To Serve the Community or Oneself:
The Public Servant's Dilemma

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Abstract[2]

Embezzlement of resources is hampering public service delivery throughout the developing world. Research on this issue is hindered by problems of measurement. To overcome these problems we use an economic experiment to investigate the determinants of corrupt behaviour. We focus on three aspects of behaviour: (i) embezzlement by public servants; (ii) monitoring effort by designated monitors; and, (iii) voting by community members when provided with an opportunity to select a monitor. The experiment allows us to study the effect of wages, effort observability, rules for monitor assignment, and professional norms. Our experimental subjects are Ethiopian nursing students.

We find that service providers who earn more embezzle less, although the effect is small. Embezzlement is also lower when observability (associated with the risk of being caught and sanctioned) is high, and when service providers face an elected rather than randomly selected monitor. Monitors put more effort into monitoring, when they face re-election and when the public servant receives a higher wage. Communities re-elect monitors who put more effort into exposing embezzlement. Framing — whereby players are referred to as "health workers" and "community members" rather than by abstract labels — affects neither mean embezzlement nor mean monitoring effort, but significantly increases the variance in both. This suggests that different types of experimental subject respond differently to the framing, possibly because they adhere to different norms.

"I Solemnly and Sincerely Swear that Above All Else I Will Faithfully Serve The People."

1. Introduction

Public servants often face a conflict between their private interests and the interests of the people they are hired to serve. Too great an emphasis on the former can manifest itself as inappropriate or corrupt behaviour, absenteeism, informal charging and misappropriation of equipment and other resources. Such behaviour is particularly prevalent in the developing world, although it is also a problem in many developed countries (see, e.g. Ensor and Duran-Moreno 2002). In this paper we focus on the misappropriation of resources by health workers in developing countries, and the choices made by those responsible for overseeing and sanctioning those workers. However, our methodology and, to some extent, our results are also applicable to public servants in other contexts.

We are interested in identifying the causes of resource misappropriation and thereby contributing to the search for methods of combating corruption. The existing literature on corruption and the performance of public servants (briefly reviewed in section 2 below) identifies many possible causes. Three topics receive special attention: (i) poor pay for public servants, which may lead to corruption either on its own or in combination with notions of what is and is not fair; (ii) the institutional environment, including the ease with which the performance of health workers can be monitored and sanctioned, and the interests of those charged with the monitoring and sanctioning duties; and (iii) the intrinsic, internal, or personal motivation of the health workers, which may be based on innate other-regarding preferences, pro-social behavioural norms internalised during childhood or adolescence, or professional principals and codes of conduct assimilated during training or through association with other members of the same professional culture.

In this paper, we explore these possible causes of corruption using an economic experiment based on a game specifically designed for this purpose (described in section 3 below). We conducted our experiment with Ethiopian nursing

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students as subjects. Many of these students will ultimately work in precisely the context within which the particular form of petty corruption that we are interested in is prevalent. By involving them, rather than students from a Western university we aim to improve the external validity of our results, at least to the Ethiopian context (described in section 4 below). Some of our results confirm the findings of other research on similar issues that exploits cross-country data while others go significantly beyond what is possible to generate using such data (results presented in section 5).

2. Literature Review

In the theoretical literature, public servants are seen as agents for multiple principals, including patients, communities, and government agencies. The focus of this literature is to design optimal institutions and contracts that exert effort from public servants on an appropriate set of tasks and deter them from opportunistic behaviour. Arrow (1963) made an early contribution on the incentive issues that arise due to the asymmetry of information between patients and providers. More recently Barnum, Kutzin, and Saxenian (1995), Gosden, Pederson, and Torgerson (1999), and Chaix-Couturier and others (2000) have discussed the effects of different systems of provider payment on hospital performance and medical practice, while (see, e.g. Goddard, Mannion, and Smith 2000; Martinez and Martineau 1998; Mills 1997) have focused on the importance of observability and performance-related incentives in the context of public sector management reform.

The principal agent model also provides the basis for much of the literature on corruption (Bardhan 1997; Klitgaard 1988; Rose-Ackerman 1978). Here, the focus is on the trade-off between the expected costs and benefits of a corrupt act. Most models identify wages as an important determinant of corruption, with low salaries increasing its prevalence (Becker and Stigler 1974; Chand and Moene 1999; Mookherjee and Png 1995). Low wages can also result in selection, whereby poor performers who are more likely to engage in rent seeking are attracted to the public sector (Besley and McLaren 1993).

Monitoring and sanctioning institutions impact on the expected cost of corruption. But they also introduce new conflicts of interest. Indeed, corruption can

emerge because there are opportunities for mutually beneficial transactions between monitors and agents (Becker and Stigler 1974; Khalil and Lawarree 1995; Mookherjee and Png 1995). In most developing countries monitoring is the duty of (other) public servants who are themselves under-paid, under-motivated, and disinterested in the performance of public service providers. In the literature on decentralization, some have argued that community participation strengthens accountability and improves governance.; others question this, pointing to the lack of salient capacity at the community-level (Banfield 1979; Manor 1999; Prud'homme 1995). Shleifer and Vishny (1993) aim to reconcile these views by proposing that corruption may be less severe in highly centralized and decentralized states, than in states with an intermediate level of institutional centralization.

Diverging from neo-classical economics, Deci (1975), Frey (1997), Lindenberg (2001), Tendler (1997), and others identify a lack of intrinsic, internal, or personal motivation as an important determinant of professional behaviour. They see such motivations, especially in the form of professional ethics or norms, as providing a basis for self-enforcement mechanisms.[4] This may work better in some types of organizations than in others, and may explain why NGOs or religious organizations may be more able to overcome agency problems (Glaeser and Shleifer 2001; Pauly 1987). Looking at worker motivation in general, Kreps (1997) and Franco, Bennet, and Kanfer (2002) suggest that a reliance on extrinsic incentives may undermine internal sources of motivation, while Segall argues that "market relationships present health care providers with perverse incentives and can do violence to the professional ethos of caring." (Segall 2000, p. 11)

While this theoretical literature has generated many insights into the possible causes of corruption, empirical verification has proven difficult. Chiappori and Salanié (2002), for example, highlight the general mismatch between theoretical predictions and what is observed in terms of real contract forms. The former tend to be much more complex than the latter. Factors such as merit pay, group incentives,

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[4] The term intrinsic motivation is not always clearly defined. Kreps (1997) argues that in many cases what is referred to as intrinsic incentives may in fact be workers' response to fuzzy extrinsic motivators such as fears of discharge or career concerns, but he also acknowledges that "true" intrinsic motivation may be an important factor in many contexts. A helpful (and pragmatic) definition comes from self-perception theory in psychological literature, where intrinsic motivation is the motivation that drives an individual to conduct a task whatever the external incentives. Extrinsic motivation, on the other hand is the motivation that drives a person to conduct a task, whether she likes it or not, because of the external incentives.

career concerns, and the possible role of professional cultures, norms and ethics only exacerbate this mismatch (Dixit 1997; 2001; Wilson 1989).

With few exceptions (e.g. Ablo and Reinikka 1998; Fisman and Gatti 2000; Svensson forthcoming), empirical analysis of corruption has often been based on cross-country perception data.[5] This analysis has focused an a wide range of factors, including legal systems, socio-economic development, political rights and democracy, ethnic composition, dimensions and degrees of decentralization, political instability, openness to trade, and public sector salaries and recruitment policies (for a review, see Andvig and Fjelstad (2001)). Of particular interest to us here is the work of Van Rijkeghem and Weder (2001) who find that, although higher public servant salaries (relative to manufacturing wages) are associated with less corruption, those salaries would have to increase dramatically to eradicate corrupt behaviour. Using alternative measures of public sector earnings, neither Treisman (2000) nor Rauch and Evans (2000) identify an effect on perceived corruption. Moreover, Rauch and Evans (2000) find that employment security and recruitment and promotion criteria may be of greater important. While interesting, these analyses have been subject to criticism on account of the unsatisfactory measurement of corruption and the potential endogeneity of public sector salaries.

These results can be contrasted with studies that have focused specifically on opportunistic behaviour by health workers. These studies often have a substantial qualitative component, and tend to be based on small samples. Ferrinho and Van Lerberghe (Ferrinho Paulo and Van Lerberghe 2000; 2002) for example discuss the various coping strategies employed by health workers; Ferrinho et al (1998) analyses absenteeism; Ensor and Witter (2001) and Killingsworth and others (1999) discuss informal payments; McPake and others (1999) provide a detailed and quantified assessment of informal economic activities by health workers in Uganda.

The primary hindrances to agent-level, quantitative analysis of corruption and embezzlement relate to measurement, and the lack of institutional variation across otherwise directly comparable contexts. One way to circumvent these problems is to rely on experimental techniques to explore the various possible causal relationships mentioned above. Bjorn and Schulze (2000) develop a principal-agent game in which the agent is offered a bribe by an exogenous party. Bribery yields a higher pay off for

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[5] E.g. Transparency International's Corruption Perception Index

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the agent but causes damage to the principal. They find that certain types (economists, men) are more corrupt than others, but that the relationship is complex.[6] They also find that agents are no less corrupt if they are paid more (independent of the bribe). Abbink et al (2002) developed and Abbink (2002a; 2002b) applied a game in which one actor (a firm) can choose to bribe another (a public servant), who may accept or reject the bribe. There is a fixed probability of detection, whereby both players are disqualified from the game and loose any prospect of further earnings. Abbink finds that reciprocity can support bribery and that the threat of disqualification significantly reduces corruption. The results suggest that higher wages do not reduce corruption, although corruption may be motivated by fairness considerations and that rotation of staff reduces collusion and hence corruption. Complementary evidence from one of the few random policy interventions salient to this field of enquiry, is provided by Nagin and others (2002). They find that randomized changes in monitoring regimes can reduce worker effort. Azfar and Nelson (2002) develop a game designed to explore the effect on presidential resource expropriation of a division of power between an attorney-general and a president. They find that making an attorney-general separately answerable to the electorate reduces corruption significantly.

Another advantage of experiments is that they provide us with insights relating to other-regarding preferences and the crowding out effects of external incentives. However, this has not been directly linked to the issue of corruption in the existing experiments. In very different games, Fehr and Gachter (2000), Cardenas, Stranlund and Willis (2000), and Bohnet, Frey and Huck (2001) show that external incentives can crowd out co-operation, trust, and reciprocity. However, according to Fehr and Falk (2002) there is no conclusive evidence relating to the crowding out of intrinsic motivation as defined by Kreps (1997).

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[6] They find that students who study economics, and men, are more corrupt on average. But male economists are the most while male non-economist are the least corrupt. They also suggest that the higher corruption of economics students on average is a consequence of self-selection rather than indoctrination.

3. The Public Servant's Game

3.1 Overview of the Game

We designed the Public Servant's game to mimic the incentives faced by public servants in developing countries. The game bears some similarities to the Attorney-General's game, designed by Azfar and Nelson (2002)). In our experiment the game focuses on the decision-making environment faced by health workers and those appointed to monitor their performance. However, with only minor adjustments the game can be adapted to resemble the environment of other agent-types that are of interest to policy-makers.

The game involves eight players, who at different times may play the role of community member, health worker or monitor. The basic idea of the game is as follows. A health worker is randomly selected to serve a community. The health worker rolls a die to see how many resources (time, skills, drugs, bandages, syringes, etc.) she has at her disposal. The health worker then chooses how many of these resources to keep for herself and how many to pass on to the community. The performance of this health worker, i.e., her tendency to pass the resources on to the community rather than keeping them for herself, is monitored by an individual who is either elected by the community or randomly selected. The monitor chooses how much effort to put into the task of monitoring. His monitoring activity consists of trying to expose how many resources the health worker has kept for herself rather than passed on to the community. If the health worker is found to have kept resources, she looses all the resources she has kept and is excluded from being the health worker in the next round of the game (each game has 12 rounds). Then another round of the game begins. For a health worker who is not exposed as keeping resources, the probability of retaining her role is significantly higher than the probability of any other player becoming the health worker. Summarized, there are three decision variables in the experiment:

(i)   health workers have to decide whether to try and keep resources for themselves, and if so how many;

(ii)   monitors have to decide how much effort (or money) to put into trying to expose the health workers; and

(iii)   depending on the rules of the specific version of the game, community members have to decide whether to replace or re-elect the monitor.

In the experiment, we vary four factors by design in order to see how they affect the decision variables described above. The four treatment variables are:

(a)   the wage of the health worker, which is set high or low. (The high wage is equal to the upper limit of what a recipient community member can earn in a round of the game; the low wage is only marginally above the lower limit and significantly below the upper limit of what a recipient community member can earn.)

(b)   the difficulty of hiding the expropriated resources, which is set high or low. (variation is created by altering the relative amount of resources that are controlled by the health worker.

(c)   the relationship between the monitor and the community: randomly selected or elected by the community;

(d)   whether the game is framed or not. In the framed version players in the health worker and community member roles are referred to in that way. In the non-framed version they are given abstract labels.

With the resulting data we can test the following six hypotheses:

1.   Ceteris paribus, public servants who receive a higher wage expropriate less than public servants who receive a lower wage.

2.   Ceteris paribus, when the activities of the public servant are more readily observed, public servants expropriate fewer resources.

3.   Ceteris paribus, monitors who are representatives of recipient communities put greater effort into monitoring those public servants posted to the community.

4.   Ceteris paribus, monitors will put more effort into exposing expropriation by public servants who are receiving a high wage than they will into exposing expropriation by public servants who are getting a lower wage.

5.   Ceteris paribus, when faced with community representative monitors, public servants expropriate fewer resources.

6.   Ceteris paribus, there is a professional culture of caring and public service that acts as a motivation for members of the caring professions to use the resources at their disposal to serve the communities within which they live.

3.2 Details of the Game

Each experimental session involves one set of eight players. On arrival, the players are assigned participant numbers from 1 to 8. The game begins when one player is selected to be the health worker according to the roll of an eight-sided die. The health worker is referred to as player **P** in the abstract treatment.

In the random monitor treatment, the eight sided die is then rolled to select the monitor. If the health worker's number comes up the die is rolled again. In the elected monitor treatment, die rolls are used to select two candidates for the position of monitor. The five players whose numbers have not come up in the die rolling become voting community members. In the abstract treatment they are referred to as player **Cs**. They each cast a secret ballot by writing the number of the candidate they want to be their representative monitor on a piece of paper. The ballots are collected by the experimenter, the votes are tallied, and the winner announced and appointed as monitor. The unsuccessful candidate becomes the sixth ordinary community member or player **C**. The monitor is always referred to as monitor, both in the abstract and framed treatment (referred to as **M** in Figure 1).

The health worker (**P**) sits at the head of the table and unconditionally earns 20 Birr in the low wage treatment and 60 Birr in the high wage treatment.[7] The monitor takes the chair to the left of the health worker and the ordinary community members take the remaining chairs (see Figure 1). The health worker then rolls a 6-sided die in private and receives the same number of valuable tiles as the number rolled. These valuable tiles are mixed with the appropriate number of worthless tiles to bring the total number of tiles to either 10 or 18. This variation determines the difficulty of exposing resources that the health worker keeps. All the tiles are placed on a pad in front of the health worker who is sitting behind a screen. The health worker can see which tiles are valuable and which are not, but the community members and monitor cannot. Thus, the health worker is the only player with full information regarding the

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[7] One US Dollar is worth 8 Birr. 60 Birr represents 10 to 15 % of basic monthly earnings for a public sector nurse. In the private sector a nurse can earn around 60 Birr (extra) per night shift.

tiles. The health worker decides how many valuable tiles to keep and how many to distribute to the community. She indicates her allocation decision by placing 6 chosen tiles (all valuable, all worthless, or a mixture) in a bag to distribute to the community members. While doing this she is careful not to reveal the tile types to the other players. The remaining tiles are left on the pad. The community members and monitor do not know how many valuable tiles are in the bag and how many have been kept on the pad by the health worker.

Before the tiles in the bag are passed on to the community members, the monitor can attempt to expose valuable tiles that the health worker has kept. The pad, containing the tiles the health worker keeps, is presented to the monitor, with the tiles turned over so it is unclear which tiles are valuable and which not. Then the pad is placed in the middle of the table so that it can be seen by all. The monitor first states how many tiles he wishes to turn over. He can turn over zero, one, two, three, or four tiles. Each tile turned costs 5 Birr and the total cost is based on the number of tiles the monitor states that he is going to turn. The monitor receives 60 Birr. Any money remaining after the tile turning is the monitor's earnings for the round. So, his earnings will be 60 Birr, 55 Birr, 50 Birr, 45 Birr, or 40 Birr depending on whether he declares that he is going to turn zero, one, two, three, or four tiles respectively. Once he has stated how many he is going to turn, he chooses which to turn, thereby exposing to all players whether they are valuable or worthless.

Finally, the bag containing the tiles that the health worker allocated to the community is passed around the table so that each community member can blindly draw a tile. They learn the identity of their own tile, but are not told what other community members draw. Some information may be communicated through community member's reactions to their draw, but this does not affect the nature of the game. Even if the identity of *all* the drawn tiles becomes public, the communities' knowledge of the health worker's behaviour still increases with the number of tiles turned by the monitor.

Each valuable tile is worth 60 Birr to the community member that draws it. To the health worker, each valuable tile that she keeps is worth 40 Birr as long as no valuable tiles are exposed by the monitor. If valuable tiles are exposed, *all* the valuable tiles that the health worker has kept become worthless. Accordingly,

corruption causes a dead weight loss of 33.3 percent if not exposed and 100 percent if exposed.

Once all the community members have drawn a tile, that round is finished, and the next round begins. If the incumbent health worker has been exposed as keeping resources, the 8-sided die is used to select the health worker for the next round and if the number of the incumbent health worker comes up, the die is cast again. If the health worker has <u>not</u> been exposed as keeping resources, a 14-sided spinner is used to select the health worker for the next round. 8 sides of this spinner are numbered and 6 are marked incumbent. If the spinner settles on either the incumbent health worker's number or one of the 'incumbent' sides, the incumbent health worker remains in post. So, the probability that the health worker remains in post for another round is 0.5. If the spinner settles on another number then the corresponding player becomes the health worker for the next round.

The same procedure for appointing the health worker is followed in the random and elected monitor treatment. However, while in the random treatment the incumbent monitor can be selected to become the health worker, in the elected monitor treatment she cannot. This is because, in the elected monitor treatment she has to stand for re-election. So, if the spinner settles on the incumbent monitor's number it is spun again.

Once the health worker for the next round has been appointed attention turns to the appointment of the monitor. In the random monitor treatment the 8-sided die is rolled as before. In the elected monitor treatment a second candidate for the monitor role is selected using the 8-sided die. The incumbent monitor and this newly selected candidate then run for election. The successful candidate becomes the monitor. Then, play progresses as before.

Each session involves one game comprising of twelve rounds. Table 1 contains a step-by-step summary of the game. The total number of tiles placed on the pad in front of the health worker is kept constant at either 10 or 18 for the first six rounds and then changes to the other level for the remaining six rounds.

A participant's pay is determined by their earnings in *one* of the twelve rounds. This pay round is randomly and openly determined in front of the participants at the end of the experiment, using a 12-sided die. We based pay on a randomly selected round rather than cumulative earnings to minimize income effects. Payments

are calculated with reference to the data collected during play and placed in envelopes. The participants sign to verify payment, and fill out a questionnaire, and a list of general questions regarding the experiment.

3.3 Experimental Design and Implementation

We ran sixteen experimental sessions. In eight of these sessions we minimized the extent to which the game was framed. We did not use the terms 'health worker', 'community members', or 'resources'. The health worker was referred to as 'Player P', the community members were referred to as 'Player C's, and valuable tiles were simply referred to as such. In the other eight sessions we framed the game strongly. Not only did we use the labels 'health worker' and 'community members', but when introducing the valuable tiles we drew an analogy between them and resources such as bandages, syringes, and drugs, sent by the central government. Further, the gathering of all eight players around the table was likened to a village community and the screen erected around the 'health worker' was referred to as 'the clinic'.

In four out of each of these two sets of eight sessions, the monitor was randomly selected and in the other four the monitor was elected. In four sessions the 'health worker' was paid the lower wage and in the other four he or she was paid the higher wage. Finally, in four sessions the first six rounds were played with high observability (ten tiles on the pad) and the second six were played with low observability (eighteen tiles on the pad). And in the remaining four, the six low observability games preceded the high observability ones.

The design ensured that the resulting sample of 192 game rounds was balanced with respect to all four treatment variables and that the variation in each was orthogonal to the variation in all of the others (see Table 2 for the session plan). It would also have ensured a balanced sample with respect to the order of the levels of observability, however during implementation, instead of conducting sessions 15 and 16 we repeated sessions 13 and 14 by accident. This error had implications for the way in which we check for order effects relating to the observability results, but affects none of our conclusions.

4. Context and External Validity

The research questions addressed in the game are highly pertinent to the Ethiopian context. Health outcomes and health service indicators in Ethiopia are among the worst in the world. Even after a decade of concerted efforts to expand access to health care, health worker/population ratios remain three to four times lower in Ethiopia than in neighboring countries. According to policy makers, experts and health workers themselves corruption and inappropriate behaviour are rife in the health sector (Lindelow and Serneels 2003). Health workers claim that equipment, drugs, and other material are often removed from public facilities for sale or use in private practice, and that absenteeism, motivated by a desire to augment income by providing healthcare privately, is commonplace.

Formally, the monitoring and sanctioning of health workers is the responsibility of the district governments. However, requisite capacity is often lacking, especially in more remote areas, where monitoring is also inherently difficult. The smallest, most local administrative units (urban dwellers' and peasants' associations) have a semi-formal monitoring role, although contact between these community organizations and health workers is often limited in practice.

In what way does the experiment help us understand the Ethiopian reality? This question about external validity is both pertinent and difficult to answer. It is a question about whether subjects play in the laboratory as real life. The final answer to this can only come from empirical observation. But in the absence of agent-level quantitative analyses, one possible answer is that experimental results are the best we can offer at this present. At the same time this should not lead to complacency. In the implementation of this experiment we made a conscious choice to implement the experiment "in the field". This is an important step towards improving external validity. Subject type matters: players bring an entire set of heuristics, values and expectations, which affect the way they play, as argued by Cardenas (2003) and Harrison and List (2003). We have made three conscious choices in this regard. First of all we implemented the game in Ethiopia. This allows us to play the game with Ethiopians in their cultural home environment. If cultural norms affect how agents play a game, as shown by Henrich et al (2001), implementing the game in Ethiopia gives experimental results that are closer to the Ethiopian reality. Second, we played the game with Ethiopian nursing students, who will ultimately work in the Ethiopian

health sector. So if nursing students have a specific profile—say for example that they have a higher intrinsic motivation – this will be reflected in our experimental results. Third, we play both an abstract and a concrete version of the game. This allows us to investigate whether and to what extent the specific context of the health sector affects the way the game is played.

5. Results

Our understanding of the results can be improved by working backwards; to gain insights relating to the motivations of monitors it is useful to first look at community members' voting behaviour. Similarly, to gain insights about the motivations of 'health workers' it is useful to have first looked at the monitors' behaviour. Therefore, in this section we first look at community voting behaviour, then at monitoring behaviour, and finally at the behaviour of the health worker.

5.1 Community Voting Behaviour

During the experiment a total of 96 elections were held (12 in each of eight sessions). Of these, eight elections were between new candidates in the first round of the game. In the remaining 88, one candidate had been monitor during the preceding round. In Figure 2 community members' votes of the incumbent monitor are plotted against the number of tiles turned over by that monitor just prior to the election, i.e., how much effort or money he put into monitoring. The upper half of the figure contains a scatter plot and the lower half contains a bar chart of mean votes for each level of monitoring effort. Both graphs suggest that monitors who make more effort are more likely to be re-elected. The statistical significance of this result is indicated by the regression in the first column of Table 3. The second and third columns of this table indicate that neither the success of the monitor at exposing an embezzling 'health worker' nor any of the other treatment variables like the wage level or the level of observability affects voting behaviour.

5.2 Monitoring Behaviour

Figure 3 contains a histogram of the tiles turned by the monitors in each of the 192 rounds. The distribution of monitoring effort has a single mode at one tile, although nearly one third of the sample turned none and only slightly fewer turned two. It was relatively rare for monitors to turn three or four tiles. Table 4 indicates that the mean number of tiles turned is 1.28; and that this varies across treatments.

Figure 4 displays the histograms and cumulative distributions of the numbers of tiles turned under the different treatments. Starting at the top of Table 4 and Figure 4 we see that the randomly selected monitors turned fewer tiles than the elected monitors. The mean numbers of tiles turned were 0.72 and 1.84 respectively and the modes were zero and two respectively. In contrast, varying observability left the mean number of tiles turned unchanged. Both Table 4 and the third row of graphs in Figure 4 indicate that the monitors exerted more effort, i.e., turned more tiles, when the health workers were paid the high wage. The mean numbers of tiles turned in the low and high wage treatments were 1.04 and 1.52 respectively and the modes were zero and one. Finally, the effects of framing the experiment are less straightforward. The mean numbers of tiles turned in the abstract and framed treatments were very similar, 1.30 and 1.26 respectively, but the modes were distinct at one and zero respectively. Further, framing was associated with a significant increase in the variance of monitoring effort (1 percent level in a two tailed variance ratio test).

We explore the statisitical significance of these treatment effects using regressions analysis. The regressions in Table 5 indicate that the wage received by the 'health workers' had a positive and significant (5 percent level) effect on the monitors' behaviour. *Ceteris paribus*, according to the regression in column 1 of Table 5, if the health worker received 60 Birr rather than 20 Birr, the monitor turned an additional 0.478 tiles. How the monitor is selected also has a significant (1 percent level) effect on his own behaviour. According to the regression in the first column of Table 5, elected monitors turned more tiles than the randomly selected monitors. However, when we enter an interaction term between Monitor elected (E) and Observability (OH) in the second column, it is also significant. When observability was low, *ceteris paribus*, an elected monitor turned 0.839 tiles more than a randomly selected one and when observability was high, *ceteris paribus*, they turned 1.411 tiles more. Further, when monitors were randomly selected, changing the level of

observability had no impact on the number of tiles they turned. No other interaction effects between treatment variables were identified.

5.3 Health Worker Behaviour

Figure 5 contains a histogram of the tiles retained by the 'health worker' in each of the 192 rounds. The distribution of embezzlement has a single mode at one tile. In over one fifth of the rounds no tiles were retained, while in a similar proportion two were retained, and in nearly a quarter three or more tiles were retained. Table 6 indicates that the mean number of tiles retained was 1.61. It also shows how the mean number of tiles retained varies across treatments.

Figure 6 displays the histograms and cumulative distributions of the numbers of tiles retained under the different treatments. Starting at the top of Table 6 and Figure 6 we see that when the monitors were randomly selected the 'health workers' retained more tiles than when the monitors were elected. The mean numbers of tiles retained were 1.96 and 1.27 respectively. The second row of graphs in Figure 6 indicates that observability also had an impact. When observability was high health workers retained fewer tiles than when it was low. The mean numbers of tiles retained were 1.36 and 1.86 respectively. Both Table 6 and the third row of graphs in Figure 6 indicate that when health workers were paid more they retained fewer tiles. The mean numbers of tiles retained in the low and high wage treatments were 1.90 and 1.33 respectively. Finally, the effects of framing are complex once again. The mean numbers of tiles retained in the abstract and framed treatments were very similar, 1.66 and 1.57 respectively, even though the modes were distinct at one and zero respectively. And again framing seems to significantly increase (5 percent level) the variance in behaviour.

We can explore the statistical significance of these treatment effects using regression analysis. The regressions in Table 7 indicate that the 'health workers' expropriated more when they received more. Re-running the regressions using the number of valuable tiles retained divided by the number of valuable tiles received as the dependent variable (results not reported) revealed that the proportion of valuable tiles retained remained stable or declined very marginally as the number of valuable tiles received by the 'health worker' increased. *Ceteris paribus*, 'health workers'

facing elected monitors retained 0.683 fewer tiles (significant at 1 percent level), 'health workers' that received a wage of 60 Birr rather than 20 Birr retained 0.489 fewer tiles (significant at 5 percent), and when observability was high the 'health worker' retained 0.452 fewer tiles. Finally, *ceteris paribus*, the number of tiles retained by the health workers tended to increase as the games progressed. No interaction effects between treatment variables can be identified.

6. Conclusions

From the literature we identified three possible causes of corruption: (i) poor public servant pay; (ii) the monitorability and sanctionability of public servants and the interests of those charged with monitoring and sanctioning; and (iii) the intrinsic, internal, or personal motivations of public servants. We then designed an experiment that enabled us to test six hypotheses relating to these causes. The game at the heart of this experiment mimics a situation in which a public servant receives resources and chooses how many to pass on to the community. The public servant's behaviour is observed by a monitor. Here we review our results relating to each of the hypotheses.

Two of our hypotheses relate to the effect of poor public servant pay. Our results suggest that public servants who receive a higher wage expropriate less. However, in accordance with the findings of Van Rijckeghem and Weder (2001), the effect is small; a 200% increase in wages leads to only a 30% reduction in resource expropriation. Unlike those working with cross-country datasets we were also able to explore the effect of the pay of public servants on the effort of those charged with the duty of monitoring them. Here we found that monitors put more effort into exposing expropriation by public servants who are receiving a higher wage. This corroborates Abbink's (2002a) observation that distributive fairness considerations cause well-paid public officials to behave less corruptly.

Turning to our hypotheses relating to the institutional environment of monitoring, like Azfar and Nelson's (2002) presidents, we find that public servants expropriate fewer resources when faced with community representative monitors; and monitors who are elected representatives put greater effort into monitoring public servants. We also find that public servants expropriate fewer resources when observability is higher; and that community members re-elect monitors who put more

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effort (money) into exposing expropriation. What our results cannot tell us is how observability might decline as we move from professional to community representative monitoring due to the change in the capacity to monitor in real contexts. This notwithstanding, the strength of the 'democracy effect' is worthy of note by those interested in policy in this area.

Finally, our experimental design allows us to explore the effect of a particular type of personal or intrinsic motivations By framing the game we endeavoured to activate any context- or profession-specific behavioural norms. We observe no effect resulting from this framing in either mean monitoring or mean expropriating behaviour. This suggests that there is no commonly shared context-specific or professional culture of caring pertaining to our subject pool. However, framing did significantly increase the variance in both monitoring and expropriating behaviour. This suggests that different subject sub-groups were variably motivated by the invoked context. As part of our ongoing work programme we are endeavouring to identify these sub-groups.

References

Abbink, K. 2002a. "Fair Salaries and the Moral Costs of Corruption." Working Paper 2002-5, Centre for Decision Research and Experimental Economics, Nottingham University, United Kingdom.

Abbink, K. 2002b. "Staff Rotation: A Powerfull Weapon Against Corruption?" Working Paper 2002-4, Centre for Decision Research and Experimental Economics, Nottingham University, United Kingdom.

Abbink, K., B. Irlenbusch, and E. Renner. 2002. "An Experimental Bribery Game." *Journal of Law, Economics and Organization*, 18:2, pp. 428-54.

Ablo, E. Y. and R. Reinikka. 1998. "Do budgets really matter? : evidence from public spending on education and health in Uganda." World Bank Africa Region Macroeconomics 2.

Andvig, J. C. and Fljelstad. 2001. "Corruption: A Review of Contemporary Research." Chr. Michelsen Institute: CMI report R 2001:7.

Arrow, K. J. 1963. "Uncertainty and the Welfare Economics of Medical Care." *American Economic Review.*

Azfar, O. and W. R. J. Nelson. 2002. "Transparency, wages, and the separation of powers: An experimental analysis of the causes of corruption." Processed.

Banfield, E. C. 1979. "Corruption as a feature of government organization," in *Corruption in Sub-Saharan Africa: Towards a Search for Causes and Consequences*. Ekpo ed. Washington DC: University Press of America.

Bardhan, P. 1997. "Corruption and development: A review of issues." *Journal of Economic Literature*, XXXV:September, pp. 1320-46.

Barnum, H. N., J. Kutzin, and H. Saxenian. 1995. "Incentives and Provider Payment Methods." *International Journal of Health Planning and Management*, 10, pp. 23-45.

Becker, G. S. and G. J. Stigler. 1974. "Law enforcement, malfeasance, and the compensation of enforcers." *Journal of Legal Studies*, 3:1, pp. 1-18.

Besley, T. and J. McLaren. 1993. "Taxes and bribery: the role of wage incentives." *The Economic Journal*, 103:416, pp. 119-41.

Bohnet, I., B. S. Frey, and S. Huck. 2001. "More order with less law: On contract enforcement, trust, and crowding." *American Political Science Review*, 95, pp. 131-44.

Cardenas, J. C. 2003. "Bringing the Lab to the Field: More than Changing Subjects." *mimeo*.

Cardenas, J. C., J. Stranlund, and C. Willis. 2000. "Local Environmental Control and Institutional Crowding-Out." *World Development*, 28:10, pp. 1719-33.

Chaix-Couturier, C., I. Durand-Zaleski, D. Jolly, and P. Durieux. 2000. "Effects of financial incentives on medical practice: results from a systematic review of the literature and methodological issues." *Int J Qual Health Care*, 12:2 (April), pp. 133-42.

Chand, S. K. and K. O. Moene. 1999. "Controlling fiscal corruption." *World Development*, 27:7, pp. 1129-40.

Chiappori, P. A. and B. Salanie. 2002. "Testing Contract Theory: A Survey of Some Recent Work." *CESIFO Working Paper*, 738.

Deci, E. L. 1975. *Intrinsic Motivation*. New York: Plenum Press.

Dixit, A. 1997. "Power of incentives in private vs public organisations." *American economic Review Papers and Proceedings*, 87:2.

Dixit, A. 2001. "Incentives and Organizations in the Public Sector: An Interpretative Review." Processed.

Ensor, T. and A. Duran-Moreno. 2002. "Corruption as a challenge to effective regulation in the health sector," in *Regulating Entrepreneurial Behaviour in European Health Care Systems*. Saltman, Busse and Mossialos eds: Open University Press.

Ensor, T. and S. Witter. 2001. "Health economics in low income countries: adapting to the reality of the unofficial economy." *Health Policy*, 57:1, pp. 1-13.

Fehr, E. and A. Falk. 2002. "Psychological Foundations of Incentives." *European Economic Review*, 46:4-5, pp. 687-724.

Fehr, E. and S. Gachter. 2000. "Fairness and Retaliation: The Economics of Reciprocity." *Journal of Economic Perspectives*, 14:3, pp. 159-81.

Ferrinho, P. and W. Van Lerberghe eds. 2000. *Providing Health Care Under Adverse Conditions: Health Personnel Performance and Individual Coping Strategies*. Antwerp: ITGPress.

Ferrinho, P. and W. Van Lerberghe. 2002. "Managing Health Professionals in the Context of Limited Resource: a Fine Line Between Corruption and the Need for Moonlighting." Unpublished manuscript.

Ferrinho, P., W. Van Lerberghe, M. R. Julien, E. Fresta, A. Gomes, F. Dias, A. Goncalves, and B. Backstrom. 1998. "How and why public sector doctors engage in private practice in Portuguese-speaking African countries." *Health Policy Plan*, 13:3, pp. 332-8.

Fisman, R. and R. Gatti. 2000. "Decentralization and Corruption." World Bank: Policy Research Working Paper No. 2290.

Franco, L. M., S. Bennett, and R. Kanfer. 2002. "Health sector reform and public sector health worker motivation: a conceptual framework." *Social Science and Medicine*, 54, pp. 1255-66.

Frank, B. and G. G. Schultze. 2000. "Does economics make citizens corrupt?" *Journal of Economic Behavior and Organization*, 43, pp. 101-13.

Frey, B. S. 1997. "On the relationship between intrisic and extrinsic work motivation." *International Journal of Industrial Organization*, 15, pp. 427-39.

Glaeser, E. L. and A. Shleifer. 2001. "Not-for-profit entrepreneurs." *Journal of Public Economics*, 81:99-115.

Goddard, M., R. Mannion, and P. Smith. 2000. "Enhancing Performance in Health Care: Theoretical Perspectives on Agency and the Role of Information." *Health Economics*, 9, pp. 95-107.

Gosden, T., L. Pederson, and D. Torgerson. 1999. "How Should We Pay Doctors? A Systematic Review of Salary Payments and their Effect on Doctor Behaviour." *Quarterly Journal of Medicine*, 92, pp. 47-55.

Harrison, G. W. and J. A. List. 2003. "What Constitues a Field Experiment in Economics?" *mimeo*.

Henrich, J., R. Boyd, S. Bowles, C. Camerer, E. Fehr, H. Gintis, and R. McElreath. 2001. "In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies." *American Economic Review*, 91:2, pp. 73-78.

Khalil, F. and J. Lawarree. 1995. "Collusive auditors." *American Economic Review*, 1995:May, pp. 442-46.

Killingsworth, J. R., N. Hossain, Y. Hedrick-Wong, S. D. Thomas, A. Rahman, and T. Begum. 1999. "Unofficial fees in Bangladesh: price, equity and institutional issues." *Health Policy Plan*, 14:2, pp. 152-63.

Klitgaard, R. 1988. *Controlling Corruption*. Berkeley: University of California Press.

Kreps, D. M. 1997. "Intrinsic Motivation and Extrinsic Incentives." *American Economic Review*, 87:2, pp. 359-64.

Lindelow, M. and P. Serneels. 2003. "Health workers in Ethiopia: findings from focus group research and expert interviews." Processed.

Lindenberg, S. 2001. "Intrinsic Motivation in a New Light." *Kyklos*, 54, pp. 317-42.

Manor, J. 1999. *The Political Economy of Democratic Decentralization*. Washington DC: The World Bank.

Martinez, J. and T. Martineau. 1998. "Rethinking human resources: an agenda for the millennium." *Health Policy Plan*, 13:4, pp. 345-58.

McPake, B., A. Asiimwe, F. Mwesigye, M. Ofumbi, L. Orthenblad, P. Streefland, and A. Turinde. 1999. "Informal economic activities of public health workers in Uganda: implications for quality and accessibility of care." *Social Science and Medicine*, 49:4, pp. 849-65.

Mills, A. 1997. "Improving the Efficiency of Public Sector Health Services in Developing Countries: Bureaucratic versus Market Approaches," in *Marketizing education and health in developing countries: Miracle or mirage?* Colclough ed. Oxford and New York: Oxford University Press, pp. pages 245-74.

Mookherjee, D. and I. P. L. Png. 1995. "Corruptible law enforcers: how should they be compensated." *Economic Journal*, 105:January, pp. 149-59.

Nagin, D. S., J. B. Rebitzer, S. Sanders, and L. J. Taylor. 2002. "Monitoring, Motivation, and Management: The Determinants of Opportunistic Behavior in a Field Experiment." *American Economic Review*, 92:4, pp. 850-73.

Pauly, M. V. 1987. "Nonprofit Firms in Medical Markets." *American Economic Review*, 77:2, pp. 257-62.

Prud'homme. 1995. "The dangers of decentralization." *World Bank Research Observer*, pp. 201-20.

Rauch, J. E. and P. B. Evans. 2000. "Bureaucratic structure and bureaucratic performance in less developed countries." *Journal of Public Economics*, 75, pp. 49-71.

Rose-Ackerman, S. 1978. *The Political Economy of Corruption*. New York: Academic Press.

Segall, M. 2000. "Human Development Challenges for Health Care Reform," in *Providing Health Care Under Adverse Conditions: Health Personnel Performance and Individual Coping Strategies*. Ferrinho and Lerberghe eds.

Shleifer, A. and R. W. Vishny. 1993. "Corruption." *Quarterly Journal of Economics*, August, pp. 599-617.

Svensson, J. forthcoming. "Who must pay bribes and how much?: Evidence from a cross-section of firms." *Quarterly Journal of Economics*, 118.

Tendler, J. 1997. *Good government in the tropics.* Baltimore ; London: Johns Hopkins University Press.

Treisman, D. 2000. "The causes of corruption: a cross-national study." *Journal of Public Economics*, 76, pp. 399-457.

Van Rijckeghem, C. and B. Weder. 2001. "Bureaucratic Corruption and the Rate of Temptation: Do Wages in the Civil Service Affect Corruption, and by How Much?" *Journal of Development Economics*, 65:2, pp. 307-31.

Wilson, J. Q. 1989. *Bureaucracy : what government agencies do and why they do it.* [New York]: Basic Books.

Table and Figures

TABLE 1

THE STRUCTURE OF THE GAME

Monitor is randomly selected	Monitor is a community representative
1. Health worker selected using 8-sided die	Health worker selected using 8-sided die
2. Monitor selected using 8-sided die	2 candidates for monitor selected using 8-sided die and community votes to elect one
3. Health worker rolls a 6-sided die to determine the number of valuable tiles (resources) she gets	Health worker rolls a 6-sided die to determine the number of valuable tiles (resources) she gets
4. Health worker decides how many valuable tiles to keep	Health worker decides how many valuable tiles to keep
5. Monitor states how many tiles (0 to 4) he is going to turn in order to try and expose a valuable tile (resources) that the health worker has kept. Then he turns	Monitor states how many tiles (0 to 4) he is going to turn in order to try and expose a valuable tile (resources) that the health worker has kept. Then he turns
6. If the monitor exposes a valuable tile, the health worker looses all the valuable tiles he has kept, and is excluded from being HW in the next round	If the monitor exposes a valuable tile, the health worker looses all the valuable tiles he has kept, and is excluded from being HW in the next round
7. Six tiles including all the valuable tiles that the health worker has not kept are randomly distributed to the six community members	Six tiles including all the valuable tiles that the health worker has not kept are randomly distributed to the six community members
8. If incumbent HW is exposed, start again at 1. If incumbent HWs' numbers come up, roll again. If incumbent HW not exposed, select HW for next round using 14-sided spinner - incumbent remains if own number or 'incumbent' comes up.	If incumbent HW is exposed, roll 8-sided die to select new HW. If incumbent HWs' or monitor's numbers come up, roll again. If incumbent HW not exposed, select HW for next round using 14-sided spinner - incumbent remains if own number or 'incumbent' comes up. If incumbent monitor's number comes up, spin again
9. Continue at 3.	Incumbent monitor faces reelection. Roll 8-sided die to select the other candidate. Continue at 2.

TABLE 2

EXPERIMENTAL DESIGN: SESSIONS

Session number	Abstract or framed	Monitor selection	Observability		Health worker wage
			rounds 1 - 6	rounds 7 - 12	
1	Abstract	Random	Low (18 tiles)	High (10 tiles)	Low (20 Birr)
2	Abstract	Random	Low (18 tiles)	High (10 tiles)	High (60 Birr)
3	Abstract	Random	High (10 tiles)	Low (18 tiles)	Low (20 Birr)
4	Abstract	Random	High (10 tiles)	Low (18 tiles)	High (60 Birr)
5	Abstract	Representative	Low (18 tiles)	High (10 tiles)	Low (20 Birr)
6	Abstract	Representative	Low (18 tiles)	High (10 tiles)	High (60 Birr)
7	Abstract	Representative	High (10 tiles)	Low (18 tiles)	Low (20 Birr)
8	Abstract	Representative	High (10 tiles)	Low (18 tiles)	High (60 Birr)
9	Framed	Random	Low (18 tiles)	High (10 tiles)	Low (20 Birr)
10	Framed	Random	Low (18 tiles)	High (10 tiles)	High (60 Birr)
11	Framed	Random	High (10 tiles)	Low (18 tiles)	Low (20 Birr)
12	Framed	Random	High (10 tiles)	Low (18 tiles)	High (60 Birr)
13	Framed	Representative	Low (18 tiles)	High (10 tiles)	Low (20 Birr)
14	Framed	Representative	Low (18 tiles)	High (10 tiles)	High (60 Birr)
15*	Framed	Representative	High (10 tiles)	Low (18 tiles)	Low (20 Birr)
16*	Framed	Representative	High (10 tiles)	Low (18 tiles)	High (60 Birr)

* - Planned but not implemented (see text).

TABLE 3:

REGRESSION ANALYSIS OF VOTES FOR INCUMBENT MONITORS

	Coef.	s.e.		Coef.	s.e.		Coef.	s.e.	
Constant	0.710	0.222	**	0.710	0.223	**	0.635	0.157	***
Tiles turned	0.408	0.077	***	0.417	0.093	***	0.435	0.073	***
Resources exposed				-0.035	0.184				
Wage high							-0.396	0.282	
Observability high							0.341	0.246	
Abstract							0.086	0.266	
Observations	88			88			88		
R-squared	0.129			0.129			0.173		

Notes: Standard errors are corrected for heteroscedasticity using the cluster command in Stata with reference to the session within which the round was played.

TABLE 4

MONITORING OF 'PUBLIC SERVICE PROVIDERS'

Tiles turned…	n	Mean	Standard dev.
Full sample	192	1.28	1.13
Monitor randomly selected	96	0.72	0.79
Monitor elected	96	1.84	1.14
Observability high	96	1.28	1.19
Observability low	96	1.28	1.07
Wage low	96	1.04	1.09
Wage high	96	1.52	1.11
Abstract	96	1.30	0.96
Framed	96	1.26	1.28

TABLE 5

REGRESSION ANALYSIS OF MONITORING OF 'PUBLIC SERVICE PROVIDERS'

Dependent variable = number of tiles turned by monitor				
	Coef.	s.e.	Coef.	s.e.
Constant	0.480	0.221 **	0.672	0.260 **
Resource	-0.005	0.035	-0.004	0.035
Monitor elected (E)	1.125	0.217 ***	0.839	0.276 ***
Wage high	0.478	0.214 **	0.479	0.214 **
Observability high (OH)	0.000	0.137	-0.271	0.161
Abstract	0.042	0.219	0.042	0.219
Round (continuous)	-0.001	0.017	-0.010	0.016
E x OH			0.572	0.247 **
Observations	192		192	
R-squared	0.296		0.311	

Notes: Standard errors are corrected for heteroscedasticity using the cluster command in Stata with reference to the session within which the round was played. The round counter was included in these regressions to control for order effect. No such effects were found.

TABLE 6

RESOURCES RETAINED BY 'PUBLIC SERVICE PROVIDERS'

Tiles retained	n	Mean	Standard dev.
Full sample	192	1.61	1.34
Monitor randomly selected	96	1.96	1.35
Monitor elected	96	1.27	1.24
Observability high	96	1.36	1.21
Observability low	96	1.86	1.42
Wage low	96	1.90	1.36
Wage high	96	1.33	1.26
Abstract	96	1.66	1.19
Framed	96	1.57	1.47

TABLE 7

REGRESSION ANALYSIS OF TILES RETAINED BY 'PUBLIC SERVICE PROVIDERS'

Dependent variable = tiles retained by provider

	Coef.	s.e.	
Constant	0.831	0.240	***
Resource	0.413	0.037	***
Monitor elected	-0.683	0.177	***
Wage high	-0.489	0.175	**
Observability high	-0.506	0.115	***
Abstract	0.027	0.177	
Round (continuous)	0.035	0.020	*
Observations	192		
R-squared	0.428		

Notes: Standard errors are corrected for heteroscedasticity using the cluster command in Stata with reference to the session within which the round was played.
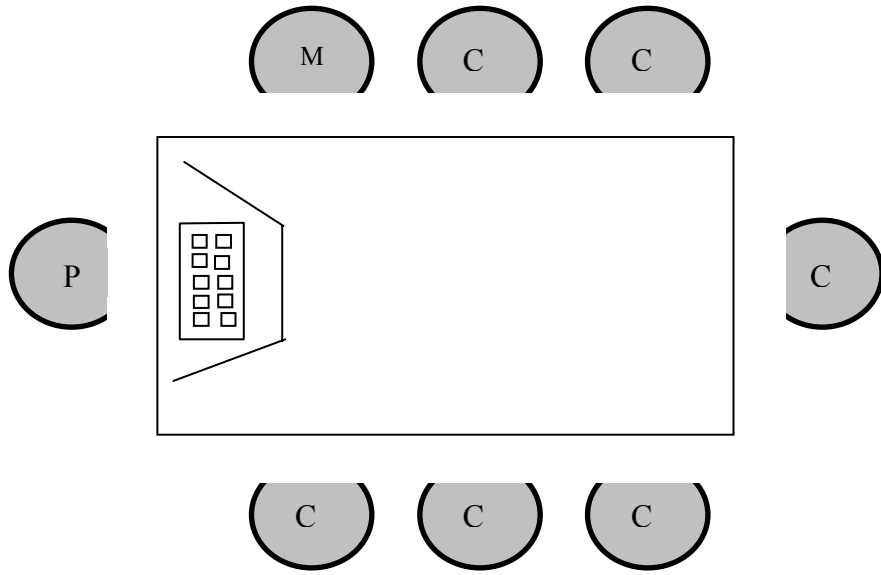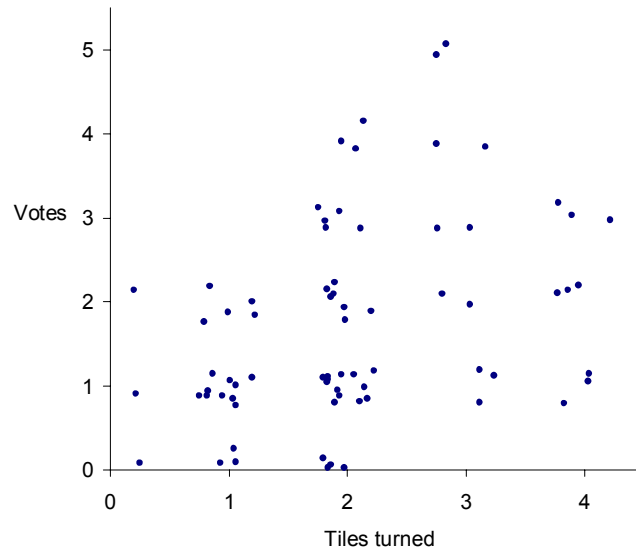
FIGURE 1

SEATING PLAN

FIGURE 2

VOTES AND MONITORING EFFORT

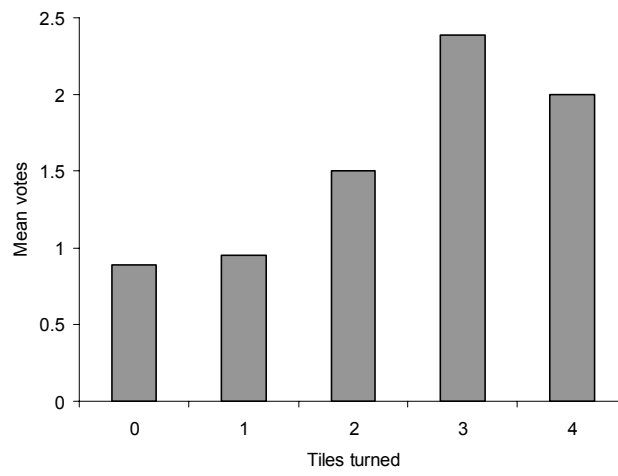### MONITORING OF 'PUBLIC SERVICE PROVIDERS'

FIGURE 2

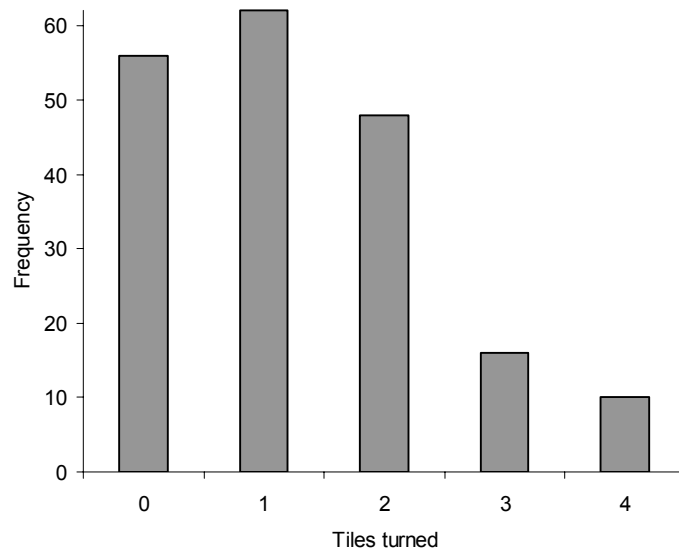**MONITORING OF 'PUBLIC SERVICE PROVIDERS'**

FIGURE 3

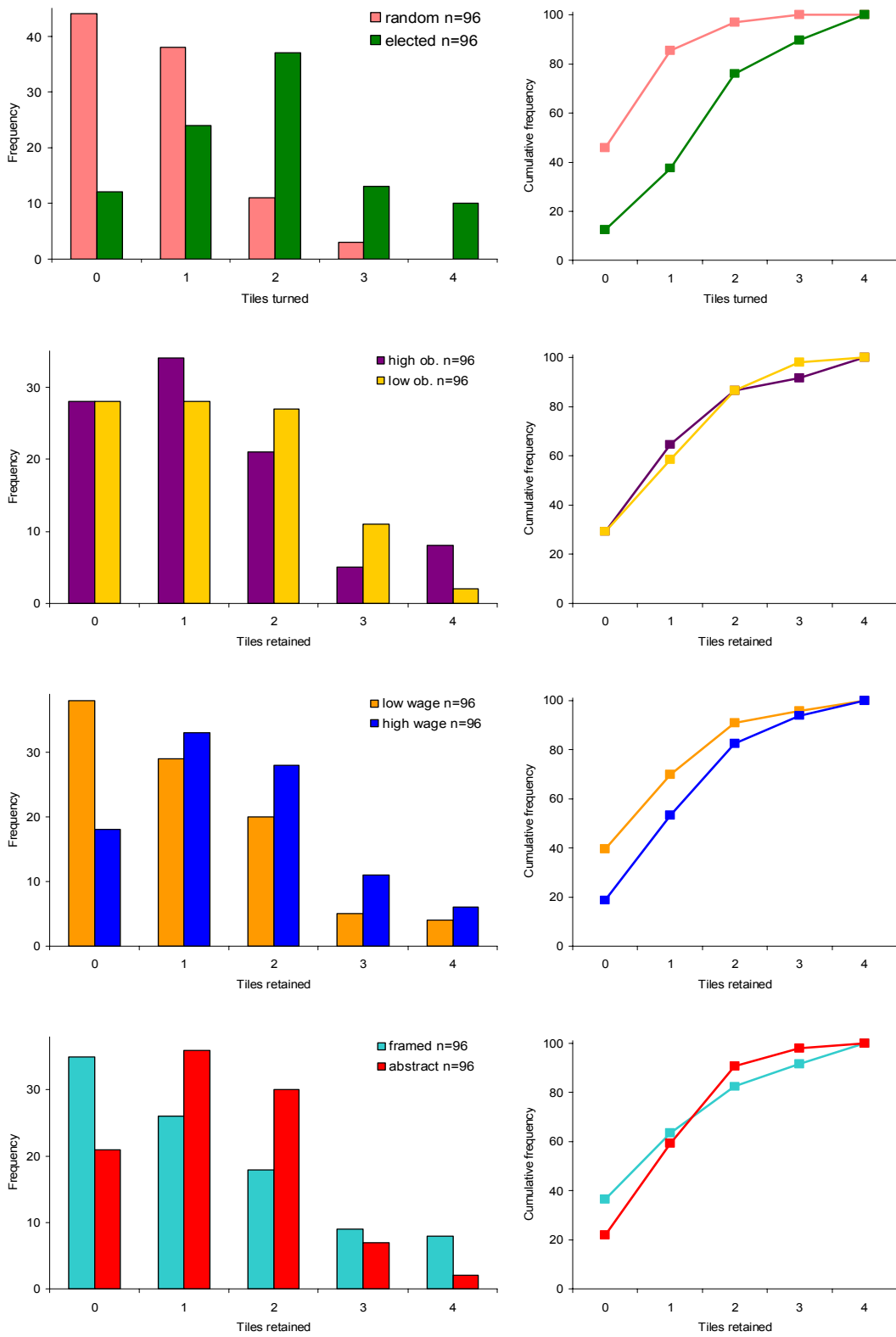## MONITORING OF 'PUBLIC SERVICE PROVIDERS' UNDER DIFFERENT TREATMENTS

FIGURE 4

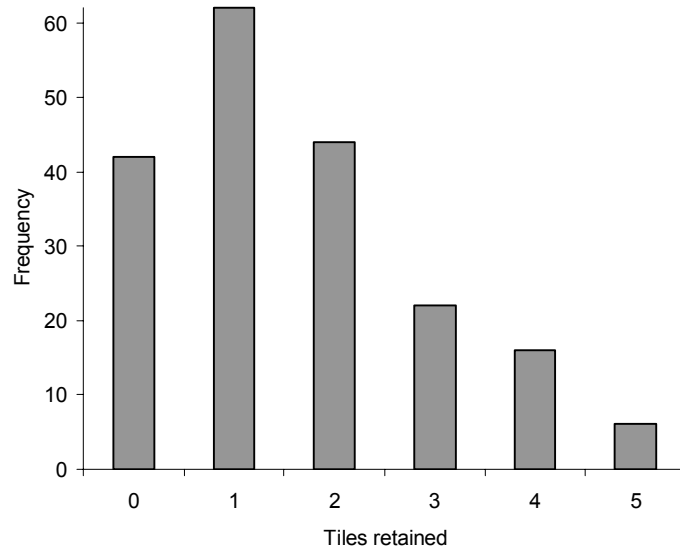## RESOURCES RETAINED BY PUBLIC SERVICE PROVIDERS

FIGURE 5

RESOURCES RETAINED BY 'PUBLIC SERVICE PROVIDERS' UNDER DIFFERENT TREATMENTS