effort provision and labour supply such that effort provision is often short term and momentary when the task is being performed, then the results are strictly applicable to short term effort provision behaviour. This has several implications: namely increasing effort by increasing base salaries and not through bonuses or windfalls. However, this type of distinction is not discussed in the experimental literature.

Exploring effort supply responses to more windfall types and possibly further increasing levels of cash windfalls would be an interesting further research to explore. Doing this will allow to explore if there is a threshold after which inertia kicks in and the decline in effort supply gets sticky.

4.3.2 Tax Evasion

Taxpayers exhibit two types of behaviour in this study; evaders and compliers. Percentage of compliers in both experiments are higher than evaders. For the taxed windfall, the percentage of compliant taxpayers is twice as higher than compliant taxpayers in the untaxed windfall. The effects of two types of windfall treatments were studied on evasion (taxed windfalls and untaxed windfalls).

There is weak evidence that evasion responds to financial incentives, namely minor increases in response to taxed windfalls. There is no response to untaxed windfall treatment. Once the windfall transfer is made, taxpayers do not precisely distinguish the sources of their earnings. To re-adjust/recover the losses in the post-tax state, taxpayers evade labour earnings to compensate, at the risk of being caught and fined. This is only true for voluntary tax reporting circumstances and does not include third-party reporting.

The other main finding of the study is on the tax evasion behaviour of taxpayers with different productivity levels. Top productive taxpayers, measured by their ability to provide effort, exhibit highest level of evasion. This behaviour is consistent as we move down the productivity level, the average productive taxpayers and then to the least productive taxpayer, their tax evasions fall respectively. There is little distinction in responses to the fact whether the windfall is taxed or untaxed. Evasions are generally higher for the most able taxpayer. This is because highest able individuals have different marginal utility of labour to lower productive members, since earnings are

tied to their effort, taxpayers feel more attached to their income. They are reluctant to hand over their hard-earned income as taxes.

Finally, windfall evasion is lower than labour evasion. The difference between the two is windfall being unearned in the experiment. This points out that a sense of ownership or sunk costs are developed toward labour earnings (during the course of undertaking the real effort task). That may explain why evasion levels for labour earnings is higher. Similar to previous studies, I find that risk aversion lowers tax evasion due to risks of being caught and fined, even though the probability of detecting under-reporting was minimal in the experiment. Finally, lack of trust in the government also lowers evasion, indicating that taxpayers who are not happy with state's performance, will evade paying taxes.

References

Aaberge, R., & Colombino, U. (2014). *Labour supply models', handbook of microsimulation modelling (contributions to economic analysis, volume 293).* Emerald Group Publishing Limited.

Abeler, J., Falk, A., Goette, L., & Huffman, D. (2011). Reference points and effort provision. *American Economic Review*, *101*(2), 470–92.

Akerlof, G. (1982). Labor contracts as partial gift exchange. *The Quarterly Journal of Economics*, *97*(4), 543–569.

Akerlof, G., & Yellen, J. (1988). Fairness and unemployment. *The American Economic Review*, *78*(2), 44–49.

Akerlof, G., & Yellen, J. (1990). The fair wage-effort hypothesis and unemployment. *The Quarterly Journal of Economics*, *105*(2), 255–283.

Akseer, T., Hayat, K., Keats, E. C., Kazimi, S. R., Maxwell-Jones, C., Shiwan, M. S., ... Yousufzai, F. A. (2019). *A survey of the afghan people: Afghanistan in 2019.* Afghanistan, Kabul: Asia Foundation.

Allingham, M., & Sandmo, A. (1972). Income tax evasion: A theoretical analysis. *Journal of Public Economics*, *1*(3-4), 323–338.

Alm, J. (2012). Measuring, explaining, and controlling tax evasion: lessons from theory, experiments, and field studies. *International Tax and Public Finance*, *19*(1), 54–77.

Alm, J. (2019). What motivates tax compliance? *Journal of Economic Surveys*, *33*(2), 353–388.

Alm, J., Bruner, D., & McKee, M. (2016). Honesty and dishonesty in taxpayer communications in an enforcement regime. *Journal of Economic Psychology*, *56*, 85–96.

Alzúa, M. L., Cruces, G., & Ripani, L. (2013). Welfare programs and labor supply in developing countries: experimental evidence from latin america. *Journal of Population Economics*, *26*(4), 1255–1284.

Ambler, K., Godlonton, S., et al. (2019). *Windfalls and work requirements: Evidence from a field experiment in malawi.* No.2019-25.

Andreoni, J., Erard, B., & Feinstein, J. (1998). Tax compliance. *Journal of Economic Literature*, *36*(2), 818–860.

Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational behavior and human decision processes*, *35*(1), 124–140.

Arkes, H. R., Joyner, C. A., Pezzo, M. V., Nash, J. G., Siegel-Jacobs, K., & Stone, E. (1994). The psychology of windfall gains. *Organizational Behavior and Human Decision Processes*, *59*(3), 331–347.

Baird, S., McKenzie, D., & Özler, B. (2018). The effects of cash transfers on adult labor market outcomes. *IZA Journal of Development and Migration*, *8*(1), 22.

Banerjee, A., Hanna, R., Kreindler, G., & Olken, B. (2017). Debunking the stereotype of the lazy welfare recipient: Evidence from cash transfer programs. *The World Bank Research Observer*, *32*(2), 155–184.

Battalio, R., & Kagel, J. (1985). Consumption-leisure tradeoffs of animal workers: effects of increasing and decreasing marginal wage rates in a closed economy experiment. *Research in Experimental Economics*, *3*, 1–30.

Bibler, A., Guettabi, M., & Reimer, M. (2019). Short-term labor responses to unconditional cash transfers. *Anchorage, AK: Institute of Social and Economic Research*.

Bloemen, H. G. (2011). The effect of private wealth on the retirement rate: an empirical analysis. *Economica*, *78*(312), 637–655.

Bloemen, H. G., & Stancanelli, E. G. (2001). Individual wealth, reservation wages, and transitions into employment. *Journal of Labor Economics*, *19*(2), 400–439.

Blumkin, T., Ruffle, B., & Ganun, Y. (2012). Are income and consumption taxes ever really equivalent? evidence from a real-effort experiment with real goods. *European Economic Review*, *56*(6), 1200–1219.

Bø, E. E., Halvorsen, E., & Thoresen, T. O. (2019). Heterogeneity of the carnegie effect. *Journal of Human Resources*, *54*(3), 726–759.

Burtless, G. (1986). The work response to a guaranteed income: A survey of experimental evidence. In *Conference series: [proceedings]* (Vol. 30, pp. 22–59).

Cahuc, P., Carcillo, S., & Zylberberg, A. (2014). *Labor economics*. MIT press.

Calnitsky, D., & Latner, J. (2017). Basic income in a small town: understanding the elusive effects on work. *Social Problems*, *64*(3), 373–397.

Camerer, C., Babcock, L., Loewenstein, G., & Thaler, R. (1997). Labor supply of new york city cabdrivers: One day at a time. *The Quarterly Journal of Economics*, *112*(2), 407–441.

Camerer, C., & Weber, R. (2013). Experimental organizational economics. *The handbook of organizational economics*, 213–262.

Cameron, A., & Trivedi, P. (2010). *Microeconometrics using stata* (Rev. ed.). College Station, TX: Stata Press.

Cesarini, D., Lindqvist, E., Notowidigdo, M., & Östling, R. (2017). The effect of wealth on individual and household labor supply: Evidence from swedish lotteries. *American Economic Review*, *107*(12), 3917–46.

Charness, G., Gneezy, U., & Kuhn, M. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization*, *81*(1), 1–8.

Charness, G., & Kuhn, P. (2011). Lab labor: What can labor economists learn from the lab? , *4*, 229–330.

Choo, C., Fonseca, M., & Myles, G. (2016). Do students behave like real taxpayers in the lab? evidence from a real effort tax compliance experiment. *Journal of Economic Behavior & Organization*, *124*, 102–114.

Clark, A., Masclet, D., & Villeval, M. (2010). Effort and comparison income: Experimental and survey evidence. *ILR Review*, *63*(3), 407–426.

Davis, L., Joyce, B., & Roelofs, M. (2010). My money or yours: house money payment effects. *Experimental Economics*, *13*(2), 189–205.

Dickinson, D. (1999). An experimental examination of labor supply and work intensities. *Journal of Labor Economics*, *17*(4), 638–670.

Doerrenberg, P., & Duncan, D. (2014). Experimental evidence on the relationship between tax evasion opportunities and labor supply. *European Economic Review*, *68*, 48–70.

Doorley, K., & Pestel, N. (2020). Labour supply after inheritances and the role of expectations. *Oxford Bulletin of Economics and Statistics*, *82*(4), 843–863.

Durham, Y., Manly, T., & Ritsema, C. (2014). The effects of income source, context, and income level on tax compliance decisions in a dynamic experiment. *Journal of Economic Psychology*, *40*, 220–233.

Dwenger, N., Kleven, H., Rasul, I., & Rincke, J. (2016). Extrinsic and intrinsic motivations for tax compliance: Evidence from a field experiment in germany. *American Economic Journal: Economic Policy*, *8*(3), 203–232.

Erard, B., & Feinstein, J. (1994). The role of moral sentiments and audit perceptions in tax compliance. *Carleton University, Department of Economics*, *94*(03).

Fehr, E., Kirchsteiger, G., & Riedl, A. (1993). Does fairness prevent market clearing? an experimental investigation. *The Quarterly Journal of Economics*, *108*(2), 437–459.

Fischbacher, U. (2007). z-tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, *10*(2), 171–178.

Fochmann, M., & Weimann, J. (2013). The effects of tax salience and tax experience on individual work efforts in a framed field experiment. *FinanzArchiv/Public Finance Analysis*, 511–542.

Fortin, B., Lacroix, G., & Villeval, M. (2007). Tax evasion and social interactions. *Journal of Public Economics*, *91*(11-12), 2089–2112.

Frey, B., & Torgler, B. (2007). Tax morale and conditional cooperation. *Journal of Comparative Economics*, *35*(1), 136–159.

Gilbert, R., Murphy, N. A., Stepka, A., Barrett, M., & Worku, D. (2018). Would a basic income guarantee reduce the motivation to work? an analysis of labor responses in 16 trial programs. *Basic Income Studies*, *13*(2).

Gill, D., & Prowse, V. (2012). A structural analysis of disappointment aversion in a real effort competition. *American Economic Review*, *102*(1), 469–503.

Gneezy, U., & Potters, J. (1997). An experiment on risk taking and evaluation periods. *Quarterly Journal of Economics*, *112*(2), 631–645.

Gneezy, U., & Rustichini, A. (2000). Pay enough or don't pay at all. *The Quarterly Journal of Economics*, *115*(3), 791–810.

Greiner, B., Ockenfels, A., & Werner, P. (2011). Wage transparency and performance: A real-effort experiment. *Economics Letters*, *111*(3), 236–238.

Halla, M. (2012). Tax morale and compliance behavior: First evidence on a causal link. *The BE Journal of Economic Analysis & Policy*, *12*(1).

Holtz-Eakin, D., Joulfaian, D., & Rosen, H. S. (1993). The carnegie conjecture: Some empirical evidence. *The Quarterly Journal of Economics*, *108*(2), 413–435.

Hum, D., & Simpson, W. (1991). *Income maintenance, work effort, and the canadian mincome experiment*. Economic Council of Canada.

Imbens, G. W., Rubin, D. B., & Sacerdote, B. I. (2001). Estimating the effect of unearned income on labor earnings, savings, and consumption: Evidence from a survey of lottery players. *American Economic Review*, *91*(4), 778–794.

IMF. (2019). World economic outlook (october): Afghanistan. *Internatinoal Monetary Fund*.

Joulfaian, D., & Wilhelm, M. O. (1994). Inheritance and labor supply. *Journal of Human Resources*, 1205–1234.

Kangas, O., Jauhiainen, S., Simanainen, M., Ylikännö, M., et al. (2019). The basic income experiment 2017–2018 in finland: Preliminary results.

Kessler, J., & Norton, M. (2016). Tax aversion in labor supply. *Journal of Economic Behavior & Organization*, *124*, 15–28.

Kirchler, E., Hoelzl, E., & Wahl, I. (2008). Enforced versus voluntary tax compliance: The "slippery slope" framework. *Journal of Economic Psychology*, *29*(2), 210–225.

Kleven, H., Knudsen, M., Kreiner, C., Pedersen, S., & Saez, E. (2011). Unwilling or unable to cheat? evidence from a tax audit experiment in denmark. *Econometrica*, *79*(3), 651–692.

Lamberton, C. (2013). A spoonful of choice: How allocation increases satisfaction with tax payments. *Journal of Public Policy & Marketing*, *32*(2), 223–238.

Lefebvre, M., Pestieau, P., Riedl, A., & Villeval, M. (2015). Tax evasion and social information: an experiment in belgium, france, and the netherlands. *International Tax and Public Finance*, *22*(3), 401–425.

Loewenstein, G., & Issacharoff, S. (1994). Source dependence in the valuation of objects. *Journal of Behavioral Decision Making*, *7*(3), 157–168.

Mascagni, G. (2018). From the lab to the field: A review of tax experiments. *Journal of Economic Surveys*, *32*(2), 273–301.

McCaffery, E., & Baron, J. (2006). Thinking about tax. *Psychology, Public Policy, and Law*, *12*(1), 106.

Mettler, S. (2011). *The submerged state: How invisible government policies undermine american democracy*. University of Chicago Press.

Minkov, M. (2012). World values survey. *The Wiley-Blackwell Encyclopedia of Globalization*.

Muehlbacher, S., Kirchler, E., Hoelzl, E., Ashby, J., Berti, C., Job, J., & Waldherr, K. (2008). Hard-earned income and tax compliance: A survey in eight nations. *European Psychologist*, *13*(4), 298–304.

Nassif, C., Joya, O., Haque, T., & A., F. (2018). Afghanistan to 2030 : priorities for economic development under fragility. Retrieved from `http://documents.worldbank.org/curated/en/156881533220723730/Afghanistan-to-2030-priorities-for-economic-development-under-fragility`

NSIA. (2018). *Afghanistan living conditions survey 2017-2018*. National Statistics and Information Authority. Retrieved from `https://cso-of-afghanistan.shinyapps.io/ALCS_Dashboard/`

Pannenberg, M. (2007). Risk aversion and reservation wages. *IZA Discussion Paper No. 2806, SOEPpaper, No. 23*.

Paridon, H. M., & Kaufmann, M. (2010). Multitasking in work-related situations and its relevance for occupational health and safety: Effects on performance,

subjective strain and physiological parameters. *Europe's Journal of Psychology*, *6*(4), 110–124.

Picchio, M., Suetens, S., & Ours, J. (2017). Labour supply effects of winning a lottery. *The Economic Journal*, *128*(611), 1700–1729.

Pissarides, C. A. (1974). Risk, job search, and income distribution. *Journal of Political Economy*, *82*(6), 1255–1267.

Rick, S., Paolacci, G., & Burson, K. (2018). Income tax and the motivation to work. *Journal of Behavioral Decision Making*, *31*(5), 619–631.

Robins, P. (1985). A comparison of the labor supply findings from the four negative income tax experiments. *Journal of Human Resources*, 567–582.

Rubinstein, A. (1997). *Modeling bounded rationality (zeuthen lecture book series.* MIT Press.

Sapsford, D., & Tzannatos, Z. (1993). *The economics of the labour market.* Macmillan International Higher Education.

Schöttner, A. (2008). Relational contracts, multitasking, and job design. *The Journal of Law, Economics, & Organization*, *24*(1), 138–162.

Sillamaa, M. (1999). How work effort responds to wage taxation: A non-linear versus a linear tax experiment. *Journal of Economic Behavior & Organization*, *39*(2), 219–233.

Slemrod, J., Blumenthal, M., & Christian, C. (2001). Taxpayer response to an increased probability of audit: evidence from a controlled experiment in minnesota. *Journal of Public Economics*, *79*(3), 455–483.

Spink, A., Cole, C., & Waller, M. (2008). Multitasking behavior. *Annual Review of Information Science and Technology*, *42*(1), 93–118.

Srinivasan, T. N. (1973). Tax evasion: A model. *Journal of Public Economics*, *2*, 339–346.

Sussman, A., & Olivola, C. (2011). Axe the tax: Taxes are disliked more than equivalent costs. *Journal of Marketing Research*, *48*(SPL), 91– 101.

Swenson, C. (1988). Taxpayer behavior in response to taxation: An experimental analysis. *Journal of Accounting and Public Policy*, *7*(1), 1–28.

Thaler, R. (1999). Mental accounting matters. *Journal of Behavioral Decision Making*, *12*(3), 183–206.

Thaler, R., & Johnson, E. (1990). Gambling with the house money and trying to break even: The effects of prior outcomes on risky choice. *Management Science*, *36*(6), 643–660.

Tobin, J. (1958). Estimation of relationships for limited dependent variables. *Econometrica: Journal of the Econometric Society*, 24–36.

Torgler, B. (2006). The importance of faith: Tax morale and religiosity. *Journal of Economic Behavior & Organization*, *61*(1), 81–109.

Torgler, B. (2007). *Tax compliance and tax morale: A theoretical and empirical analysis*. Edward Elgar Publishing.

Torgler, B., & Schneider, F. (2009). The impact of tax morale and institutional quality on the shadow economy. *Journal of Economic Psychology*, *30*(2), 228–245.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*(4157), 1124–1130.

Wilcoxon, F. (1992). Individual comparisons by ranking methods. In *Breakthroughs in statistics* (pp. 196–202). Springer.

Woods, S., & Hampson, S. (2005). Measuring the big five with single items using a bipolar response scale. *European Journal of Personality: Published for the European Association of Personality Psychology*, *19*(5), 373–390.

Wooldridge, J. (2010). *Econometric analysis of cross section and panel data*. MIT press.

Chapter 5

Appendix A

5.1 Taxed windfall instructions

Welcome to today's experiment at Rana University. You will be taking part in an experiment on decision making. Starting from now, you are kindly asked to refrain from communicating with other participants in this session. You will be paid for your time and effort; your cash earnings depend solely on your decisions. You have been provided with a hard-copy of the instructions, you may refer to these at any point during the experiment or alternatively you can raise your hands and the experimenter will answer your questions individually without disturbing others. It is important to understand the rules of the experiment before you proceed so pay close attention to the following instructions please.

In this experiment, your earnings are calculated in tokens and 1 token is equal to 25 AFN (£0.30). At the end of the experiment, the average of 3 randomly rounds are chosen for payment purposes. Your token earnings will be converted, rounded up to the nearest tens into Afghanis (AFN) and will be paid privately in cash. There are two parts in this experiment.

Part A:

Stage 1: Each of you has been given a pack of scratch cards numbered 1 to 12. At the start of each round, tore apart the card belonging to that round i.e. for round 2 tear

apart card number 2 and scratch it to see the amount of variable tokens allocated to you. After scratching, record the tokens you have earned from this in the box provided in the z-Tree screen. In order to save and proceed to the following stage each time, you must click confirm.

Stage 2: You are asked to solve 48 slider puzzles in order to earn more tokens. You are paid at a piece rate of 1 token per correctly positioned slider puzzle. Each slider is positioned at either end of the line (0 or 100) and your tasked to drag and place this at 50 using a mouse. Only correctly positioned sliders will earn you tokens. You have also been given the option to opt-out should you wish. You can do so by clicking the SKIP red-button to opt-out of this stage at any point during the task without losing any of your earnings. You have 120 seconds to complete this task.

Stage 3: All your earnings are taxable, and you will be presented with a tax form to report your gross income for each round. There is a tax rate of 35% on your earnings, for example for 10 tokens, 3.5 tokens taxes will apply. After you submit your tax returns, the correct amount is calculated by the computer and is deducted from your total earnings. There is also a 5% chance of being selected for tax audit: If you are audited and if you have reported your earnings accurately, then no further action will take place. Your final earnings will stay the same as before being audited.

If you are audited and if you have under-reported your earnings, in addition to the correct amount of the tax, you will pay a fine equal to 25% of the unpaid taxes. The audit probability is independent in each round and your previous filing behaviour doesn't change the audit probability for the next round.

Stage 4: The final screen will present the following information for that round:

- Your variable tokens
- Your tokens earned from the slider puzzles
- Your declared variable tokens
- Your declared slider task tokens
- Paid amount in taxes
- Net earnings (after tax deductions)

- Whether you were audited or not
- Your final payoff for that round in tokens

Rounds repeat themselves after stage 4, i.e. after stage 4, it goes back to stage 1 and you are required to scratch a new card for the variable tokens. The average of 3 random rounds from this is chosen for payment.

Part B:

Stage 5: You will be asked to make an investment decision in the following manner: you will have 4 tokens; each token is worth 25 Afghanis (£0.30). You are required to invest this in an account that pays 2.5 tokens for every token invested with a probability (p = 1/2); however, with probability (1-p) it pays back nothing. To determine the outcome, the computer will draw a number between 1 and 10; if numbers 1-5 are picked, then you lose the amount you allocated; if numbers 6-10 are picked, then you win 2.5 times the amount you allocated. The unallocated amount from the 4 original tokens and the outcome of this lottery will be added to your final tokens in the experiment.

Stage 6: Finally, you will be presented with a set of questions to answer. With this round the experiment comes to an end.

Stage 7: You will be notified of your final earnings in both tokens and Afghanis (AFN). You are required to confirm this by clicking the button at the bottom of the page. Once this is done, please notify the experimenter by raising your hand and wait to be attended to for payment.

5.2 Untaxed windfall instructions

Welcome to today's experiment at Rana University. You will be taking part in an experiment on decision making. Starting from now, you are kindly asked to refrain from communicating with other participants in this session. You will be paid for your time and effort; your cash earnings depend solely on your decisions. You have been provided with a hard-copy of the instructions, you may refer to these at any point during the experiment or alternatively you can raise your hands and the experimenter will answer your questions individually without disturbing others. It is important to

understand the rules of the experiment before you proceed so pay close attention to the following instructions please.

In this experiment, your earnings are calculated in tokens and 1 token is equal to 25 AFN (£0.30). At the end of the experiment, the average of 3 randomly rounds are chosen for payment purposes. Your token earnings will be converted, rounded up to the nearest tens into Afghanis (AFN) and will be paid privately in cash. There are two parts in this experiment.

Part A:

Stage 1: Each of you has been given a pack of scratch cards numbered 1 to 12. At the start of each round, tore apart the card belonging to that round i.e. for round 2 tear apart card number 2 and scratch it to see the amount of variable tokens allocated to you. After scratching, record the tokens you have earned from this in the box provided in the zTree screen. In order to save and proceed to the following stage each time, you must click confirm.

Stage 2: You are asked to solve 48 slider puzzles in order to earn more tokens. You are paid at a piece rate of 1 token per correctly positioned slider puzzle. Each slider is positioned at either end of the line (0 or 100) and your tasked to drag and place this at 50 using a mouse. Only correctly positioned sliders will earn you tokens. You have also been given the option to opt-out should you wish. You can do so by clicking the SKIP red-button to opt-out of this stage at any point during the task without losing any of your earnings. You have 120 seconds to complete this task.

Stage 3: Your earnings from the slider puzzles are taxable and you will be presented with a tax form to report your slider puzzle earnings ONLY for each round. Your variable tokens are NOT taxable. There is a tax rate of 35%, for example for 10 tokens, 3.5 tokens taxes will apply. After you submit your tax return, the correct amount is calculated by the computer and is deducted from your total earnings. There is also a 5% chance of being selected for tax audit:

- If you are audited and if you have reported your earnings accurately, then no further action will take place. Your final earnings will stay the same as before being audited.

- If you are audited and if you have underreported your earnings, in addition to the correct amount of the tax, you will pay a fine equal to 25% of the unpaid taxes. The audit probability is independent in each round and your previous filing behaviour doesn't change the audit probability for the next round.

Stage 4: The final screen will present the following information for that round:

- Your variable tokens
- Your tokens earned from the slider puzzles
- Your declared slider task tokens
- Paid amount in taxes
- Net earnings (after tax deductions)
- Whether you were audited or not
- Your final payoff for that round in tokens

Rounds repeat themselves after stage 4, i.e. after stage 4, it goes back to stage 1 and you are required to scratch a new card for the variable tokens. The average of 3 random rounds from this is chosen for payment.

Part B:

Stage 5: You will be asked to make an investment decision in the following manner: you will have 4 tokens; each token is worth 25 Afghanis (£0.30). You are required to invest this in an account that pays 2.5 tokens for every token invested with a probability (p = 1/2); however, with probability (1-p) it pays back nothing. To determine the outcome, the computer will draw a number between 1 and 10; if numbers 1-5 are picked, then you lose the amount you allocated; if numbers 6-10 are picked, then you win 2.5 times the amount you allocated. The unallocated amount from the 4 original tokens and the outcome of this lottery will be added to your final tokens in the experiment.

Stage 6: Finally, you will be presented with a set of questions to answer. With this round the experiment comes to an end.

Stage 7: You will be notified of your final earnings in both tokens and Afghanis (AFN). You are required to confirm this by clicking the button at the bottom of the page. Once this is done, please notify the experimenter by raising your hand and wait to be attended to for payment.

5.3 Taxed windfall histogram and box-plots

Fig. 5.1 Taxed windfall histogram and box-plots

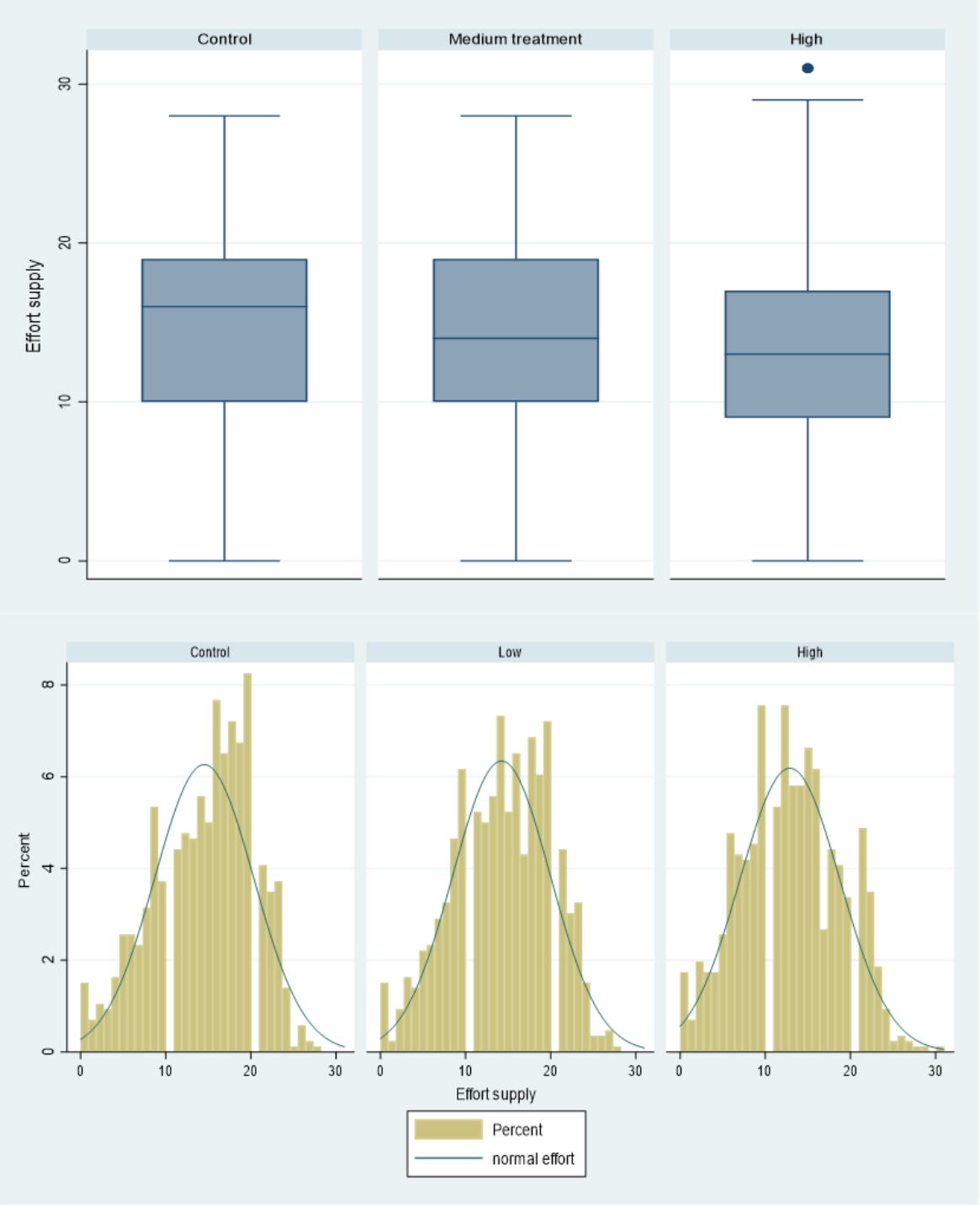
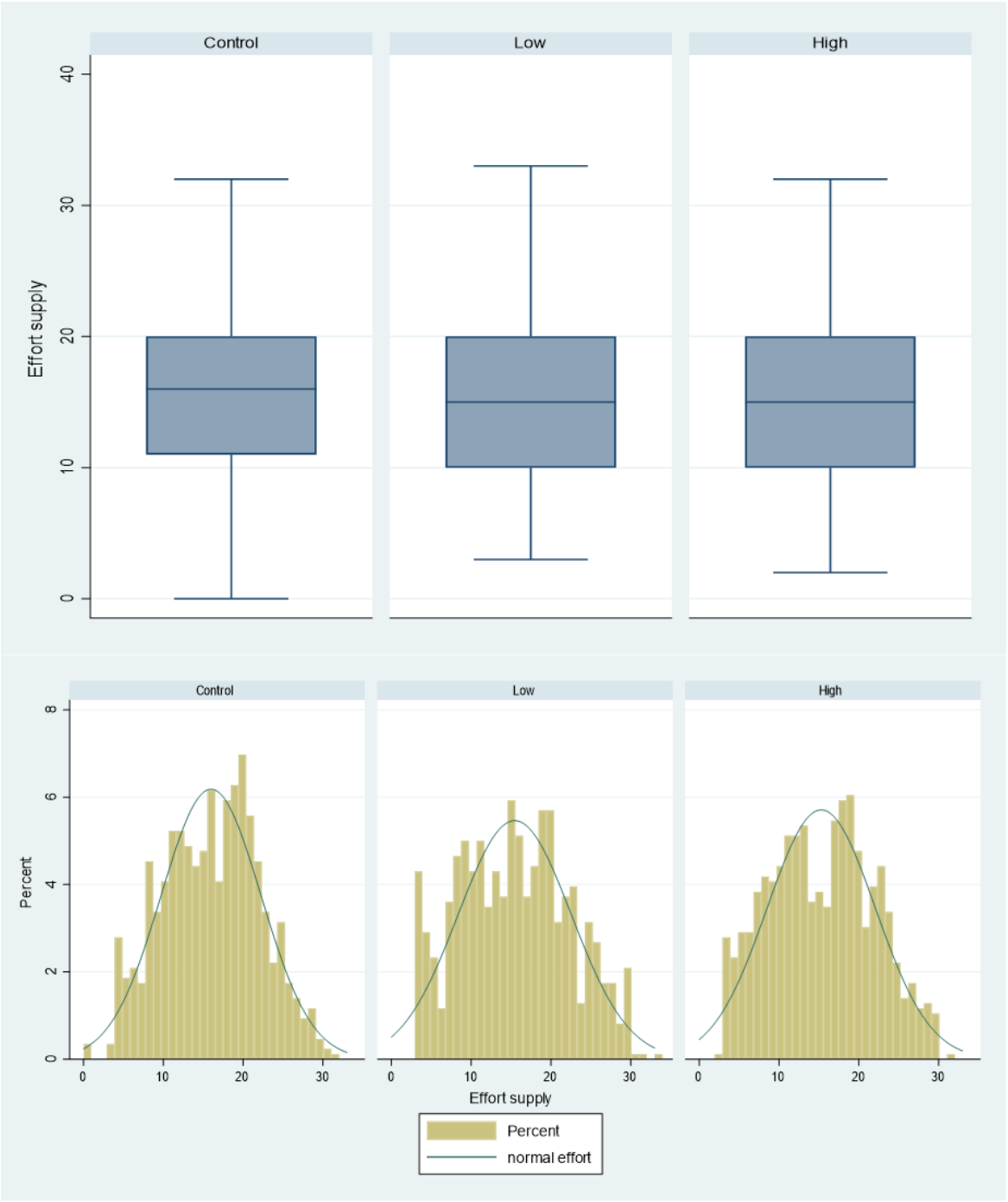
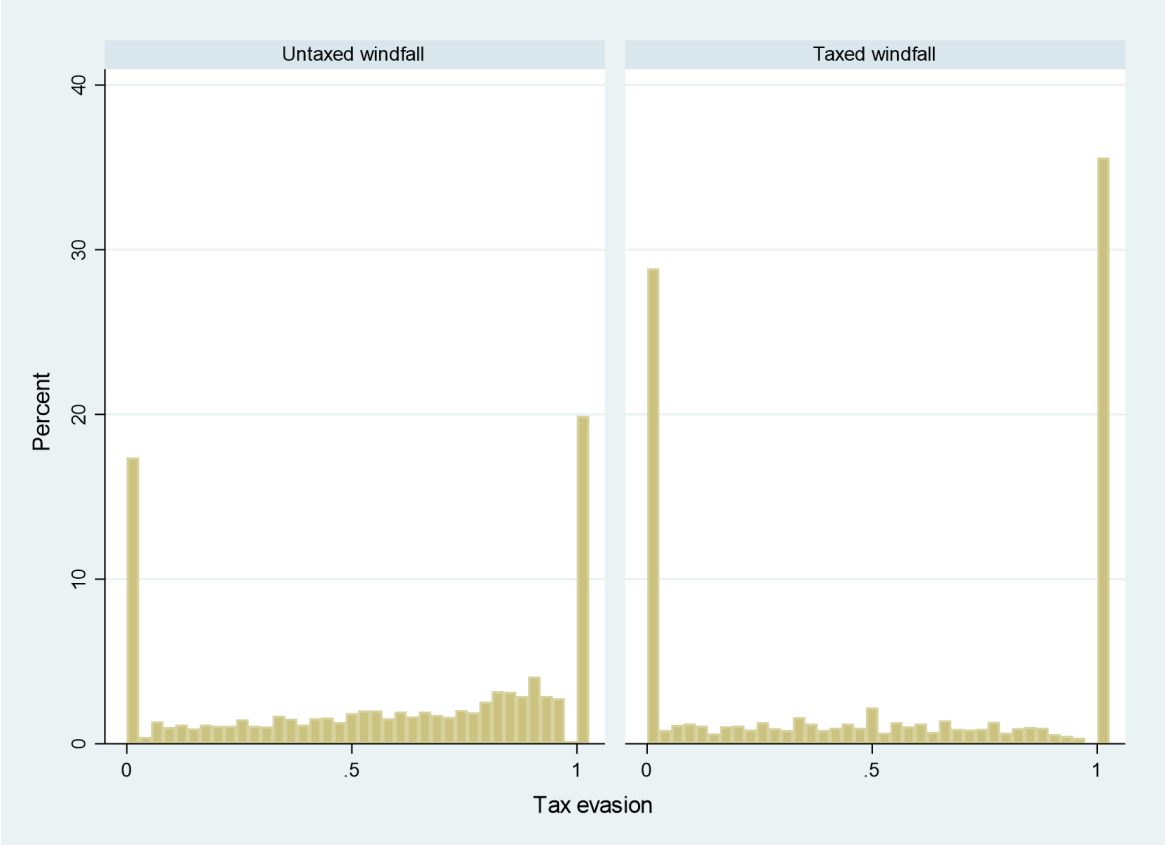


Fig. 5.2 Untaxed windfall histogram and box-plots



5.4 Tax evasion histograms

Fig. 5.3 Tax evasion histograms (mass points at each end)



5.5 Tax evasion; taxed windfall vs untaxed windfall

Table 5.1 Tax evasion; taxed windfall vs untaxed windfall

DV: Tax evasion	(1)	(2)	(3)	(4)
Low	0.00954	0.00953	0.0255	0.0256
	(0.0171)	(0.0171)	(0.0168)	(0.0168)
High	0.00764	0.00766	0.0277*	0.0278*
	(0.0170)	(0.0170)	(0.0166)	(0.0166)
Tax treatment	-0.0836	-0.0871	-0.112	-0.114
	(0.0683)	(0.0688)	(0.0743)	(0.0747)
Period			-0.00723***	-0.00724***
			(0.00197)	(0.00197)
Audited			-0.715***	-0.713***
			(0.0585)	(0.0584)
Caught			0.853***	0.850***
			(0.0722)	(0.0721)
Effort			0.0196***	0.0197***
			(0.00173)	(0.00173)
Risk aversion			0.0566*	0.0572*
			(0.0336)	(0.0334)
Attitude toward the Govt.			0.0173	0.0155
			(0.0108)	(0.0109)
Tax morale			-0.0401***	-0.0384***
			(0.0134)	(0.0135)
Trust in Govt.			0.0193*	0.0212*
			(0.0114)	(0.0115)
Knows evasion			0.00540	0.00782
			(0.0109)	(0.0112)
Believes pays all taxes			0.0127	0.0128
			(0.0130)	(0.0130)
Age			-0.0179	-0.0180
			(0.0119)	(0.0118)
Male			0.0231	0.0267
			(0.0655)	(0.0649)
Extraversion		0.00271		0.00509
		(0.0129)		(0.0125)
Agreeableness		-0.00738		-0.000732
		(0.0138)		(0.0135)
Emotional stability		0.0110		0.00616
		(0.0124)		(0.0118)
Conscientiousness		-0.0312**		-0.0325***
		(0.0129)		(0.0121)
Openness		0.0111		0.0115
		(0.0129)		(0.0125)
Constant	0.597***	0.643***	0.657*	0.647*
	(0.0487)	(0.149)	(0.342)	(0.356)
Observations	5,160	5,160	5,160	5,160
Number of subjects	430	430	430	430
Log likelihood (LL)	-3582.2	-3577.9	-3409.3	-3404.8

Standard errors are clustered at individual level in parentheses
Coefficients are marginal effects
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.6 Untaxed windfall; tax evasion by productivity levels

Table 5.2 Untaxed windfall; tax evasion by productivity levels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV: Tax evasion	Pooled	Pooled	zero	zero	low	low	high	high
Low	-0.0185	0.0115						
	(0.0183)	(0.0176)						
High	0.00376	0.00870						
	(0.0182)	(0.0167)						
Average productivity	0.0935	0.117	0.0937	0.104	0.140	0.174**	0.0505	0.0745
	(0.0751)	(0.0734)	(0.0772)	(0.0742)	(0.0871)	(0.0851)	(0.0764)	(0.0738)
High productivity	0.135*	0.137*	0.132*	0.146**	0.157*	0.131	0.136*	0.134*
	(0.0706)	(0.0703)	(0.0726)	(0.0711)	(0.0818)	(0.0810)	(0.0719)	(0.0706)
Extraversion	-0.00845	-0.00648	-0.00755	-0.00304	-0.00628	-0.00671	-0.0117	-0.0106
	(0.0108)	(0.0109)	(0.0110)	(0.0110)	(0.0125)	(0.0127)	(0.0109)	(0.0110)
Agreeableness	-0.00435	0.00663	-0.0167	-0.00772	0.00499	0.0211	0.00286	0.0123
	(0.0129)	(0.0136)	(0.0133)	(0.0138)	(0.0150)	(0.0158)	(0.0131)	(0.0137)
Emotional stability	0.0296***	0.0291***	0.0420***	0.0364***	0.0252**	0.0286**	0.0233**	0.0258**
	(0.0103)	(0.0103)	(0.0105)	(0.0104)	(0.0119)	(0.0119)	(0.0104)	(0.0103)
Conscientiousness	-0.0237**	-0.0189*	-0.0332***	-0.0313***	-0.0226*	-0.0157	-0.0136	-0.00890
	(0.0108)	(0.0108)	(0.0111)	(0.0109)	(0.0125)	(0.0125)	(0.0110)	(0.0108)
Openness	-0.00857	-0.0111	-0.00475	-0.00476	-0.00774	-0.0152	-0.0123	-0.0141
	(0.0115)	(0.0119)	(0.0118)	(0.0120)	(0.0134)	(0.0137)	(0.0117)	(0.0119)
Tax morale		-0.0168		-0.0121		-0.0278*		-0.0124
		(0.0124)		(0.0125)		(0.0144)		(0.0125)
Believes pays all taxes		0.0160		0.0202*		0.00528		0.0168
		(0.0116)		(0.0117)		(0.0135)		(0.0117)
Attitude toward Govt.		0.0125		0.0168*		0.0178		0.00714
		(0.00964)		(0.00969)		(0.0112)		(0.00969)
Trust in Govt.		0.00399		0.00477		0.00716		0.00364
		(0.0102)		(0.0103)		(0.0118)		(0.0102)
Age		-0.0108		-0.0126		-0.0123		-0.00837
		(0.00916)		(0.00920)		(0.0105)		(0.00918)
Risk aversion		-0.0105		-0.0320		-0.00595		-0.0141
		(0.0327)		(0.0329)		(0.0381)		(0.0327)
Knows evasion		-0.00148		0.00435		-0.0170		-0.00110
		(0.0104)		(0.0105)		(0.0121)		(0.0104)
Audited		-2.971		-3.107		-3.436		-2.879
		(35.10)		(49.81)		(61.54)		(42.14)
Period		-0.0118***		-0.00118		-0.00912***		-0.0194***
		(0.00207)		(0.00446)		(0.00335)		(0.00341)
Male		-0.0567		-0.0385		-0.0552		-0.0686
		(0.0587)		(0.0592)		(0.0675)		(0.0588)
Caught		3.029		3.332		3.512		2.940
		(35.10)		(49.81)		(61.54)		(42.14)
Constant	0.587***	0.893***	0.620***	0.874***	0.487***	0.978***	0.578***	0.883***
	(0.131)	(0.295)	(0.134)	(0.297)	(0.152)	(0.340)	(0.132)	(0.296)
Observations	2,577	2,577	857	857	860	860	860	860
Number of subjects	215	215	215	215	215	215	215	215
Log likelihood (LL)	-1611.2	-1349.2	-611.1	-511.8	-613.4	-524.3	-649.1	-584.2

Standard errors clustered at individual level in parentheses
Coefficients are marginal effects
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.7 Static labour supply model

5.7.1 Equilibrium existence

Equation 3.3 represents a tangency condition between the slope of the budget constraint (w) and the slope of the indifference curve ($U_l^{'}/U_Y^{'}$). For the purpose of existence of interior solution we suffice with the tangency which diagrammatically can be shown. We could show this formally using Kuhn-Tucker conditions but intuition from the tangency condition is perfectly clear. It is also possible that G is high and w is low, which will result in a corner solution, i.e. it would be optimal not to work at all (see (Sapsford & Tzannatos, 1993); (Aaberge & Colombino, 2014).

5.7.2 Comparative statics

To obtain dh/dG, we totally differentiate equation 3.4:

$$Adw + Bdh + cdG = 0 \tag{5.1}$$

$$A = (U_Y^{'} + wU_Y^{''}h - U_l^{'}) \tag{5.2}$$

$$B = (w(U_Y^{'}w - U_l^{'}) - (U_Y^{''}w - U_l^{''}) \tag{5.3}$$

$$C = (wU_Y^{'} - U_Y^{''}) \tag{5.4}$$

$U(wh + G, T - h)$ must be concave in h, therefore, $B < 0$. In addition SOCs require $U_Y^{''} \leq 0$ and $U_l^{''} \leq 0$. Holding changes in effort earnings constant $dw = 0$, we have:

$$\frac{dh}{dG} = -\frac{C}{B} \tag{5.5}$$

Assuming leisure is a normal good, we get that $\frac{dh}{dG} < 0$.

5.8 Allingham-Sandmo model (1972)

5.8.1 Equilibrium existence

For existence of an interior solution, first order condition must be positive at $x = 0$ and negative at $w = 0$. To find the conditions for a maximum, we must differentiate equation 3.6 for second moments:

$$\frac{dU^2}{d^2x} = D = \tau^2(1-p)U_Y^{''} + (t-f)^2U_Z^{''} \tag{5.6}$$

when $x = 0$ and $x = w$

$$-\tau(1-p)U^{'}(w) - (\tau - f)pU^{'}(w - fw) > 0 \tag{5.7}$$

$$-\tau(1-p)U^{'}(w(1-\tau)) - (\tau - f)pU^{'}(w(1-\tau)) < 0 \tag{5.8}$$

Rearranging and assuming $p = \tau$, the conditions can be rewritten as:

$$pf > \tau\left[(1-p)\frac{U^{'}(w)}{U^{'}(1-\tau)} + p\right] \tag{5.9}$$

$$pf < \tau \tag{5.10}$$

Part II

Bribery as Administrative Corruption

Chapter 1

Introduction

At the very core of it, corruption can be presented as a social dilemma such that a transaction benefits two or more individuals at the cost of other members of the society. There is a negative externality incurred directly or indirectly that harms others. In the interaction between citizens and public officials, the citizen has the choice to bribe or not to bribe, whereas the public official could choose to reject the bribe or accept it. While referred to as "petty" or "administrative" corruption, examples of these may include payments to skip long queues, avoid court summons, escape speeding-tickets, evade taxes, gain employment or avert legal requirements/certification to win government contracts. When aggregated over time, these practices potentially have terrible consequences and can lead an economy to a “corruption trap” (Rose-Ackerman, 1999).

According to Global Corruption Barometer in 2017, 1 in 4 people around the world paid a bribe to access public services in the past 12 months (Barometer, 2017). Bribery affects everyone negatively but leaves individuals at the poorest end of the income distribution worse off compared to those at the highest end. In addition, corruption undermines development and weakens institutions within a state. The negative growth effects are much stronger for poorer countries where corruption is believed to be more widespread (Klitgaard, 1991; Bardhan, 1997; Lambsdorff, 2007). Given the global scale and the crippling effects of administrative corruption, devising effective policy to understand demand and supply of bribery is paramount. Bribery is one of the many forms of administrative corruption. Analogous to markets, there is supply (agents and

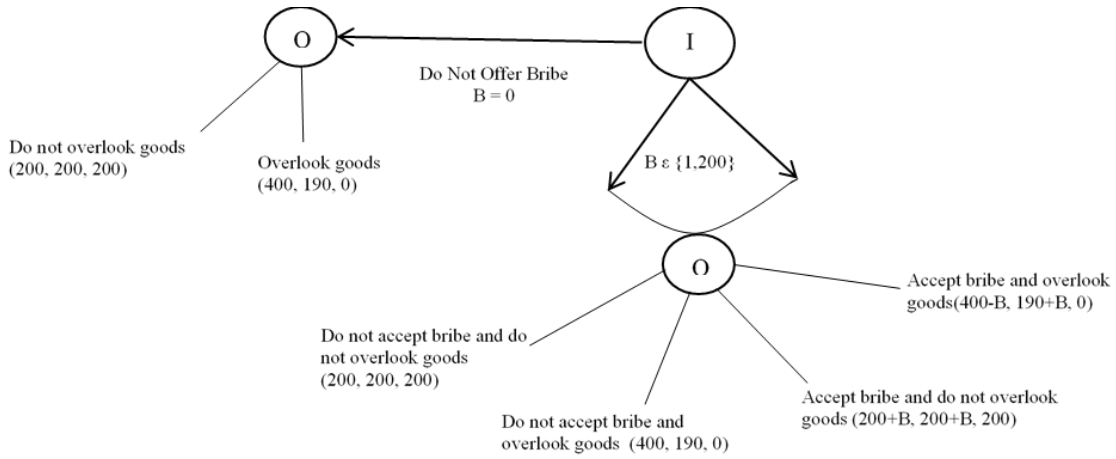
corporations) and demand (public officials) for bribes. Citizens who offer or 'supply bribes' to gain favourable treatments or skip long waiting lists do so to "grease the wheels" (Leys, 1965; Lui, 1985). Bribes allow citizens to make the slow bureaucratic setting, where institutional quality is low, more efficient. Public officials who 'demand bribes' do so to provide preferential treatments for reasons such as acting purely out of self-interest to maximise private gains.

In this spirit, I study supply and demand for bribes and explore the effects of introducing a legal fee option as an institutional reform on the rate of bribery. In essence, the idea is to test whether the introduction of a two-tier system of service delivery can deter citizens from offering bribes and public officials from accepting bribes knowing that the citizen had the choice for a legal route but chose to bribe. Previous experiments studying bribery have looked at the effects of staff rotation (Abbink, 2004), symmetric vs asymmetric monitoring systems (Lambsdorff & Nell, 2007; Basu, 2011; Abbink et al., 2014; Engel et al., 2016) and the four-eye principle implementation (Schikora, 2011; Frank et al., 2015; Bodenschatz & Irlenbusch, 2019). I will deal with this literature in more details in the literature review chapter.

In addition, I examine how moral and strategic concerns change depending on the existence of negative externalities imposed on the rest of the society due to the corrupt transactions. In doing so, this study gives further evidence to the findings in Barr and Serra (2009). I explore the role of beliefs in predicting as well as actually engaging in bribery and taking up the legal fee by eliciting first-order beliefs. Finally, I explore whether the changes are sensitive to gender, as in Lambsdorff & Frank (2011), Rivas (2013), and to differences in students vs non-students.

There are several advantages in using experiments to study bribery (administrative corruption). Experiments allow greater degree of control by removing the identification problem as well as measuring/observing bribery directly. Corruption simulations are designed experimentally to replicate specific aspects of corruption in order to test the ramifications of monetary/nonmonetary incentives and anti-corruption policies (Roth, 2002). Most importantly, there are two aspects of decision-making one must remember when we speak about corruption: 1) subject's view of corruption, 2) subjects' propensity to engage in corrupt decisions. For a full review of studies based on perception measures of corruption that focuses on the first aspect (Rose-Ackerman, 2005). However, to

Fig. 1.1 Importer, Officer and Government



study the second aspect of decision-making, other methods such as experiments are more flexible and useful.

Previous laboratory experiments studying briber-bribee interaction do so with variations of a similar corruption game. A standard dynamic bribery game runs as follows: subjects are matched and assigned to the role of public citizens, public officials and/or firms (for studies with three players). As modified trust games, the moves are either simultaneous or sequential and either one-shot or repeated over several rounds. A bribe is offered by a citizen or a firm to the public official in return for a favourable decision. Usually, this 'corrupt' transaction has a negative externality on the payoffs of other subjects taking part in the experiment or some other variations like lowering payments to a charity. The public official either accepts or rejects the offer. If the official rejects, the game ends. If the official accepts the offer, they must return the favour. Then, manipulations take place within this context. In some of those, other citizens can retaliate against the corrupt transaction at a personal cost, whereas public officials can accept/reject and/or return/not return the favour, see Figure 1.1, is an illustration of one such configuration by Abbink & Wu (2017).

Nevertheless, the current study adopts a novel non-dynamic experimental design where individuals (citizens or public officials) are fully accountable over whether bribery is enforced or not. In previous designs, including the one depicted in Figure 1.1, mostly it would be up to the public official to enforce the bribe and ultimately carry the weight of imposing the negative externality on other citizens. In such dynamic designs, outcomes

could be interfered by confounds such as conditional cooperation i.e. the need to reciprocate when offered a bribe, and the competing bias i.e. getting competitive upon the opportunity to interact with other players. Thus, with a non-dynamic framework, subjects are not assigned roles and are left to decide solely based on their preferences, with no further strategic concerns.

Assigning roles in experiments may interfere with the natural course of decision-making or may fail to trigger the expected frame of mind. Therefore, it is important that subjects are not told to act as public officials or citizens. In addition, most bribery games end if the subject chooses not to bribe, while choosing to bribe ensues a series of consecutive decisions that will entice experimental curiosity and compel subjects to choose the bribe option more often as in Figure 1.1.

It is for the reasons outlined above that a non-dynamic design is better suited to study bribery decisions. To reiterate, there are two novel contributions in the study of bribery. First, it studies the effects of introducing a legal fee that allows for a preferential treatment on offering and accepting bribes. Second, the non-dynamic experimental approach that studies supply and demand for bribes separately, eliminates some of the criticisms pointing at the experimental designs in this area.

In experiment one, subjects (citizens) had to complete a real effort task of entering random sequences of letters and numbers correctly to earn a lump sum. This was done to invoke sense of ownership of the earnings. Next, subjects were allocated randomly to one of the three treatments. In *No Legal Fee (henceforth NLF)* they faced a choice between two payment options to receive their earnings in the experiment: default, free of charge with longer waiting time and another option to pay a bribe with no waiting time. The bribe option had a negative externality such that one other participant in the experiment would be forced to wait twice as the default waiting time. Previous experiments have motivated the negative externality by imposing the loss on five or more other participants (Abbink et al., 2002; Barr & Serra, 2010). The negative externality is something economically meaningful, corruption impacts others, and motivating it this way captures whether the briber/bribee cares. The *Legal Fee and Negative Externality (henceforth LFNE)* treatment was the same as *NLF* but added a legal fast-track option to pay a fee to speed up the payment process with no negative externality. Choosing the legal fee was more expensive than bribing. *Legal Fee (henceforth LF)* was the last treatment, which was exactly as the same as *LFNE*

but the bribe option did not have the negative externality attached to it either. This was done to see if negative externality had an impact on the decisions.

In experiment two, public officials had to decide whether to reject or accept a bribe offered to them by subjects from another experiment. The public officials were told that subjects in an experiment had the choice to pay a bribe, pay a fee or neither (depending on the treatment). Now, it was up to them to decide whether to process the payments of those who paid a bribe or not. Public officials were allocated randomly to one of the four following treatments:

No Legal Fee (henceforth NLF), public officials in this treatment were presented with the storyline from the NLF treatment from the Citizen's bribery chapter. They were told that subjects taking part in an experiment faced a choice of two options to get their payments processed: default, free of charge with relatively longer waiting time (11 days), or paying a bribe against a premium with no waiting time. The bribe option associated a negative externality such that it forced one other participant to wait 11 additional days to receive their payments (total of 22 days). With this information, public officials were then told that now it was up to them to process the payments by accepting or rejecting the bribes offered. Public officials were told that there were two non-active participants in the same experiment as them who would incur the negative externality, should they choose to accept the bribe. Again, the negative externality associated to accepting the bribe by the officials was that one other passive participant in the experiment would be made to wait twice as much as the default waiting time. The gains from the bribe would then directly benefit the official.

The *Legal Fee and Negative Externality (henceforth LFNE)* treatment was the same as *NLF* but the deviation was introduced in the story told to the public officials such that subjects participating in an experiment also had a legal option against a 9p premium but chose not to do so. *Legal Fee (LF)* treatment was the same as *LFNE* but in the story presented to the public officials, they were told that the bribe option had no negative externality. Up until now the stories presented to the public officials in each treatment mirrored those in Citizen's Bribery chapter. I add a fourth treatment *Legal Fee and Probabilistic Negative Externality (henceforth LFPNE)* with the following variation: the story presented to the public officials were the same as that of *LFNE* and *LF* treatments but the negative externality had a 50% probability of materialising.

The idea was to capture a "moral wiggle room" hypothesis as in Dana et al., (2007) using the probability of negative externality incurring or not.

Officials had to make a choice to accept or reject the bribe that was offered to them by complete strangers in another experiment. Since this was a non-dynamic design, two passive participants were recruited as the rest of the society such that each public official decision would affect their payoff to ensure that the experiment remained incentivised and there was no deception. The use of passive participants to incur the negative externality is common in bribery experiments (Barr & Serra, 2009). In other words in experiment one, bribees were taken as passive and did not make any decisions, in experiment two, bribers were assumed passive and did not make any decisions however they were not the same subjects. Therefore, in the supply and demand for bribes, there is no specific link between the citizen and the public official.

In experiment one, I find that many citizens pay the legal fee (i.e. take up the fast track option) because they want to grease the wheels. They prefer a solution that does not imply a negative externality on the rest of the society. This could be due to two reasons: to avoid harming others (empathy) and self-image or social-image concerns. While they care about the negative effects of their decision on other's outcome, they also care about their image. This is either their self-image (their perception of themselves) or social image (other's perception of them). Citizens are willing to incur additional costs in doing so. In weak institutional settings, moral incentives are the determining factor. High supply of bribes can be minimised if preferential treatment is offered institutionally. I also find that beliefs about what constitutes the norm strongly predicts whether the individual will engage in bribery or not. Believing that others will accept bribes makes one more propense to similarly engage in corruption.

In addition, females indicate a general aversion to preferential treatment (both the paying bribes or the legal fee) compared to male subjects. Students are less corrupt (offer less bribes) than non-student subjects. Consequently, effective communication relative to observed and perceived corruption rates, when low, could further dampen corruption – however, the opposite could also be true. Governments should take this into account when choosing the information to be shared in campaigns that are aimed at fighting corruption.

In experiment two, despite caring about harming others, introducing a fast track option alone does not prevent public officials from accepting/demanding bribes. The costs imposed on others does not outweigh the private gains to the public official. Thus, this leads to choosing the legal fee less. This is what standard economic models of utility maximisation framework predicts too. Moreover, overall bribery rates are lower whenever there is a negative externality attached to it. Two types of reasoning emerge as prominent, those who maximise their gains which is referred to as 'profit-maximisers', and the 'rationalisers', who show signs of conflict and unease about harming others, and yet accept bribes.

To curb bribery acceptance or demand for bribes by the public official, complementary measures are required to support the effects of a fast track option that provides preferential treatment to the public. These may include adopting piece rate pay/efficiency wages or a central processing mechanism where monitoring is less costly. This way the public official's private gains are restricted and the decision to accept bribes is made costly.

Students indicate higher levels of bribe acceptance than non-students. However, when controlled for age, the difference is no longer present. In addition to this, I confirm previous studies findings on cultural background. Bribe acceptance rates are much higher among subjects from countries ranked higher by the CPI ranking too, also found in Fisman & Miguel (2007). This provides further validity to the findings in the experiment.

The rest of part two of the thesis is divided as follows: chapter two reviews the relevant literature, chapter three outlines experiment one, which discusses offering (supplying) bribes; chapter four outlines experiment two, which discusses accepting (demanding) bribes.

Chapter 2

Literature Review

Early theoretical research on corruption uses a principal-agent framework (Rose-Ackerman, 1978; Becker & Stigler, 1974; Klitgaard, 1991; Acemoglu & Verdier, 2000). It assumes a benevolent principal controls/monitors the actions of the corruptible agents in the administrative hierarchy. If so, anti-corruption policy measures should be based on three principles: increasing the cost of corruption for the official (penalties, effective monitoring), reduce its benefits (limits to discretionary powers of officials, balancing administrative monopoly) and increase the benefits of acting honestly (Mookherjee & Png, 1995; Marjit & Shi, 1998; Waller et al., 2002; Schulze & Frank, 2003).

These policy measures could be classified as addressing strategic concerns of the decision-making aspect i.e. punitive and legal measures to prevent corruption. The question is whether the legal fee (fast track option) acts as a substitute to offering and accepting bribes to access public services. Given that bribes may have social and personal costs, the question arises whether these costs matter for the parties involved in the transaction.

In broader terms, this study contributes to the literature that incorporates moral and strategic concerns in studying corrupt decisions. Examples of strategic concerns include those discussed under the principal-agent framework above. While, moral concerns manifest themselves in several ways, here I limit the focus on four types that I deem most relevant to this study:

First, individuals resist unfair transactions and are willing to enforce fairness, by focusing on the effects of their action on others' well-being (Kahneman et al., 1986; Engel, 2011). This is empathy, the ability to care for others and it plays an important role in explaining aspects of altruistic behaviour (Eisenberg & Miller, 1987; Batson, 1990; De Waal, 2008; Klimecki et al., 2016). Humans are not pure egoists and have "the capacity to share feelings of another" (Eisenberg & Fabes, 1990).

Second, individuals are concerned about how they act as well as how others judge their actions. Both self-image and social-image concerns have been heavily researched (Bodner & Prelec, 2003; Güth et al., 1982; Andreoni & Bernheim, 2009; Battigalli & Dufwenberg, 2007). Formally, self-image concerns could be defined as "the psychological benefits and costs of seeing oneself doing good or bad compared to a moral ideal" (Baumeister, 1999). On the other hand, social-image concerns could be defined as "one being observed and judged by others against some moral ideal" (Elster, 1989).

Third, individuals care about preserving relative outcomes. Even if others' outcomes are not affected, they are willing to give up their own material payoffs to make the outcomes more similar/equal (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000; Fehr & Fischbacher, 2003). In other words, aversion to preferential treatment which is a specific type of inequity aversion. In addition, procedures on how an outcome has come about matters for fairness (Fehr & Gächter, 2002, 2000).

Fourth, individuals use self-serving biases or what I refer to as rationalisation to make themselves or others seem/look 'honest' even when they behave dishonestly. This is when several narratives are employed by the individuals who act in their own self-interest to justify their action (Babcock & Loewenstein, 1997; Grossman & Van der Weele, 2017; Shalvi & Leiser, 2013).

Previous studies of bribery explicitly discuss the negative externality effects of acting corruptly (Barr & Serra, 2009; Abbink et al., 2002). The Barr and Serra (2009) paper finds negative externaltiy effects while the second paper does not. However, little discussion is devoted to the mechanisms or reasons why there is an effect. The behavioural factors mentioned above are all important and they have been studied in other aspects of decision making.

Whether negative externality associated to the corrupt decision matters or not is experimentally tested in (Abbink & Hennig-Schmidt, 2006). In their bribery game, if the bribe was accepted and the service was returned by the official, a cost was incurred on all other 16 participants. The authors found no evidence supporting the hypothesis that the negative externality prevented players from engaging in bribery. They argued that negative effects are negligible and campaigns to nudge consciousness about welfare-reducing effects of bribery may not be very effective.

Similarly, in another experiment where negative externality was motivated by the deviations in total amount of bribe offered by a group of three subjects while competing amongst themselves, they also competed against a reference group. The group with the highest deviation in bribe offers from that of the reference group then received the lowest payments in the experiment (Büchner et al., 2008). Authors concluded that negative externality does not play a role in decision-making process.

However, the null findings on the negative externality effects in Barr and Serra (2009) and Banerjee (2016) were challenged. In a modified one-shot ultimatum game, they found that bribery rates for citizens offering and public officials accepting bribes declined significantly when there was a negative externality attached to the bribe. There were several differences between this experiment and its predecessors which renders direct comparison of the results difficult. For instance, this was a one-shot game whereas in Abbink et al., (2002), subjects played a repeated game. Here, the incurred negative externality was on five 'other members of the society' who were inactive participants in the experiment.

The reasons behind the null results, as argued in Barr and Serra (2009) was the 'negative reciprocity' and 'conditional cooperation' amongst the players. Conditional cooperation arises due to the repeated nature of the games such that a player gives the matched partner the benefit of the doubt or just an implicit cooperation develops between partners. Negative reciprocity happens when players react negatively to their partner's negative actions (magnitude does not have to be the same). In other words, subjects in the previous experimental settings reciprocated in a 'quid pro quo' manner or a tit-for-tat strategy.

As discussed earlier, the experiments in this study breaks down the conditional co-operation and negative reciprocity incentives and eliminates any competition arising

by adopting a novel experimental design. This is to determine the effects of negative externality, including its underlying behavioural mechanisms.

Furthermore, this study contributes to the growing experimental literature on testing effectiveness of anti-corruption policy measures. By introducing a legal fee as an alternative to bribery, the study attempts to widen the spectrum of choices for citizens to access public services, at least those who can afford it, and make it harder for public officials to break the law.

Previous studies explore the effects of several policies. Lowering the cost of monitoring may help reduce corruption (Rose-Ackerman, 1999). Designing a different punishment mechanism for corrupt public officials, the citizens and conditioning the punishments on the delivery of corrupt decisions has been suggested as one way to encourage whistle-blowing which in turn lowers monitoring costs (Lambsdorff & Nell, 2007). A similar notion such as letting the "briber go free" was proposed by Basu (2011) that suggested a fundamental change in the legal domain for certain types of bribery.

Most legal systems consider the briber and the bribee guilty if the corrupt exchange is uncovered “symmetric system”. The proposal argued that this creates a reciprocity for both parties to stay quiet. In order to give one of the parties engaged in administrative corruption or bribery an incentive to act as a whistle-blower, the law should consider the briber not guilty. This will create an incentive for bribers to come forward and expose corrupt practices “asymmetric system”. Immediately there are several problems with the proposal as well as the advantage of "breaking the silence". Bribery hierarchy is a major issue in most legal systems. If one gets caught taking bribes, there is a possibility to bribe the very agency that has caught you in the first place. Bribery is only a small part of the bigger problem of institutionalised corruption. So, an asymmetric system may not guarantee reducing bribery. In addition, the asymmetric system doesn’t remove all the incentives to pay or take bribes. Other legal precautions are needed to make sure an asymmetric system is not abused.

Nonetheless, the effects of asymmetric vs symmetric system discussed above on harassment bribery was tested experimentally in Abbink et al., (2014). The paper found that when bribe giving is legalized, reporting increases and bribe demands decrease. In the experiment, the official had the option to retaliate against the whistle-blower and this lowered reporting rates but not significantly. The incentive to report under

asymmetric regime is therefore intrinsic. The above results were challenged by the findings in Engel et al., (2016). The authors carried out two experiments (loaded and neutral language) with symmetric and asymmetric monitoring systems in Germany and China. They found that bribery rates were high under both systems.

Interesting results have been found on group decisions vs individual decisions in studying bureaucratic processes in the context of corruption. Almost in all cases, group decisions have led to higher bribery rates compared to individual decisions. Four-eye principle is the introduction of an additional official in the administrative process for decision making. The idea is that the additional pair of eyes will act as a monitor to lower corrupt transactions and deter the first official from engaging in corruption. This was tested experimentally using students from Munich (Schikora, 2011), China and Germany (Frank et al., 2015) separately. Both studies found that bribery rates increased when an additional public official was included to make the final decision jointly. They argued that individual profit-maximising motives in the experiment crowded-out altruistic motives. In a one-shot game and repeated game setting Bodenschatz and Irlenbusch (2019) attempted to test the same policy question once more. They noted that bribery rates decreased with repeated games whereas for the one-shot game there were no effects.

Staff rotation is another policy practiced in several government offices including Germany. The policy involves moving public officials from one department to another in order to prevent the establishment of a cooperative behaviour between staff and clients. In an experiment, Abbink (2004) showed that staff rotation significantly reduced bribery, almost by 2/3. This experiment does not discuss the cost of implementing such policy or the dissatisfaction caused to labourers due being moved every now and then. The level of information about the corruptibility of the public official has a significant impact on citizens' behaviour. The idea was tested and found supporting results in Ryvkin and Serra (2012). Staff rotation is one of those mechanisms that brings about uncertainty about the behaviour of the partner.

Rewarding those who report bribery or corruption is another policy that was adopted by the government of Singapore. The effectiveness of such a policy was tested experimentally in Abbink and Wu (2017). They found evidence from a repeated game setting that permitting both parties to report (symmetric reporting mechanism) did in fact significantly reduce bribery.

Given that engaging in bribery is a risky act, individual risk attitudes is of importance in paying or receiving bribes. Experimental findings show that bribery rates are not significantly different among risk-loving, risk-averse and risk-neutral individuals. However, it has been found that belief about probability of getting caught i.e. perceived probabilities is very important in reducing bribery (Berninghaus et al., 2013). The effects of perceived probabilities links to the works of Tversky and Kahneman (1974) on judgement under uncertainty. The implication of this finding is that increasing the degree of uncertainty amongst the citizens leads to lower corruption levels.

While these policy measures result in mixture of findings with regards to bribery rates, there are no studies on the effects of a legal fee (fast track option) that resembles several features of a bribe in the first place, the stark difference being that the latter is illegal. This study contributes to the list of policies to tackle bribery as an adverse phenomenon. Finally, this study adds to the existing debate and findings on whether the following factors are important in studying corrupt decision-making: gender, student status and cultural background of individuals.

There is evidence suggesting that women are risk averse, more sensitive to social cues, less competitive and less selfish than men. For a review of the literature on this see Croson and Gneezy (2009). The evidence on increasing the share of female participation in the public sector on corruption is mixed (Dollar et al., 2001; Swamy et al., 2001; Sung, 2012; Jha & Sarangi, 2018). A cross-national experiment was carried out in Australia, India, Indonesia and Singapore by Cameron et al., (2009). This study showed that Australian women accept significantly lower bribes than men. In Singapore the opposite was true. There were no gender differences between India and Indonesia. Though indirectly related, in an experiment comparing male and female willingness to deceive, authors showed that men's willingness to deceive were significantly higher than that of women's who were facing identical situations (Dreber & Johannesson, 2008). In addition, Lambsdorff and Frank (2011) found that as public officials, women accepted less bribes than men when they were offered bribes. Less percentage of women reciprocated the favour compared to men and the rate of reporting the bribe were not very different between the genders. Similar results in the context of corruption were found for women in Rivas (2013). However, it was also found that women would act more opportunistically than men if the risk of detection was negligible (Armantier & Boly, 2011; Schulze & Frank, 2003).

Cultural norms may shape individual perceptions and influence attitudes towards corrupt decisions. Experimental evidence from Singapore (ranked 5th in CPI 2003), Indonesia (ranked 122nd in CPI 2003), India (ranked 83rd in CPI 2003) and Australia (ranked 8th in CPI 2003) produced puzzling results: in general it was found that Indian subjects were likely to offer bribes and less likely to punish the bribees compared to other three countries. Singaporeans and Indians had similar acceptance rates, and both were much higher than Indonesian and Australians. Singaporeans were much more tolerant of corruption whereas Indonesians were much strict. Considering these puzzling findings that CPI ranking countries did not match the experimental findings, the authors ruled out ethnicity/nationality as a driver of corruption (Cameron et al., 2009). This led them to argue that recent institutional reforms and values communicated through those reforms explains their results better than cultural background.

However, using data on parking tickets issued to diplomats in New York city, found a positive relationship for diplomats with unpaid tickets and corruption perception index (CPI) in their home country (Fisman & Miguel, 2007). They concluded that in societies where corruption is the norm, individuals have higher expectations that government officials are corrupt too.

Whether country of origin affects propensities to engage in corruption and whether time spent away from the country of origin changes those propensities was studied in Barr and Serra (2010). It was found that the former is a strong predictor of individual's willingness to engage in corruption. They also found that time spent in the UK was important in what they referred to as "socialisation". They observed that subjects from low CPI countries with the highest amount of time spent in the UK had lower propensity to engage in corrupt transactions. They argued that some norms prevalent in their home countries were carried across yet conformity to those norms declined over time.

Within every culture there exists social enforcement mechanisms, one of those may be the sense "social identity" of belonging to a low corrupt country, when this is the case, it may affect agent's propensity to engage in corruption. The idea was experimentally tested in the US with a subject pool of second-generation immigrants (Salmon & Serra, 2017). They found evidence that socio-cultural norms do play a role and bribery rates were much lower among those participants who identified themselves from countries with a low level of corruption.

Chapter 3

Citizen's Bribery

To remind ourselves, the aim of this experiment is to study supply of bribes. Often the supply and demand of bribes are studied jointly in the experimental settings. I argued that the interaction between experimental subjects gives rise to a number challenges, namely negative reciprocity and conditional cooperation. The following experiment is designed with no interactions. In doing so, it removes the burden of making a decision which is solely on the public official as the second mover and avoids decisions enticed by curiosity.

3.1 The Experimental procedures

Subjects were not exposed to all treatments. There were no interactions between subjects while the experiment was taking place either. Each round was repeated only once. Participants were completely randomly allocated to each treatment.

The experiment did not have risk of detection (punishment). The rationale behind this is twofold: The research question is to study paying bribes which is a small part of the problem in the wider context of corruption. For this reason eradicating it, is considered as secondary for the authorities. Secondly in most less developed and developing countries where bribery is widespread, it goes unnoticed i.e. the probability of getting caught is very low and therefore negligible. Moreover, I abstract away from the use of neutral language and provide full setting to the experiment. The default

option was presented as 'default', bribe was presented as 'bribe' and fast track was presented as 'fast track fee'. Again, this is done to add realism with the assumption that those engaged in bribery are almost always aware they are going to pay a bribe irrespective of the language used. Furthermore, if there are any effects (i.e. framing effects), they remain constant across all treatments.

Experimental findings are mixed on non-neutral vs neutral language[1]. For example (Abbink & Hennig-Schmidt, 2006) do not find differences for corruption games. They stated that in bribery games the intentions are understood irrespective of semantics. This result is particularly important in relation to the experiment in this chapter. On the other hand, there are experiments that find framing effect, such as (Barr & Serra, 2009).

The experiment was conducted online in November 2019 and participants were recruited via the Prolific platform (`http://prolific.co`). Subjects who have already signed up in this academic research platform normally receive an email informing them about taking part in a decision-making experiment. The subject pool was pre-screened by country whose GDP per capita is lower than 35,000 USD per annum (IMF, 2019). I followed two objectives with this pre-screening: to ensure recruiting subjects from less developed economies where bribery is believed to be more common. Second, financial stakes in the experiment were set to match the minimum wages in the UK, which is much higher when converted to other currencies internationally. This way the experiment is relatively high stake and captures corrupt transactions better. The experiment was designed using Otree software (Chen et al., 2016).

3.2 Overview of the experiment

3.2.1 Real effort task

Participants needed to complete a real-effort task of randomly selected letters and numbers in the spaces provided. In order to move to the next stage, they had to

[1]It is noteworthy that in the wider discussion within experimental economics evidence on framing effect has been found in many settings: dictator games (Brañas-Garza, 2007; Eckel & Grossman, 1996), public goods games (Andreoni, 1995; Cookson, 2000), prisoner's dilemma (Liberman et al., 2004) among others

enter 20 sequences correctly within 10 minutes. Subjects were told that doing the real effort task will earn them £1.5 lump sum. The use of real effort tasks is common in experimental economics (Abbink & Serra, 2012). The reason behind using a real effort task is for subjects to exert effort. This allows them to develop a sense of ownership and feel that they have earned their money.

3.2.2 Willingness to pay (WTP) pilot

As mentioned before, to determine the cost of the bribe and the fast track fee to be used in the actual experiment, first a separate willingness to pay (WTP) pilot with a sample size of 101 participants was carried out. I used the multiple price mechanism to elicit subjects' willing to pay for the bribe and the fast track fee (Andersen et al., 2006). As a result of the pilot, the fast track fee was set to be 50% more expensive than the bribe.

3.2.3 Treatments

Each treatment was varied in one crucial aspect to investigate the research questions in this chapter. I used the payoffs earned in the real-effort task to delay payments to the subjects (citizens) by conditioning the time of the payment on their chosen delivery mechanism/option. As subjects signed up and read the instructions, they were promised that they would earn £1.50 by taking part in this experiment. At the end of the real-effort task, they were explicitly told that they had correctly entered the sequence of numbers and earned money. The idea of earning one's payoff was made salient to ensure that subjects felt that it was *their* earnings.

In total there were three options available depending on the treatment, default, pay a bribe or pay the fast track fee. Each subject was then presented with the delivery mechanisms to choose from to receive their earnings. This was done specifically to replicate the notion of 'harassment' or 'administrative' bribery. It is when individuals are entitled to receive a service for free and get agitated by being asked to pay for it. Following the real effort task, subjects were exposed to one of the following treatments, in a between-subject design.

3.2.4 No legal fee (NLF)

In the *No Legal Fee* treatment each subject had earned their lump sum and were presented with two payment (delivery) options. The first was a default system, choosing this option was free of charge and entailed 11 days of waiting time to receive their payments. The second was paying a bribe, choosing this option was costly (6 pence per transaction) and entailed no waiting time. If chosen, the payments were processed and paid on the same day. This was done to replicate the idea of "greasing the wheels". However, this corrupt transaction had a negative externality on one other member of the society. One other subject taking part in the same experiment/session was pushed down the line and must wait 22 days in total to be paid. Thus, offering to bribe directly harmed another subject by making them wait 11 additional days relative to the default option.

This is how the notion of negative externality on other members of the society was motivated. Several other mechanisms have been used to do this experimentally. For example, reducing payoffs for all of the participants in the experiment (Abbink et al., 2002), or recruiting additional participants who aren't directly part of the experiment and reducing their payoffs for each corrupt transaction (Barr & Serra, 2009; Chaudhuri et al., 2009). Others promised to give money to a charity but deducted the payments against each corrupt transaction (Lambsdorff & Frank, 2010). For a full review of pros and cons of each method see (Abbink & Serra, 2012). Making subjects wait to be receive their earning is closer to representation of one of the forms of administrative corruption, after all, time is a scarce commodity.

By choosing to pay a bribe, other members of the community were treated unfairly. Choosing to 'bribe' cost 6 pence (£0.06) which was deducted directly from the total earnings of £1.50 in the experiment. Each subject had to actively chose by clicking whether they wanted to offer the bribe or not. To elicit reasons why subjects, choose a specific delivery option and to capture the behavioural responses for decisions a survey was carried out at the end of each treatment.

3.2.5 Legal fee and negative externality (LFNE)

This treatment was the same as *NLF* but introduced an additional delivery mechanism/option. Subjects had the default and paying a bribe options; in addition, they could choose to 'pay the fee' that was legal and had no negative consequences on others. Choosing to pay the fee was costly (9 pence) and entailed no waiting time. Bribing still had a negative externality of impacting someone else's payment time by an additional 11 days of waiting time. Once presented with three choices and their consequences, subjects had to actively choose by clicking on their preferred option.

3.2.6 Legal fee (LF)

The *legal fee treatment* was the same as *LFNE* however the bribe did not have the negative externality. In other words, choosing to bribe to receive earnings on the same day differed from paying the legal fee in their costs. The costs chosen for the bribe and the fee were elicited by a willingness to pay (WTP) pilot experiment discussed above. Eliminating the negative externality from the bribe in this treatment allows to test the hypothesis whether it has any impact on corrupt decisions.

3.2.7 Eliciting first-order beliefs

It is believed that beliefs are closely linked to actions and choices (Neumann & Vogt, 2009). To elicit this, each subject was asked to predict the percentage of participants in the experiment that would choose to pay the bribe and the fast track fee. This elicitation was monetary incentivised such that if the prediction were within the 10% in either direction of the average for the treatment, one participant would randomly receive £10.

3.2.8 Personality traits

To measure personality traits of the subjects, I use a 10-item version of big five developed by (Gosling et al., 2003). It uses a score between 1 and 7 (inclusive) with 1 being

'strongly disagree' about how much the statement appeals to the subject and 7 being 'strongly agree'. The five personality traits measured are: openness, conscientiousness, agreeableness, extraversion, and emotional stability. These characteristics are collected to enable comparisons between different treatments.

3.2.9 Questionnaire and demographics

Prolific members can cash out their earnings from their Prolific account only if they have more than five pounds. Payments from the experiment was used to simulate different delivery options. Knowing the amount of money each subject had in their account was therefore important. Due to inflexibility of Prolific platform, subjects could not be pre-screened for this criterion. Thus, I opted to collect data on the amount of money each participant had in their account. This was an optional question and subjects could choose not to answer.

Another important question for the study was how they reached their decision. This question was important to gain insights of why subjects choose specific options. The answers to this question will be used to explain results. Other general questions included the comments about the experiment and what the experiment was about, see Appendix B 5.1 for the full copy of the instructions. Alongside this, demographic information about age, profession, student status, country of residence, country of birth, nationality and first language were also collected to carry out further analysis.

3.3 Experimental hypothesis

Broadly speaking, there are two types of concerns that I have reviewed in the literature to aid me in the derivation of the hypothesis:

1. Strategic concerns: not wanting to be caught and faced with sanctions, either of monetary or non-monetary nature (for instance exclusion from a program, reputation or social-image damage).

2. Moral concerns: not wanting to break the law (self-image concerns i.e. aversion to feeling shame and guilt), caring about not harming others/empathy (other-

regarding preferences, aversion to negative externalities) and/or being averse to creating inequity/unfairness by indulging in preferential treatment.

It is noteworthy that there are 3 effects that may influence the preference of subjects vis-a-vis the fast track option and bribery: the existence of a negative externality (in favour of the fast-track option), the difference in cost (in favour of bribery) and the framing effect (in favour of the fast-track option). I am not able to comment on the second and third effects with precision. More treatments are needed to do so.

Critically examining the literature on the determinants of corrupt or non-compliant decisions, I derive the following hypothesis. First, I consider the case for no legal fee (NLF) and legal fee with negative externality (LFNE) treatments. It is already been established in Kahneman et al., (1986), Engel (2011) and others that people care about the consequences of their actions on others. People are empathetic and care if through their actions the resulting outcome is unfair. If a generic outcome (Y_j) is attained by j^{th} subject in the baseline scenario. Bribery of i^{th} subject creates an unfair outcome ($Y_j{}^*$) for j^{th} subject such that the new outcome is lower ($Y_j{}^* < Y_j$) in the experiment, the cost is modelled through waiting time. To bribe forces one other individual to wait twice as much as default waiting time. This is the direct consequence of the bribe transaction. The other contributing factors as suggested in the literature are social-image and self-image concerns. Social image is less of a concern as the experiment will be anonymous and online. Self-image concerns is most relevant, it is defined as the "psychological costs of seeing oneself doing bad compared to a moral ideal" (Baumeister, 1999). Similarly, if c denotes the psychological costs for i^{th} subject, it negatively impacts the final outcome (Y_i) for the same subject such that the new outcome is lower ($Y_i - c < Y_i$). Following the theoretical discussions above, I derive the first hypothesis:

Hypothesis 1. *Subjects will choose to pay bribes less often when there is a fast track option available to them.*

To do this, I will compare the rate of bribes paid in NLF and LFNE treatments. In LFNE treatment, the legal fee becomes available to subjects, while both treatments always have the default delivery option. If the rate of bribes paid falls in LFNE treatment, this will be considered as evidence of treatment effects.

To derive the second and the third hypothesises the discussion on negative externality of harming others through additional waiting time in the experiment and aversion to norm-breaking models of social preferences (López-Pérez, 2008) takes the centre stage. In the experiment illegality of the bribe option does not have punitive fines (i.e. there is no risk of getting caught and fined), however the psychological costs associated to bribe is captured via the aversion to norm breaking discussion (assuming implicitly that not to bribe is the norm). This is in addition to the points on empathy (Kahneman et al., 1986; Fehr & Schmidt, 1999; Engel, 2011) and self-image (Baumeister, 1999) from the discussion under hypothesis one:

Hypothesis 2. *Subjects will choose to pay bribes less often when there is a negative externality.*

Bribes are considered sub-optimal because of the negative externality they pose on the rest of the society trying to access the same services. Based on this, the rate of paying bribes should be less in LFNE treatment compared to LF treatment.

Hypothesis 3. More subjects will choose the fast track option (pay the fee) when a negative externality is attached to paying bribes.

In treatments LFNE and LF, subjects have the ability to pay the legal fee (the fast track option) or pay a bribe to access the service. I compare the negative externality effects through decisions made with regards to legal fee uptake. If the rate of paying the fee is higher in LF compared to LFNE treatment, this is evidence of treatment effect. The difference between this with hypothesis 2 is that there, I investigate bribery decisions but here we are concerned with choices concerning the legal fee. This is important to investigate because in all treatments, subjects had the default option, allowing them to switch away from both fast track and bribery to default.

Finally, first order beliefs are important in predicting actions and actual events (Berninghaus et al., 2013; Neumann & Vogt, 2009). In all treatments, I elicit subject's first order belief about the rate of bribery and the rate of paying the fee in the experiment after they have completed their choices. The order of eliciting predictions and decisions is experimentally important (Hogarth & Einhorn, 1992). With this in mind, I derive the last two hypothesises (H4 and H5):

Hypothesis 4. *There is a positive correlation between the predictions and actual rate of paying bribes in each treatment and overall.*

Hypothesis 5. *There is a positive correlation between the predictions and actual rate of paying the legal fee (fast track option) in treatments LFNE and LF and both treatments jointly.*

3.4 Results

3.4.1 Summary statistics

Subjects in the experiment had an average age of 26.55 years old and 30% of them were female. Statistics on personality traits collected in this experiment can be seen in Table 3.1. Only 36% of the subjects stated that they had less than £5 in their Prolific accounts. I call this variable no cash withdrawal, controlling for this is important because there is a limit imposed by the platform on participants ability to cash out only if they have more than £5. Of the 600 subjects in the experiment only 8 of them decided not to answer this question.

Table 3.1 Summary statistics

Variables	Full sample	NLF	LFNE	LF
Age	26.55	26.43	26.38	26.81
	(7.79)	(7.33)	(8.37)	(7.71)
Female	30.30	30	34	27
	(0.46)	(0.46)	(0.47)	(0.45)
No cash withdrawal	0.36	0.36	0.35	0.35
	(0.48)	(0.48)	(0.48)	(0.48)
Earnings	£1.48	£1.49	£1.46	£1.48
	(0.03)	(0.03)	(0.03)	(0.03)
Extraversion	3.65	3.68	3.69	3.57
	(1.40)	(1.33)	(1.45)	(1.42)
Agreeableness	4.43	4.36	4.47	4.46
	(1.04)	(1.03)	(1.06)	(1.03)
Conscientiousness	4.78	4.85	4.63	4.85
	(1.20)	(1.12)	(1.2)	(1.26)
Emotional stability	4.26	4.25	4.16	4.35
	(1.35)	(1.35)	(1.36)	(1.34)
Openness to experiences	4.98	4.91	4.99	5.05
	(1.10)	(1.11)	(1.05)	(1.14)
Number of subjects	600	203	192	205

LFNE means Legal fee and negative externality treatment;
NLF means No legal fee treatment;
LF means Legal fee treatment;
Mean coefficients; sd in parentheses.

Using a Kolmogorov-Smirnov (KS) test I compare treatment distributions to see if they come from the same population (Smirnov, 1939). There are no significant differences

between treatments. This means the treatments are sufficiently homogeneous and there are no significant observable differences either.

3.4.2 Survey responses

At the end of the experiment subjects filled out an open-ended survey. To understand the driving motives, subjects were asked how they reached their decisions. The survey questions were optional and not incentivised. These answers are comprised to eight categories, that is summarised in panels A-C in Table 3.2.[2] For subjects who indicated more than one reason, in most cases, the motive they valued most was chosen as their category.

I follow the standard behavioural economics and psychology definitions for each of the categories in the following manner: Empathy is considered as aversion to harming others or caring about others. Self-image concerns means perceiving yourself moral by not breaking the law and, relatedly, having aversion to feeling guilt or shame if doing otherwise and considering patience as a virtue. Social image concerns are defined as reputation damage for breaking the law and answers could be linked to experimental demand effects. Aversion to preferential treatment is a specific type of inequity aversion implies avoiding both the fee and the bribe. Profit maximising individuals are those who consider money above all. Rationalisers are defined as individuals exploiting the moral wiggle room or showing conflict/discomfort in accepting the bribe or the fee or stating that the stake size was too low. Inconsistent categorises those who have accepted the bribe but commented in favour of rejection and vice-versa. Finally, non-informative includes blank and inconclusive responses.

[2]The categories were cross checked independently with one other PhD colleague.

Table 3.2 Survey responses

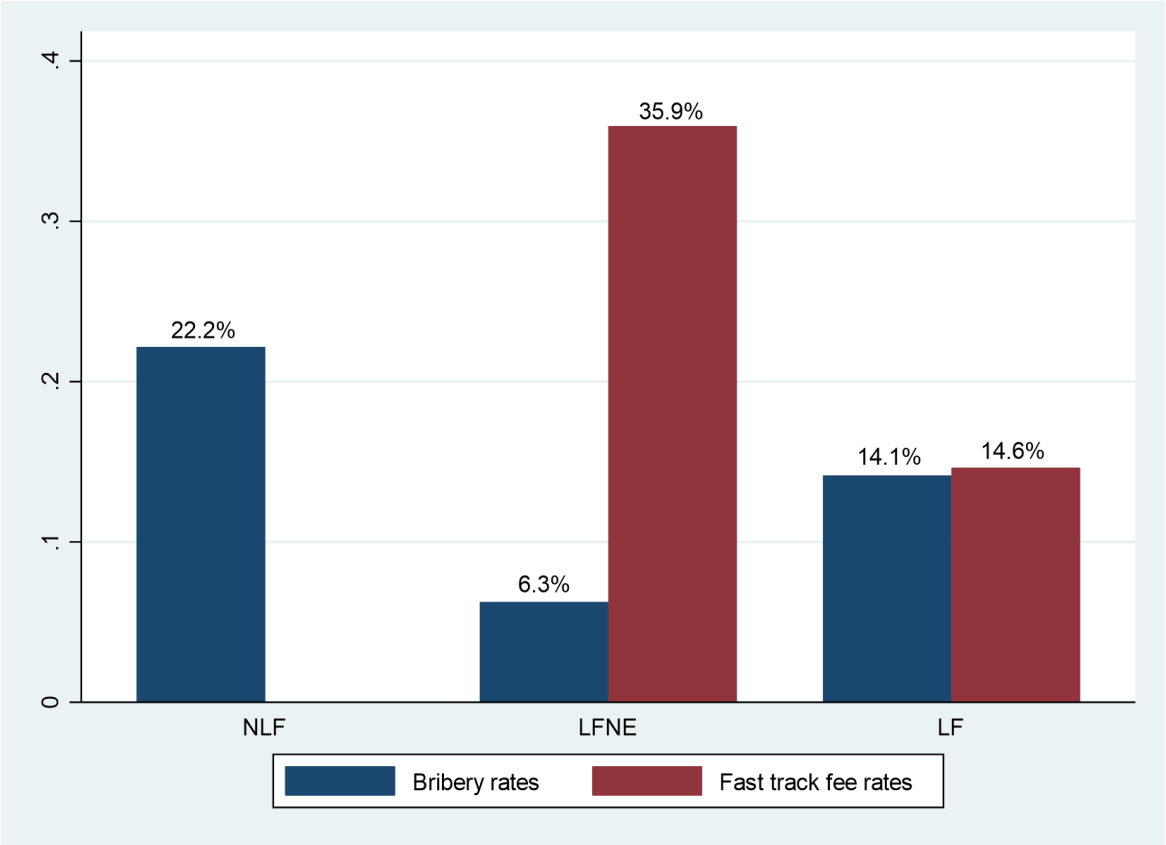
	Full sample	NLF	LFNE	LF
A. Paid the fee (fast track)				
Empathy	21.2%	/	29%	3.3%
Rationalisation	50.5%	/	50.7%	50%
Self-image concerns	11.1%	/	7.3%	20%
Social-image concerns	4.1%	/	1.5%	10%
Inconsistent	3%	/	1.4%	6.7%
Non-informative	10.1%	/	10.1%	10%
Number of subjects	99		69	30
B. Paid bribes				
Rationalisation	58.1%	62.2%	41.7%	58.6%
Profit-maximisation	29.1%	31.1%	16.7%	31%
Inconsistent	1.2%	/	/	6.9%
Non-informative	11.6%	6.7%	41.7%	3.5%
Number of subjects	86	45	12	29
C. Rejected the bribe and opted for the fee or the default		(Bribe only)		
Aversion to preferential treatment	34.2%	19%	30.6%	37%
Empathy	10.5%	37.3%	18.9%	4.1%
Rationalisation	1.2%	1.3%	/	2.2%
Profit-maximisation	26.9%	13.9%	25.2%	28.2%
Self-image concerns	12.5%	17.1%	9.9%	14.4%
Social-image concerns	1.6%	1.3%	1.8%	1.4%
Inconsistent	0.8%	1.3%	0.9%	0.8%
Non-informative	12.6%	8.9%	12.6%	12.3%
Number of subjects	257	158	111	146

NLF means No legal fee treatment; LFNE means Legal fee and negative externality treatment; LF means Legal fee treatment; Figures show percentage of respondents.

3.4.3 Paying the fee (Choosing the fast track option)

Figure 3.1 shows the differences in paying bribes and the fast track fee in all three treatments [3]. Paying the fee was not available in the no legal fee (NLF) treatment, therefore the values are missing. I begin with the non-parametric tests using a Fisher's exact test to compare differences in the choices made in all treatment configurations[4]. A Fisher's exact test is a simple comparison of acceptance or rejection proportions by subjects in each treatment. All the choices and predictions were incentivised.

Fig. 3.1 Bribery and fee rates by treatment



Introducing a fast track option lowers bribery rate. In both NLF and LFNE treatments, subjects had the default option and a choice to bribe whereas in LFNE, they also had a fast track fee option available. The bribery rate in the absence of the fast track was 22.2% in NLF treatment. With the introduction of the fast track option in LFNE,

[3] See Table 5.1 in Appendix B for more detailed statistics

[4] Not reported here, performing a Chi-squared test produces similar p-values.

bribery rates fell to 6.3%, Figure 3.1. A Fisher's exact test strongly rejects the null hypothesis that there is no significant difference (p-value = 0.0001).

Even though non-parametric tests offer evidence on the significance of treatment effects, they do not tell us much about the direction and magnitude of the differences. To investigate the signs and size of the effect while controlling for other factors, I carry out a Probit regression due to the binary nature of the dependent variables (Cameron & Trivedi, 2010; Long, 1997) [5].

The choice variable of interest is paying a bribe which takes the value of 1 if a citizen pays a bribe, and 0 otherwise. The estimated Probit models take variations of the following general form:

$$P(Bribe = 1/X_i) = \phi(\beta_0 + \beta_1 treatments + \beta_2 controls).$$

ϕ is the cumulative standard normal distribution function $\phi(z) = P(Z \leq z), Z\ N(0,1)$. The predicted probability that $Bribe = 1$ can be estimated given X_i, which is the treatment effects and control variables. β_i is the effect on paying a bribe of a unit change in regressors X_i, holding constant all other $k-1$ regressors. It is difficult to interpret the coefficients directly, I calculate and report average marginal effects. Legal fee and negative externality (LFNE) treatment is the benchmark where bribery has a negative externality attached to it. The results of the regression is presented in Table 3.3.

The positive effects in NLF for both specifications show that the rate of bribery was much higher when compared to LFNE. This effect (0.059^{**}) is statistically significant at 5% test (p-value = 0.0237) in specification (I) where I do control for bribery predictions. In addition specification (II), where bribery predictions are not accounted for, the effect (0.158^{***}) is significant at 1% level. As hypothesised, it is discernible that the introduction of a fast track option that offers a preferential treatment against a premium thwarts the rate of offering bribes. Given the above, I report the first finding:

Result 1. Less subjects pay bribes when a fast track option is available.

[5] The use of a random effects logit model would also be appropriate and produce similar results but the Probit choice was motivated by the underlying normal distribution.

Table 3.3 Paying the bribe

DV: Paying the bribe = 1	Coefficients	dydx(I)	Coefficients	dydx (II)
Bribe predictions	0.0331***	0.004***		
	(0.00330)	(0.001)		
No legal fee (NLF)	0.469**	0.059**	0.775***	0.158***
	(0.207)	(0.024)	(0.175)	(0.034)
Legal fee (LF)	0.318	0.035	0.482***	0.082**
	(0.223)	(0.024)	(0.180)	(0.030)
Extraversion	-0.0120	-0.002	0.0135	0.003
	(0.0608)	(0.008)	(0.0492)	(0.010)
Agreeableness	-0.152**	-0.020**	-0.0818	-0.017
	(0.0744)	(0.010)	(0.0626)	(0.013)
Conscientiousness	0.0153	0.002	0.00496	0.001
	(0.0755)	(0.010)	(0.0574)	(0.012)
Emotional stability	0.0622	0.008	0.0315	0.007
	(0.0605)	(0.008)	(0.0522)	(0.011)
Openness to experiences	-0.0754	-0.010	0.00258	0.001
	(0.0732)	(0.010)	(0.0629)	(0.013)
No cash withdrawal	-0.00691	-0.001	0.00779	0.002
	(0.161)	(0.021)	(0.137)	(0.029)
Age	-0.00780	-0.001	-0.00609	-0.001
	(0.0149)	(0.002)	(0.0128)	(0.003)
Female	0.0304	0.004	-0.155	-0.033
	(0.185)	(0.024)	(0.160)	(0.034)
Student	-0.123	-0.016	-0.114	-0.024
	(0.191)	(0.025)	(0.163)	(0.034)
Constant	-2.100***		-1.146**	
	(0.665)		(0.553)	
Observations	581	581	581	581

Mean coefficients; Robust standard errors in parentheses;
(I) includes bribe predictions and (II) does not.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$;

Assuming that the public officials are passive and cannot strategically obstruct the process (due to an efficient fast track option), citizens do not pay bribes. They avoid resorting to "greasing the wheels" so to speak.

In sum, I consider 3 effects that may influence the preference of subjects vis-a-vis the fast track option and bribery: the existence of a negative externality (in favour of the fast-track option), the difference in cost (in favour of bribery) and the framing effect (in favour of the fast-track option). I am not able to comment on the second and third effects with precision.

On framing effect, looking at bribery rate (14.1%) and fee rate (14.6%) in LF treatment where the negative externality is not present, the difference between the two rates is not statistically significant (p-value = 0.8964). This would tempt one to argue that there is little framing effect. However, the fact that 14.1% of the subjects in the LF treatment choose to pay the fee, in itself is evidence for framing. Otherwise due to the cost effects, theoretically, one would expect zero percent for paying the fee. To make more precise statements about these effects it is required to carry out additional treatments. Since, these effects are constant across all treatments, it is safe to say that they lead to a zero-net effect.

Even so the analysis of reasons presented in Table 3.2 from the survey responses offer some insight and suggest that the cost and framing effects are not present. Most subjects (50%) feel discomfort in choosing the preferential treatment of paying a legal fee and nonetheless choose to pay. The next top two reasons are self-image concerns and social-image concerns. Individuals care about their moral ideals that shapes their perception of themselves when carrying out an action as well as what other's think of them when they pay the fee, see Table 3.2, Panel A, LF Treatment. Those who offer bribes do not express caring about these two reasons, see Table 3.2, Panel B, LF Treatment. They are more concerned with maximising private gains and try to justify their action by rationalising (58%), an attempt to make themselves feel or look good while acting dishonestly. Bearing in mind that this is in the absence of negative externality effects.

On the other hand, in LFNE treatment over 29% of the subjects who pay the fee state that they do not want to harm others by choosing to pay the bribe. Those who do pay

the bribe either rationalise (41.37%) or state explicitly that they value money more (16.7%) than other factors, see Table 3.2, Panel A & B, LFNE Treatment.

3.4.4 Negative externality

To investigate the effects of negative externality, I compare bribery rates in LFNE and LF treatments, Figure 3.1. The difference between the two is that the bribe in LF treatment does not have a negative externality. A Fisher's exact test (p-value = 0.0013), at 5% rejects the null that bribery rates do not change between these treatments. In other words, there are sizeable differences between the choices, which provides evidence for treatment effects.

In Table 3.3, specification (II), the positive margins on LF (0.082^{***}) shows that paying bribes increased significantly compared to LFNE. The difference in bribery rates in the regression is significant at 1% only when not controlled for subject's predictions of how much bribe others will pay in the experiment. Nonetheless, the predictions on bribery were collected at the end of the experiment. This was when the decision on whether to pay a bribe or pay a fee was already taken. The order of eliciting these aspects are important. In this manner, subjects' decisions on paying a bribe were not primed.

Therefore one can argue that the results in specification (II) are valid since bribe predictions (first-order beliefs) refer to the profile of subjects, as do demographics, but do not interfere directly with the decision-making process. This would not be the case if subjects had been making a prediction followed by the decision on whether to bribe or not to bribe.

Result 2. Subjects engage in bribery less when there is a negative externality attached to it.

Rationalisers and profit-maximisers are the two types of behavioural responses that is paramount among those who choose to bribe in treatments LFNE and LF, see Table 3.2.

In addition, I examine the difference in paying the fee (fast track) between LFNE and LF treatments to explore the effects of negative externality see Figure 3.1. A two-sided

Fisher's exact test strongly rejects the null that the rates are the same (p-value = 0.000).

With n= 384 subjects (NLF treatment has been excluded from the analysis because the choice to pay the fee was not available in this treatment). The choice variable of interest is paying a fee which takes the value of 1 if a citizen pays a fee, and 0 otherwise. The estimated Probit models take variations of the following general form:

$$P(Fee = 1/X_i) = \phi(\beta_0 + \beta_1 Treatments + \beta_2 Controls).$$

ϕ is the cumulative standard normal distribution function $\phi(z) = P(Z \leq z), Z\ N(0,1)$. The predicted probability that $Fee = 1$ can be estimated given X_i, which is the treatment effects and control variables. β_i is the effect on paying a fee of a unit change in regressors X_i, holding constant all other $k-1$ regressors. It is difficult to interpret the coefficients directly, I calculate and report average marginal effects. Table 3.4 presents the results of a Probit regression analysis that specifically examines this hypothesis. LFNE is the benchmark.

Model (I) shows the negative coefficient on Legal Fee (LF) is (-0.167^{***}) that paying the fee declined in this treatment compared to LFNE. This is strongly significant. The difference was the absence of negative externality on other participants. This confirms that negative externality has an impact in corruption decisions, as stated in Result 3:

Result 3. Subjects choose fast track option more when a negative externality is associated to the bribe option.

For example, many subjects stated empathy (29%) which is not harming others as their reason in LFNE treatment for choosing to pay the fee, see Table 3.2, Panel A. Other reasons include self-image (20%) and social-image (10%) concerns with paying the fee , see Table 3.2, Panel A, LF treatment. Again, both moral and strategic concerns are important in support of choosing to pay the fee instead of paying the bribe. In line with findings in (Barr & Serra, 2009), in a non-dynamic corruption setting, I find that negative externality plays an important role in decision-making when subjects face with a corrupt vs not corrupt choice. There is no evidence of negative reciprocity in my experiment as it is a one-player setup and subjects are not playing against each other or the computer. The most repeated anecdote was that through their decision 'someone else will be harmed'.

Table 3.4 Paying the fee

DV: Pay the fee = 1	Coefficients	dydx(I)	Coefficients	dydx(II)
Fee predictions	0.0240***	0.006***		
	(0.00305)	(0.001)		
Legal fee (LF)	-0.637***	-0.167***	-0.821***	-0.24***
	(0.164)	(0.043)	(0.150)	(0.043)
Extraversion	-0.00911	-0.002	0.00979	0.003
	(0.0620)	(0.016)	(0.0562)	(0.016)
Agreeableness	0.143*	0.037*	0.190***	0.056**
	(0.0805)	(0.021)	(0.0735)	(0.021)
Conscientiousness	-0.0691	-0.018	-0.0641	-0.019
	(0.0657)	(0.017)	(0.0626)	(0.018)
Emotional stability	-0.0987	-0.026	-0.0846	-0.025
	(0.0617)	(0.016)	(0.0564)	(0.017)
Openness to experiences	-0.0255	-0.007	-0.0920	-0.027
	(0.0763)	(0.02)	(0.0716)	(0.021)
No cash withdrawal	0.258	0.067	0.208	0.061
	(0.173)	(0.045)	(0.155)	(0.045)
Age	0.0116	0.003	0.0123	0.004
	(0.0118)	(0.003)	(0.0112)	(0.003)
Female	-0.427**	-0.111**	-0.462**	-0.135**
	(0.201)	(0.051)	(0.184)	(0.053)
Student	0.149	0.039	-0.0667	-0.02
	(0.197)	(0.051)	(0.176)	(0.051)
Constant	-1.470**		-0.343	
	(0.591)		(0.539)	
Observations	384	384	384	384

Mean coefficients; Robust standard errors in parentheses;
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$;
(I) includes bribe predictions and (II) does not.

3.4.5 Beliefs

Beliefs are important predictors of actions. Participant's beliefs about the percentage of other subjects who may engage in bribery in the experiment was elicited. Due to non-normal nature of the data distributions on belief variable, I use a Spearman's test of independence. There is strong evidence against the null (H0: the prediction about the rate of bribery is independent of the actual engagement in bribery). This is true for NLF (p-value = 0.000), LFNE (p-value = 0.0002) and LF (p-value = 0.000) treatments. Furthermore, these beliefs are statistically significant at 1% and 5% level for both male and female subjects separately.

From the regression results in Table 3.3 specification (I), I verify in the data that predictions about bribery rates are positively and significantly (0.006^{***}) correlated to actual bribery rates. This points out the importance of belief, if it is made common belief that corruption rates are falling, this may lead to a perpetual reduction in bribery rates as less and less will choose to engage. However, in reality this heavily depends on actual measures to tackle bribery, if the effects are not observed or felt, communication strategy effects may fade away over time.

Result 4. Predictions about the rate of bribery and actual engagement in corruption/bribery are positively correlated in each treatment.

In addition, beliefs about the rates of choosing the fast track option were also elicited. I find strong evidence in the data (p-value = 0.000) against the null for treatments LFNE and LF. Therefore, participant's predictions about other subjects paying the fee are highly correlated to actually choosing the fast track option.

From regression results in Table 3.4 specification (I), the actual rate of paying the fee and fee predictions in the data are positively correlated (0.024^{***}). It suggests that beliefs are important and that promoting the idea that many people use the fast track option among the community will lead to a perpetual increase in usage of the option, ultimately leading to lower bribes being offered by the citizens.

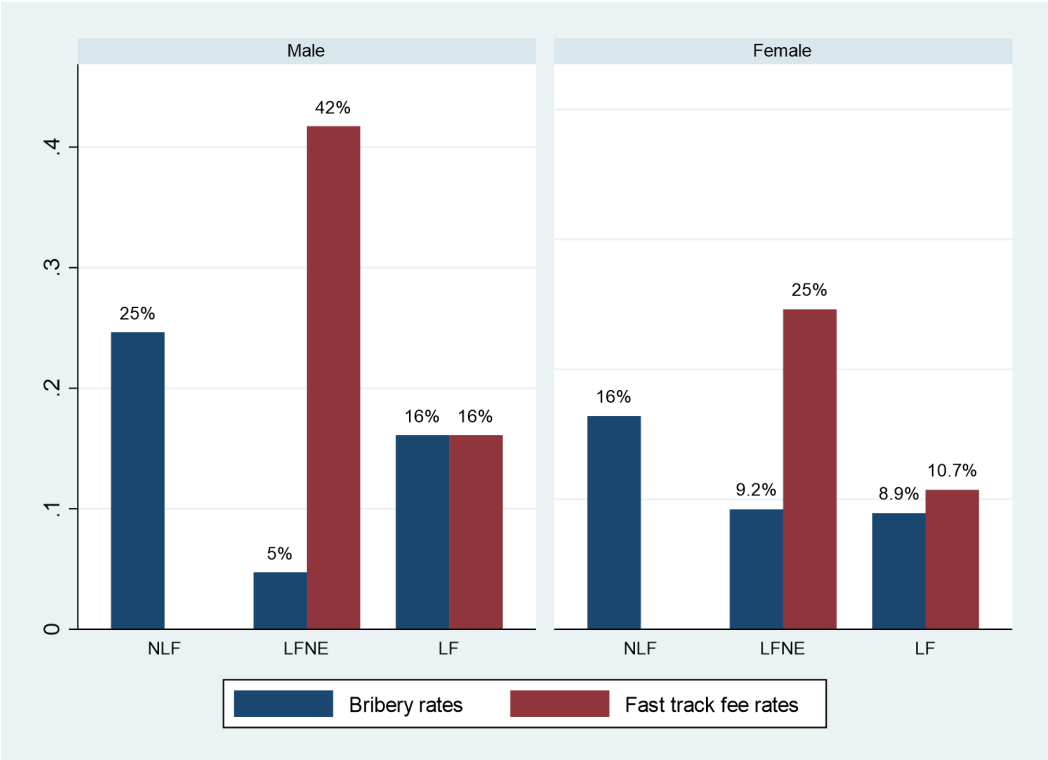
Result 5. Predictions about the percentage of subjects paying the fee and the actual fast track payment rates in the experiment are positively correlated.

The results on beliefs being positively correlated to actual rates of the events in the experiment is in line with theoretical work on the role of beliefs in (Neumann & Vogt, 2009; Berninghaus et al., 2013).

3.4.6 Gender effects

Figure 3.2 shows the rate of bribes and fast track fees for male and female subjects by treatment. There are two types of comparisons I will carry out in this section: First, male vs female decisions within each treatment i.e. holding treatments constant using a Wilcoxon ranksum test[6]. This is a non-parametric test of medians and the reason for employing such a test is the non-normal distribution of the data. The null hypothesis here is that the two medians are equal.

Fig. 3.2 Actual rates by gender and treatment



As it can be seen in Figure 3.2, there are large disparities between male and female subjects paying bribes in treatments LFNE and LF. I find evidence that male subjects

[6]For robustness purposes, I carry out a two-sample independent t-test too but the results are not reported here.

bribe significantly (p-value = 0.003) more in LF than LFNE. The same choice for female subjects is not statistically significant (p-value = 0.604), despite the difference in the existence of the negative externality.

Following the logic that cost effects and framing effects result in a zero-net effect, it is the externality of harming others that lead male subjects to avoid bribing in the LFNE treatment. However, female subjects avoid paying the fee or the bribe. This is an aversion to preferential treatment, classified as a specific form of inequity aversion, female subjects avoid paying either. A closer look at the absolute numbers for females, reveals that only 21 female subjects paid the bribe out of 182. The finding for female inequity aversion being more pronounced than male subjects is in line with findings in (Dollar et al., 2001; Lambsdorff & Frank, 2011; Rivas, 2013).

Second differences in (fe)male decisions i.e. holding the gender constant and looking for differences in treatments, using a Fischer's exact test for this purpose. There are differences in male and female decisions in paying the fee within each treatment. For example, male subject's fast track fee rate in treatment LFNE is 42% whereas that of their female counterparts is only 25%. This difference is statistically significant (p-value = 0.0274), at 5% level, which points to the same direction that female subjects are averse to the idea of preferential treatment.

Furthermore, estimates in model (I) in Table 3.4 shows that being female is negatively correlated (0.111^{**}) with paying the fee. This is significant at 5% test level. This gender difference in rejecting the fee should not be directly translated as higher bribery rates either. Looking at absolute numbers, out of 121 female subjects, only 22 of them paid the fee (remembering that those rejecting the fee mostly chose the default option and a few chose to bribe).

Result 6. Male subject's decisions are sensitive to negative externality, while female subjects avoid paying the fee or the bribe.

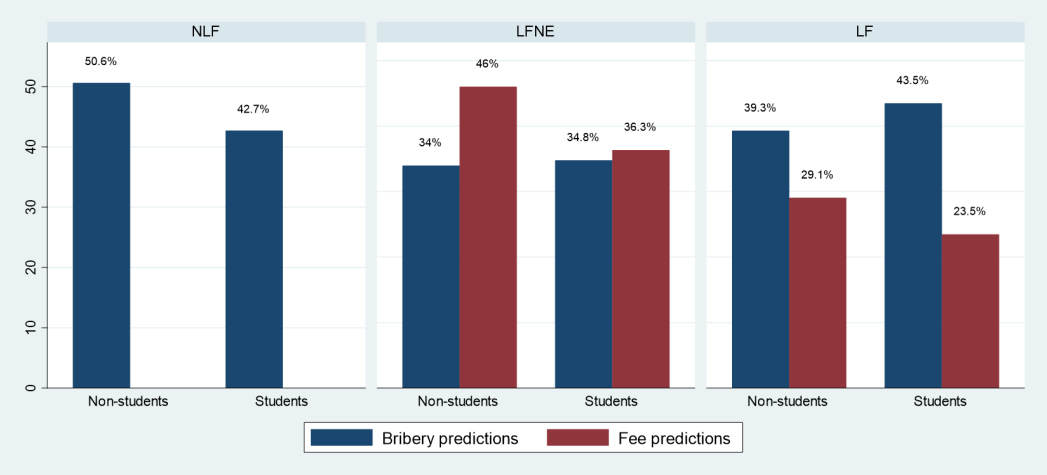
Subjects pay the fee more when bribery harms other people in the experiment. I find that female subjects (p-value = 0.060) pay the fee with higher frequency in treatment LFNE compared to treatment LF. The difference between the two treatments is that bribery has a negative externality associated to it. Similar results hold for male subjects (p-value = 0.000). This is in line with the hypothesised prediction.

Result 7. Both male and female subjects choose fast track option more frequently when paying the bribe has a negative externality attached to it.

3.4.7 Student status

One may conjecture that student's attitude toward paying bribes and choosing the fast track option differs with that of non-student subjects. The discussion here focuses on actual and prediction rates for both bribes and the fast track fee. I find that non-student subjects consistently overpredict bribery rates than students. In the experiment 50.85% of the subjects were students and the rest were non-students. The data shows that non-student subjects' predictions for bribery rates (50.6%) were higher than that of student subjects (42.7%), see Figure 3.3. Using a Wilcoxon ranksum test, this difference is only significant (p-value = 0.0442) at 5% level in NLF treatment.

Fig. 3.3 Bribery and fee predictions by students vs non-students



Similarly, students predict lower rates for paying the fee (30%) compared to non-students (37.1%), and this difference is significant at 5% level for the full sample (p-value = 0.0305). Moreover in LFNE treatment in Figure 3.3, student (36.3%) have much lower prediction rates than non-students (46%) for the fee. This is also statistically significant at 5% test level (p-value = 0.0156).

On the other hand for actual bribery rates, the percentage of non-student subjects who bribe is 29%, which is almost twice as much as that of students 15.8% in NLF treatment, Figure 3.4. Using a Chi-squared test, the difference is significant (p-value

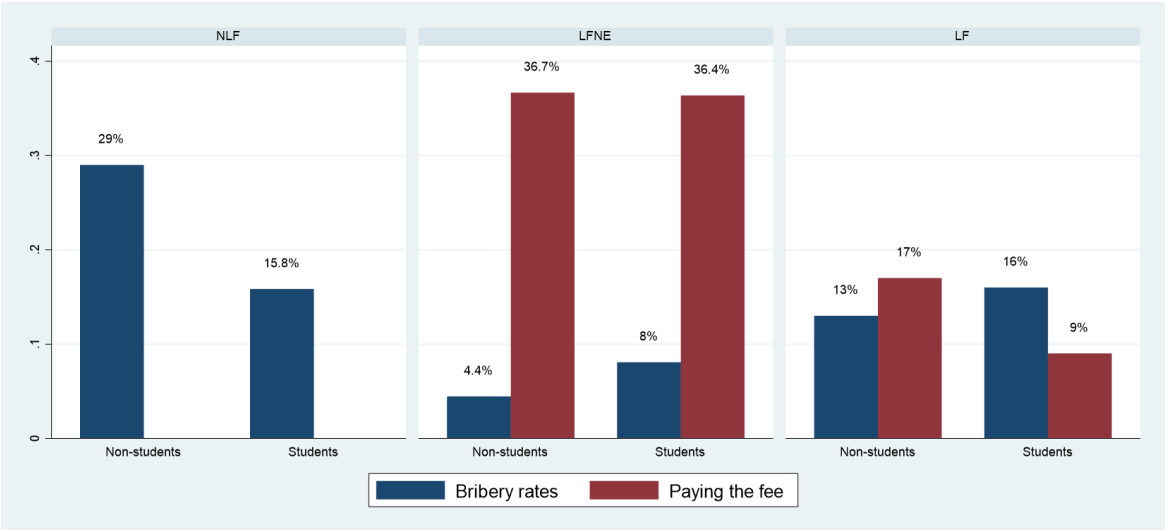
= 0.025) at 5% level. The null hypothesis for a Chi-squared test is that there is no relationship between the two decisions. It performs well with small samples. These results are not significant in the regression Table 3.3.

On the actual fee rates, Figure 3.4 also shows that there are differences between students and non-students. In treatment LF, 17% of non-student subjects pay for the fast track option compared to a 9% students.

Result 9. Student subjects are less corrupt, predict lower rates of bribery and fees than non-student subjects do in the experiment.

However, these are crude results and must not be interpreted as final findings due to several confounds. For example, the analysis does not take into account subjects education level, socioeconomic status nor it takes into account cultural differences among other factors that may affect preferences in choosing to bribery or to pay the fast track fee.

Fig. 3.4 Actual bribery and fee by students vs non-students



3.4.8 Concluding remarks

The purpose of this study is to explore the effects of introducing a fast track option that is legal on the rate of bribery (by citizens). The literature suggests that there are both moral and legal concerns. However, in societies where corruption is normalized, the low likelihood of punishment makes legal concerns negligible. In such 'corruption trap', moral concerns are the determining factor. Long and obsolete bureaucratic processes in public services, common in low-income countries, may give way to corruption but it can be minimized if preferential treatment is offered institutionally.

In this experiment, I observe that subjects are willing to pay extra to avoid paying bribes when presented with a legal channel to access public services. Subjects go through a real effort task and must wait to get paid unless they choose either the cheaper bribe or the more expensive legal channel. Additionally, the bribe may imply a negative externality on one other subject as it increases the latter's waiting period. When that is the case, subjects are less willing to choose the bribe option and will prefer the more expensive legal channel. Most importantly, this study shows that even if people are willing to pay to get their way, they are also willing to pay to keep within the bounds of the law. In sum, people are willing to bribe but less so when a legal channel is available or when it harms other people.

I use a novel structure for the experimental design in which individuals are fully accountable over whether bribery is enforced or not. In previous designs, it would be up to the official agent to enforce the bribe and ultimately carry the weight of imposing the negative externality on other citizens. Outcomes could be interfered by confounds such as fear of punishment for breaking the law, conditional cooperation i.e. the need to reciprocate when paid a bribe, and the competing bias i.e. getting competitive upon the opportunity to interact with other players. Thus, with the non-dynamic framework, subjects are not assigned roles and are left to decide solely based on their preferences, with no further strategic concerns.

Beliefs about the rate of bribery or paying the fee is a society are a strong predictor of actual engagement in bribery or taking up of the fast track option. This has interesting implication for authorities who want to adopt a fast track option to tackle bribery. In conjunction with the introduction of preferential treatment, it is important to communicate to the public how the new institutional reforms the public administrative

system. The change in general beliefs that the need to resort to paying a bribe to "grease the wheel" is rendered with the new system. I find that female subjects exhibit higher aversion to any preferential treatment (the fee and the bribe) compared to male subjects.

Moreover, the pool of subjects is composed of students and non-students. Students pay less bribes and predict less levels of bribery in the experiment. Several factors may drive these results that requires a closer examination, which is beyond the scope of this study. These factors include education levels, other socioeconomic factors like income and family education level.

With regards to limitations, more treatments can be carried to tease out specific treatment effects such as framing or cost effects. The treatments chosen in this experiment were a balance between the availability of funding and the goal of capturing the reality of corruption in the 'real-world'.

An immediate continuation of this research is to look at the public official's side of the story and decisions. Without assigning roles and conditional cooperation/reciprocity among subjects, I will be looking at bribe acceptance decisions after being offered a bribe in the following chapter.

Chapter 4

Public Official's Bribery

To recall in this chapter, I study decisions to accept bribes from subjects who had (depending on the treatments) a legal option to request their payments to be processed. In doing so, the supply of or citizens offering bribes are assumed passive and referred to as 'non-active participants' in the experiment. The rationale behind this is twofold: to eliminate cooperative or curiosity driven behaviour that may arise from subject's strategic concerns, discussed throughout this section in details. Secondly, to allow subjects (in this case public officials) to carry the burden of their decisions alone. What that means is that in an interactive setup, public officials as the second mover end up determining whether the corrupt transaction takes place or not. This inhibits understanding their true response to negative externality and corruption as a whole.

4.1 Experimental procedures

The experiment was carried out online using Prolific platform between February – March 2020. The subject pool consisted of a selected sample of residents from countries with GDP PPP below 35,000 USD using the IMF 2019 data (IMF, 2019). All those who took part in the Willingness to Pay (WTP) pilot and the citizen's bribery experiment in chapter 3 of this thesis were not eligible, thus they were excluded from this experiment. This gave access to over 6,000 pool of subjects who had been active in the past 90 days. The sample included undergraduate and postgraduate students as well as non-student

participants. The idea behind this is that administrative corruption is widespread in countries with lower per capita income. This was to ensure consistency and subjects would come from less developed economies where bribery is believed to be more common. The experiment was designed using Otree software (Chen et al., 2016).

Subjects in the experiment had to assume the role of a public official implicitly without being asked or assigned to do so. They received information that someone taking part in an experiment had offered a bribe to receive their payoffs/payments on the same day. In doing so, the timing of the payment to one other member of the society (a passive participant who does not make any decisions in this experiment) will be negatively affected. This member would have to wait twice longer than usual (22 days). Alternatively, there was a legal route to choose to be paid on the same day that the subjects choose or did not choose. This manipulation constitutes the different treatments in the experiment (discussed below). There were no interactions between subjects and they were not exposed to all treatments, ensuring a between-subject design. Each round was only repeated once. Participants were randomly allocated to each treatment.

The experiment does not include risk of detection (punishment) in the design. The rationale behind this is twofold: the research question is to study administrative corruption which is a small part of the problem in the wider context of corruption. Secondly in most developing countries where this type of corruption is widespread, it goes unnoticed i.e. the probability of getting caught is very low and therefore negligible. I abstract away from the use of neutral language and provide full setting to the experiment. The default option is presented as 'default', bribe is presented as 'bribe' and fast track is presented as 'fast track fee'. This was done to add realism with the assumption that those engaged in bribery are almost always aware they are going to pay a bribe or they have been offered a bribe.

4.2 Experimental treatments

I have four treatments to explore whether public officials accept or reject bribes to provide preferential treatment to anonymous citizens who have offered bribes (depending on the treatment). To recall, the research question asks whether a legal fee acts as

deterrent for public officials accepting bribes. Each public official is told that each citizen had options depending on which treatment (i.e. two in the NLF treatment, three in the LF treatment and so on) to request their payments to be processed in an experiment.

Public officials knew that choosing the default mechanism had 11 days of waiting time. I did this to motivate the idea that standard service delivery mechanisms are less efficient and relatively take longer in the public sector domain. Choosing to bribe at a personal cost to the citizen fastens the process and the revenues from the bribe directly benefits the public official. This option had a negative externality attached to it which varied depending on the treatment. In the story presented to the officials, the negative externality from the citiznes bribery experiment was to force one other participant to wait a total of 22 days. However, officials accepting a bribe, would force one passive participant who is not making any decisions in this experiment, and they would have to wait twice longer to receive their payments. I recruited two passive participants for each accepted bribe offer such that one would be paid on the day and one would have to wait 22 days to receive their payments. This was to make sure that all decisions were fully incentivised and no deception was involved.

Alternatively, public officials knew that citizens could choose to pay a legal fee (fast track option) slightly more expensive than the bribe but did not have any negative externality attached to it. This was done to capture the idea of two-tier public service delivery systems. A legal fee would allow a fast track option to receive discriminatory treatment but legally. The revenues from such a system would go directly to the central authority rather than the public official.

4.2.1 No legal fee (NLF)

Public officials were told that subjects taking part in an experiment had two payment options, default, and bribe with negative externality. The public officials were told that the citizen chose to offer a bribe while being fully aware of the consequences of their decision. Public officials were then asked whether to accept or reject the bribe. If they accepted the bribe, it meant that the amount of the bribe (6 pence) was added to their payoff directly and that meant they reciprocated the favour. If they rejected

the bribe, they wouldn't receive the bribe amount and one passive participant would receive their payment as usual (11 days) instead of being fast tracked.

4.2.2 Legal fee and negative externality (LFNE)

The legal fee and negative externality *(LFNE)* treatment was exactly as *NLF* treatment but public officials were told that citizens who offered the bribe also had the opportunity to pay a legal fee (9 pence) only 50% more expensive than the bribe to access their payments on the same day. The public officials in *LFNE* were told that citizen decided not to pay the legal fee and paid a bribe instead that had a negative externality. Now it was up to the official to reject or accept the bribe. They were aware that accepting the bribe was forcing a non-active participant in the same experiment as them to wait a total of 22 days to receive their payments.

4.2.3 Legal fee (LF)

Treatment three was the legal fee *(LF)*, it was the same as *LFNE* but public officials knew that the bribe offered by the citizen did not have any negative externality associated to it. This was done to capture the importance of affecting others negatively. Choosing to manipulate the timing of service delivery as proxy for public services that citizens are legally entitled for free, I believe, best captures the idea of administrative corruption. In such cases, citizens are entitled to get the service for free, but they are agitated or provoked by the public officials to pay a bribe.

4.2.4 Legal fee and probabilistic negative externality

The fourth treatment deviated from mirroring the treatments in the citizen's bribery experiment in one fundamental way. It introduced a probability in the happenstance of the negative externality. The story presented to the public officials about bribery of the citizens, it was the same as *LFNE* however, they were told that the the negative externality associated to accepting the bribe in their decision making, there is only a 50% chance of it actually happening.

In other words, accepting the bribe in *LFNE* treatment had a certain (100%) chance of negative externality incurring, whereas in the *LF* treatment there was no chance (0%) of it happening. Now in the *LFPNE* treatment, there was a 50/50 chance of 'inflicting harm to others' by pushing them down the queue. The reason behind doing this was to capture a moral wiggle room hypothesis (Dana et al., 2007), whether accepting bribes is changed if the public official knows that their decision doesn't directly impose the negative externality.

4.3 Experimental hypothesis

Examining the literature on the determinants of corrupt or non-compliant decisions, I derive the following hypothesis. Both strategic and moral concerns will play an important role in explaining the research questions and shaping the hypothesis in this chapter. Strategic concerns include fears of sanctions monetary and non-monetary like social image or reputation damage. Moral concerns encompass avoiding harming others, inequity aversions and self-image challenges. Consider the case for no legal fee (NLF) and legal fee with negative externality (LFNE) treatments: It is already been established in Kahneman et al., (1986), Engel (2011) and others that people care about the consequences of their actions on others. People have empathy and care about the payoff of others especially if their actions affect those payoffs. If a generic outcome (Y_j) is attained by j^{th} subject in the baseline scenario. Bribery of i^{th} subject creates an unfair outcome ($Y_j{}^*$) such that the new outcome is lower ($Y_j{}^* < Y_j$) for the rest of the society, in the experiment modelled through waiting time. To accept a bribe forces one other individual to wait twice as much as default waiting time. This is the direct consequence of the corrupt transaction. Other contributing factors as suggested in the literature are social-image and self-image concerns. Social image is less of a concern as the experiment will be anonymous and online. Self-image concerns is most relevant, it is defined as the "psychological costs of seeing oneself doing bad compared to a moral ideal" (Baumeister, 1999). Similarly, if c denotes the psychological costs for j^{th} subject, it negatively impacts the final outcome (Y_j) for the same subject such that the new outcome is lower ($Y_j - c < Y_j$. Following the theoretical discussions above, I derive the first hypothesis:

Hypothesis 1. *Less people will accept the bribe when there is a fast track option.*

To derive the second and third hypothesises the discussion on negative externality of harming others through additional waiting time in the experiment and aversion to norm-breaking models of social preferences (López-Pérez, 2008) takes the centre stage. In the experiment illegality of the bribe option does not have punitive fines (i.e. there is no risk of getting caught and fined), however the psychological costs associated to bribe is captured via the aversion to norm breaking discussion (assuming implicitly that not to bribe is the norm). This is in addition to the points on empathy as a (Kahneman et al., 1986; Fehr & Schmidt, 1999; Engel, 2011), and self-image (Baumeister, 1999) from the previous section. The bribes in LF treatment does not affect when others are paid, therefore bribery rates should be lower when compared to LFNE treatment.

Hypothesis 2. *Less people will accept the bribe when there is a negative externality.*

To derive hypothesises 3 to 5, I use differences created through the introduction of uncertainty in the happenstance of the negative externality in LFPNE treatment with other treatments. The probabilistic nature of the negative externality creates a "moral wiggle room" (Dana et al., 2007; Haisley & Weber, 2010) will allow bribes to be accepted more often and public officials may rationalise the notion that their decision is not negatively impacting other participants directly. As a result, I conjecture that bribery rates in LFNE treatment will be lower than LFPNE.

Hypothesis 3. *The rate of accepting a bribe is higher when taking a bribe has a 50% probability of incurring a negative externality relative to a 100% probability of incurring a negative externality.*

Alternatively, when the probability of incurring the negative externality is zero, LF treatment, bribe acceptance will be higher than LFPNE, where there is still a 50% chance.

Hypothesis 4. *The rate of accepting a bribe is lower when taking a bribe has a 50% probability of incurring a negative externality relative to a 0% probability of incurring a negative externality.*

With the introduction of the moral wiggle room with respect to the negative externality in LFPNE treatment, the thinking process behind decision making may change. Therefore, the rate of accepting bribes should not equal to the midpoint rate of accepting

bribes in the treatments with 0 (LF) and 100% (LFNE) chance of negative externality. The value may lie to the left or to the right of the midpoint.

Hypothesis 5. *The rate of accepting a bribe with a 50% probability of incurring a negative externality (T4) will be different than the midpoint of the rate from the 0% (T3) and 100% (T2) probability treatments.*

Finally, first order beliefs are important in predicting actions and actual events (Berninghaus et al., 2013; Neumann & Vogt, 2009). In all treatments, I elicit subject's first order belief about the rate of accepting bribes in the experiment after they had completed their choices. The order of eliciting predictions and decisions is experimentally important (Hogarth & Einhorn, 1992). With this in mind, I derive the last hypothesises (H6):

Hypothesis 6. *There will be a positive correlation between the prediction about the rate of accepting a bribe and the rate of bribery in each of the treatments and overall.*

4.4 Results

4.4.1 Summary statistics

On average participants had 25.28 years of age, with over 30% of them being female. Over 40% of the participants had less than £5 in their prolific account. This is called no cash withdrawal due to limits on Prolific participant's ability to cash out their earnings. I also include the average duration (in seconds), it took subjects to make their decisions. This is to investigate if the length of time spent making the decision to accept or reject the bribe is important. Using a Kolmogorov-Smirnov test, I compare if treatments come from the same population distribution (Smirnov, 1939). Except emotional stability between treatments NLF and LFNE, and NLF and LF (p-value = 0.008; p-value = 0.09 respectively), all other observable characteristics are statistically similar between treatments making them sufficiently homogeneous for further comparisons. The rest are summarised in Table4.1

Table 4.1 Summary statistics

Variables	Treatments				
	Pooled	NLF	LFNE	LF	LFPNE
Age	25.28	25.16	25.14	25.53	25.31
	(7.68)	(7.25)	(7.88)	(7.36)	(8.15)
Female	0.31	0.31	0.34	0.31	0.28
	(0.46)	(0.46)	(0.47)	(0.46)	(0.45)
Time taken (in seconds)	82.68	82.92	79.71	84.01	84.54
	(55.9)	(43.54)	(42.32)	(73.73)	(59.16)
No cash widthrawal	0.42	0.47	0.40	0.36	0.47
	(0.49)	(0.50)	(0.49)	(0.48)	(0.50)
Earnings	£0.372	£0.367	£0.368	£0.38	£0.373
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Extraversion	3.63	3.74	3.58	3.51	3.69
	(1.42)	(1.35)	(1.42)	(1.42)	(1.46)
Agreeableness	4.45	4.48	4.40	4.48	4.46
	(1.03)	(1.08)	(0.97)	(1.04)	(1.04)
Conscientiousness	4.62	4.79	4.65	4.47	4.59
	(1.25)	(1.27)	(1.16)	(1.26)	(1.30)
Emotional stability	4.14	4.35	3.96	4.06	4.23
	(1.42)	(1.53)	(1.35)	(1.36)	(1.45)
Openness to experiences	4.92	4.94	4.99	4.77	4.97
	(1.16)	(1.02)	(1.19)	(1.27)	(1.15)
Number of subjects	582	126	166	142	148

LFPNE means legal fee and probabilistic negative externality;
LFNE means legal fee and negative externality;
NLF means no legal fee; LF means legal fee;
Mean coefficients; sd in parentheses.

4.4.2 Self-reported reasons underlying decisions

One of the survey questions at the end of the experiment asked 'how did you make your decisions?'. The responses to this question provide insight into the behavioural factors that contributed to accepting or refuting the bribe. These answers are divided into seven categories and summarised in Table 1.2.[1]

These explanations provide a rich insight into the thinking process of the decisions-makers in the experiment. 1) Self-image concerns: Perceiving yourself moral by not breaking the law and, relatedly, having aversion to feeling guilt or shame if doing

[1]The categories were cross-checked independently with one other researcher (PhD colleague).

otherwise and considering patience as a virtue. 2) Social image concerns: Reputation damage for breaking the law and experimental demand effects. 3) Empathy: Aversion to harming others and caring about other's payoffs. 4) Aversion to preferential treatment to both the fee and the bribe and stating that they have no or little rush to receive their payments. 5) Profit maximising: Valuing money above all. 6) Rationalisation: Exploiting moral wiggle room, showing conflict/discomfort in accepting the bribe or the fee, stating that by doing so they are helping the briber or mentioning that the stakes are low, etc.... 7) Inconsistent: Accepting bribe but commenting in favour of rejection and vice-versa or discussing a different notion. All the answers that were left blank were categorised as non-informative.

Table 4.2 Survey responses

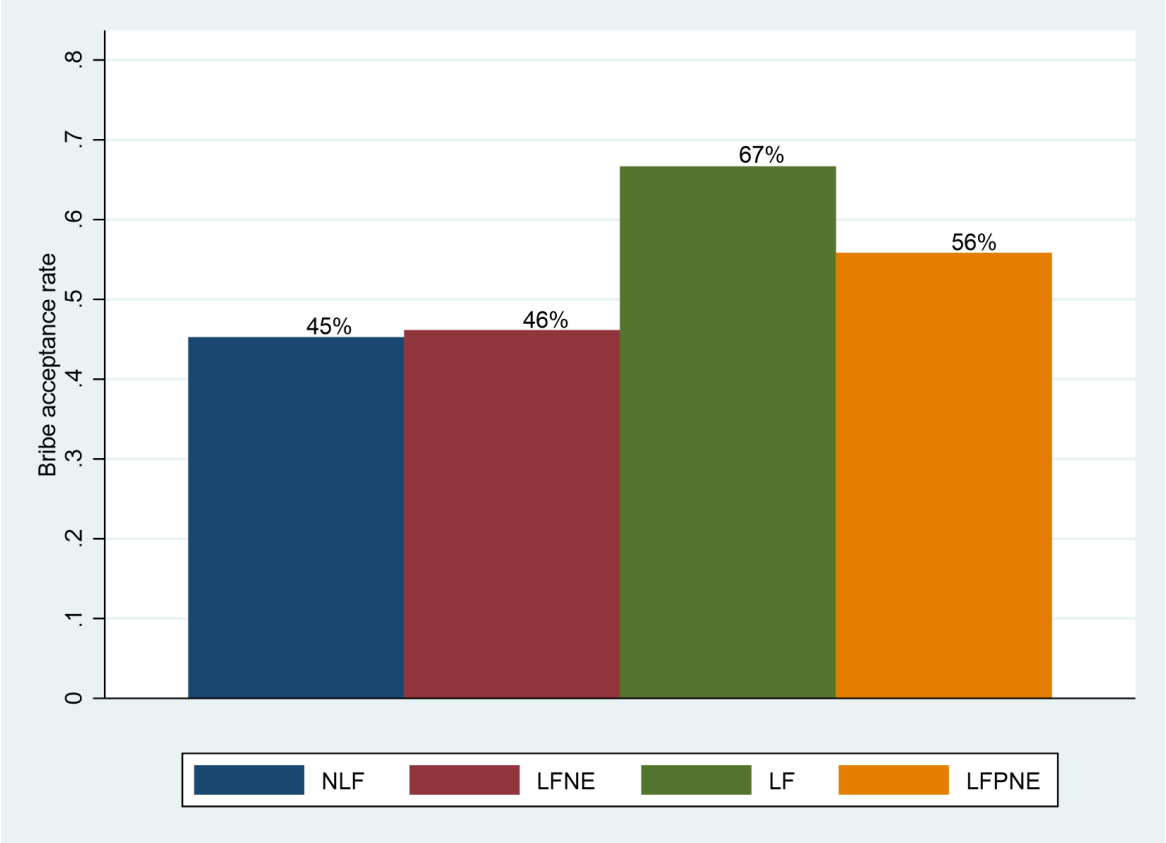
	Treatments				
A. Accepted the bribe	Pooled	NLF	LFNE	LF	LFPNE
Aversion to preferential treatment	1.23%	/	1.28%	1.02%	2.33%
Empathy	0.62%	/	/	1.02%	1.16%
Inconsistent	5.25%	4.84%	7.69%	3.06%	5.81%
Non-informative	9.88%	17.74%	11.54%	4.08%	9.30%
Profit-maximising	45.37%	38.71%	34.62%	52.04%	52.33%
Rationalisation	37.35%	38.71%	44.87%	37.76%	29.07%
Self-image concerns	0.31%	/	/	1.02%	/
Number of subjects	324	62	78	98	86
B. Rejected the bribe					
Aversion to preferential treatment	12.72%	4%	10.99%	22.45%	17.65%
Empathy	32.86%	40%	41.76%	14.29%	26.47%
Inconsistent	2.83%	1.33%	3.3%	/	5.88%
Non-informative	12.37%	16%	9.89%	18.37%	7.35%
Profit-maximising	1.77%	/	1.10%	6.12%	1.47%
Self-image concerns	34.28%	34.67%	29.67%	38.78%	36.76%
Social-image concerns	3.18%	4%	3.3%	/	4.41%
Number of subjects	283	75	91	49	68

LFPNE means legal fee and probabilistic negative externality;
LFNE means legal fee and negative externality;
NLF means no legal fee; LF means legal fee;
Figures show percentages of respondents.

4.4.3 Legal fee (fast track option)

Public official's bribe acceptance rate for each treatment is presented in Figure 4.1. I begin with simple non-parametric Fischer's exact test. This is due to the categorical nature of the outcome variable and the test requires a comparison of acceptance proportions. The null hypothesis is that bribery proportion is the same in LFNE and NLF treatments. Looking at the data, bribe acceptance rate in LFNE treatment is higher than that of NLF treatment but it is not statistically significant (p-value = 0.484). The difference between these two treatments were the introduction of the legal fee to act as a deterrent for public officials accepting bribes in treatment LFNE.

Fig. 4.1 Bribe acceptance rates



To investigate these effects in a more robust manner and control for other factors, I carry out a Probit regression analysis. The choice variable of interest is accepting a bribe which takes the value of 1 if an official accepts a bribe, and 0 otherwise. The estimated Probit models take variations of the following general form:

$$P(Bribe = 1/X_i) = \phi(\beta_0 + \beta_1 Treatments + \beta_2 Controls).$$

ϕ is the cumulative standard normal distribution function $\phi(z) = P(Z \leq z), Z\ N(0,1)$. The predicted probability that $Bribe = 1$ can be estimated given X_i, which is the treatment effects and control variables. β_i is the effect on accepting a bribe of a unit change in regressors X_i, holding constant all other $k-1$ regressors. It is difficult to interpret the coefficients directly, I calculate and report average marginal effects.

There are two specifications of the regression, one with the bribery prediction and one without. This was a hypothetical question collected at the end of the experiment that asked participants to predict the percentage of other participants who would accept the bribe. Given the hypothetical nature of the question, I investigate results both with and without including it in the regression. Treatment LFNE is the benchmark where other treatments are compared against.

Table 4.3 Accepting bribes, pooled sample

	With predictions		Without predictions	
DV: Accepting bribes = 1	Coefficients	dydx (I)	Coefficients	dydx (II)
Bribe prediction	0.0311***	0.012***		
	(0.00274)	(0.001)		
NLF	0.0537	0.021	-0.0635	-0.025
	(0.167)	(0.067)	(0.151)	(0.059)
LF	0.364**	0.144**	0.575***	0.223***
	(0.164)	(0.064)	(0.150)	(0.056)
LFPNE	0.240	0.095	0.259*	0.103*
	(0.161)	(0.064)	(0.145)	(0.057)
Extraversion	0.0431	0.017	0.0180	0.007
	(0.0437)	(0.017)	(0.0406)	(0.016)
Agreeableness	-0.00407	-0.002	-0.0234	-0.009
	(0.0593)	(0.024)	(0.0558)	(0.022)
Conscientiousness	-0.00472	-0.002	-0.00670	-0.003
	(0.0496)	(0.020)	(0.0463)	(0.018)
Emotional stability	-0.0194	-0.008	0.000508	
	(0.0451)	(0.018)	(0.0407)	
Openness	0.0133	0.005	0.0466	0.019
	(0.0527)	(0.021)	(0.0499)	(0.020)
Time taken	0.000761		0.00145	0.001
	(0.00120)		(0.00118)	(0.000)
No cash withdrawal	-0.149	-0.059	-0.0849	-0.034
	(0.121)	(0.048)	(0.110)	(0.044)
Age	-0.0276**	-0.011**	-0.0303***	-0.012***
	(0.0107)	(0.004)	(0.00928)	(0.004)
Female	-0.127	-0.051	-0.105	-0.042
	(0.133)	(0.053)	(0.122)	(0.048)
Student	0.0758	0.030	-0.0357	-0.014
	(0.156)	(0.062)	(0.135)	(0.054)
Constant	-1.403**		0.470	
	(0.550)		(0.458)	
Observations	580	580	580	580

LFPNE means legal fee and probabilistic negative externality;
LFNE means legal fee and negative externality;
NLF means no legal fee; LF means legal fee;
Mean coefficients; Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The difference between NLF and the control treatments is not statistically significant in models (I) and (II). This is similar to the results obtained using the Fischer's exact test. In other words, in legal fee and negative externality (LFNE) treatment the fast track option introduced to accommodate for the preferential treatment does not prevent subjects (public officials) from accepting bribes. Even though the bribe had a negative externality on one other person in the experiment. This is the opposite of the conjecture made in the experimental hypothesis section. The subjects in this experiment were not assigned to public official role. They acted purely as subjects taking part in the experiment and were faced to make decisions to accept or reject a bribe offer. Therefore, this finding does not suffer from the 'triggering the right frame of mind' phenomenon, a criticism often put forward on experimental findings (Levitt & List, 2007; Bardsley, 2005).

Result 1. The legal fee (fast track option) does not prevent public officials accepting/demanding bribes.

In order to explain this result, I look at the responses to the survey question collected at the end of the experiment, see Panel A in Table 4.2. On average over 36% of subjects in NLF and LFNE treatments stated profit-maximisation in response to how they made their decision. This involved reasons such as "wanting more money" or "benefits me more" and so on. The guiding principle behind accepting bribes for this cluster of subjects was money above all. While over 41% of subjects who accepted bribes tried to rationalise their decision. The responses in this category included answers such as "helping the briber", "I know its harming others but the stakes are too low to make a huge difference" and so on. The basic principle in being in this category was if the response showed conflict or discomfort in accepting the bribe but accepted it anyway. The third highest share of responses were non-informative in these two treatments, meaning that they were left blank.

With the responses in mind, two types of subjects (public officials) have emerged among those who accepted the bribes: those who care about their private gain over that of the community's as predicted by the traditional profit maximisation economic view. In addition, I find subjects who rationalise their corrupt decisions. This behavioural type varies in their response and requires further research. For example, raising the stakes for the negative externality or some other saliency may change the proportion of rationalisers. Understanding more about this type of public officials will allow

policymakers to be more targeted with their measures focusing on demand-driven bribery.

4.4.4 Negative externality

In this section, I explore whether negative externalities attached to corrupt decisions is important for public officials. Bribe acceptance rate in LFNE treatment is significantly lower than that of LF treatment (p-value = 0.000; fisher's exact test). The difference between the two treatments was absence of the negative externality in LF treatment. On the other hand bribe acceptance rates were almost 21 percentage point less in LFNE treatment, see Figure 4.1. The regression results in Table 4.3 point in the same direction. The effects on predicted probability of accepting bribes in LF treatment is positive (0.144**) in model (I) indicating that bribe acceptance is higher than LFNE treatment which is the benchmark and significant at 5% level. This is robust for all the specifications, see Table 5.2 in Appendix 5.4. This finding is in accordance with the hypothesised prediction.

Result 2. Less public officials (subjects) accept the bribe, when there is a negative externality attached to it.

To explain the behavioural mechanisms behind this result, I look at participant survey responses presented in Table 4.2, Panel B. Three types of behavioural responses emerge for those who refuse the bribe in LFNE treatment: 1) those who empathise (42%), covers specific aspects of the 'other-regarding preferences', those include aversion to harming others and caring about others' payoffs. 2) Those who are concerned about their self-image (30%), include intrinsic feelings of aversion to guilt or shame, perceiving oneself moral and ethical or not wanting to break the law or describing oneself as patience in virtuous manner. 3) Those averse to preferential treatment (11%) altogether, that is rejecting the bribe and showing aversion to paying a fee that will result in inequality. This can be classified as a specific type of inequity aversion.

4.4.5 Moral wiggle room

If the negative externality doesn't have the certainty to incurring 100%, does this matter in accepting bribes for public officials? To examine this, I compare bribe acceptance rate in LFNE and LFPNE treatments. I find that acceptance rate is lower in LFNE, see Figure 4.1 and that is only significant at 10% level (p-value = 0.095; fisher's exact test). The difference here is that incurring negative externality had only 50% chance of materialising on the other participant. In other words, the decision to accept the bribe by the public official in LFPNE treatment did not directly transform into harming other participants but a "moral wiggle room" was allowed (Dana et al., 2007).

Similar results are obtained from the Probit regression analysis presented in Table 4.3, specification (II). The effects on LFPNE treatment is positive (0.103*) but only significantly at 10% level. This result is not robust, when I include the variable on participant's prediction about bribery rates.

Result 3. The uncertainty implied in LFPNE treatment allows public officials to accept more bribes compared to LFNE treatment.

In addition, bribe acceptance rate in LFPNE treatment is lower than that of LF treatment but only at 10% significance level (p-value = 0.059; fisher's exact). The difference is that in LF treatment there is no negative externality associated to the bribe whereas in LFPNE treatment, there is 50% chance of incurring. In addition, from the regression results presented in Table 4.3, the difference between the effects in LF and LFPNE treatments shows a positive correlation indicating higher levels of bribery in LFPNE (0.223*** – 0.103*) = 0.12**. This is only significant at 5% level and it is robust.

Result 4. The uncertainty implied in LFPNE treatment allow public officials to accept less bribes compared to LF treatment.

Unsurprisingly as expected the bribe levels are higher in LF treatment. To explain this, looking at the survey responses for treatments LFNE, LF and LFPNE, all of them provide similar explanations. I will use LFPNE treatment for this purpose, see Table 4.2, Panel A. Over half (52%) of participants state profit-maximisation as their reason for accepting the bribe. Similarly, approximately 30% of the subjects rationalise

their choice of not refusing the bribe. The 50% chance of not incurring the negative externality allows the public officials to adopt a "moral wiggle room" type hypothesis.

Since LF treatment certainly does not have a negative externality attached to it (0% chance) and LFNE treatment certainly has a negative externality (100% chance), the midpoint of the bribe acceptance rate for these two treatments may be different (greater or smaller) from that of LFPNE treatment. The midpoint for the treatments LFNE and LF is $0.5(0.4615 + 0.667) = 0.564$. I use a binomial test to see if bribe acceptance rate in LFPNE treatment with a 50% probability of incurring a negative externality is equal to the midpoint value (0.564). The binomial tests the significance of deviations for a single binary variable from a theoretically expected distribution. The result is not significant (p-value = 0.935) and the values are not different from one another. This goes against the hypothesised prediction in the hypothesis section in this chapter.

Result 5. The rate of accepting bribes with a 50% probability of incurring a negative externality is no different from the midpoint of the rate from treatments LFNE and LF.

4.4.6 Duration of the decision

There is an emerging literature in economics that discusses importance of the duration of time spent on making a moral decision in explaining choices. For example, in the case of rationalisers, those who accepted the bribe, must overcome the moral dilemma of "thou shall not be corrupt" against the private gains of accepting to engage in corruption. The decision to accept the bribe is incongruent and a reflexive choice, thus takes longer to reach (Greene et al., 2004; Rustichini, 2018).

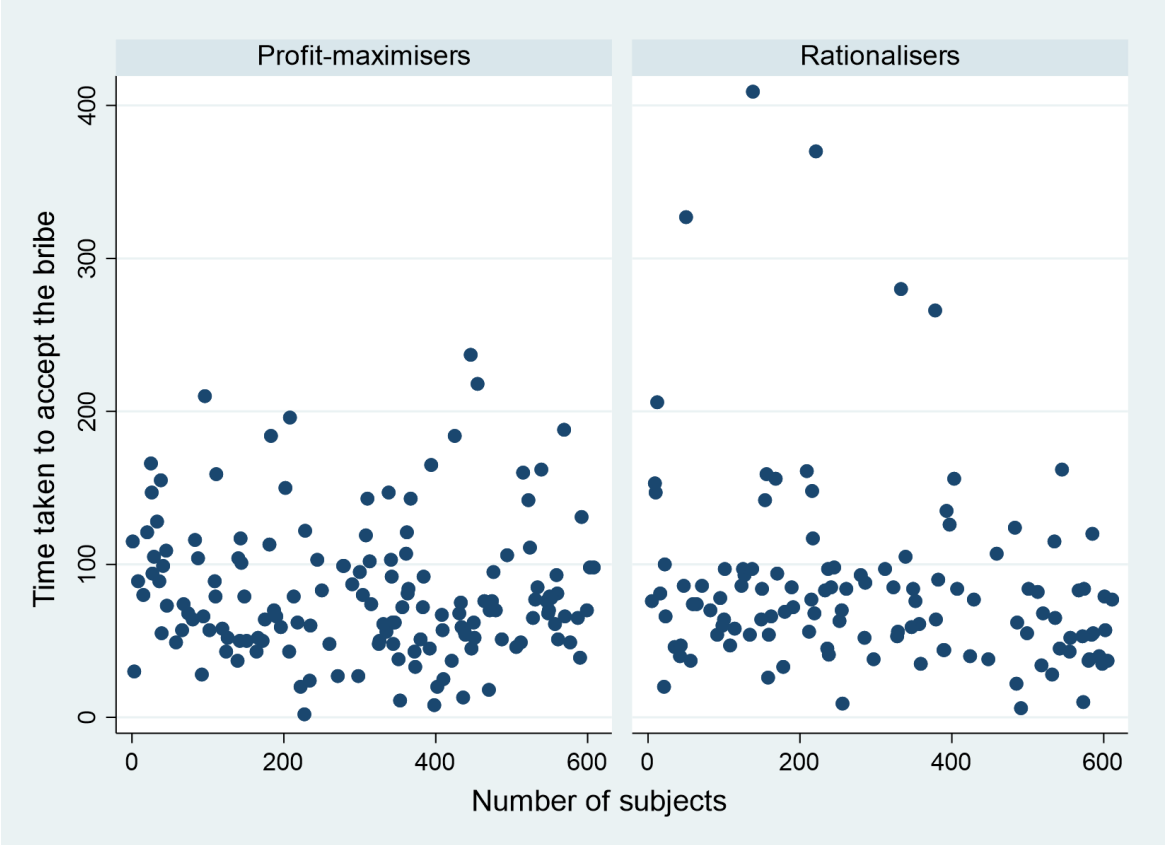
To test this conjecture in the case of accepting bribes, those who rationalised (average time taken = 85; std dev = 63.5) in the experiment may have had a "reflexive choice" and had to overcome an internal conflict of accepting the bribe and going against the norm of corruption is bad, thus needed more thinking time. On the contrary, those who are pure profit-maximisers (average time taken = 81.82; std dev = 44) may have had an automatic response and didn't require much thinking time. One individual took over 480 seconds for profit maximisers, this was the only observation treated as anomaly and excluded from the analysis, see Figure 4.2. The median time taken to

accept the bribe for each group is 72 seconds, therefore a test of medians will not be informative.

However, there are large variances and dispersion between the two times of acceptance. Using a Bartlett's test (Snedecor & Cochran, 1989) of equality of variances, I find strong evidence against the null (p-value = 0.000) and the variance in time taken to reach the decision for rationalisers are much longer than profit-maximisers. Noting this difference, I report the following result:

Result 6. The dispersion in time taken to accept the bribe between subjects (public officials) is significantly different between rationalisers and profit-maximers.

Fig. 4.2 Time taken to accept the bribe



4.4.7 Beliefs

Beliefs about others accepting or rejecting bribes are very important in predicting actual propensities to corrupt actions. From the results presented in regression Table 4.3 specification (I), I find strong evidence that subjects' predictions about rates of bribery is positively (0.012***) correlated to the choices of accepting bribes. Furthermore, a Spearman's rank correlation coefficient shows that the acceptance of bribes and predictions on the percentage of participants engaging in bribery are not independent of one another. This test measures direction and strength of the association between the two outcomes and it is not sensitive to outliers. There is a positive correlation between the two variables at 1% significance level. This is true for all treatments.

Result 7. There is a positive correlation between accepting bribes and predictions about the rate of accepting bribes in all treatments and overall.

4.4.8 Student status

The use of undergraduate students is common in experimental economics, this has drawn several criticisms to studies employing this methodology. In this experiment, over 38% of the sample constituted non-student subjects with an average age of 30 years old. The average age for students was about 22 years of age. Using this, I test differences in corrupt decisions between these two groups.

Given that the two samples are independent, using an independents means test, I find evidence (p-value = 0.0547) that accepting bribes is different between student and non-student subjects across the sample, see Figure 4.3. I also find evidence (p-value = 0.0041, one-sided[2]) that bribe acceptance rate in LFNE treatment where a legal fee was introduced is much lower for non-student subjects compared to student subjects. This is evidence that legal fees act as deterrent for non-student subjects.

[2]For all the tests in this section, I check the non-parametric counterparts, and the results are robust.

Table 4.4 Accepting bribes, students vs non-students

DV: Accepting bribes = 1	Coefficient	dydx (I)	Coefficient	dydx (II)
Bribe prediction	0.0311***	0.012***	0.0311***	0.012***
	(0.00282)	(0.001)	(0.00274)	(0.001)
NLF	-0.152	-0.060	-0.186	-0.074
	(0.170)	(0.068)	(0.172)	(0.068)
LFNE	-0.208	-0.083	-0.240	-0.095
	(0.159)	(0.063)	(0.161)	(0.064)
LF	0.145	0.057	0.125	0.049
	(0.170)	(0.066)	(0.170)	(0.066)
Extraversion	0.0361	0.014	0.0431	0.017
	(0.0434)	(0.017)	(0.0437)	(0.017)
Agreeableness	-0.00453	-0.002	-0.00407	-0.002
	(0.0587)	(0.023)	(0.0593)	(0.024)
Conscientiousness	-0.00847	-0.003	-0.00472	-0.002
	(0.0488)	(0.019)	(0.0496)	(0.020)
Emotional stability	-0.0299	-0.012	-0.0194	-0.008
	(0.0447)	(0.018)	(0.0451)	(0.018)
Openness	0.0146	0.006	0.0133	0.005
	(0.0526)	(0.021)	(0.0527)	(0.021)
Time taken	0.000637	0.0003	0.000761	
	(0.00122)	(0.0049)	(0.00120)	
No cash withdrawal	-0.117	-0.0464	-0.149	-0.059
	(0.120)	(0.047)	(0.121)	(0.048)
Age			-0.0276**	-0.011**
			(0.0107)	(0.004)
Female	-0.167	-0.066	-0.127	-0.051
	(0.131)	(0.052)	(0.133)	(0.053)
Student	0.320**	0.127**	0.0758	0.030
	(0.125)	(0.049)	(0.156)	(0.062)
Constant	-1.944***		-1.164**	
	(0.451)		(0.553)	
Observations	580	580	580	580

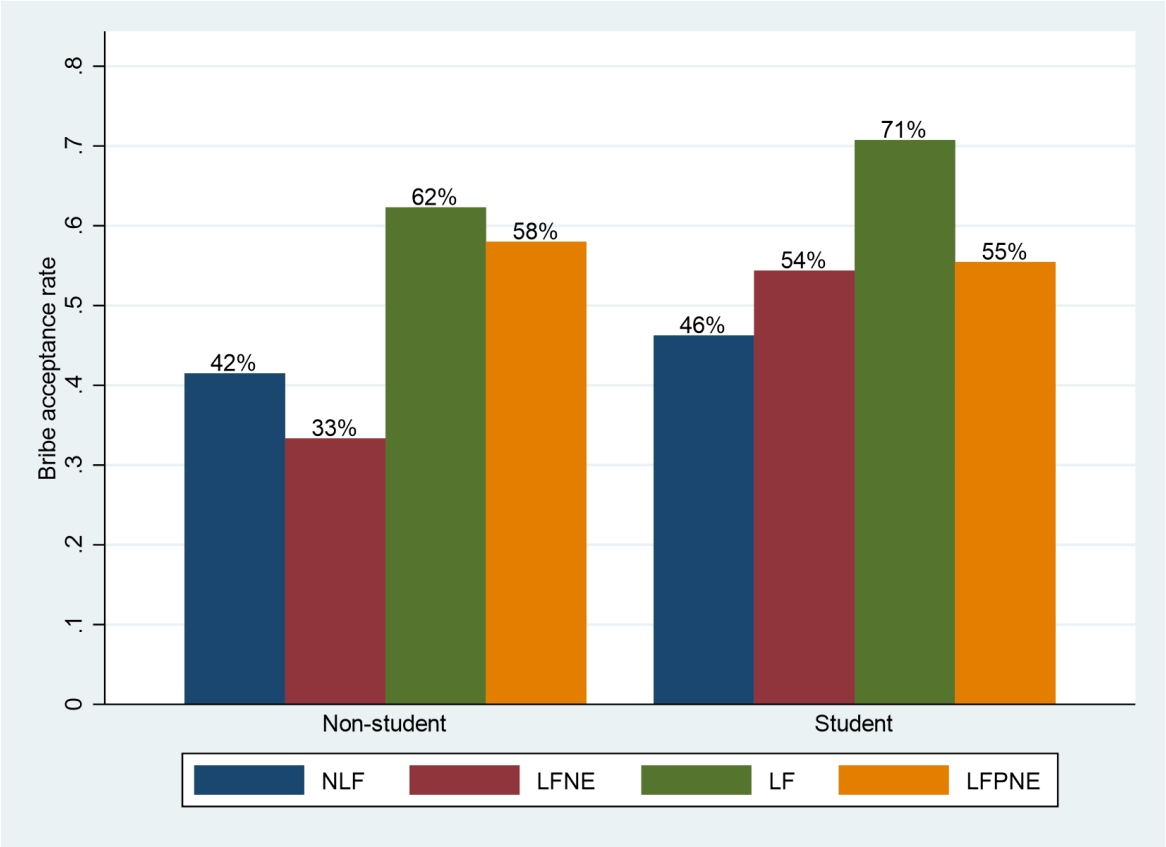
Mean coefficients; Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In addition, using a similar Probit model to Section 4.4.3, I run a regression to test student vs non-student decisions on accepting bribes. LFPNE treatment is used as the benchmark in this regression. The results are presented in Table 4.4. Model (I) shows the effects on being a student increase in predicted probability of accepting bribes

by (0.127**) points but when we control for age, the difference between students and non-students disappear in the regression.

Result 9. Legal fee acts as deterrent for accepting bribes among the non-student subjects when compared to student subjects.

Fig. 4.3 Bribe Acceptance Rate Student vs Non-student by Treatment

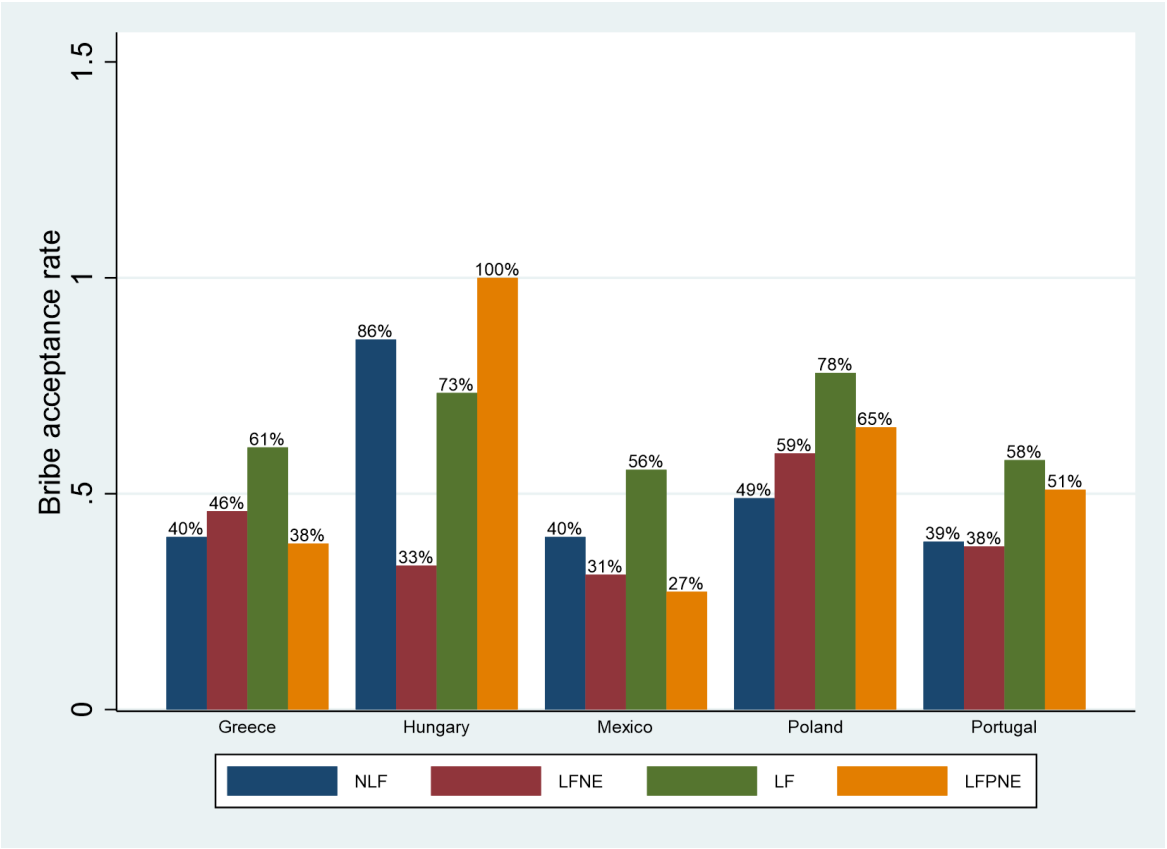


4.5 Cultural background

Finally there is evidence documented previously in the literature that people (public officials in this case) from countries with high Corruption Perception Index (CPI) are more likely to engage in corrupt behaviour compared to people from countries with low CPI. I will use current country of residence as proxy for cultural background and test whether introducing a fast track option has an impact on bribe acceptance rates of public officials in the experiment. Figure 4.4 shows bribe acceptance rates per

treatments for all the five countries in the sample. From observations, bribe acceptance rates in LFNE treatment is lower than that of NLF treatment in all countries except for Poland and Greece. The largest difference in Poland is 10%, however it is not statistically significant (p-value = 0.418; Wilcoxon ranksum test). Therefore, it is safe to argue that legal fee doesn't act as deterrent for the subjects (public officials) to accept bribes. Furthermore, in Hungary bribe acceptance rates in NLF treatment is much larger than that of LFNE treatment. The sample size is small for these two treatments however it points in the same direction, such that legal fees do not deter extortions.

Fig. 4.4 Bribe acceptance by country of residence



Another interesting observation in Figure 4.4 is that bribe accepting rates in LFPNE treatment where bribery had only 50% chance of happening. Hungary has the highest accepting rates, followed by Poland, Portugal, Greece and then Mexico.

Using a Probit regression similar to Section 4.4.3, when data is pooled across all treatments, I compare country differences in accepting bribes. Hungary is used as

the benchmark. The results are presented in Table 4.5. I find that subjects accept significantly less bribes in Portugal, Greece and Mexico compared to Hungary. This finding is in accordance with Corruption Perception Index (CPI) 2019 ranking from the Transparency International. Portugal (30^{th}) and Greece (60^{th}) are ranked lower than Hungary (70^{th}). However, Mexico (130^{th}) is not ranked lower than Hungary. The difference between accepting rates in Poland (41^{st}) is not statistically different from bribery levels in Hungary. These resutls are robust, see Table 5.3 in Appendix 5.6 for more specifications.

Result 10. Bribe acceptance rates is lower for public officials from lower ranked CPI countries compared to countries ranked higher except for Mexico.

Table 4.5 Accepting bribes, country of residence

DV: Accepting bribes = 1	Coefficient	dydx (I)	Coefficient	dydx (II)
Bribe prediction	0.0317***	0.013***		
	(0.00288)	(0.001)		
Portugal	-0.780***	-0.290***	-0.766***	-0.286***
	(0.293)	(0.096)	(0.241)	(0.079)
Greece	-1.098***	-0.413***	-1.000***	-0.377***
	(0.326)	(0.108)	(0.283)	(0.097)
Mexico	-0.811**	-0.303**	-0.856***	-0.321***
	(0.359)	(0.126)	(0.298)	(0.105)
Poland	-0.375	-0.131	-0.367	-0.129
	(0.290)	(0.093)	(0.239)	(0.078)
Extraversion	0.0336	0.013	0.0124	0.005
	(0.0463)	(0.018)	(0.0432)	(0.017)
Agreeableness	-0.0573	-0.023	-0.0573	-0.023
	(0.0643)	(0.026)	(0.0605)	(0.024)
Conscientiousness	-0.00369	-0.001	-0.00523	-0.002
	(0.0547)	(0.022)	(0.0486)	(0.019)
Emotional stability	-0.0425	-0.017	-0.0358	-0.014
	(0.0489)	(0.019)	(0.0432)	(0.017)
Openness	-0.0165	-0.007	0.0149	0.006
	(0.0541)	(0.021)	(0.0518)	(0.021)
Time taken	0.00201*	0.001*	0.00215**	0.001**
	(0.00122)	(0.000)	(0.00106)	(0.000)
Age	-0.0253**	-0.010**	-0.0273***	-0.011***
	(0.0117)	(0.005)	(0.00991)	(0.004)
Female	-0.161	-0.064	-0.151	-0.060
	(0.139)	(0.055)	(0.127)	(0.050)
Student	0.167	0.066	0.0134	0.005
	(0.166)	(0.066)	(0.143)	(0.057)
No cash withdrawal	-0.184	-0.073	-0.126	-0.050
	(0.128)	(0.051)	(0.116)	(0.046)
Constant	-0.353		1.597***	
	(0.645)		(0.542)	
Observations	527	527	527	527
Observations	527	527		

(I) and (II) shows robustness checks with additional controls
Mean coefficients; Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.6 Concluding remarks

This study explores bribery decisions, namely acceptance rates by public officials in the presence of a legal fast track option. The economic literature suggests that both moral and punitive costs matter for public officials who accept or reject bribes offered to them.

In this experiment, I find that the legal fee mirroring the merits of a bribe that is used to "grease the wheels" of a slow bureaucratic process does not stop public officials accepting bribes on it is own. However, bribery rates are generally lower when there is a negative externality of harming others, even when there is a moral wiggle room. In addition in pursuit of maximising private gains, a significant percentage of subjects in this experiment 'rationalised' their corrupt decisions. The rationalisation behaviour provides individuals with sufficient self-serving incentive to continue accepting bribes at the expense of others. Although subjects accept bribes but show signs of discomfort and conflict on the issue of harming others. Policy measures targeting bribe acceptance that pronounces the moral costs more boldly combined with punitive measures will be more effective.

In situations where the public official's private gains are at large, both moral and punitive concerns must work together to be effective. This finding resembles the bribery rates in toll payments by taxi drivers in response to financial rewards in (Reid & Weigel, 2020). They found that public officials could strategically manipulate the timings to delay the process and agitate the drivers to offer bribes.

In other words, to prevent the demand-driven bribery, it needs further complementary policies such as stricter monitoring regimes, piece rate payments to officials or e-processing that reduces human interaction. Further research is required to test specifically what measures are effective. The rationalisers come in several types, those who discuss helping the briber, the negative externality not being about the payoffs, but the timing of the payoff or even the minimum wage payment being too low in the experiment as reasons for their decision. Of these, the low stake and other ways of motivating the negative externality may need further research to understand whether bribery rates change when these factors carry more weight.

Finally, the subject pool in this experiment comes from countries of low GDP per capita. In accordance to CPI measures, I confirm that those with less exposure to bribery and corruption accept less bribes. In other words, subjects from countries with higher CPI ranking, accept significantly more bribes than others. These results are consistent with the previous literature that studies cultural effects.

In addition, I find that beliefs among male or female public officials about accepting bribes are strong predictor of accepting actual bribes. The findings further confirm that legal fee prevents bribe acceptance among non-student subjects more than students in the sample.

Finally, there is no evidence whether time taken to make the decision to accept or reject bribes had any impact. I examine specifically time taken to decide, that is the amount of time spent on the page to make a choice. I find that there exists significant dispersion in time spent accepting the bribe. This is particularly salient among subjects who exhibit two types of behaviour: rationalisers and profit-maximisers. Such that rationalisers show greater deviations in making their decision.

There are limitations to every study. Due to experimental funding, the stakes were set to match minimum wages in the UK for this experiment and it was carried out online. An interesting complementary study would be to carry out this in the lab with higher stakes. In addition, more treatments can be carried out to isolate specific effects such as framing and cost.

References

Abbink, K. (2004). Staff rotation as an anti-corruption policy: An experimental study. *European Journal of Political Economy*, *20*(4), 887–906.

Abbink, K., Dasgupta, U., Gangadharan, L., & Jain, T. (2014). Letting the briber go free: An experiment on mitigating harassment bribes. *Journal of Public Economics*, *111*, 17–28.

Abbink, K., & Hennig-Schmidt, H. (2006). Neutral versus loaded instructions in a bribery experiment. *Experimental Economics*, *9*(2), 103–121.

Abbink, K., Irlenbusch, B., & Renner, E. (2002). An experimental bribery game. *Journal of Law, Economics, and Organization*, *18*(2), 428–454.

Abbink, K., & Serra, D. (2012). Anti-corruption policies: Lessons from the lab. In *New advances in experimental research on corruption.* Emerald Group Publishing Limited.

Abbink, K., & Wu, K. (2017). Reward self-reporting to deter corruption: An experiment on mitigating collusive bribery. *Journal of Economic Behavior & Organization*, *133*, 256–272.

Acemoglu, D., & Verdier, T. (2000). The choice between market failures and corruption. *American Economic Review*, *90*(1), 194–211.

Andersen, S., Harrison, G., Lau, M., & Rutström, E. (2006). Elicitation using multiple price list formats. *Experimental Economics*, *9*(4), 383–405.

Andreoni, J. (1995). Warm-glow versus cold-prickle: The effects of positive and negative framing on cooperation in experiments. *The Quarterly Journal of Economics*, *110*(1), 1–21.

Andreoni, J., & Bernheim, B. D. (2009). Social image and the 50/50 norm: A theoretical and experimental analysis of audience effects. *Econometrica*, *77*(5), 1607–1636.

Armantier, O., & Boly, A. (2011). A controlled field experiment on corruption. *European Economic Review*, *55*(8), 1072–1082.

Babcock, L., & Loewenstein, G. (1997). Explaining bargaining impasse: The role of self-serving biases. *Journal of Economic Perspectives*, *11*(1), 109–126.

Banerjee, R. (2016). On the interpretation of bribery in a laboratory corruption game: Moral frames and social norms. *Experimental Economics*, *19*(1), 240–267.

Bardhan, P. (1997). Corruption and development: A review of issues. *Journal of Economic Literature*, *35*(3), 1320–1346.

Bardsley, N. (2005). Experimental economics and the artificiality of alteration. *Journal of Economic Methodology*, *12*(2), 239–251.

Barometer, G. C. (2017). People and corruption: Citizens'voices from around the world. *Tech. Rep. Transparency Int.*.

Barr, A., & Serra, D. (2009). The effects of externalities and framing on bribery in a petty corruption experiment. *Experimental Economics*, *12*(4), 488–503.

Barr, A., & Serra, D. (2010). Corruption and culture: An experimental analysis. *Journal of Public Economics*, *94*(11-12), 862–869.

Basu, K. (2011). Why, for a class of bribes, the act of giving a bribe should be treated as legal. *Ministry of Finance, Govt. of India*.

Batson, C. D. (1990). How social an animal? the human capacity for caring. *American Psychologist*, *45*(3), 336.

Battigalli, P., & Dufwenberg, M. (2007). Guilt in games. *American Economic Review*, *97*(2), 170–176.

Baumeister, R. F. (1999). Self-concept, self-esteem, and identity. In *Personality: Contemporary theory and research (p. 339-375)*. Nelson-Hall Publishers.

Becker, G., & Stigler, G. (1974). Law enforcement, malfeasance, and compensation of enforcers. *The Journal of Legal Studies*, *3*(1), 1–18.

Berninghaus, S., Haller, S., Krüger, T., Neumann, T., Schosser, S., & Vogt, B. (2013). Risk attitude, beliefs, and information in a corruption game: An experimental analysis. *Journal of Economic Psychology*, *34*, 46–60.

Bodenschatz, A., & Irlenbusch, B. (2019). Do two bribe less than one? an experimental study on the four-eyes-principle. *Applied Economics Letters*, *26*(3), 191–195.

Bodner, R., & Prelec, D. (2003). Self-signaling and diagnostic utility in everyday decision making. *The Psychology of Economic Decisions*, *1*(105), 26.

Bolton, G. E., & Ockenfels, A. (2000). Erc: A theory of equity, reciprocity, and competition. *American Economic Review*, *90*(1), 166–193.

Brañas-Garza, P. (2007). Promoting helping behavior with framing in dictator games. *Journal of Economic Psychology*, *28*(4), 477–486.

Büchner, S., Freytag, A., González, L., & Güth, W. (2008). Bribery and public procurement: An experimental study. *Public Choice*, *137*(1-2), 103–117.

Cameron, A., & Trivedi, P. (2010). *Microeconometrics using stata* (Rev. ed.). College Station, TX: Stata Press.

Chaudhuri, C.-L., A., Erkal, N., & Gangadharan, L. (2009). Propensities to engage in and punish corrupt behavior: Experimental evidence from australia, india,

indonesia and singapore. *Journal of Public Economics*, *93*(7-8), 843–851.

Chen, D., Schonger, M., & Wickens, C. (2016). otree—an open-source platform for laboratory, online, and field experiments. *Journal of Behavioral and Experimental Finance*, *9*, 88–97.

Cookson, R. (2000). Framing effects in public goods experiments. *Experimental Economics*, *3*(1), 55–79.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic literature*, *47*(2), 448–74.

Dana, J., Weber, R., & Kuang, J. (2007). Exploiting moral wiggle room: Experiments demonstrating an illusory preference for fairness. *Economic Theory*, *33*(1), 67–80.

De Waal, F. B. (2008). Putting the altruism back into altruism: the evolution of empathy. *Annu. Rev. Psychol.*, *59*, 279–300.

Dollar, D., Fisman, R., & Gatti, R. (2001). Are women really the "fairer" sex? corruption and women in government. *Journal of Economic Behavior & Organization*, *46*(4), 423–429.

Dreber, A., & Johannesson, M. (2008). Gender differences in deception. *Economics Letters*, *99*(1), 197–199.

Eckel, C., & Grossman, P. (1996). Altruism in anonymous dictator games. *Games and Economic Behavior*, *16*(2), 181–191.

Eisenberg, N., & Fabes, R. A. (1990). Empathy: Conceptualization, measurement, and relation to prosocial behavior. *Motivation and Emotion*, *14*(2), 131–149.

Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, *101*(1), 91.

Elster, J. (1989). Social norms and economic theory. *Journal of Economic Perspectives*, *3*(4), 99–117.

Engel, C. (2011). Dictator games: A meta study. *Experimental Economics*, *14*(4), 583–610.

Engel, C., Goerg, S., & Yu, G. (2016). Symmetric vs. asymmetric punishment regimes for collusive bribery. *American Law and Economics Review*, *18*(2), 506–556.

Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, *425*(6960), 785–791.

Fehr, E., & Gächter, S. (2000). Fairness and retaliation: The economics of reciprocity. *Journal of Economic Perspectives*, *14*(3), 159–181.

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, *415*(6868), 137–140.

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, *114*(3), 817–868.

Fisman, R., & Miguel, E. (2007). Corruption, norms, and legal enforcement: Evidence from diplomatic parking tickets. *Journal of Political Economy*, *115*(6), 1020–1048.

Frank, B., Li, S., Bühren, C., & Qin, H. (2015). Group decision making in a corruption experiment: China and germany compared. *Jahrbücher für Nationalökonomie und Statistik*, *235*(2), 207–227.

Gosling, S. D., Rentfrow, P. J., & Swann Jr, W. B. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, *37*(6), 504–528.

Greene, J., Nystrom, L., Engell, A., Darley, J., & Cohen, J. (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron*, *44*(2), 389–400.

Grossman, Z., & Van der Weele, J. J. (2017). Self-image and willful ignorance in social decisions. *Journal of the European Economic Association*, *15*(1), 173–217.

Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior & Organization*, *3*(4), 367–388.

Haisley, E. C., & Weber, R. A. (2010). Self-serving interpretations of ambiguity in other-regarding behavior. *Games and economic behavior*, *68*(2), 614–625.

Hogarth, R. M., & Einhorn, H. J. (1992). Order effects in belief updating: The belief-adjustment model. *Cognitive Psychology*, *24*(1), 1–55.

IMF. (2019). World economic outlook database gdp per capita [Computer software manual]. Retrieved from `https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/weoselgr.aspx`

Jha, C. K., & Sarangi, S. (2018). Women and corruption: What positions must they hold to make a difference? *Journal of Economic Behavior & Organization*, *151*, 219–233.

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1986). Fairness and the assumptions of economics. *Journal of Business*, S285–S300.

Klimecki, O. M., Mayer, S. V., Jusyte, A., Scheeff, J., & Schönenberg, M. (2016). Empathy promotes altruistic behavior in economic interactions. *Scientific Reports*, *6*(1), 1–5.

Klitgaard, R. (1991). *Controlling corruption*. University of California Press.

Lambsdorff, J. (2007). *The institutional economics of corruption and reform: Theory,*

evidence and policy. Cambridge University Press.

Lambsdorff, J., & Frank, B. (2010). Bribing versus gift-giving: An experiment. *Journal of Economic Psychology*, *31*(3), 347–357.

Lambsdorff, J., & Frank, B. (2011). Corrupt reciprocity: Experimental evidence on a men's game. *International Review of Law and Economics*, *31*(2), 116–125.

Lambsdorff, J., & Nell, M. (2007). *Fighting corruption with asymmetric penalties and leniency*. CeGE Discussion Paper.

Levitt, S. D., & List, J. A. (2007). What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic Perspectives*, *21*(2), 153–174.

Leys, C. (1965). What is the problem about corruption? *The Journal of Modern African Studies*, *3*(2), 215–230.

Liberman, V., Samuels, S., & Ross, L. (2004). The name of the game: Predictive power of reputations versus situational labels in determining prisoner's dilemma game moves. *Personality and Social Psychology Bulletin*, *30*(9), 1175–1185.

Long, J. (1997). Regression models for categorical and limited dependent variables. In *Advanced quantitative techniques in the social sciences. vol 7*.

López-Pérez, R. (2008). Aversion to norm-breaking: A model. *Games and Economic Behavior*, *64*(1), 237–267.

Lui, F. (1985). An equilibrium queuing model of bribery. *Journal of Political Economy*, *93*(4), 760–781.

Marjit, S., & Shi, H. (1998). On controlling crime with corrupt officials. *Journal of Economic Behavior & Organization*, *34*(1), 163–172.

Mookherjee, D., & Png, I. P.-L. (1995). Corruptible law enforcers: How should they be compensated? *The Economic Journal*, *105*(428), 145–159.

Neumann, T., & Vogt, B. (2009). *Do players' beliefs or risk attitudes determine the equilibrium selections in 2x2 coordination games?* Univ., FEMM.

Reid, O., & Weigel, J. L. (2020). *The supply of bribes: Evidence from roadway tolls in the drc* (Tech. Rep.). Working Paper.

Rivas, M. (2013). An experiment on corruption and gender. *Bulletin of Economic Research*, *65*(1), 10–42.

Rose-Ackerman, S. (1978). *Corruption: A study in political economy*. New York, NY: Academic Press.

Rose-Ackerman, S. (1999). *Corruption and government: Causes, consequences, and reform*. New York: Cambridge University Press.

Rose-Ackerman, S. (2005). The challenge of poor governance and corruption. *Especial 1 DIREITO GV L. Rev.*, 207.

Roth, A. (2002). The economist as engineer: Game theory, experimentation, and computation as tools for design economics. *Econometrica*, *70*(4), 1341–1378.

Rustichini, A. (2018). Morality, policy, and the brain. *Journal of Economic Literature*, *56*(1), 217–33.

Ryvkin, D., & Serra, D. (2012). How corruptible are you? bribery under uncertainty. *Journal of Economic Behavior & Organization*, *81*(2), 466–477.

Salmon, T., & Serra, D. (2017). Corruption, social judgment and culture: An experiment. *Journal of Economic Behavior & Organization*, *142*, 64–78.

Schikora, J. (2011). Bringing the four-eyes-principle to the lab. *University of Munich - Department of Economics*. (Munich Discussion Paper No. 2011-3.)

Schulze, G., & Frank, B. (2003). Deterrence versus intrinsic motivation: Experimental evidence on the determinants of corruptibility. *Economics of Governance*, *4*(2), 143–160.

Shalvi, S., & Leiser, D. (2013). Moral firmness. *Journal of Economic Behavior & Organization*, *93*, 400–407.

Smirnov, N. (1939). Estimate of deviation between empirical distribution functions in two independent samples. *Bulletin Moscow University*, *2*(2), 3–16.

Snedecor, G., & Cochran, W. (1989). *Statistical methods, 8thedn.* Ames: Iowa State Univ. Press Iowa.

Sung, H.-E. (2012). Women in government, public corruption, and liberal democracy: A panel analysis. *Crime, Law and Social Change*, *58*(3), 195–219.

Swamy, A., Knack, S., Lee, Y., & Azfar, O. (2001). Gender and corruption. *Journal of Development Economics*, *64*(1), 25–55.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*(4157), 1124–1131.

Waller, C. J., Verdier, T., & Gardner, R. (2002). Corruption: Top down or bottom up? *Economic Inquiry*, *40*(4), 688–703.

Chapter 5

Appendix B

5.1 Instructions for citizen's bribery experiment

This experiment has received approval from the University of Exeter's research ethics committee. No deception is involved: all our instructions are accurate, and we will pay exactly as stated. No personally identifiable information is collected, and everyone will remain anonymous. We will process personal data in accordance with the EU General Data Protection Regulation (GDPR). You consent to the publication of the study results. No data will be personally identifiable. Anonymized data may be stored for an indefinite period of time and/or made available online to other researchers. Any published data will have your Prolific ID removed. You will not be able to withdraw consent after completing the study as there will be no way to link you to your data, but you are free to withdraw at any time during the study without giving a reason. **The study must be completed in one go so please only continue if you have at least 10 minutes to complete it.** By entering your Prolific ID and clicking next you agree that you understand the above information and give your consent to taking part in the study.

Stage One: Real effort task

In this part of the experiment you will be presented with a series of randomly selected letters and numbers. You will need to type 20 sequences correctly to be able to continue.

Once you have entered the string, click the **Next** button or press the **Enter** key. You will earn **£1.50 for completing** this section of the experiment.

You will have a maximum of 10 minutes to complete the task which should be plenty of time.

Stage Two: Treatments

Treatment 1: No legal fee (NLF)

By default, you will be paid in **11 days**.

You do however have an option to pay a bribe where you will be paid today but **someone else taking part in the experiment today will have to wait 22 days** to be paid.

Do you choose to pay the bribe? "No" "Pay the bribe"

Treatment 2: Legal fee and negative externality (LFNE)

By default, you will be paid in **11 days**.

You do however have an option to pay a bribe where you will be paid today but **someone else taking part in the experiment today will have to wait 22 days** to be paid.

Alternatively, you have an option to pay **a fast track fee** where you will be paid **today** with **no effect on when others are paid**.

Do you choose to pay the bribe or fast track fee? "No" "Pay the bribe" "Pay the fast track fee"

Treatment 3: Legal fee (LF)

By default, you will be paid in 11 days.

You do however have an option to pay a **bribe** where you will be paid **today** with **no effect on when others are paid**.

Alternatively, you have an option to pay a fast track fee where you will be paid today with no effect on when others are paid.

Do you choose to pay the bribe or fast track fee? "No" "Pay the bribe" "Pay the fast track fee"

Stage Three: Personality question (big five)

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1 = Disagree strongly; 2 = Disagree moderately; 3 = Disagree a little; 4 = Neither agree nor disagree; 5 = Agree a little; 6 = Agree moderately; 7 = Agree strongly

I see myself as:
1. Extraverted, enthusiastic.
2. Critical, quarrelsome.
3. Dependable, self-disciplined.
4. Anxious, easily upset.
5. Open to new experiences, complex.
6. Reserved, quiet.
7. Sympathetic, warm.
8. Disorganized, careless.
9. Calm, emotionally stable.
10. Conventional, uncreative.

Stage Four: Post-experimental questions

1. Do you have more than £5 in your Prolific account?
2. What do you think this experiment was about?
3. How did you reach your decision?
4. Any other comments?

5.2 Average fee and bribe payments

Table 5.1 Bribery and fees paid by treatment

Variables	Full sample	NLF	LFNE	LF
Default option	69.2%	77.8 %	57.8%	71.3%
Observations	(415)	(158)	(111)	(146)
Bribery rates	14.3%	22.2%	6.3%	14.1%
Observations	(86)	(45)	(12)	(29)
Fee rates	24.9%		35.9%	14.6%
Observations	(99)		(69)	(30)
Pay a bribe first order belief	40.9%	46.3%	34%	41.9%
Std dev.	(0.265)	(0.28)	(0.23)	(0.27)
Pay a fee first order belief	33.8%		40.9%	27.1%
Std dev.	(0.266)		(0.26)	(0.25)
Observations	600	203	192	205

Percentages; Frequencies in parentheses

5.3 Instructions for public official's bribery experiment

This experiment has received approval from the University of Exeter's research ethics committee. No deception is involved: all our instructions are accurate, and we will pay exactly as stated. No personally identifiable information is collected, and everyone will remain anonymous. We will process personal data in accordance with the EU General Data Protection Regulation (GDPR). You consent to the publication of the study results. No data will be personally identifiable. Anonymized data may be stored for an indefinite period of time and/or made available online to other researchers. Any published data will have your Prolific ID removed. You will not be able to withdraw consent after completing the study as there will be no way to link you to your data, but you are free to withdraw at any time during the study without giving a reason. **The study must be completed in one go so please only continue if you have at least 10 minutes to complete it.** By entering your Prolific ID and clicking next

you agree that you understand the above information and give your consent to taking part in the study.

Stage One: Treatments

Treatment 1: No legal fee (NLF) Several people taking part in this study earned £1.50 for completing a task. They then chose to pay **a bribe of 6p (£0.06)** to be paid **on the day they took part** rather than waiting **11 days** to be paid.

They also knew that paying the bribe would cause **someone else** in the study to wait **22 days** to be paid **instead of 11 days**.

Your choice today is whether you accept such a bribe.

If you **accept** then **6p will be added** to your earnings. There are also **two other participants** who are not making decisions today. By accepting the bribe, **one** will receive their participation payment **today** and the **other will wait 22 days**.

If you **reject**, then the **two other participants** will both be paid in **11 days** and you will not receive the additional 6p.

Do you choose to accept the bribe? "Reject the bribe" "Accept the bribe"

Treatment 2: Legal fee and negative externality (LFNE)

Several people taking part in this study earned £1.50 for completing a task. They then chose to pay **a bribe of 6p (£0.06**) to be paid **on the day they took part** rather than waiting **11 days** to be paid.

They also knew that paying the bribe would cause **someone else** in the study to wait **22 days** to be paid **instead of 11 days**.

They also had the option to pay **a fast track fee of 9p (£0.09)** to be paid **on the day they took part with no effect on when others are paid**. They did however **not pick this fast track option and paid the bribe instead.**

Your choice today is whether you accept such a bribe.

If you **accept** then **6p will be added** to your earnings. There are also **two other participants** who are not making decisions today. By accepting the bribe, **one** will receive their participation payment **today** and the **other will wait 22 days**.

If you **reject** then the **two other participants** will both be paid in **11 days** and you will not receive the additional 6p.

Do you choose to accept the bribe? "Reject the bribe" "Accept the bribe"

Treatment 3: Legal fee (LF)

Several people taking part in this study earned £1.50 for completing a task. They then chose to pay **a bribe of 6p (£0.06)** to be paid **on the day they took part** rather than waiting **11 days** to be paid. They also knew that paying the bribe would have **no effect on when others are paid**.

They also had the option to pay **a fast track fee of 9p (£0.09)** to be paid **on the day they took part** with **no effect on when others are paid**. They did however **not pick this fast track option and paid the bribe instead.**

Your choice today is whether you accept such a bribe.

If you **accept** then **6p will be added** to your earnings. There are also **two other participants** who are not making decisions today. By accepting the bribe, **one** will receive their participation payment **today** and the **other will wait 11 days**.

If you **reject**, then the **two other participants** will both be paid in **11 days** and you will not receive the additional 6p.

Do you choose to accept the bribe? "Reject the bribe" "Accept the bribe"

Treatment 4: Legal fee and probabilistic negative externality (LFPNE)

"Several people taking part in this study earned £1.50 for completing a task. They then chose to pay **a bribe of 6p (£0.06)** to be paid **on the day they took part** rather than waiting **11 days** to be paid. They also knew that paying the bribe would have **no effect on when others are paid.**

They also had the option to pay **a fast track fee of 9p (£0.09)** to be paid **on the day they took part** with **no effect on when others are paid**. They did however **not pick this fast track option and paid the bribe instead.**

Your choice today is whether you accept such a bribe.

If you **accept** then **6p will be added** to your earnings. There are also **two other participants** who are not making decisions today. By accepting the bribe, **one** will receive their participation payment **today**. The **other will wait 22 days** with **50% chance** and will wait **11 days** with **50% chance** (i.e. they are equally likely).

If you **reject**, then the **two other participants** will both be paid in **11 days** and you will not receive the additional 6p.

Do you choose to accept the bribe? "Reject the bribe" "Accept the bribe"

Stage Three: Personality question (big five) Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1 = Disagree strongly; 2 = Disagree moderately; 3 = Disagree a little; 4 = Neither agree nor disagree; 5 = Agree a little; 6 = Agree moderately; 7 = Agree strongly

I see myself as:
1. Extraverted, enthusiastic.
2. Critical, quarrelsome.
3. Dependable, self-disciplined.
4. Anxious, easily upset.
5. Open to new experiences, complex.
6. Reserved, quiet.
7. Sympathetic, warm.
8. Disorganized, careless.
9. Calm, emotionally stable.
10. Conventional, uncreative.

Stage Four: Post-experimental questions

1. Do you have more than £5 in your Prolific account?
2. What do you think this experiment was about?
3. How did you reach your decision?
4. Any other comments?

5.4 Negative externality

Table 5.2 Accepting bribes, robustness check

	With predictions				Without predictions			
DV: Accepting bribes= 1	Coefficients	dydx	Coefficients	dydx	Coefficients	dydx	Coefficients	dydx
Bribe prediction	0.0309***	0.012***	0.0311***	0.0120***				
	(0.00269)	(0.001)	(0.00274)	(0.0010)				
NLF	0.0674	0.021	0.0537	0.0210	-0.0550	-0.022	-0.0635	-0.025
	(0.167)	(0.067)	(0.167)	(0.0670)	(0.150)	(0.059)	(0.151)	(0.059)
LF	0.378**	0.144**	0.364**	0.1440**	0.589***	0.228***	0.575***	0.223***
	(0.164)	(0.064)	(0.164)	(0.0640)	(0.150)	(0.056)	(0.150)	(0.056)
LFPNE	0.259	0.095	0.240	0.0950	0.265*	0.105*	0.259*	0.103*
	(0.161)	(0.064)	(0.161)	(0.0640)	(0.145)	(0.057)	(0.145)	(0.057)
Extraversion	0.0365	0.017	0.0431	0.0170	0.0123	0.005	0.0180	0.007
	(0.0429)	(0.017)	(0.0437)	(0.0170)	(0.0399)	(0.016)	(0.0406)	(0.016)
Agreeableness	-0.0117	-0.002	-0.00407	-0.0020	-0.0294	-0.012	-0.0234	-0.009
	(0.0591)	(0.024)	(0.0593)	(0.0240)	(0.0555)	(0.022)	(0.0558)	(0.022)
Conscientiousness	-0.00507	-0.002	-0.00472	-0.0020	-0.00670	-0.003	-0.00670	-0.003
	(0.0496)	(0.020)	(0.0496)	(0.0200)	(0.0463)	(0.018)	(0.0463)	(0.018)
Emotional stability	-0.0173	-0.008	-0.0194	-0.0080	0.00181	0.001	0.000508	
	(0.0450)	(0.018)	(0.0451)	(0.0180)	(0.0407)	(0.016)	(0.0407)	
Openness	0.0219	0.005	0.0133	0.0050	0.0517	0.021	0.0466	0.019
	(0.0527)	(0.021)	(0.0527)	(0.0210)	(0.0496)	(0.020)	(0.0499)	(0.020)
Time taken	0.000854		0.000761		0.00148	0.001	0.00145	0.001
	(0.00120)		(0.00120)		(0.00118)	(0.000)	(0.00118)	(0.000)
No cash withdrawal	-0.158	-0.059	-0.149	-0.0590	-0.0870	-0.035	-0.0849	-0.034
	(0.121)	(0.048)	(0.121)	(0.0480)	(0.109)	(0.043)	(0.110)	(0.044)
Age	-0.0304***	-0.011***	-0.0276**	-0.0110**	-0.0290***	-0.012***	-0.0303***	-0.012***
	(0.00874)	(0.004)	(0.0107)	(0.0040)	(0.00763)	(0.003)	(0.00928)	(0.004)
Female	-0.118	-0.051	-0.127	-0.0510	-0.102	-0.041	-0.105	-0.042
	(0.133)	(0.053)	(0.133)	(0.0530)	(0.122)	(0.048)	(0.122)	(0.048)
Student			0.0758	0.0300			-0.0357	-0.014
			(0.156)	(0.0620)			(0.135)	(0.054)
Constant	-1.285***		-1.403**		0.422		0.470	
	(0.492)		(0.550)		(0.413)		(0.458)	
Observations	582	580	580	580	582	582	580	580

LFPNE means legal fee and probabilistic negative externality;
LFNE means legal fee and negative externality;
NLF means no legal fee; LF means legal fee;
Mean coefficients; Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5.5 Country of residence

Table 5.3 Accepting bribes, country of residence

	With predictions				Without predictions			
DV: Accepting bribes = 1	Coefficient	dydx	Coefficient	dydx	Coefficient	dydx	Coefficient	dydx
Bribe prediction	0.0317***	0.013***	0.0359***	0.014				
	(0.00288)	(0.001)	(0.00590)	0.002				
Portugal	-0.780***	-0.290***	-0.363		-0.766***	-0.286***	-0.418	
	(0.293)	(0.096)	(0.290)		(0.241)	(0.079)	(0.264)	
Greece	-1.098***	-0.413***	-1.419***		-1.000***	-0.377***	-1.255**	
	(0.326)	(0.108)	(0.511)		(0.283)	(0.097)	(0.509)	
Mexico	-0.811**	-0.303**	-0.899		-0.856***	-0.321***	-0.914*	
	(0.359)	(0.126)	(0.605)		(0.298)	(0.105)	(0.500)	
Poland	-0.375	-0.131			-0.367	-0.129		
	(0.290)	(0.093)			(0.239)	(0.078)		
Extraversion	0.0336	0.013	-0.124	-0.049	0.0124	0.005	-0.145	-0.058
	(0.0463)	(0.018)	(0.0929)	0.037	(0.0432)	(0.017)	(0.0913)	(0.036)
Agreeableness	-0.0573	-0.023	-0.258*	-0.103	-0.0573	-0.023	-0.263**	-0.104**
	(0.0643)	(0.026)	(0.149)	0.059	(0.0605)	(0.024)	(0.127)	(0.051)
Conscientiousness	-0.00369	-0.001	0.145	0.058	-0.00523	-0.002	0.110	0.044
	(0.0547)	(0.022)	(0.116)	0.046	(0.0486)	(0.019)	(0.104)	(0.041)
Emotional stability	-0.0425	-0.017	-0.0898	-0.036	-0.0358	-0.014	-0.117	-0.047
	(0.0489)	(0.019)	(0.107)	0.042	(0.0432)	(0.017)	(0.0942)	(0.037)
Openness	-0.0165	-0.007	0.174	0.069	0.0149	0.006	0.168	0.067
	(0.0541)	(0.021)	(0.124)	0.049	(0.0518)	(0.021)	(0.117)	(0.046)
Time taken	0.00201*	0.001*	0.00192	0.001	0.00215**	0.001**	0.00272	0.001
	(0.00122)	(0.000)	(0.00208)	0.001	(0.00106)	(0.000)	(0.00215)	(0.001)
Age	-0.0253**	-0.010**	-0.0269	-0.011	-0.0273***	-0.011***	-0.0248	-0.010
	(0.0117)	(0.005)	(0.0211)	0.008	(0.00991)	(0.004)	(0.0189)	(0.008)
Female	-0.161	-0.064	-0.331	-0.132	-0.151	-0.060	-0.237	-0.094
	(0.139)	(0.055)	(0.328)	0.131	(0.127)	(0.050)	(0.298)	(0.119)
Student	0.167	0.066	-0.0156	-0.006	0.0134	0.005	-0.288	-0.115
	(0.166)	(0.066)	(0.349)	0.139	(0.143)	(0.057)	(0.304)	(0.121)
No cash withdrawal	-0.184	-0.073	-0.415	-0.165	-0.126	-0.050	-0.508**	-0.202**
	(0.128)	(0.051)	(0.282)	0.112	(0.116)	(0.046)	(0.246)	(0.098)
Constant	-0.353		-0.548		1.597***		2.184**	
	(0.645)		(1.109)		(0.542)		(0.949)	
Observations	527	527	125	125	527	527	125	125

Mean coefficients; Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.