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Morality, Altruism, and Occupation Choice: Theory and Evidence

Abstract

We consider occupation/effort choices between a private sector that provides incentive-based pay and a public sector that offers opportunities for corruption, but fixed wages. We estimate subject-specific parameters of dishonesty-aversion and altruism from the occupation/effort choice game and estimate separate proxies for these parameters from the dictator/die-rolling games; the estimated parameters are portable across the two games. The majority of subjects choose the corrupt public sector job, and more dishonest subjects choose this job. Those choosing the private sector use a simple heuristic of maximizing legal-monetary payoffs, and are more honest. Effort is highest in the private sector. Corruption increases the size of the public sector, but consumer welfare is unchanged relative to a honest public sector job.

JEL-Codes: D010, D910.

Keywords: dishonesty-aversion, altruism, institutional corruption, occupational/effort choice, portability of behavioural parameters.

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1 Introduction

A recent literature identifies altruism and honesty as the leading determinants of occupational choice between private sector and public sector jobs. Experiments on Indian students show that greater dishonesty and lower altruism are associated with a greater desire to join government service (Hanna and Wang, 2017). Supporting evidence shows that civil service aspirants in India are more likely to engage in corruption in experimental games (Banerjee et al., 2015). A similar result is found for Ukranian subjects (Gans-Morse et al., 2020). The opposite pattern (more altruistic and more honest students more likely to join public sector jobs) is found in Denmark (Barfort et al., 2019) and for students at elite Russian universities (Gans-Morse et al., 2020).[1]

Despite commendable progress in this literature, there are several areas of concern. We offer a complementary, yet quite different, approach to the underlying questions in order to establish causality between variables. The following important observations motivate our analysis.

1. In most existing observational/experimental studies that specifically study the impact of altruism and honesty on occupation choice, 'public sector jobs' and 'private sector jobs' are not rigorously defined in the experiments.[2] In the real world, these jobs are typically associated with a rich vector of job characteristics (e.g., wage levels, incentives, corruption, productivity, career progression, non-pecuniary incentives). The typical approach is to ask subjects to make a choice between private and public sector jobs based on their 'subjective perceptions' of the different jobs. Without a formal, objective, specification of the precise job characteristics, different subjects could, subjectively, be comparing very different jobs, which makes it difficult to establish causality, and compare results across subjects.[3]

   The literature does not also typically distinguish between public sector jobs that allow opportunities for corruption, and those that do not. Hence, the implications of corruption for the size of the public sector and welfare cannot be inferred relative to a counterfactual where there is an absence of corruption.[4]

[1] Brassiolo et al. (2021) find that more dishonest subjects are more likely to self select themselves into public sector jobs that allow for corruption. Banuri and Keefer (2016) show that those joining the Indonesian Ministry of Finance have relatively higher prosocial motivation. Alatas et al. (2009) find that the extent of bribery in public sector jobs might itself be influenced by the experience of civil servants. Friebel et al. (2019) find that applicants to the German Police Force exhibit greater trust and trustworthiness. Schneider et al. (2022) show that 'immoral types' state a greater willingness to work in firms and industries perceived by others as immoral. Armantier and Boly (2013) find that lab experiments on corruption have external validity with respect to data from a laboratory in a developed country, a laboratory in a developing country, and the field in a developing country. There is a separate literature on motivated agents, starting with Besley and Ghatak (2005), who care for the team output while motivated agents do not. However, this literature is not directly related to our work.

[2] We are only aware of a single exception, Brassiolo et al. (2021), but our work differs significantly from theirs. First, they do not provide a theoretical model with rigorous predictions; their analysis is entirely empirical. Second, their public sector job does not have a effort task. Third, they do not directly estimate preference parameters structurally from the games they are testing; they use proxy parameters from other experimental tasks. Fourth they do not check for the mutual portability of the behavioral parameters as we do.

[3] For instance, a student subject with low ability could be imagining a choice between a low-wage private sector job and a public sector job that provides job security and a decent pension. However, a student subject with high ability could be imagining a high-wage private sector job in the city with performance related pay and equity options vis-a-vis a public sector job that offers low-powered incentives.

[4] We use the term 'size of the public sector' in the sense that is used in classical public finance, i.e., the total output produced by the public sector. In particular, we are interested in an occupation and effort choice problem

2. Related to occupational choice is the question of the choice of optimal costly effort in each of the occupations. Do we expect subjects to put in higher effort in the private sector, or in the public sector? Does a larger size of the public sector translate into higher output received by consumers, as opposed to more leakages into corruption? However, without a precise, and formal, specification of the characteristics of alternative jobs, and the cost of effort function, it is not possible to analyze effort choices either.

3. The literature typically lacks formal theoretical models that make precise predictions about the choice between private and public sectors. However, it does propose 'informal' hypotheses about the effects of 'altruism' and 'honesty' on occupation choice. Testing these hypotheses requires estimates of the parameters of altruism and honesty (or dishonesty-aversion). The most common approach is to use data from separate games, such as dictator games and versions of the Fischbacher and Föllmi-Heusi die rolling experiments to determine proxies for these parameters (Hanna and Wang, 2017; Barfort et al., 2019; Gans-Morse et al., 2020). Friebel et al. (2019) use a trust game and Banerjee et al. (2015) use a bribery game.

   The dictator and the die-rolling games have an individual-individual interface. However, in a public sector job that offers possibilities for corruption, the interface is individual-government/society. This gives rise to questions about the portability of the estimated parameters. Ideally, one wishes to obtain estimates of the altruism and the dishonesty-aversion parameters directly from the occupation/effort choice games. This can enable a test of the mutual portability and relevance of the parameters from the two separate classes of game (dictator and die rolling games vis-a-vis the occuptional/effort choice games).

We provide a theoretical and empirical analysis of occupation/effort choice that comprehensively addresses all 3 concerns outlined above. This requires a carefully controlled lab design that allows variations in a range of factors, one at a time, while keeping everything else fixed; this is likely to be highly unfeasible in a field environment. Our theoretical model comes first, providing the relevant predictions that fully inform our experiments, and are stringently tested. We give a precise characterization of the job features for the private sector job and the public sector job, based on the following observed features of such jobs (Lee et al., 2021).[5]

First, there is typically a relatively greater incidence of performance-related pay (or high-powered incentives) in the private sector jobs, in comparison to public sector jobs. Second, the public sector, particularly in developing countries, offers relatively greater opportunities for 'institutionalized corruption' relative to the private sector.[6] Third, the public sector typically

and not a general equilibrium model that also considers labor demand and a labor market clearing mechanism. Our aim is not to simulate real world labor supply and demand.

[5] Any experimenter-provided characterization of the private and public jobs in experiments must necessarily be stylized and subjective. It will need to abstract away from all possible job characteristics that might be associated with these jobs in the real world. Yet, in the absence of such a characterization, one cannot ensure that subjects in experiments have some underlying objective understanding of the occupations they are asked to choose between. Hence, the challenge is to capture the key, and salient, features of these alternative jobs.

[6] *Institutionalized corruption* is typical of several forms of corruption in the public sector in developing countries, particularly India. For instance, a 'fixed price' to be paid to obtain a driving license, industrial license, a government permit, a government contract, or to annul a police charge. These fixed prices are, in turn, deter-

provides an opportunity to public servants to provide public outputs and services that benefit the citizenry. We consider the relatively stark comparison where the private sector offers high-powered incentives (i.e., performance-related pay), and provides a private good, while the public sector provides low-powered incentives (i.e., a fixed wage) and provides a public output.[7]

In addition to the *private sector job*, we consider two kinds of public sector jobs– one that offers the possibility of institutionalized corruption (*taking public sector job*), and another that does not offer a corruption opportunity (*no-taking public sector job*). Individuals then make a choice of effort in each job if they were to have that job (this is to measure the altruism and dishonest-aversion parameters), and also make an occupational choice decision between the three jobs (private, taking public, no-taking public).[8]

In choosing a private sector job, some individuals might be attracted by higher incentives, e.g., performance-based pay. In opting for the public sector jobs, some individuals might be motivated by altruism/warm-glow in providing a public output to society. In addition, those who have lower honesty might be more inclined to choose the 'taking' public sector job. The evidence suggests preference heterogeneity.[9] Hence, it is critical to measure *individual-specific* altruism and dishonesty-aversion parameters. We do so directly from the individual choices in the occupation/effort choice games. But we also separately measure proxies for these variables from a dictator game and from a modified die-rolling task as in Kocher et al. (2017).

We have two main treatments, a *primed treatment* in which subjects read a factually correct description of the extent of corruption in the public sector, and a *neutral treatment* that contains neutral text where no corruption related information is provided.

mined by an underlying bargaining model of the demand and supply of corrupt activities (Aidt, 2003). Another important form, that is directly relevant to our paper, involves fixed shares of payments to government officials at various levels of the hierarchy, say, in public procurement, grant of government licenses, disbursement of public benefits such as social welfare schemes, and in sidestepping regulations (Alam, 1989). *Any public official involved in this form of corruption receives a fixed share of the bribe* that is determined by some underlying process of bargaining, that we do not model in this paper. In this form of corruption, the politicians and the police also typically take a share of the corruption money, hence, there is little danger of being caught taking the bribe, unless a whistleblower/press expose the underlying activities. This massively reduces the effectiveness of deterrence policies. For instance, in trucking operations, subjects to repeated checks on toll plazas and state border along Indian national highways, Transparency International India estimates in a February 2007 report that the extent of annual corruption is Rs, 22,200 crores per year. They estimate that the government officials and the police share, respectively, 43% and 45% of this bribe money. The remaining bribe was shared between government forest, sales/excise, and octroi officials. Hence, we do not formally model the deterrence side of corruption in this paper. There might well be non-institutionalized forms of corruption in developing countries that require endogenous modeling of deterrence parameters (Olken and Pande, 2012; Dhami and al-Nowaihi, 2007). Our model may not directly apply in these domains. See also the particularly informative wikipedia entry on the extent and type of corruption in India, where our data comes from: https://en.wikipedia.org/wiki/Corruption_in_India.

[7]We do not deny the possibility in the real world of corruption in the private sector; or the possibility that the private sector may supply goods that might have features of impure public goods (e.g., club goods); or the existence of some component of the public sector remuneration to have an incentive component. However, to get cleaner and sharper results, and to make our experiment manageable, we consider the polar cases. Our results go through, in principle, if we allowed for (i) the private sector to be also corrupt, so long as the public sector was 'relatively' more corrupt, or (ii) the public sector provides high-powered incentives, so long as the private sector provides 'relatively' higher-powered incentives.

[8]We abstract from a range of other job characteristics that might influence the selection of individuals into such jobs. These include characteristics such as an organization's mission and career incentives (Dal Bo et al., 2013; Banuri and Keefer, 2016; Cassar and Meier, 2018, Deserranno, 2019; Ashraf et al., 2020). We also abstract from other kinds of jobs, such as those in not-for-profit organizations and jobs in the voluntary sector.

[9]Individuals may differ in their propensity to engage in corruption (Andvig and Moene, 1990; Prendergast, 2007). There is also preference heterogeneity in measures of the degree of altruism and honesty in experimental games (Dhami, 2019, Vol. II).

Our results are as follows.

Occupational choice: There are a total of 500 subjects; of these 242 were in the neutral treatment and 258 in the primed treatment. Nearly two-thirds of the subjects chose the taking public sector job; about a third chose the private sector job; only 5.3% in the neutral treatment and 9.3% in the primed treatment chose the no-taking public sector job. Including state-owned companies and municipal government employees in India, the data shows that 64.2% work in the public sector and 35.8% in the registered private sector. In our experiments, 65.4% chose the public sector job and 34.6% chose the private sector job. The two sets of figures are remarkably close, despite the fact that we have a very simple model.[10]

Priming had no statistical effect on occupation choice. Post experimental questionnaires revealed that subjects in the neutral treatment already had fairly accurate beliefs about the extent of corruption in public sector jobs. Our simple, parsimonious, theoretical model allows us to derive conditions, based on the underlying preference parameters for altruism and dishonesty-aversion, that predict occupation choice. These conditions are satisfied by 71.8% of the subjects who choose the no-taking public sector job, and 64.2% of the subjects who choose the taking public sector job; and this is significantly different from pure statistical chance.

A probit analysis shows that in the choice between the taking and no-taking public sector jobs, more dishonest subjects are significantly more likely to choose the taking public sector job. Our dishonesty-aversion parameters, measured directly from the occupational/effort choice experiment, and separately from the die rolling experiments, are both highly significant in correctly predicting occupation choice and give similar results. Conversely, the dishonesty-aversion parameter measured from the occupation/effort choice experiments is correlated with lying behavior in the die rolling experiments. Thus, the same underlying preference parameter of dishonesty-aversion, measured from each experimental game, predicts well the subjects' choice in the other experimental game. This speaks to the issue of the external validity of the parameters and their portability to different contexts. To the best of our knowledge, this is the first experiment to establish the portability of this behavioral parameter in such a manner.

The majority of our subjects (94.2% in the neutral treatment and 91.7% in the primed treatment) pick either the taking public sector job or the private sector job. Hence, this is the most important binary occupation choice decision among all three possibilities (taking vs no-taking; taking vs private; no-taking vs private). In the 'taking public sector vs private' job choice, the altruism parameters measured from the occupation/effort choice decision, and separately from the dictator game experiment, are both insignificant in explaining job choice. On the other hand, altruism positively affects the binary choice between the taking and no-taking public sector jobs in favor of the former, which is not consistent with the predictions of our simple parsimonious model.[11]

[10] We are only pointing out to the similarity between the two sets of figures, not claiming here to explain the real world proportion of subjects choosing the private and public sector jobs that are determined by complex labor market factors, and general equilibrium factors.

[11] A potential explanation, which is not a part of our model, and neither tested in our experimental results, is guilt-aversion. Those who choose the taking public sector job may experience guilt from the act of corruption, and they may try to compensate for their feelings of guilt by being more altruistic in the taking public sector jobs. Empirical evidence supports this channel (Regan, 1971; Haidt, 2003; Nunney et al., 2022; Scaffidi et al.,

Our model predicts that, for the parameter values chosen in our experiments, subjects should choose the two public sector jobs over the private sector job. Yet, a third of the subjects choose the private sector job. Those who choose the private sector job chose either the monetary payoff maximizing level of effort, or close to it. Indeed, for half the subjects who chose the private sector job, it is true that their monetary payoffs were greater relative to what they would have received had they chosen any of the two public sector jobs. These subjects appear to use a simple heuristic of maximizing their legal monetary payoffs in occupation choice.[12]

It is quite conceivable that many subjects, despite being altruistic and honest in other domains, may use the heuristic of legal monetary maximization in occupation choice and then use their payoffs to exhibit altruism elsewhere, e.g., contribute to charity. They might also be particularly repelled by institutional corruption in the taking public sector job, because they are relatively honest. These conclusions are well supported by our evidence. Subjects who chose private sector jobs are as altruistic as those who chose public sector jobs; and they are significantly more honest. These results are also related to the large literature on context dependence of preferences, widely observed in behavioral economics (Dhami, 2016). These findings are also consistent with the responses from our exit questionnaire, which also shows that subjects choosing the private sector job appear to have an inherent preference for jobs that are associated with performance related pay (as in our private sector job).

Despite the absence of risk considerations in our model, more risk taking subjects are more likely to choose the private sector job over the two public sector jobs. Risk taking behavior and overconfidence are highly correlated (Nosic and Weber, 2010; Broihanne et al., 2014). More overconfident subjects may view the private sector job as providing a more competitive performance-based pay environment, where they are likely to do better. Our data does not allow us to specifically check for this channel.

Effort choice decisions and public output: In the private sector job, most people chose the effort level that maximizes monetary payoffs. Subjects who are more altruistic, exert greater effort in both the public sector jobs, while the more honest subjects exert less effort in the taking public job. These results are consistent with the predictions of our model, although, of these, the only significant coefficient is for altruism in the no-taking public sector job.

The average effort level in the private sector job is the highest, followed by the taking public sector job, and the no-taking public sector job in that order. If employees exerted the same effort in the taking public sector job, as they did in the private sector, then they would produce, on average, an extra 28.54% of public output. The corresponding figure of 58.4% extra output in the no-taking job is even higher because there are no leakages into corruption.

The average output produced in the taking public sector job is significantly higher than the no-taking public sector job. However, the final output, net of corruption, received by society in both cases, is virtually indistinguishable. Thus, the size of the government, as measured by the

2022). We also find that subjects in the taking public sector job are more altruistic relative to the no-taking public sector job. Formal modeling will need to consider explicitly beliefs-based models using the machinery of psychological game theory (see Dhami et al., 2019; Dhami et al., 2022) and also consider the endogeneity of the preference parameters themselves.

[12]The evidence increasingly shows that in making choices, many people use simple context-dependent heuristics (Dhami and Sunstein, 2022).

size of the public output, can be much higher in more corrupt nations, although, ceteris-paribus, society receives a level of public output that is no different from that in a corresponding honest nation. Thus, consumer welfare does not change on account of corruption, at least in the setting of our model, although the size of the government does.

The schematic outline is as follows. Section 2 outlines the model. Section 3 gives the theoretical predictions on optimal effort choices and on occupation choice. Section 4 explains our estimation strategy for the altruism and dishonesty-aversion parameters from the occupation choice game. Section 5 describes the dictator game and the die-rolling game, as well as our strategy for estimating the relevant indices of altruism and honesty from these games. Section 6 describes our experimental design. Sections 7 to 10 explain our experimental findings. Section 11 concludes. All proofs are contained in the Appendix. Some additional data analysis is provided in the supplementary section.

2 A model of occupational and effort choice

An individual chooses between a private/corporate sector job and a public sector job. We assume that there is only one kind of private sector job that allows performance-based pay and does not allow for corruption. But there are two kinds of public sector jobs that offer identical fixed wages, but one in which there is no scope for corruption (the *no-taking public sector job*), and another, which allows for the possibility of institutionalized corruption (the *taking public sector job*).[13] We deliberately avoided the loaded terms 'corrupt' and 'non-corrupt' in the experimental instructions in favor of 'taking' and 'no-taking' jobs, to minimize framing effects. We keep the theoretical model as simple as possible to enable us to map it very closely into our experimental design and enable stringent empirical tests.

The individual makes two types of decisions.

(1) *Effort choice decision*: The level of costly effort to exert in each of the three jobs, if the individual were to be doing that job, in order to enable estimation of the altruism and dishonest-aversion parameters.

(2) *Occupation choice decision*: Choosing one among the three jobs, the private sector job, the taking public sector job, and the no-taking public sector job.

We subscript/superscript variables for the (i) private sector/corporate job by 'c', (ii) taking public sector job by 't', and (iii) no-taking public sector job by 'n.'

In each job, private or public, the worker's effort level $e \in [0, \overline{e}]$, $\overline{e} > 0$, and there is an identical cost function $c(e)$ for effort that is increasing and strictly convex ($c' > 0$, $c'' > 0$ for all $e \in [0, \overline{e}]$). Effort is observable and verifiable to a third party (no moral hazard). The outside option of the individual is normalized to zero. Denoting the individual's generic utility by V, the participation constraint of the individual in any of the occupations must satisfy $V \geq 0$.

[13] We have described institutionalized corruption in the introduction, which obviates the importance of the deterrence effects of corruption. For this reason, we do not model deterrence policies. Our predictions are robust to extensions of the model to the presence of corruption in the private sector, so long as it is relatively lower than the public sector.

2.1 Private Sector

The private sector job offers a performance-based incentive scheme.[14] Employees are offered the wage schedule $w_c(e) = \beta e$, where the size of $\beta > 0$ captures the extent of performance-based pay. Employees derive utility from labor income, net of effort costs, $c(e)$. Hence, the optimization problem of an employee in the private sector job is

$$e^c \in \arg\max_{e\in[0,\bar{e}]} V^c = \beta e - c(e);\ \beta > 0. \tag{2.1}$$

2.2 Public Sector

The public sector pays a fixed wage $w_P > 0$, independent of effort, to its employees, thus incentives are low-powered. The public sector produces a public output that directly benefits society, using effort e of the employee as the only input.[15] The production function for the public output is

$$f(e) = \lambda e;\ \lambda > 0,\ e \in [0, \bar{e}]\,, \tag{2.2}$$

where λ is the marginal productivity of effort.

2.2.1 The 'no-taking' public sector job

In the no-taking public sector job, there are no opportunities for corruption. The utility of an employee from this job is

$$V^n = [w_p - c(e)] + \alpha f(e). \tag{2.3}$$

The first term on the RHS in (2.3) is the net monetary payoff; the fixed public sector wage, w_p, net of the cost of effort, $c(e)$. The second term arises from the employee's 'altruistic motivations' in providing a public output, $f(e)$, to society, weighted by the individual-specific preference parameter, α.[16] If $\alpha \geq 0$, then the individual is altruistic. However, if $\alpha < 0$, then the individual is spiteful because they dislike sharing the output produced by their effort with other members of society. The sign of α is an empirical question, and we shall refer to α as the *altruism parameter*. Substituting (2.2) in (2.3), the optimization problem of the employee is

$$e^n \in \arg\max_{e\in[0,\bar{e}]} V^n = [w_p - c(e)] + \alpha\lambda e. \tag{2.4}$$

2.2.2 The 'taking' public sector job

In the 'taking' public sector job, there is 'institutionalized corruption.' If an individual chooses this job, they know that they 'must' accept a fraction $0 < \gamma < 1$ of the public output produced,

[14] Since effort is observable, *effort-contingent pay* and *performance-based pay* are analogous terms in our model.

[15] Our interest does not lie in issues of team production. Furthermore, the public output is distributed to members of society. In our experiments, this output was distributed among low income people; we give details below in the experimental design.

[16] The term $\alpha f(e)$ is akin to 'warm glow.' In the experiments, subjects working in the no-taking public sector job are not paid a monetary amount equivalent to $\alpha f(e)$l the supposition is that they receive hedonic benefits equivalent to this amount. Yet, we can test the indirect implications of the presence of this term by tested the predicted comparative static effects of subject-specific measured α when subjects choose such a job and/or when they decide their effort level in such a job.

$\gamma f(e)$, so that society only receives the remaining fraction $(1-\gamma)\, f(e)$.[17] The utility function of an employee in this job is

$$V^t = [w_p - c(e) + \gamma f(e)] + \alpha\,(1-\gamma)\, f(e) - \theta\gamma f(e). \tag{2.5}$$

From the RHS in (2.5), there are three differences relative to the utility function in the no-taking job in (2.3). First, the monetary payoffs to the individual increase, on account of corruption, by $\gamma f(e)$ (first term). Second, on account of corruption, the amount available for public distribution to society is now lower, $(1-\gamma)\, f(e)$ (second term). Hence, the altruistic benefits from public output provision, weighted by the altruism parameter α, are lower. The last term captures the *internal moral norms* of the individual. When the preference parameter $\theta \geq 0$, the individual faces hedonic dishonesty costs from corruption because a lower level of the public output is distributed to society. When $\theta < 0$, the individual derives hedonic pleasure from being corrupt. The sign of θ is an empirical matter. We shall refer to θ as the *dishonesty-aversion parameter* (or the honesty parameter), of the employee.

Substituting (2.2) in (2.5), the optimization problem of the employee is:

$$e^t \in \arg\max_{e\in[0,\bar{e}]} V^t = [w_p - c(e)] + \phi\,(\alpha,\gamma,\theta)\,\lambda e, \tag{2.6}$$

where

$$\phi = \phi\,(\alpha,\gamma,\theta) = \alpha + \gamma\,(1-\alpha-\theta)\,. \tag{2.7}$$

Remark 1. *We allow for individual-specific heterogeneity in the altruism parameter α, and the dishonesty-aversion parameter θ. However, in order to minimize notation, we do not introduce further subscripts on these parameters (e.g., α_i, θ_i where i denotes an index for individuals). We do not directly observe the altruism parameter α and the dishonesty-aversion parameter θ. Hence, we estimate these parameters in two different ways. (1) We directly use the optimal effort choices in the occupations to estimate α, θ. (2) We estimate proxies for α, θ using the results from the dictator game experiment and the Fischbacher and Föllmi-Heusi die-rolling experiment; the details are described in Section 5.*

3 Theoretical predictions of the model

3.1 Optimal effort choice in the occupations

We summarize the main results for effort choice in each of the three occupations through a series of propositions. The relatively simple proofs are given in the appendix.

3.1.1 Effort choice in the private sector job

Differentiating (2.1) with respect to e, we get

$$\frac{dV^c}{de} = \beta - c'(e). \tag{3.1}$$

[17] As noted in the introduction, institutionalized corruption is endemic in developing countries. Highly honest subjects may then wish not to choose this job. In the experiments, subjects must accept the monetary amount $\gamma f(e)$ if they choose the taking public sector job.

The marginal benefit of an extra unit of effort is $\beta > 0$, which arises from the incentive structure in the private sector. This is traded-off against the marginal cost of an extra unit of effort.

Proposition 1. *: Consider (2.1), the effort choice problem of an employee in the private sector. A unique optimal solution exists, given by e^c. At an interior solution, we have*

$$e^c = c'^{-1}(\beta), \tag{3.2}$$

which is strictly increasing in β. The optimal solution is a corner solution (i) $e^c = 0$ if $\beta \leq c'(0)$, and (ii) $e^c = \overline{e}$ if $\beta \geq c'(\overline{e})$.[18]

From Proposition 1, optimal effort in the private sector responds positively to performance-based incentives, as captured in the size of β.

3.1.2 Effort choice in the 'no-taking' public sector job

Differentiating (2.4) with respect to e, we get

$$\frac{dV^n}{de} = \alpha\lambda - c'(e). \tag{3.3}$$

The marginal benefit of an extra unit of effort is the extra output, λ, per unit of effort, that is produced for society, weighted by the employee's altruism parameter, α. The marginal cost is the cost of an extra unit of effort.

Proposition 2. *: Consider (2.4), the effort choice problem of an employee in the no-taking public sector job.*
(i) (Existence) A unique optimal solution exists, given by e^n. At an interior solution, we have

$$e^n = c'^{-1}(\alpha\lambda). \tag{3.4}$$

The optimal solution is a corner solution (i) $e^n = 0$ if $\alpha\lambda \leq c'(0)$, and (ii) $e^n = \overline{e}$ if $\alpha\lambda \geq c'(\overline{e})$.
(ii) (Comparative statics at an interior solution) At an interior solution, we have $0 < \alpha < \frac{c'(\overline{e})}{\lambda}$, and optimal effort e^n is strictly increasing in the altruism parameter, α, and in the marginal productivity of effort, λ.[19]

Discussion: From Proposition 2(i), an optimal solution exists and is unique. From Proposition 2(ii), at an interior solution, optimal effort is always strictly increasing in the extent of altruism α, and in the public sector productivity parameter, λ. Both factors increase the marginal benefit of exerting more effort.

3.1.3 Effort choice in the 'taking' public sector job

Differentiating (2.6) with respect to e, we get

$$\frac{dV^t}{de} = \phi\lambda - c'(e), \tag{3.5}$$

[18] The comparative static results are easily extended to a corner solution. If $e^c = \overline{e}$, then effort is non-increasing in β.

[19] Extension of the comparative statics to the corner solutions is straightforward. If $e^n = \overline{e}$, then optimal effort is non-increasing in α and λ.

The interpretation of (3.5) is similar to (3.3) except that the weight $\phi = \alpha + \gamma(1 - \alpha - \theta)$, defined in (2.7), replaces the altruism parameter α; ϕ is increasing in the altruism parameter α, and decreasing in the dishonesty-aversion parameter θ, because $0 < \gamma < 1$.

Proposition 3. *: (i) Consider an employee in the taking public sector job with the objective function in (2.6). A unique optimal solution exists, given by e^t. At an interior solution,*

$$e^t = c'^{-1}(\phi\lambda). \tag{3.6}$$

The optimal solution is a corner solution $e^t = 0$ if $\phi\lambda \leq c'(0)$, and $e^t = \overline{e}$ if $\phi\lambda \geq c'(\overline{e})$.
(ii) (Comparative statics at an interior solution) At an interior solution, we have $0 < \phi < \frac{c'(\overline{e})}{\lambda}$, and optimal effort e^t is (a) strictly increasing in the altruism parameter, α, and in the marginal productivity of effort, λ, and (b) strictly decreasing in the dishonesty-aversion parameter, θ. The comparative static effect of γ is ambiguous, but if $0 \leq \alpha + \theta < 1$, then the effect is positive.[20]

Discussion: Proposition 3(i) is a standard existence and uniqueness result. From Proposition 3(ii), more altruistic individuals and greater public sector productivity strictly increase optimal effort, as in the no-taking public sector job. However, less honest individuals are predicted to exert greater public sector effort. The counterintuitive effect of honesty on effort highlights the importance of basing hypotheses in experiments on formal theoretical models. The intuition is as follows. A higher value of the dishonesty-aversion parameter, θ, creates greater moral disutility from corruption. Higher corruption arises from producing extra public output, $\gamma f(e)$, which is increasing in the amount of effort expended. Hence, greater honesty reduces optimal effort. An increase in the fraction, γ, of the public output siphoned off as corruption has, in general, an ambiguous effect on effort.[21]

3.1.4 Comparison of effort levels in the two public sector jobs

From Propositions 2, 3, the optimal effort levels in the two public sector jobs are

$$e^n = c'^{-1}(\alpha\lambda),\ e^t = c'^{-1}(\phi\lambda). \tag{3.7}$$

From (2.7), we have $\phi = \alpha + \gamma(1 - \alpha - \theta)$, hence,

$$\phi \gtreqless \alpha \Leftrightarrow 1 \gtreqless \alpha + \theta. \tag{3.8}$$

Using (3.7), (3.8) and noting that $c'^{-1} > 0$, we get

$$e^t \gtreqless e^n \Leftrightarrow \phi \gtreqless \alpha \Leftrightarrow 1 \gtreqless \alpha + \theta. \tag{3.9}$$

As noted in Proposition 3, a higher value of the dishonesty-aversion parameter, θ, reduces optimal effort choice, e^t. An increase in the altruism parameter α increases optimal effort levels

[20] It is straightforward to check that the comparative statics at the corner solutions are as follows. (a) If $\phi \leq 0$, then $e^t = 0$. Optimal effort is non-decreasing in the dishonesty-aversion parameter, θ. (b) If $\phi \geq \frac{c'(\overline{e})}{\lambda}$, then $e^t = \overline{e}$. Optimal effort is non-increasing in the altruism parameter, α, and in public sector productivity, λ.

[21] There is a direct monetary benefit from an increase in γ. But there are two costs. (i) Reduced public sector output available for disbursement, so there is a reduction in the altruism, or warm glow, benefits. (ii) Greater moral costs arising from the higher corruption due to dishonesty-aversion.

in both public sector jobs, but it raises optimal effort in the no-taking job relatively more. To see this, from (3.3) and (3.5), the relative marginal benefits of a unit increase in effort in the no-taking and the taking public sector jobs are $\alpha\lambda > \alpha(1-\gamma)\lambda$, because $0 < \gamma < 1$. Thus, an increase in α is more conducive to increasing e^n relatively more than e^t.

3.2 Predictions of the model with a particular cost function

The results above were derived for the general case of any convex cost of effort function. However, tests of the predictions in experiments require the specification of a particular cost function. In our experiments, we use the following quadratic cost of effort function,

$$c(e) = \frac{c}{2}e^2;\ c > 0. \tag{3.10}$$

In this section, we calculate the optimal effort levels, indirect utilities, and the choice of occupation for the cost function in (3.10).

3.2.1 Effort and indirect utilities in the private sector and the public sector

From (3.1), at an interior solution, $\beta - ce = 0$, so $e^c = \frac{\beta}{c}$. From (3.3), at an interior solution, we have $\alpha\lambda - ce = 0$, so $e^n = \frac{\alpha\lambda}{c}$. From (3.5), at an interior solution, we have $\phi\lambda - ce = 0$, so $e^t = \frac{\phi\lambda}{c}$. We can, therefore, summarize the optimal effort in the three cases by

$$\begin{cases} \text{Private job} & e^c = \frac{\beta}{c} \\ \text{No-taking public job} & e^n = \frac{\alpha\lambda}{c} \\ \text{Taking public job} & e^t = \frac{\phi\lambda}{c} \end{cases}, \tag{3.11}$$

where $\phi = \alpha + \gamma(1-\alpha-\theta)$ is given in (2.7).

We now calculate the indirect utilities in the three jobs, V^i, $i = c, n, t$. Substituting (3.11) successively in (2.1), (2.4), and (2.6), we get,

$$V^c = \frac{\beta^2}{2c}. \tag{3.12}$$

$$V^n = w_p + \frac{1}{2c}(\alpha\lambda)^2. \tag{3.13}$$

$$V^t = w_p + \frac{1}{2c}(\phi\lambda)^2. \tag{3.14}$$

From (3.13), (3.14), since $w_p \geq 0$, so $V^n \geq 0$ and $V^t \geq 0$, thus the participation constraint holds. Similarly, all terms on the RHS of (3.12) are positive, so $V^c \geq 0$.

3.2.2 Choice between taking and no-taking public sector jobs

An individual prefers the taking public sector job over the no-taking public sector job if $V^t > V^n$; otherwise if $V^t \leq V^n$ the individual prefers the no-taking public sector job.[22]

[22] We assume that the tie breaking rule works in favour of the no-taking job. Nothing substantive hinges on this tie breaking rule or the others that we use below. All the results could be restated by adding another case that deals with indifference.

Proposition 4. *: Consider a public sector employee facing a choice between the taking and the no-taking jobs. The taking public sector job is preferred if*

$$1 > \alpha + \theta, \tag{3.15}$$

otherwise if $1 \leq \alpha + \theta$*, the no-taking public sector job is preferred.*[23]

From Proposition 4, higher dishonesty-aversion, i.e., a greater value of θ, makes it too costly to be corrupt in the taking public sector job, so the individual prefers the no-taking public sector job, instead. Greater altruism also works in favor of the no-taking public sector job. The reason is that the individual receives the full benefits of altruism in the no-taking job, but only partial benefits from altruism under the taking job, as only a fraction of the public sector output is redistributed to society (see discussion following (3.9)).

3.2.3 Choice between private and public sector jobs

The individual chooses among the private sector job and the taking and no-taking public sector jobs by comparing the respective indirect utilities: (3.12) with (3.14); and (3.12) with (3.13).

Proposition 5. *: Let* $\phi = \alpha + \gamma(1 - \alpha - \theta)$*, as given in (2.7).*
(i) Consider an individual who prefers the taking public sector job to the no-taking public sector job, i.e., $1 > \alpha + \theta$ *(see Proposition 4). The individual prefers the 'taking' public sector job over the private sector job if*

$$V^t > V^c \Leftrightarrow w_p + \frac{1}{2c}(\phi\lambda)^2 > \frac{\beta^2}{2c}. \tag{3.16}$$

(ii) Consider an individual who prefers the no-taking public sector job to the taking public sector job, i.e., $1 \leq \alpha + \theta$ *(see Proposition 4). The individual prefers the 'no-taking' public sector job over the private sector job if*

$$V^n > V^c \Leftrightarrow w_p + \frac{1}{2c}(\alpha\lambda)^2 > \frac{\beta^2}{2c}. \tag{3.17}$$

From (2.7), $\phi = \alpha + \gamma(1 - \alpha - \theta)$, which is increasing in α but decreasing in θ.[24] Thus, from (3.16), an individual is more likely to choose the taking public sector job over the private sector job, the higher is the public sector wage, w_p, the lower is the dishonesty-aversion parameter, θ, the higher is the altruism parameter, α, the lower are the performance-based incentives in the private sector (lower β), the higher is the productivity in the public sector, λ, and if $\alpha + \theta < 1$, the higher is the share, γ, of the public output that goes into corruption.

Remark 2. *From Proposition 5 and (3.17), the individual prefers the no-taking public sector job over the private sector job (i) the higher is the public sector wage* w_p*, the higher is altruism,* α*, the higher is the productivity of the public sector,* λ*, (ii) and the lower are the performance-based incentives in the private sector (lower* β*).*

This provides testable restrictions on behavior that can be checked in experiments.

[23] We can also state the relevant results in terms of cutoff values of the altruism and dishonesty-aversion parameters. The following result can be easily proved. Consider a public sector employee. There exist cutoff values of α and θ, given by α_c and θ_c, such that if $\alpha < \alpha_c$ or $\theta < \theta_c$ then the individual prefers the taking public sector job. Otherwise, the individual prefers the no-taking public sector job.

[24] The effect of the corruption share, γ, depends on the sign of $1 - \alpha - \theta$. If $\alpha + \theta < 1$, then ϕ is increasing in γ, otherwise if $\alpha + \theta > 1$, then ϕ is decreasing in γ.

4 Estimation of the preference parameters, α, θ

We now briefly describe our strategy for estimating the altruism and the dishonesty-aversion parameters based on the decisions made in the occupation choice and effort choice tasks.

Recall that optimal effort in the three jobs is given in (3.11), where $\phi = \alpha + \gamma(1 - \alpha - \theta)$. In (3.11), the parameters $\gamma, \beta, \lambda, c$ are set by the experimenter. In order to directly estimate the values of α and θ, we use the following two steps.

Step 1: In the first instance, all subjects are asked to choose their optimal effort level if they were to be working in the 'no-taking' public sector job. Given the values of $\gamma, \beta, \lambda, c, w_p$, chosen by the experimenter, subjects are now asked to choose their optimal level of effort, e^n, as the value of λ is varied, but everything else is kept fixed. Using the strategy method, all subjects choose the optimal effort, e, from the set of possible effort levels $e \in [0, 10]$ as λ is varied over 21 levels of the productivity parameter, $\lambda \in \{0, 1, ..., 20\}$.

We now run individual-specific, regressions, where we regress e^n on λ/c, i.e.,

$$e^n = \eta_0 + \eta_1 \left(\frac{\lambda}{c}\right) + u, \tag{4.1}$$

where u is an error term. We cannot use the vector $\mathbf{X}$ of controls (gender, education,....) in these regressions because each of these regressions uses data for 'each' individual separately, and the controls do not vary for the same individual. Using the middle row of (3.11), $e^n = \frac{\alpha\lambda}{c}$, hence the BLUE estimate of the altruism parameter, α, from the data on occupational/effort choice is given by the regression estimate $\widehat{\eta}_1$.

Step 2: All subjects are now asked to choose their optimal effort level, e^t, if they were to be working in the 'taking' public sector job. We run subject-specific, regressions, where we regress e^t on λ/c, i.e.,

$$e^t = \pi_0 + \pi_1 \left(\frac{\lambda}{c}\right) + u. \tag{4.2}$$

Denote the regression estimate of π_1 by $\widehat{\pi}_1$. From the last row of (3.11), $e^t = \frac{\phi\lambda}{c}$, hence, a BLUE estimate of ϕ is given by $\widehat{\pi}_1$.

From (2.7), $\phi = \alpha + \gamma(1 - \alpha - \theta)$, hence, we get $\theta = 1 - \alpha - \left(\frac{\phi - \alpha}{\gamma}\right)$. Thus, an estimate of the dishonesty-aversion parameter θ from the occupational/effort choice data, denoted by $\widehat{\theta}$, is given by

$$\widehat{\theta} = 1 - \widehat{\eta}_1 - \left(\frac{\widehat{\pi}_1 - \widehat{\eta}_1}{\gamma}\right).$$

Thus, we obtain the following unbiased estimates of the altruism and the dishonesty-aversion parameters.

$$\alpha = \widehat{\eta}_1; \ \theta = \widehat{\theta}. \tag{4.3}$$

5 Eliciting altruism and dishonesty-aversion parameters from experimental games

Section 4 outlined our estimation strategy for the altruism and dishonesty-aversion parameters, α, θ, from the occupation/effort choice experiments. We now elicit separate proxies for these

parameters from, respectively, a dictator game and a die-rolling experiment. These are the typical proxies used in the literature, but it remains to check if they have explanatory power in occupational/effort choice game. Conversely, we also check whether the parameters estimated from the occupational/effort choice game have explanatory power in the dictator game and the die-rolling experiments. As far as we are aware, such mutual portability of the parameters has not been checked out before.

5.1 Die-rolling game and a lying index

Suppose that an individual observes a randomly generated signal $s \in [0, \overline{s}]$, and then gives a 'report' $r \in [0, \overline{s}]$ to the experimenter of the signal. The individual is paid a monetary amount that is increasing in r. There are no penalties for lying and reporting a number $r > s$.

For the purposes of our theoretical model, we rule out the case $r < s$ on empirical grounds; this is well supported by our data and by the literature (Dhami, 2019, Vol. 2). However, lying potentially imposes moral costs, on account of internal moral values. The utility, U_L, of the individual incorporates lying costs (hence, the subscript 'L'). Thus, the individual's optimization problem, for a given value of observed signal, s, is

$$r \in \arg\max_{r \in [s, \overline{s}]} U_L = u(r) - \widetilde{\theta}\,(r - s)\,;\, 0 \leq s \leq r \leq \overline{s}, \tag{5.1}$$

where u is a twice continuously differentiable, increasing, and strictly concave function that captures the utility from monetary payoffs. The second term on the RHS of (5.1) captures the hedonic dishonesty costs, which are directly proportional to the extent of lying. When $\widetilde{\theta} \geq 0$, the individual experiences hedonic moral costs from lying and when $\widetilde{\theta} < 0$, the individual experiences hedonic benefits from lying. We refer to $\widetilde{\theta}$ as the individual's dishonesty-aversion parameter from the die-rolling game; the tilde on this parameter separates it from the analogous dishonesty-aversion parameter θ from the occupation/effort choice game in (2.5). The literature universally assumes that $\widetilde{\theta}$ is a suitable proxy for θ.

From (5.1), in the absence of lying costs, $\widetilde{\theta} = 0$, we have $r = \overline{s}$, i.e., the subject makes the maximum possible report because it maximizes monetary payoffs. We summarize the main results in the proposition below, omitting the results for the corner solutions that can be easily stated.

Proposition 6. *: Consider an individual who has received an actual signal $s \in [0, \overline{s}]$. A unique solution exists to the optimization problem of the individual, denoted by $r^*(\widetilde{\theta}) \in [s, \overline{s}]$. In an interior solution, $r^* = u'^{-1}(\widetilde{\theta})$, and the optimal report, $r^*(\widetilde{\theta})$, is decreasing in the size of the dishonesty-aversion parameter $\widetilde{\theta}$.*

In our experiments, we use a discrete version, as in Fischbacher and Föllmi-Heusi (2013). Subjects receive the true signal $s = \{1, .., 6\}$; this is the number observed on the die roll of a six-sided die. They then report a number $r = \{1, .., 6\}$ to the experimenter.[25] Subjects

[25] In constructing the lying index, we consider a more general case, relative to the theoretical model above, by not restricting $r = \{s, .., 6\}$. This is to allow for the possibility (which is not important in our data) that $r < s$ so subjects can be over-honest.

receive monotonically increasing payoffs of $2, 4, 6, 8, 10$, for reporting the numbers $r = 1, 2, 3, 4, 5$, respectively. If the number 6 is reported ($r = 6$), then the payoff is zero. We now construct the lying index as follows. Define

$$\sigma_l(\widetilde{\theta}) = \begin{cases} \left(\frac{r-s}{5-s}\right) & \text{if} \quad r > s,\ s = 1,2,3,4 \\ 0 & \text{if} \quad r \leq s,\ s = 1,2,3,4,5 \\ 0 & \text{if} \quad r \neq s,\ s = 5. \\ 0 & \text{if} \quad r = s = 6 \\ \frac{r}{5} & \text{if} \quad r < s,\ s = 6 \end{cases} \tag{5.2}$$

We now explain (5.2). (1) Consider first the signals $s = 1, 2, 3, 4$. From the first row of (5.2), if $r > s$ the individual is dishonest, and the extent of dishonesty depends on the extent of overreporting, $r - s$, normalized by the maximum potential overreport, $5 - s$. From the second row of (5.2), if $r \leq s$ the individual is classed as honest. We are not interested in the case of over-honesty in subjects, so we classify the case $r < s$ as honest. (2) Now consider the case $s = 5$. Honest reporting ($r = s = 5$) maximizes the individual's income (this is covered in the second row of (5.2)). Any other report, when $s = 5$, reduces the payoffs, i.e., denotes over-honesty, hence, given our convention, is classed as honest reporting (third row of (5.2)). (3) Now suppose $s = 6$. The subject is either honest (fourth row), or dishonest (fifth row). If dishonest, using the same formula as in the first row, a report of $r = 6$ earns the subject a zero payoff, so the extent of lying when $r \neq 6$ is $\frac{r-0}{5-0} = \frac{r}{5}$. From Proposition 6 and (5.2), the lying index σ_l is decreasing in the size of the dishonesty-aversion parameter $\widetilde{\theta}$.

Our construction ensures that $\sigma_l \in [0, 1]$, with a value of 0 for full honesty (e.g., $s = r = 3$) and 1 for complete dishonesty (e.g., $s = 6$, $r = 5$). Since dishonesty is the flip side of honesty, we take the value of $1 - \sigma_l$ to be a proxy for the dishonesty-aversion parameter of the individual, as measured from the die-rolling experiments; this is the main supposition that is tested in the related literature on occuption choice reviewed in the introduction.

5.2 Dictator game and an altruism index

In the dictator game, subjects in their role as dictators are given an endowment of $\overline{y} > 0$ and asked to share it with a passive receiver. The dictator keeps an amount y, $0 \leq y \leq \overline{y}$, and gives the rest, $\overline{y} - y$, to the receiver. The optimization problem of the dictator, U_A, that incorporates altruism (hence, the subscript 'A' on the utility function) is given by

$$y \in \arg\max_{y \in [0,\overline{y}]} U_A = u(y) + \widetilde{\alpha}\,(\overline{y} - y)\,; 0 \leq y \leq \overline{y}, \tag{5.3}$$

where u is a twice continuously differentiable, increasing, and strictly concave function. The first term gives the utility from material payoffs and the second term gives the utility from hedonic payoffs. If $\widetilde{\alpha} \geq 0$ the individual is altruistic, and if $\widetilde{\alpha} < 0$, the individual is spiteful; $\widetilde{\alpha}$ is the altruism parameter for the dictator game.

Proposition 7. *: A unique solution exists to the optimization problem in (5.3), denoted by $y^* \in [0, \overline{y}]$. When the solution is an interior solution, it is given by $y^* = u'^{-1}(\widetilde{\alpha})$. At an interior solution, the optimal share kept by the dictator, $y^*(\widetilde{\alpha})$, is decreasing in the altruism parameter*

$\widetilde{\alpha}$. *If* $u'(0) \leq \widetilde{\alpha}$, *then the dictator chooses to keep nothing, or* $y^* = 0$. *If* $u'(\overline{y}) \geq \widetilde{\alpha}$, *then the dictator chooses to give nothing, or* $y^* = \overline{y}$.

We define the *altruism index* as the fraction of the amount shared by the dictator with the passive receiver, i.e.,

$$\sigma_a(\widetilde{\alpha}) = \frac{\overline{y} - y^*(\widetilde{\alpha})}{\overline{y}} \in [0, 1]\,. \tag{5.4}$$

From Proposition 7 and (5.4), $\sigma_a(\widetilde{\alpha})$ is increasing in $\widetilde{\alpha}$. This is used by the literature as a proxy for the altruism parameter of subjects in explaining occupation choice.

6 Experimental design

There are three games in the experiment. (1) The occupational/effort choice game that has three occupations (private, taking public, no-taking public). Subjects first choose their costly effort level in each job, as if they were doing that job, and then they choose one among the three occupations. (2) Dictator game. (3) The Fischbacher and Föllmi-Heusi die-rolling game. The order of the three games follows a Latin square design, thus, there is no need to analyze order effects (Chen et al., 2019). Using the precedence relation $\succ$, the three orders used were: (1) Occupation choice $\succ$ dictator game $\succ$ die-rolling game. (2) Die-rolling game $\succ$ occupational choice $\succ$ dictator game. (3) Dictator game $\succ$ die-rolling game $\succ$ occupational choice. For each subject, one of the orders was picked at random.

The experiments were conducted in India with 500 university students from various disciplines over a period of time in 2021/22. No subject participated in the experiment more than once. The average time taken to complete the experiment was 53 minutes, and the subjects earned, on average, 468 Indian Rupees (INR), roughly 6.25 US dollars, including the participation fee.[26] All subjects were paid in private after the experiment through an automated process which excluded the experimenter from the payment process. The currency used in the experiments is tokens that are converted into Indian Rupees at the end of the experiment at an exchange rate of 1 token = INR 10. Additionally, subjects receive INR 100 as a show-up fee for participating in this study. We maintained a high degree of subject anonymity.[27]

6.1 Occupation/effort choice game

The parameter values used in the experiments were as follows. The private sector job offers a wage equal to 4 times the exerted effort, so the performance-based pay parameter, $\beta = 4$ (see (2.1)). In the public sector job, the fixed wage is $w_p = 25$ tokens, independent of the effort chosen. In the taking public sector job, which has institutionalized corruption, employees *must* take $\gamma = 1/5$ of the public sector output produced by their effort and keep it for themselves (see (2.6)).

[26] INR 500 is the amount that Center for Social and Behavioral Change (CSBC) pays per hour of subject time, which is higher than most other research organizations in India and higher than the minimum wage.

[27] In order to enhance subject anonymity with respect to their decisions, the experimenter does not directly pay the subjects. A link is sent by SMS after the experiment ends, and subjects are asked to enter their preferred mode of payment and financial details. The subjects are then paid by an automated method. The experimental instructions repeatedly emphasize the anonymity of the subjects' choices to others (including the experimenters).

As described in the estimation method for α, θ in Section 4, in the two public sector jobs, subjects need to decide their effort levels for each of the 21 levels of the productivity parameter, $\lambda \in \{0, 1, ..., 20\}$, using the strategy method. At the time of making their choices, subjects do not know that value of the actual productivity parameter, which is $\lambda = 10$ (see (2.2)). Once they have made their effort choices for all values of λ, their actual effort choice corresponding of $\lambda = 10$ is implemented.[28] In the private sector job, subjects only need to decide on a single effort level.[29] The cost of effort, $c(e) = \frac{c}{2}e^2$, is identical in the three jobs, and $c = 0.5$. Subjects can readily calculate the cost of effort for each effort level by using a slider on a computer screen.

In any of the public sector jobs, the corresponding public sector output available for the public is distributed directly to low-income individuals in need (subjects knew this, and we implemented this faithfully).[30] The experimental instructions were clearly explained to the subjects in detail. Subjects also had to pass a test of understanding of the instructions in the experiments to proceed further. Details can be found in the experimental instructions.

Once subjects had chosen the effort levels in the three occupations, as described above, they then choose only one among the three potential jobs. The payoff of the subjects in the occupational choice game is based on the final job they have selected and the actual effort that they have chosen in the effort choice task for that job is implemented for $\lambda = 10$. Subjects also receive 20% of the income from one of the other two unchosen jobs; each of these jobs has a 50% chance of being chosen for the 20% payment. This ensures that the effort choices of the subjects in all the jobs are chosen in an incentive compatible manner.

We distinguish between a primed treatment and a neutral treatment. In the former, subjects are primed for the presence of corruption. In addition to neutral, publicly available, information, subjects in the primed treatment (but not the neutral treatment) read the following paragraph.[31]

Data indicates that on average 45% of government officials in India use the "take" option in public sector jobs. In other words, they "take" from the public output, a part for their own private use. This figure is likely to be an underestimate as this includes only monetary taking. In actual practice there are many forms in which public sector employees can engage in non-monetary taking also.

In all other respects, the primed and the neutral treatments are identical (details in the experimental instructions).

[28] Subjects knew that the effort choice corresponding to the actual productivity parameter, λ, would be implemented, but they did not know the value of λ when making their effort choices. They were told that the actual productivity could be any of the 21 levels given to them.

[29] The strategy method is only needed for the public sector job in order to estimate the altruism and the dishonesty-aversion parameters; see Section 4. It is not needed for the private sector job.

[30] The total amount produced, Rs. 36,030, was transferred to individuals who participated in the following CSBC studies/surveys, as due to regulatory concerns, an organization like CSBC (on an FCRA license) cannot make charity donations (i.e. people are required to have rendered CSBC a service, like participate in a study, in order to disburse these amounts). All individuals to whom the following amounts were transferred either resided in rural areas or had a monthly household income of less than Rs. 10,000.

[31] We used two bits of neutral public information in our experiments. (1) "If state-owned companies and municipal government employees are included, India has a 1.8:1 ratio between public sector employees and private sector employees. Thus, out of every 2.8 employees, 1.8 are in the public sector and 1 is in the private sector." (2) "India is the second-most populous country in the world, and the seventh largest country by land area. It has been a republic since 1950 and has a parliamentary system of government."

6.2 Dictator game

In the dictator game (referred to as a 'sharing game' in the experiments), subjects in the role of dictators are endowed with $\overline{y} = 20$ tokens. They make a decision to share any amount between 0 and 20 tokens with a receiver. The shared amount goes to low income individuals in need and subjects knew this; we implemented this in the manner already described above.

6.3 Die-rolling game

We use the experimental design in Kocher et al. (2017) so that the experimenter can actually observe the signal s and the report r in the following manner. We had 6 videos of a 6-sided die being randomly rolled, and each of the videos was equally likely to be chosen to be shown to each subject. In effect, for each subject, the outcome of the die roll can be either $1, 2, ..., 6$ and each outcome is equally likely; this is the signal s observed by the subject. The subjects are asked to give a report, r, of the signal. Subjects know that there are no penalties for over-reporting and being dishonest.

Each subject knows that no other participant in the experiment can observe their signal, s. No information is given to the subject about whether the experimenter can, or cannot, observe s, hence, there is no classical subject deception. However, the experimenter can match the actual number observed by the subject on the computer screen (this is the signal s) with the subject's actual report, r, of the number. The experimenter does this by using the subject's id numbers, while never being able to find out the identity of the subject. Thus, the identity of the subject is always protected and subjects know this. The main attractiveness of the Kocher et al. (2017) design is that we can determine individual-specific lying, albeit only through the student id numbers, and not their actual identity, in the experiment.

The participants are assured of anonymity through the following text in the experiments: "No other participant in the study can observe the number on your screen, nor your decision in this task." As already explained, we use a similar payoff structure to Fischbacher and Föllmi-Heusi (2013), so the reports $1, 2, ..., 5$ yield payoffs of, respectively, $2, 4, ..., 10$ tokens, and a report of 6 gives a payoff of zero tokens. In the experimental instructions, subjects are explicitly told that: "There are NO monetary penalties or questions ever asked of you if the reported number and the actual number are different."

At the end of the experiment, one of the two games (dictator game and the die-rolling game) is randomly chosen to pay the subject for real.

6.4 List of independent variables

We use the following list of independent variables in our empirical results.

α: The altruism parameter from the occupational/effort choice game.

θ: The dishonesty-aversion parameter from the occupational/effort choice game.

σ_a: The proxy for the altruism parameter from the dictator game.

$1 - \sigma_l$: The proxy for the dishonesty-aversion parameter from the die-rolling game.

Prime: Dummy variable that equals 1 for primed subjects, and 0 otherwise.

Religion: Dummy variable that equals 1 for Hindu subjects, and 0 otherwise.

Business: Dummy variable that equals 1 for business/economics subjects, and 0 otherwise.

Income: Subject's annual household income.

Experience: Dummy variable that equals 1 if the subjects have attended similar experiments before, and 0 otherwise.

CE: Elicited certainty equivalent from a risky lottery.

Male: Dummy variable that equals 1 for male subjects and 0 otherwise.

Age: Subject's age.

Private: Dummy variable that equals 1 if subjects chooses the private sector job, and 0 otherwise.

Some basic participation data are as follows. 51.6% (= 258/500) of the subjects participated in the primed treatment, and the rest in the neutral treatment. 75.4% (= 377/500) of the subjects are Hindu, which is close to the actual percentage of Hindus in the population. 29.2% (= 146/500) of the subjects reported having participated in experiments before. 56.8% (= 284/500) of the subjects are male.

7 The results from experimental games

In this section, we report the results from the dictator game, the die-rolling game, and on risk attitudes. Occupation and effort choices are described in Sections 9, 10.

7.1 Dictator game and die-rolling game

The average transfer in the dictator game is 22% (= 4.4/20) of the dictator's endowment, which is comparable to the literature on dictator game experiments (Dhami, 2019, Vol. II).

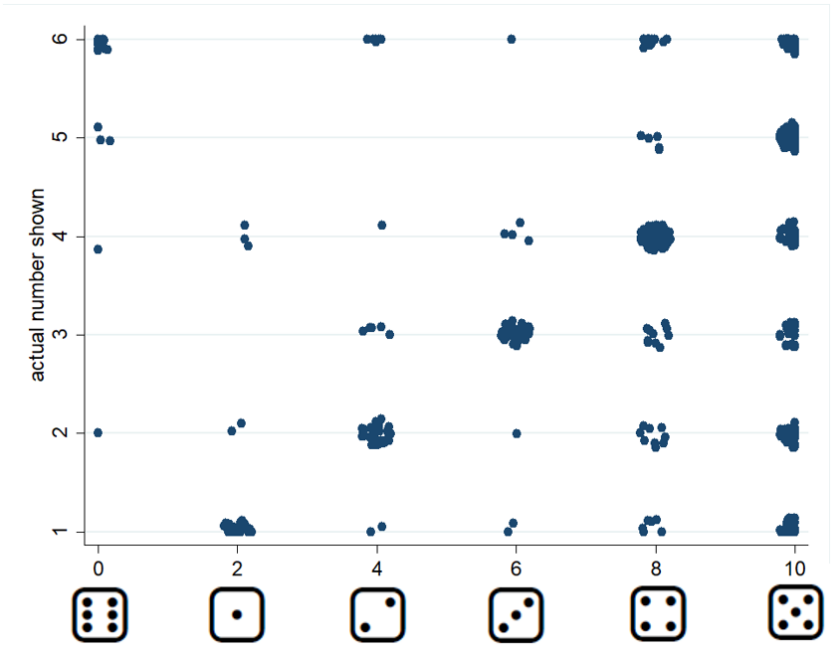


Figure 1: The vertical axis measures the observed signal s and the horizontal axis measures the payoff from the reported number r in the die-rolling task.

In Figure 1, we show the results from the die-rolling experiments in the form of a jitter graph. The actual number observed by subjects, i.e., the signal $s = 1, 2, ..., 6$, is shown on the vertical axis. Along the horizontal axis, we measure the monetary payoffs $0, 2, 4, 6, 8, 10$, respectively, that arise from the reported number $r = 6, 1, 2, 3, 4, 5$.

Dots in Figure 1, along the 45 degree line (the pairs $(1, 2), (2, 4), ..., (5, 10)$) reflect honest reporting ($r = s$). Subjects report dishonestly when they over-report relative to their signal (unless the signal is 6). The payoff maximizing dishonest report arises whenever $s < 5$ but $r = 5$ (see the cluster of dots at various heights over the number 10 in Figure 1). Since we use the Kocher et al. (2017) design, we can determine that the actual proportion of subjects who lie is 51.6% (= 258/500). This is slightly higher than the $31\% - 41\%$ in Kocher et al. (2017) who use a German subject pool, while we report the results with Indian subjects.[32] There is also widespread partial lying, a well established finding in the literature (Dhami, 2019, Vol. II).

7.2 Risk attitudes

In our post-experimental survey, which was non-incentivized, we asked subjects the following question. "Suppose that you are offered a bet in which you have a 50-50 chance of either gaining 100 tokens or losing 100 tokens, i.e., the lottery $(-100, 0.5; 100, 0.5)$. What "sure amount in tokens" would you like to be offered that will make you just indifferent to taking on this bet?"

The expected value of this lottery is 0 and the sure amount stated by subjects is the certainty equivalent, CE, of the lottery. The proportion of (i) risk-averse subjects ($CE < 0$) is 0% (= 97/500), (ii) risk-loving subjects ($CE > 0$) is 97.4% (= 487/500), and (iii) risk-neutral subjects ($CE = 0$) is 2.6% (= 13/500).[33] We can interpret an increase in CE as a reduction in risk aversion of the subject, or a greater preference for risk-taking.

8 Parameters of altruism and dishonesty-aversion

In Section 4, we described the direct structural estimation method for the altruism parameter α and the dishonesty-aversion parameter θ from the occupation/effort choice game. Based on the data from the die-rolling and dictator experiments, respectively, we also measure the proxy $1 - \sigma_l$ for the dishonesty-aversion parameter (see (5.2)), and the proxy σ_a for the altruism parameter (see (5.4)). We report these direct and proxy estimates in this section.

8.1 Descriptive statistics

Our estimates are as follows. For the altruism parameter measured from the occupation/effort choice game, there are 39.6% (=198/500) subjects with $\alpha > 0$ (altruistic); 53.4% (=267/500) subjects with $\alpha = 0$ (altruism-neutral); and 7% (=35/500) subjects with $\alpha < 0$ (spiteful). For the altruism proxy measured from the dictator game, σ_a, there are 96.6% (=483/500) subjects with $\sigma_a > 0$; and 3.4% (=17/500) subjects with $\sigma_a = 0$.

[32] There is a very small fraction of the subjects misreporting to earn lower income, possibly by error. This arises in two possible cases. (i) For $s = 1, ..., 5$ if $r < s$, or (ii) reporting $r = 6$ but $s \neq 6$. The proportion of subjects in these two cases is small: 4% (= 20/500) and 1% (= 5/500) respectively.

[33] We are only interested in the variation of CE across subjects, and not the precise classification of subjects into risk averse/loving/netural.

Our theoretical model allows for $\theta \gtreqless 0$, however, by construction, the index $1-\sigma_l \in [0,1]$ (see (5.2)). The estimates are as follows. For the dishonesty-aversion parameter measured from the occupation/effort choice game, there are 94% (=470/500) subjects with $\theta > 0$ (dishonesty-averse); 1.2% (=6/500) subjects with $\theta = 0$ (dishonesty-neutral); and 4.8% (=24/500) subjects with $\theta < 0$ (dishonesty-seeking). For the dishonesty-aversion measure, $1-\sigma_l$, from the die-rolling experiment, there are 64% (=320/500) subjects with $1-\sigma_l > 0$ (dishonesty-averse) and 36% (=180/500) subjects with $1-\sigma_l = 0$ (dishonesty-neutral).

In our data, 89.8% (449 out of 500) of the subjects jointly satisfy the conditions $\alpha \geq 0$ and $\theta \geq 0$. If we restricted our sample to satisfy $\alpha \geq 0$ and $\theta \geq 0$, our results are roughly similar, but there are no compelling grounds to truncate our sample in this manner.

8.2 External validity of the estimated parameters from occupation choice

We now investigate if the estimates of the parameters α and θ measured from the occupation/effort choice game can be used to explain, respectively, subjects' behavior in the dictator game and the die rolling game. This would establish external validity of the estimated parameters from the occupation choice game by predicting behavior in a separate class of games. It also speaks to the issue of portability of the estimated parameters, which is an important research agenda for the behavioral sciences. The converse task of judging the predictive ability of the proxy parameters σ_a and $1-\sigma_l$, from the dictator and the die-rolling games, to explain the occupation/effort choice data, is undertaken in Sections 9 and 10.

1. The correlation between the altruism parameter α estimated from the occupational/effort choice game and the transfer by the dictator in the dictator game is significantly positive (Spearman coefficient = 0.10, p-value = 0.030). This is consistent with the predictions of our model in Proposition 7, namely more altruistic dictators send higher transfers.

2. The correlation between the dishonesty-aversion parameter θ estimated from the occupational/effort choice game and the reported number, r, in the die-rolling game is significantly negative when the signal $r \neq 6$ (Spearman coefficient = -0.58, p-value = 0.000).[34] Thus, more honest subjects (as measured in the occupation/effort choice game) also report lower numbers, that are closer to the observed signal, s, in the die-rolling task. This is consistent with the predictions of our model in Proposition 6.

9 Findings from the occupational choice game

Proposition 4 gives the required condition for the taking public sector job to be preferred over the no-taking public sector job; see (3.15). In Proposition 5, inequalities (3.16) and (3.17) give the respective conditions for choosing a public sector job over the private sector job. We now test these conditions. We run Tobit models (censored on both sides) using the data from our sample of 500 subjects, and report the calculated marginal effects for the censored data; we

[34] Recall that the payoff from reporting the number 6 is zero. Thus, payoffs are monotonic in reports only when $r \neq 6$.

report the "scaled betas" rather than the original betas because the original betas cannot be directly interpreted like the slope parameters.[35]

9.1 Descriptive statistics

The percentage of subjects and the number of subjects (in brackets) choosing each of the 3 occupations in the neutral and the primed treatments is shown in Table 1. Of the 500 subjects, 242 were in the neutral treatment and 258 in the primed treatment. Close to 60% of the subjects chose the taking public sector job. Only 5.8% subjects in the neutral and 9.3% subjects in the primed treatment chose the no-taking public sector job. Roughly one third of the subjects chose the private sector job.

Overall, in our sample, 65.4% chose the public sector job and 34.6% chose the private sector job. This is remarkably close to the actual percentages of (i) public sector employees in India (64.2%), which includes state-owned companies and municipal government employees, and (ii) registered private sector employees (35.8%).[36]

In the post-experimental survey, subjects had to answer the following question related to their "real world preferred" occupational choice: "What would be your job preference after your graduation." Among the subjects who selected the private sector job in the occupational choice game, 77.06% (= 131/170) subjects also preferred the private sector job after graduation; among the subjects who selected the public sector job in the occupational choice game, 76.97% (= 254/330) subjects also preferred the public sector job after graduation. Thus, the high consistency between the occupational preferences outside the lab and those in the lab speaks to the issue of external validity of the choices made in our experimental occupation game.

Table 1: Choice percentages for each job.

Treatment	Private Sector	Public Sector	
		Taking	No-Taking
Neutral (242)	36.8 (89)	57.4 (139)	5.8 (14)
Primed (258)	31.4 (81)	59.3 (153)	9.3 (24)

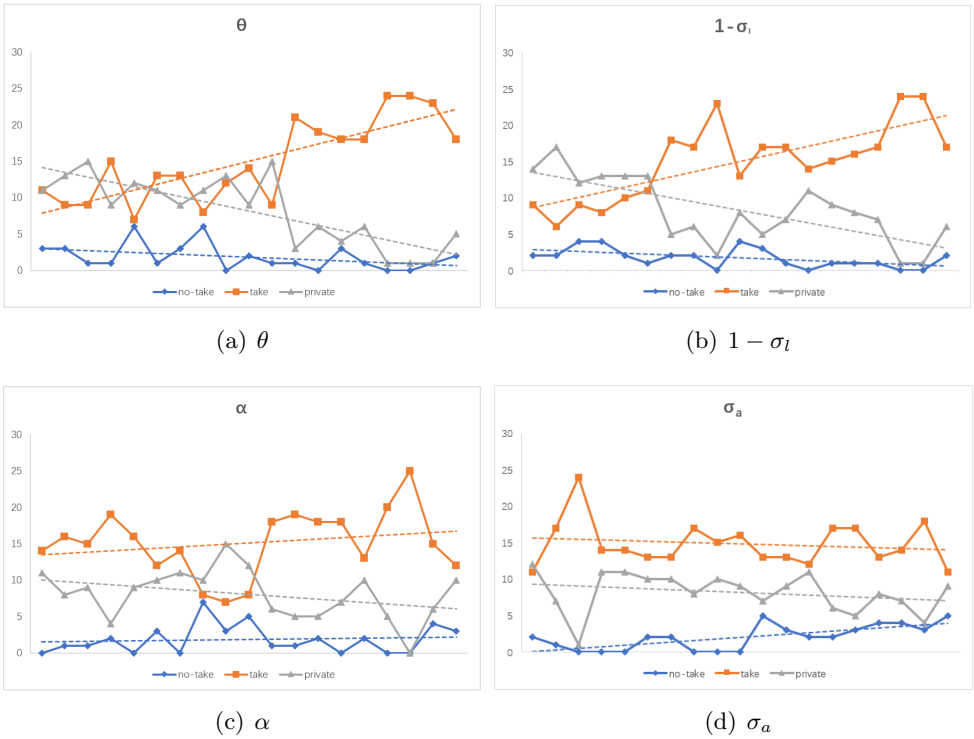
Notes: The number of subjects is shown in brackets.

Fixing a job (private, taking, no-taking), the percentage of subjects in each treatment (neutral or primed) is not significantly different. For any of the three jobs, the job choice distributions in the two treatments are not significantly different either (Kolgomorov-Smirnov test, p-value= 0.862). Thus, priming does not play a significant role. A plausible explanation for the weak priming effect is that subjects in the neutral treatment already had 'accurate' and 'salient' beliefs about the extent of corruption in public sector jobs.[37]

[35] In cases that the Tobit model could not produce any result, e.g. "convergence not achieved", we used OLS models with robust errors instead. For the subjects who chose constant effort level at different productivity (λ) levels, we use (4.1) and (4.2), to assign the value zero to their α or θ coefficients.

[36] As noted in the introduction, we are not claiming to have explained the actual percentage of subjects choosing each of these occupations in the real world, where other general equilibrium factors come into play, such as labor demand and market clearing, which we have not modeled.

[37] This is particularly the case since our subjects are students who are about to enter into the job market and appear well informed. Corruption itself is fairly salient in the social media and on the news in India. In



(a) θ (b) $1-\sigma_l$

(c) α (d) σ_a

Figure 2: Percentages of job choices as the intensity of altruism and honesty varies.

Since the main interest in the literature has been on the parameters of altruism and dishonesty-aversion in determining occupational choice, we first give some descriptive statistics. In the top row of Figure 2, along the horizontal axis, we vary the extent of estimated dishonesty-aversion, θ, of the subjects from the occupational/effort choice game (panel (a)) and the proxy from the die-rolling experiments, $1-\sigma_l$ (panel (b)). In the bottom row, we similarly vary the estimated parameter of altruism, α, from the occupational choice game (panel (c)) and the proxy from the dictator game, σ_a (panel (d)). Going from left to right along the horizontal axis in any panel, we first have the subjects with the highest value of the parameter, followed by the next highest value, and so on, in the following sequence in successive increments of 5%– top 5%, top 10%, top 15%,..., top 100%. Thus, as we go from left to right along the top row, we are picking up successively more honest subjects; and in the bottom row, successively less altruistic subjects.

Along the vertical axis in Figure 2 we have, for each unit change on the horizontal axis, the additional percentage of subjects choosing each of the three jobs– the no-taking public sector job, the taking public sector job, and the private sector job. In Table 2, we report the slope coefficients of the best fitting trend lines through each of the occupation choice curves in the 4 panels of Figure 2.

In panel (a) in Figure 2, for instance, among all three jobs, the trend line (see column 3 in Table 2 with the heading θ) is the steepest and the slope is most significant for the taking public sector job. As the dishonesty-aversion of the subjects reduces (from left to right on the

the post-experimental survey, in the neutral treatment, subjects answered the question "What do you think is the actual percentage of the government officials in India that use the take option in public sector jobs?". The average answer is 49.5%, which is close to the number announced in the primed treatment (45%).

horizontal axis), they are more likely to choose the taking public sector job. This increase in the choice for the taking public sector job comes at the expense of a reduction in choices for the other two jobs, which both display negative and significant trends. A similar picture arises in panel (b), in Figure 2, in the top row where we use the proxy dishonesty-aversion variable, $1-\sigma_l$, from the die-rolling experiment. The results in panels (a) and (b) look similar, suggesting the portability of the proxy dishonesty-aversion parameter between different games.

From panel (c) in Figure 2, none of the slope parameters is significant (see corresponding column 2 in Table 2 with the heading α). Thus, without controlling for other variables, altruism does not appear to provide an explanatory basis for occupational choice. The estimated slope coefficients in column 4 in Table 2 (corresponding to panel (d) in Figure 2) use the altruism proxy, σ_a, from the dictator game. Two of the three coefficients in column 4 are insignificant. The only significant coefficient is for the no-taking public sector job. However, this analysis needs to be refined by controlling for other factors. We do so below.

Table 2: Slope coefficients when a trend line is fitted through the graphs in each of the panels in Figure 2.

	α	θ	σ_a	$1-\sigma_l$
no-taking	0.09	-0.01**	0.01**	-0.01**
taking	-0.02	0.04***	-0.003	0.04***
private	-0.07	-0.03***	-0.01	-0.04***

Notes: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

9.2 Choice between taking and no-taking public sector jobs

From Proposition 4, conditional on being a public sector employee, an individual chooses the taking job if $\alpha + \theta < 1$ and the no-taking job if $\alpha + \theta \geq 1$.

Table 3: Occupational choice in the public sector.

No-taking public sector job		Taking public sector job	
$\alpha + \theta \geq 1$	$\alpha + \theta < 1$	$\alpha + \theta \geq 1$	$\alpha + \theta < 1$
28/39 (71.8%)	11/39 (28.2%)	105/293 (35.8%)	**188/293 (64.2%)**

Table 3 shows the percentage choosing each of the two public sector jobs whose individual-specific estimates of α, θ satisfy the predicted condition in Proposition 4. The behavior of 71.8% of subjects who chose the no-taking job and 64.2% of the subjects who chose the taking job (both shown in bold), is consistent with the predictions of Proposition 4. Both these proportions are significantly greater than 50% (z test, p-value< 0.01), which may be taken as the prediction of a model based on random allocation of subjects to the two jobs, on the basis of these parameters.

9.3 Choice between private and public sector jobs

The predictions for the choice between private and public sector jobs are given in Proposition 5. We consider the two cases in the proposition, separately below.

Case I: $\alpha + \theta < 1$ (Taking public sector job is preferred to the private sector job)

Our theoretical prediction is given in (3.16), $V^t > V^c \Leftrightarrow w_p + \frac{1}{2c}(\phi\lambda)^2 > \frac{\beta^2}{2c}$. Substituting the values of $w_p = 25$, $c = \frac{1}{2}$, $\lambda = 10$, $\gamma = 1/5$, $\beta = 4$ used in our experiments, this condition always holds.[38] This is also true of Case II below, thus, the subjects are predicted to always choose the public sector job rather than the private sector job. In the experiments, 63.6% subjects chose the taking public sector job, consistent with our theoretical prediction, but 36.4% subjects chose the private sector job; we offer potential explanations below in Section 9.4.

Case II: $\alpha + \theta \geq 1$ (No-taking public sector job is preferred to the private sector job)

Our theoretical prediction is given in (3.17), $V^n > V^c \Leftrightarrow w_p + \frac{1}{2c}(\alpha\lambda)^2 > \frac{\beta^2}{2c}$. Analogous to the calculations in Case-I, this condition always holds. Thus, no subjects should choose the private sector job. In the experiments, for the subjects who satisfy $\alpha + \theta \geq 1$, 18.8% (= 39/207) subjects chose the no-taking public sector job and 81.2% (= 168/207) subjects chose the private sector job. This does not support the predictions of our model. However, overall, the subjects choosing the no-taking public sector job is only 5.8% in the neutral treatment, and 9.3% in the primed treatment (see Table 1). Thus, in terms of absolute numbers, this prediction fails for a relatively small number of subjects (for 4.7% of the subjects in the neutral and 7.55% of the subjects in the primed treatment).

Discussion: Overall, the predictions of the theoretical model are well supported by the data, particularly in the choice between the two public sector jobs and also in terms of the required conditions $\alpha + \theta \gtreqless 1$ for the choice between the two public sector jobs. However, the preference for a private sector job for a third of the subjects (see Table 1) when no subjects are predicted to choose a private sector job is a-priori puzzling. But we can explain this finding by considerations that are not a part of our theoretical model, as we show below.

The respective legal monetary payoffs from the private and the public sector jobs are $4e - c(e)$ and $25 - c(e)$.[39] Subjects had available a slider to compute the exact cost corresponding to each possible effort level. Hence, the calculation of the legal 'monetary payoff-maximizing effort choice' was straightforward in our experiment. For 80 out of the 168 subjects who chose the private sector job, we have that

$$4e^c - c(e^c) > 25 - c(e^j),\ j = t, n$$

i.e., the monetary payoff in the private sector job is relatively higher as compared to the corresponding public sector job in the taking and the no-taking conditions.

Thus, the behavior of nearly half of the 34% subjects who choose the private sector job appears to be explained by the use of the following simple *heuristic*: Choose the job that offers the higher legal monetary payoff. Mounting evidence shows that people use a variety of simple context-dependent heuristics in making their choices (Dhami and Sunstein, 2022). Thus, it

[38] Rewriting this condition, we have $(\phi\lambda)^2 > \beta^2 - 2cw_p$. But $\beta^2 - 2cw_p = -9 < 0$ while $(\phi\lambda)^2 \geq 0$. A similar calculation also holds for Case II below. A necessary condition for this inequality to hold is that the incentive payment in the private sector, $\beta > 5$, while we have $\beta = 4$.

[39] Those who have chosen the private sector prefer it to the taking public sector job, partly because they did not wish to partake in 'mandatory' institutional corruption. Indeed, as we show below, their average dishonesty-aversion is significantly higher than those who choose the taking public sector jobs. So, in comparing their respective material payoffs from the two jobs, it is reasonable to compare the legal material payoffs.

is quite possible that some subjects make occupational choice on the basis of simple payoff maximization, yet they might be altruistic and honest in other domains. They might well argue that through payoff maximization, they will be able to use the money for altruistic purposes elsewhere (e.g., contribute to charity). Indeed this is supported by the free-from responses of several subjects in the exit questionnaire, who chose the private sector job.[40] This suggests context dependent preferences that are well documented in behavioral economics (Dhami, 2016).

Table 4: Average altruism and dishonesty-aversion in the private and public jobs.

	α	θ	σ_a	$1-\sigma_l$
private	0.06	0.89	0.79	0.70
public	0.05	0.62	0.77	0.51
t test p	0.063	0.000	0.156	0.000

These conclusions are supported by the results in Table 4. Recall that in our experimental design, all subjects choose effort levels in all the 3 jobs and play both experimental games (dictator and die-rolling game). Hence, we have estimates of altruism and dishonesty-aversion, and the corresponding estimates for the proxy variables from the experimental games, for all subjects. From Table 4, when making choices in the dictator game, subjects who chose private sector jobs are as altruistic as those who chose public sector jobs (as measured by both sets of altruism parameters). However, they are significantly more honest in the die-rolling lying game, as measured by both sets of the dishonesty-aversion parameters; for each of the two dishonesty-aversion parameters, the t-test for differences of dishonesty-aversion between those who choose the private sector job and those who choose the public sector is highly significant.

There are other factors, supported by our post-experimental survey, that favor private sector jobs, although these were not a part of our parsimonious theoretical model. For instance, subjects might have an 'intrinsic preference' for jobs that offer performance-based pay, such as private sector jobs, over the public sector that offers a fixed wage (as in our experiments).[41] It is also possible that some subjects invoke outside-the-lab job features while making lab choices. For instance, the perception that private sector jobs are associated with greater autonomy and a steeper career profile; both are desirable features identified by the literature (Dhami, 2016). A few subjects who chose the private sector job mentioned factors such as "Great encouragement to skills and protection & respect" as explanations for their choice.

9.4 Probit analysis of job choice

We now use probit models to examine the pairwise job choices in Table 5 (taking public versus private), Table 6 (taking public versus no-taking public), and Table 7 (no-taking public versus

[40] Here is a sample from one of the subjects: "If I want to do something good for the society I can do it even by being a private sector job holder. So I can get income according to the effort I put in and I can help someone simultaneously."

[41] A total of 85.9% (= 146/170) of the subjects who preferred the private sector job in the experiment over the public sector jobs, selected the following option as their preferred explanation for their choice: "The incentive payment in the private sector because the private sector wage increases the higher the effort you choose. By contrast the public sector pays only a fixed wage that is independent of effort".

private). We report the marginal effects with particular emphasis on the estimates of the altruism and the dishonesty-aversion parameters, which are reported in all tables. The variables controlled in these 3 tables are *age*, *male*, *business* (this includes economics and business students), *experience*, *income*, *religion*, *CE*, and *prime*; these variables are defined in Section 6.4. To conserve space, in the tables we only report the marginal effects for the significant control variables, in addition to the estimated parameters of altruism and dishonesty-aversion.

Table 5: Choice between taking public sector job and private sector job (average marginal effects).

Probit	Model 1	Model 2
θ	-0.22**	
	[0.098]	
α	0.04	
	[0.252]	
$1-\sigma_l$		-0.15***
		[0.042]
σ_a		-0.07
		[0.102]
CE	-0.002**	-0.002**
	[0.001]	[0.001]
business	0.11**	0.12**
	[0.054]	[0.055]
demographic variables	controlled	controlled
No. of Obs.	462	462

Notes: For the dependent variable, private sector job =0, and taking public sector job =1. Robust standard errors, adjusted for clustering on individual subjects, are in the brackets. The demographic variables are controlled, and the insignificant ones are not shown in the table. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

The findings from Tables 5, 6 and 7 are as follows.

1. Dishonesty-aversion: From Tables 5 and 6, more honest subjects are significantly less likely to choose the taking public sector job. Both estimated dishonesty-aversion parameters, θ and $1-\sigma_l$, from the occupation/effort choice and the die rolling experiments, respectively, are highly significant. This not only supports our theoretical predictions (Proposition 4, 5), but also demonstrates the portability of the proxy dishonesty-aversion parameter $1-\sigma_l$ to the occupation choice problem. Conversely, in Section 8.2, we have presented results consistent with the portability of the dishonesty-aversion parameter θ, measured from the occupation/effort choice game, to explain behavior in the die-rolling experiment.

2. Altruism: The estimated altruism parameter, α, measured from the occupation choice data is insignificant in explaining 2 out of the three pairwise job comparisons (taking public sector job vs private, and no-taking public sector job vs private). The proxy altruism parameter from the dictator game, σ_a, is insignificant in the choice between the taking public sector job and the private sector job. From Table 1, only 9.3% of our

Table 6: Choice between taking and no-taking public sector jobs (average marginal effects).

Probit	Model 1	Model 2
θ	-0.15***	
	[0.039]	
α	0.43**	
	[0.210]	
$1-\sigma_l$		-0.06***
		[0.023]
σ_a		0.20***
		[0.062]
demographic variables	controlled	controlled
No. of Obs.	330	330

Notes: For the dependent variable, taking public sector job =1, and no-taking public sector job =0. Robust standard errors, adjusted for clustering on individual subjects, are in the brackets. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 7: Choice between no-taking public sector job and private sector job (average marginal effects).

Probit	Model 1	Model 2
θ	-0.04	
	[0.045]	
α	0.41	
	[0.267]	
$1-\sigma_l$		-0.01
		[0.038]
σ_a		0.35***
		[0.088]
CE	0.002**	0.002**
	[0.001]	[0.001]
prime	-0.10*	-0.11**
	[0.052]	[0.051]
demographic variables	controlled	controlled
No. of Obs.	204	204

Notes: For the dependent variable, private sector job =1, and no-taking public sector job =0. Robust standard errors, adjusted for clustering on individual subjects, are in the brackets. The demographic variables are controlled, and the insignificant ones are not shown in the table. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

subjects in the primed treatment, and 5.8% in the neutral treatment choose the no-taking public sector job. The no-taking public sector job is involved in 2 out of 3 binary job comparisons. Thus, for the very vast majority of our subjects (94.2% in the neutral treatment and 91.7% in the primed treatment) the only relevant job choice is between the taking public sector job and the private sector job. In this comparison, the altruism parameters measured from both class of games, α and σ_a are insignificant in explaining the occupation choice decision. This is consistent with the graphs in panels (c) and (d) in Figure 2 and our discussion of those results. However, as we shall see below, the altruism parameter significantly influences effort choices in the predicted direction.

Consider now the following result in Table 6 that is inconsistent with the predictions of our model (see Proposition 4). A higher value of the parameter α makes it more likely that subjects prefer the taking public sector job over the no-taking public sector job. This result also holds when we use the proxy parameter σ_a. We have considered a plausible explanation in the introduction, based on the effect of guilt-aversion on altruism (corruption leads to guilt, which subjects deal with by being more altruistic). However, this channel is absent from our theoretical model, and modeling it would require an ambitious model of endogenous preferences.

3. Risk: Recall that a higher value of the certainty equivalent, CE, corresponds to more 'risk taking' behavior.[42] The effects of CE are either insignificant (in the choice between the two public sector jobs; see Table 6), or when significant, the effects are quantitatively small (2 in 1000 chance) as in Tables 5, 7. The more risk-taking subjects are (i) less likely to choose the taking public sector job over the private sector job (Table 5), and (ii) more likely to choose the private sector job over the no-taking public sector job (Table 7). Thus, more risk-taking subjects prefer the private sector job over the two public sector jobs.

   In our experimental design, we eliminated the confounding factor of risk in occupational choice. Yet more risk-taking subjects are more likely to choose the private sector job that some people might perceive to be more risky in the real world. In the introduction, we have considered a plausible channel (risk taking and overconfidence are highly correlated). Our experiments do not allow us to explore this channel.

4. Other factors: As noted before, the priming treatment produces results similar to the neutral treatment, hence, the variable 'prime' is not significant in any regressions. The only exception is in Table 7 where priming decreases the probability of choosing a private sector job. The priming effect is significant only at 5% for the case when we use the proxy dishonesty-aversion parameter, $1 - \sigma_l$, from the die rolling task. When the dishonesty-aversion parameter, θ, from the occupation choice data is used, priming is significant only at 10%. Business students are more likely to choose the taking public sector job over the private sector job (Table 5). However, their choices are not significantly different in any other pairwise comparison.

[42] Note that if a subject is risk averse then a higher value of CE implies lower risk aversion. If a subject is risk loving, then a higher value of CE implies more risk loving. We follow the convention of classing both subjects as more risk-taking.

10 Choice of effort and size of the public sector

In this section, we report the results of the Tobit models, censored on both sides, to explain effort choices of our subjects. For ease of interpretation, we report the *marginal effects* of the independent variables.

Table 8: Average effort levels in the 3 jobs in each treatment.

Treatment	taking public sector	no-taking public sector	private sector
primed	5.95	4.84	7.68
neutral	6.17	4.87	7.77

Table 8 shows the average effort level in each treatment (primed and neutral) for all three jobs. For the two public sector jobs, the effort level chosen by subjects corresponds to the actual productivity level, $\lambda = 10$. A t-test of the differences in the averages between the primed and neutral treatments, for each of the 3 jobs, reveals no statistical difference. Hence, priming does not influence average effort level in a between-subjects design. Table 8 reveals the following findings.

(1) The average effort level is highest in the private sector, followed by the taking public sector job, and it is lowest in the no-taking public sector job.

(2) The average effort levels in the three pairwise job comparisons (no-taking versus private; taking versus private; no-taking versus taking) are significantly different (p-values< 0.01 each case). A Kolgomorov-Smirnov test also shows that the distributions of effort levels, in each pairwise comparison of the jobs, are significantly different (p-values< 0.01 in all cases).

Consider the primed treatment. Private sector effort is 1.73 units higher than in the taking public sector job. If the same effort was to be exerted in the taking public sector job, it would produce $10 \times 1.73 = 17.3$ extra units of public sector output. The taking public sector job produces 60.6 units of output (see Section 10.3), so this would be an increase of $\frac{17.3}{60.6} \times 100 = 28.5\%$ in output. A similar comparison for the no-taking versus private sector job, based on the primed treatment in Table 8 and an output level of 48.6 for the no-taking job, gives an increase of $\frac{28.4}{48.6} \times 100 = 58.4\%$ in public output in the no-taking job.

10.1 Effort choices in the public sector jobs

The determinants of the effort choices in the two public sector jobs are shown in Table 9. In Table 9, the positive coefficients on α in Model 1 and Model 3 respectively show that more altruistic subjects exerted more effort in both the taking public job and the no-taking public job. This is consistent with our predictions (Propositions 2, 3). The negative sign on θ in Model 1 indicates that the more honest subjects exerted less effort in the taking public job, which is also consistent with our predictions (Proposition 3), although the effect is not significant. However, the parameters of altruism, σ_a, and dishonesty-aversion, $1 - \sigma_l$, measured from the two experimental games (respectively, dictator and die-rolling task) are not significant.

In the *no-taking* public sector job, older people, and more risk-taking subjects exerted higher effort; males exerted lower effort; and Hindu subjects exerted relatively higher effort, although

Table 9: Determinants of public sector efforts (marginal effects).

Dependent variable	Taking effort		No-taking effort	
Tobit	Model 1	Model 2	Model 3	Model 4
α	7.24		6.92***	
	[5.782]		[1.095]	
θ	-0.84			
	[0.983]			
σ_a		-0.10		0.86
		[0.597]		[0.570]
$1-\sigma_l$		0.11		
		[0.241]		
prime	0.78	0.82	0.19	-0.58
	[0.989]	[1.080]	[0.264]	[1.682]
male	-0.93	-1.54	-0.56**	-2.68**
	[1.228]	[1.017]	[0.267]	[1.094]
age	-0.04	0.09	0.26***	0.60***
	[0.186]	[0.199]	[0.048]	[0.231]
income	-1.01***	-1.00***	-0.21**	-0.84
	[0.302]	[0.292]	[0.094]	[0.589]
religion	1.01	0.96	0.91***	-0.18
	[0.924]	[0.933]	[0.295]	[1.299]
experience	-0.74	-1.03	0.14	1.56
	[1.170]	[1.105]	[0.299]	[1.476]
business	1.29	1.34	-0.49	-0.28
	[0.846]	[0.919]	[0.334]	[1.626]
CE	0.03	0.02	0.01*	0.05*
	[0.018]	[0.019]	[0.005]	[0.029]
No. of Obs.	500	500	500	500

Notes: Robust standard errors, adjusted for clustering on individual subjects, are in the brackets. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

this is only significant in Model 3. In both public sector jobs, subjects with higher annual household incomes exerted lower effort, but this effect is not significant in Model 4.

10.2 Effort choices in the private sector job

The optimal effort which maximizes the monetary payoff in the private sector job, $4e - \frac{1}{4}e^2$, equals $e = 8$. The modal effort level in our data is 8 and it is chosen by 47% of the subjects. The average effort level chosen in the private sector job is 7.7, which is also close to 8. This lends further credence to the hypothesis that many subjects who chose the private sector job appear to be using a simple heuristic of maximizing their monetary payoffs. Thus, it is not surprising that in a regression analysis, most other explanatory variables are insignificant, except business students who exert significantly more effort in the private sector job relative to students from other disciplines. There is no economic justification in including the altruism and dishonesty-aversion parameters in explaining effort choices in the private sector. The following variables were found to be insignificant: Prime, male, age, income, religion, experience, and risk attitudes; the results are reported in the supplementary file.

10.3 Public output in the public sector jobs

The production function in the two public sector jobs is $f(e) = \lambda e$ (see (2.2)). In the no-taking public sector job, the output distributed to society equals λe, while in the taking public sector job the output distributed equals $(1 - \gamma)\lambda e$. We use the actual parameter values, $\gamma = 0.2$, $\lambda = 10$; and the actual effort levels chosen by the subjects for these parameter values.

The average public output produced in the taking and the no-taking public sector jobs is, respectively, 60.6 and 48.6. The output produced in the taking public sector job is significantly higher (t-test p-value=0.000). Since public sector employees take 1/5 of the output produced in the taking public sector job, the output received by society in the taking public sector job is 48.4. The outputs received by society in the two jobs, 48.6 and 48.4, are not statistically different (t-test p-value=0.949), but the distributions of the outputs are significantly different (KS test p-value=0.000). Thus, on average, corruption expands the size of the public sector, although it makes no difference to the output received by society.

11 Conclusions

The problem of occupation/effort choice between the private and public sectors in the presence of corruption has been an active area of research. Despite notable progress in the literature, several factors conspire against drawing firmer conclusions and establishing causality. These include the lack of a precise specification of the job characteristics that subjects are asked to choose between; the absence of an analysis of effort choice in these jobs; the absence of theoretical models that make precise predictions that can be tested; and the practice of using proxy preference parameters only (e.g., from dictator game and die-rolling tasks) to correlate with occupation choice, rather than, additionally, estimating these parameters from occupation/effort choice

data. The aim of our paper, and its main motivation, is to address all these concerns in one fell swoop.

The predictions of our theoretical model are reasonably well supported by the data. Dishonesty-aversion is a strong determinant of occupation choice and its effect is as predicted by the theoretical model. The effects of altruism are more complicated. The vast majority of our subjects (94.2% in the neutral treatment and 91.7% in the primed treatment) choose either the taking public sector job or the private sector job. In this binary job choice comparison, altruism is not a significant determinant of occupation choice. However, in job choice comparisons involving other pairs of jobs, altruism is either not significant (no-taking versus private), or when significant (no-taking versus taking), it appears to indicate that corruption leads to guilt and a response from subjects in the form of greater altruism.

Altruism increases public sector effort as predicted by our theoretical model. We use estimated parameters of altruism and dishonesty-aversion from the occupation/effort choice game, and also proxies for these parameters from dictator and die-rolling games. Both sets of parameters are reasonably portable across both sets of games. Thus, our work also contributes to the literature on establishing portability of model parameters and establishing external validity of behavioral parameters. Those choosing the private sector are as altruistic, but even more honest, relative to those choosing the public sector; and they follow a simple heuristic of maximizing legal material payoffs and exhibit context dependent preferences. Another novel finding from our paper is that corrupt economies are likely to have a larger size of the public sector (as measured by public output), but consumer welfare in corrupt and honest economies is similar.

Our paper puts the effects of dishonesty-aversion and altruism on a firmer theoretical and experimental foundation. However, the work can be extended in several directions. For instance, to environments where corruption is not institutionalized and deterrence parameters play an important role. One could also extend our theoretical model to other possible job characteristics including non-pecuniary benefits such as status and image concerns arising from various jobs. Two new channels that appear to play a role in explaining our results but are not a part of our theoretical model deserve further exploration. The first is the "corruption to guilt to altruism channel" in occupation choice. The second is the relationship between risk aversion and overconfidence in explaining occupation/effort choice.

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Appendix: Proofs

Proof of Proposition 1: From (3.1), $\frac{d^2V^c}{de^2} = -c''(e) < 0$. Hence, V^c is a strictly concave function of e on a compact interval $[0, \overline{e}]$. Thus, a unique maximum value exists which can be found by setting $\frac{dV^c}{de} = 0$ in (3.1). This gives $e^c = c'^{-1}(\beta)$. Differentiating the optimal solution, we get $\frac{de^c}{d\beta} = c''^{-1}(\beta) > 0$ (because the inverse of an increasing function is also increasing), so e^c is strictly increasing in β. From (3.1), we directly get one corner solution $e^c = 0$ if $\beta \leq c'(0)$; and the other corner solution $e^c = \overline{e}$ if $\beta \geq c'(\overline{e})$. ■

Proof of Proposition 2: (i) Differentiating (3.3) with respect to e we get $\frac{d^2V^n}{de^2} = -c''(e) < 0$. Hence, V^n is a strictly concave function of e on a compact interval $[0, \overline{e}]$. Thus, a unique maximum value exists. At an interior solution, $\frac{dV^n}{de} = 0$ in (3.1), which gives $e^n = c'^{-1}(\alpha\lambda)$. It follows directly from (3.3) that we get the corner solution $e^n = 0$ if $\alpha\lambda \leq c'(0)$ and the other corner solution $e^n = \overline{e}$ if $\alpha\lambda \geq c'(\overline{e})$.

(ii) Differentiating the optimal interior solution we get

$$\frac{de^n}{d\alpha} = \lambda c''^{-1}(\alpha\lambda); \frac{de^n}{d\lambda} = \alpha c''^{-1}(\alpha\lambda).$$

Suppose that $0 < \alpha < \frac{c'(\overline{e})}{\lambda}$, then from (3.3) we get an interior solution to effort, $0 < e^n < 1$. We then have $\frac{de^n}{d\alpha} > 0$ and $\frac{de^n}{d\lambda} > 0$. (because the cost function is increasing and convex; and the inverse of an increasing function is increasing) ■

Proof of Proposition 3: (i) From (3.5), we have $\frac{d^2V^t}{de^2} = -c''(e) < 0$. Hence, V^t is a strictly concave function of e on a compact interval $[0, \overline{e}]$. Thus, a unique maximum value exists. At an interior solution, $\frac{dV^t}{de} = 0$ in (3.5), which gives $e^t = c'^{-1}(\phi\lambda)$. We get the corner solution $e^t = 0$ if $\phi\lambda \leq c'(0)$ and the other corner solution $e^t = \overline{e}$ if $\phi\lambda \geq c'(\overline{e})$.

(ii) At an interior solution, we must have $0 < \phi < \frac{c'(\overline{e})}{\lambda}$. Otherwise if $\phi \leq 0$ or if $\phi \geq \frac{c'(\overline{e})}{\lambda}$, then from (3.5), we get, respectively, the corner solutions, $e^t = 0$ and $e^t = \overline{e}$. Differentiating the optimal interior solution to effort, with respect to λ we get $\frac{de^t}{d\lambda} = \phi c''^{-1}(\phi\lambda) > 0$. In order to study the other comparative static effects, first note that

$$\frac{de^t}{d\phi} = \lambda c''^{-1}(\phi\lambda) > 0.$$

Now using the definition of $\phi = \alpha + \gamma(1 - \alpha - \theta)$ given in (2.7), we can determine $\frac{de^t}{d\alpha} = (1-\gamma)\frac{de^t}{d\phi} > 0$; $\frac{de^t}{d\theta} = -\gamma\frac{de^t}{d\phi} < 0$; and $\frac{de^t}{d\gamma} = (1 - \theta - \alpha)\frac{de^t}{d\phi} \gtreqless 0$, but if $0 \leq \alpha + \theta < 1$, then $\frac{de^t}{d\gamma} > 0$. ■

Proof of Proposition 4: Using (3.13), (3.14), the taking job is preferred if $V^t > V^n \Leftrightarrow \phi > \alpha$. Using (3.8), we can write this as $V^t > V^n \Leftrightarrow 1 > \alpha + \theta$. Otherwise, the public sector employee prefers the no-taking job, i.e., $V^t \leq V^n \Leftrightarrow 1 \leq \alpha + \theta$. ■

Proof of Proposition 5: Suppose that we use the tie breaking rule that when indifferent between the private and the public sector jobs, the individual chooses the private sector job.

Case-I: $1 > \alpha + \theta$.: From Proposition 4, the taking public sector job is preferred. Hence, in this case, the relevant choice is between a 'taking' public sector job and a private sector job. The individual chooses the taking public sector job if $V^t > V^c$. Using (3.12), (3.14), one can easily verify that $V^t > V^c$ implies the condition in (3.16).

Case II: $1 \leq \alpha + \theta$.: From Proposition 4, the no-taking public sector job is preferred. Hence, in this case, an individual who is deciding between the private job and the no-taking public sector job, chooses the public sector job if $V^n > V^c$. Using (3.12), (3.13), one can easily verify that $V^n > V^c$ implies the condition in (3.17). ■

Proof of Proposition 6: From (5.1) we get

$$\frac{dU_L}{dr} = u'(r) - \widetilde{\theta}. \tag{11.1}$$

The second order condition is $\frac{d^2U_L}{dr^2} = u''(r) < 0$, so U_M is a strictly concave function of r, defined on the compact interval $[s, \overline{s}]$. Thus, a unique maximum exists, and can be found by solving the first order condition $\frac{dU_L}{dr} \leq 0$. At an interior solution, $\frac{dU_L}{dr} = 0$, which gives $r^* = u'^{-1}(\widetilde{\theta})$. Differentiating this condition, we get $\frac{dr^*}{d\widetilde{\theta}} = u''^{-1}(\widetilde{\theta}) < 0$ if $r^* > s$ and $\frac{dr^*}{d\widetilde{\theta}} = 0$ if $r^* = s$ is at the lower boundary of the feasible set $[s, \overline{s}]$. Thus, r^* is decreasing in θ. ■

Proof of Proposition 7: From (5.3), we have

$$\frac{dU_A\left(y;\widetilde{\alpha}\right)}{dy} = u'(y) - \widetilde{\alpha}. \tag{11.2}$$

Since $\frac{d^2U_A(y;\widetilde{\alpha})}{dy^2} = u''(y) < 0$, U_A is a strictly concave function of y, defined on the compact interval $[0, \overline{y}]$. Thus, a unique maximum value exists and it can be found by solving the first order condition $\frac{dU_A(y;\widetilde{\alpha})}{dy} \leq 0$. At an interior solution, $\frac{dU_A(y;\widetilde{\alpha})}{dy} = 0$, which gives the solution $y^* = u'^{-1}(\widetilde{\alpha})$. Differentiating the optimal solution, it follows that $\frac{dy}{d\widetilde{\alpha}} = u''^{-1}(\widetilde{\alpha}) < 0$. Thus, $y^*(\widetilde{\alpha})$, the amount kept by the dictator, is decreasing in the altruism parameter of the dictator. If $\frac{dU_A(0;\widetilde{\alpha})}{dy} \leq 0$ or $u'(0) \leq \widetilde{\alpha}$, then the dictator chooses to keep nothing, or $y^* = 0$. If $\frac{dU_A(\overline{y};\widetilde{\alpha})}{dy} \geq 0$ or $u'(\overline{y}) \geq \widetilde{\alpha}$, then the dictator chooses to give nothing, or $y^* = \overline{y}$. ■

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