MUNI
ECON

WORKING PAPER

The Effects of Staff-rotation in Public Administration on the Decision to Bribe or be Bribed

Miloš Fišar
Masaryk University

Ondřej Krčál
Masaryk University

Rostislav Staněk
Masaryk University

Jiří Špalek
Masaryk University

Contact: milos.fisar@econ.muni.cz

MUNI ECON Working Paper n. 2019-01

Masaryk University, Faculty of Economics and Administration
Lipová 41a, 602 00 Brno, Czech Republic

Citation:
Fišar, M., Krčál, O., Staněk, R.,Špalek, J. 2019. *The Effects of Staff-rotation in Public Administration on the Decision to Bribe or be Bribed*. MUNI ECON Working Paper n. 2019-01. Brno: Masaryk University.

econ.muni.cz **ISSN 2571-130X**

The effects of staff-rotation in public administration on the decision to bribe or be bribed

Miloš Fišar* Ondřej Krčál† Rostislav Staněk‡ Jiři Špalek§

February 6, 2019

Abstract

Periodic rotation of staff in public administration may lead to lower corruption, as it disrupts long-term relationships between public officials and potential bribers. This paper proposes an experimental design that tests the anti-corruption effect of staff rotation in situations where public officials have committed to reciprocating bribes. We find that staff rotation does not influence the proportion of firms offering bribes but does reduce the share of bribe acceptance and inefficient decisions owing to bribery. The outcome of the staff-rotation treatment, in which firms offered bribes even though they were rarely accepted by officials, is consistent with the game having a quantal response equilibrium.

Keywords: bribery, economic experiment, anti-corruption, staff rotation, corruption

JEL-Classification: D73, D91

* Department of Public Economics, Masaryk University. Email: milos.fisar@econ.muni.cz
† Department of Economics, Masaryk University. Email: ondrej.krcal@econ.muni.cz
‡ Department of Economics, Masaryk University. Email: rostislav.stanek@econ.muni.cz
§ Department of Public Economics, Masaryk University. Email: jiri.spalek@econ.muni.cz

1 Introduction

Corruption and especially bribery is a prevelent issue in any country it the world. As the Internationally Monetary Fund estimates, the costs of corruption are equivalent to 2 percent of the global GDP (Gaspar and Hagan, 2016).

This paper studies *staff rotation* - a periodical rotation in work positions of public employees to break long-term corrupt relationships between public officials and potential bribers and, as a consequence, reduce corruption. We replicate original bribery study by Abbink (2004). Abbink models situations where a firm bribes a public official in order to manipulate a decision in its favor. The timing of the game is as follows: (i) the briber(the firm) decides whether to offer a bribe. If the bribe is offered, the official can accept or reject it. (ii) The public official chooses an honest or a manipulated option.

Abbink models the staff rotation as a one-shot game where the briber and the public officials are paired for only one period. In this treatment, the official maximizes her pay-off by accepting the bribe offered by the firm while simultaneously choosing the ”honest” option that is not manipulated in favor of the firm. Since the official would choose the honest option even if no bribe is offered, the best response of the firm is not to offer any bribes. On the other hand, the situation without staff rotation is modeled as a repeated interaction between the same firms and government officials. Here, it makes sense for the official to choose the manipulated version in order to motivate the firm to keep offering bribes in future. This theoretical intuition is confirmed by the Abbink's experiment that finds that staff rotation reduces both the levels of bribes and the frequency of manipulated decisions.

These findings rest on the assumption that the official can accept the bribe and simultaneously choose the honest option. However, in situations where the decision makers receive the bribe only if they reciprocate by choosing the manipulated option, Abbink's framework cannot be used as a rationale for implementing staff rotation. This includes all situations in which the bribe, or a significant part of it, is handed over only after the official provides the corrupt service. Similarly, if the officials deal with the same firm several times before they rotate to different positions, a significant part of the bribes from the repeated interaction can be expected to arrive

after the first choice between the honest and manipulated option. Hence, the total amount of bribes is not independent of whether the official reciprocates. In addition, many of the corrupt services are provided directly against a bribe payment; thus, it is difficult for the official not to provide the service.

This paper concentrates on the efficiency of staff rotation in situations where public officials are committed to reciprocate the bribe. In our design, the official may accept, return, or report the bribe. If the bribe is accepted, the official automatically choose the manipulated option. On the other hand, returning or reporting the bribe automatically leads to the honest option. As in Abbink (2004), each firm interacts with a different official in every period in the staff-rotation treatment, while the matched option remains the same in all periods in the control treatment.

The results of our experiment are influenced by two important features of the payoff structure. First, to motivate officials to select the honest option, we set their payoff if they report the bribe above the payoff if they accept the bribe. This means that the official receives a reward for reporting, which is always higher than the bribe. While the experimental subjects were motivated exclusively by monetary payoffs, it is difficult to imagine that the real-life officials receive a monetary reward that is higher than the bribe. In reality, the decisions to report bribes are also probably based on other motives: the official might have a good feeling that she did the right thing; she might enjoy a higher status at the work place, and a significant part of the reward might come from better prospects of being promoted and so forth.

Second, if a firm decides to offer a bribe and if the bribe is reported by the official, there is only a 1% probability that the firm is convicted and looses all its payoffs. If the firm is not convicted, its payoff is very similar to the situation where no bribe was offered, as the firm keeps the offered bribe and pays only a small transaction cost for the bribe. On the other hand, if the bribe is accepted, there is zero probability of being convicted, and the payoff of the firm is significantly higher than if no bribe is offered. We believe that this payoff structure reflects a common situation where it is unlikely that the public official can produce legal evidence leading to conviction. Thus, we test the anti–corruption effects of staff rotation under adverse conditions where governments fail to punish most corrupt behavior.

The results confirm the anti–corruption effect of staff-rotation. Officials in the staff-rotation

treatment report more and accept less of the offered bribes, so the manipulated option is selected less frequently. Interestingly, staff rotation has no impact on the share of firms that offer bribes. This is slightly surprising since the probability of being reported is significantly higher under staff rotation.

While the result of the staff rotation treatment differs from the subgame-perfect equilibrium of the game, it is consistent with a quantal response equilibrium where some of the bribes are accepted although it is not the optimal choice for officials. In sum, the paper finds that staff rotation leads to a less corrupt outcome even if the bribers cannot be sufficiently penalized and even if their choices are largely independent of officials' reactions.

The proposed design gives similar theoretical predictions as in Abbink (2004). In a one shot-game, the official reports any bribes, which leads do zero corruption by the firm. If the same pairs of participants play the game repeatedly, accepting bribes might be a rational strategy, as it motivates bribes in future interactions. The choices of officials correspond to expectations: staff rotation increases reporting and reduces accepting of bribes. Contrary to theoretical predictions and to findings by Abbink (2004), the frequency and the size of the bribes offered by firms remain similar between treatments. This surprising behavior likely results from payoffs if the bribe is reported and if no bribe is offered that are so similar, which is the same share of firms (the corrupt firms) that might want to continue offering bribes even if the probability of being accepted is lower. The result of the staff-rotation treatment is consistent with a quantal response equilibrium where some of the bribes are accepted although it is not the optimal choice for the officials. In sum, the paper finds that staff rotation leads to a less corrupt outcome even if the bribers cannot be sufficiently penalized and even if their choices are largely independent of the officials' reactions.

The rest of the paper is organized as follow. Section 2 provides the theoretical model that motivates our experimental design and presents the experimental procedures. Section 3 discusses the results. Section 4 concludes the paper.

2 Experimental design and procedures

Our paper presents replication of a bribery game design by Abbink (2004) with two substantial changes: (i) we assume that the public official is committed to choose the manipulated option after the bribe is accepted; (ii) we allow the public official to blow the whistle and report the bribe. The whistleblowing is then honoured with a the reward that is always higher than the bribe.

With this model design, we study a different effects of staff rotation. In Abbink's design, the absence of staff rotation creates incentives to reciprocate the bribe; in our design, the absence of staff rotation creates incentives not to report the bribe.

2.1 Model

Formally, the model is a sequence of two-stage sequential games. In each period, the firm is matched with the public official. They play the game with the following timing.

1. In the first stage, the firm chooses whether to offer a bribe to the public official. If the firm does not offer a bribe, the game ends. The firm and the official obtain basic payoffs m_f and m_o, respectively. If the firm decides to offer a bribe, it has to specify the exact amount b from the interval $[0, \bar{b}]$. When the bribe is offered, the firm always has to pay transaction cost t.

2. In the second stage, the official decides whether to accept the bribe, to reject the bribe, or to reject and report the bribe. Let us denote these actions as A, E, and R, respectively. If the bribe is accepted, then the public official gets her basic payoff plus the bribe accepted. The firm gets a premium α, as we suppose that the bribe has to be reciprocated by the public official who provides a favor to the firm. Moreover, the acceptance of the bribe imposes an negative externality on all other members of society. Namely, the amount e is deducted from the payoff of each player. The payoffs of the official Π_o and of the firm Π_f can be written as follows:

$$\Pi_o(b, A) = m_o + b - ne \tag{1}$$

$$\Pi_f(b, A) = m_f - b + \alpha - ne - t \tag{2}$$

where n is the number of public officials who accept the bribe.

When the official rejects the bribe, the transaction is not completed, the official gets her basic payoff, and the firm receives its basic payoff less the transaction costs. The payoffs are

$$\Pi_o(b, E) = m_o - ne \tag{3}$$

$$\Pi_f(b, E) = m_f - ne - t \tag{4}$$

When the official reports the bribe, a lottery takes place. With probability p, the bribery is revealed (prosecuted), and the firm is punished, which means that it receives payoff $z < 0$. With probability $1 - p$, the firm is not punished, and its payoff is the same as that in the case that the bribe is rejected but not reported. Irrespective of whether the corruption is punished, the public official receives a reward β for reporting the bribe. The reward is larger than bribe $\beta > b$. The payoffs are therefore given as follows:

$$\Pi_o(b, R) = m_o + \beta - ne \tag{5}$$

$$\Pi_f(b, R) = (1 - p)(m_f - ne - t) + pz \tag{6}$$

2.1.1 Equilibrium

We consider two versions of the model: with and without staff rotation. If there is staff rotation, then each firm interacts with a different official in each round. This corresponds to the one-shot game between the firm and the official in the given match. In the version without staff rotation, each firm interacts with the same official in each round. This corresponds to the repeated game.

Consider first the staff rotation version of the model. The subgame perfect equilibrium of the model can be found by backward induction. First, consider the subgame after the firm offers bribe $b > 0$. The official decides among accepting, rejecting, and reporting the bribe. Hence, she compares three different payoffs (1), (3), and (5). Obviously, any bribe is always reported

by the official as $\beta > b > 0$. Given the best response of the offical, the firm decides not to offer any bribe because its payoff from not offering the bribe $\Pi_f(0, R) = m_f$ is higher than the payoff from offering positive bribe $\Pi_f(b, R) = (1-p)(m_f - t) + pz$. This discussion results in the following proposition.

Proposition: In the one-shot bribery game, there is a unique subgame perfect equilibrium $(0, R)$, i.e., the official always reports the bribe if it is offered and if the firm does not offer any bribe.

The absence of staff rotation turns the one-shot game into a repeated game. Consider, therefore, the situation in which firms interact with the same official repeatedly. As is common in repeated games, there may be multiple equilibria. To show that there exists a bribery equilibrium, where a positive bribe isoffered and accepted, consider, for example, the pair of the following grim-trigger strategies. In the first period, the firm offers some bribe $b^* > 0$, and it continues to do so unless the public official reports or rejects the bribe. After any history when the bribe is not accepted, the firm does not offer the bribe, i.e., $b^* = 0$. The public official accepts the bribe in the first period, and she behaves in the same way after the history when the bribe $b > b^*$ was offered in each period. After any other history, the official reports the bribe. This pair of strategies supports a bribery equilibrium because the sufficiently patient public official is deterred from reporting the bribe and exploiting her short-term payoff by the punishment that no other bribe will be offered in the future. This result is summarized in the following proposition.

Proposition: In the infinitely repeated bribery game, there exists a subgame perfect equilibrium that supports the outcome (b^*, A) in which some positive amount of bribe b^* is offered, and this amount is accepted.

Moreover, the folk theorem states that any payoff profile that ensures that the firm's average discounted payoff is at least $m_f - ne$ and that the official's average discounted payoff is at least $m_o - ne$ can be supported as an equilibrium. It follows from the folk theorem that the specific bribe level cannot be determined. Any bribe level that satisfies the condition $b \in [e, \alpha - t - e]$ can be supported as an equilibrium bribe level.

The prediction of the model can be summarized as follows. In an infinitely repeated game where the staff does not rotate and where firms and officials form fixed pairs during the entire

game, there exist a subgame perfect equilibria in which firms offer bribes and officials accept them. On the other hand, there is a unique subgame perfect equilibrium in a one-shot game when firms are matched with different officials in every round. In this subgame perfect equilibrium, the official reports the bribe, and the firm therefore offers no bribes. The above-mentioned predictions lead us to the formulation of the following hypotheses:

Hypothesis 1. *Introducing staff rotation decreases the frequency of bribe offers.*

Hypothesis 2. *In the staff rotation setting, public officials do not reciprocate bribe offers and report misconduct behavior more often in comparison with a no rotation situation.*

2.2 Procedures

In our game, two types of agents interact: a firm f and a public official o. The whole experimental monetary unit (EMU) is used and is exchanged into Czech crowns at the end of the experiment. Both firms and officials are given an initial endowment of 50 EMU at the beginning of each period, i.e., $m_f = m_o = 50$. The period is divided into two stages:

1. In the first stage, the firm may offer a bribe $b = (0, 45)$. It also has to pay transaction cost $t = 5$ when the positive amount is offered. If the firm does not offer the bribe, the period ends, and both roles keep their initial endowment minus the negative externality of $0.025n$. The payoffs are $\Pi_f(0) = \Pi_o(0) = 50 - 0.025n$.

2. In the second stage, the public official reacts to the offered bribe b. The official has three choices: accept A, return E, or report R.

   When the bribe is *accepted*, the income of both roles is increased. The official adds the bribe b to his endowment, and the firm receives the premium $\alpha = 100$. The payoffs are $\Pi_f(b, A) = 145 - b - 0.025n$ and $\Pi_o(b, A) = 50 + b - 0.025n$.

If the official decides to *return* the bribe b, then his payoff equals the situation with no bribe offered: $\Pi_o(b, E) = \Pi_o(0) = 50 - 0.025n$. The payoff of the firm reduced by the transaction cost is $\Pi_f(b, E) = 45 - 0.025n$.

When corruption is *reported*, the official receives a reporting reward $\beta = 1.2b$ so that her payoff equals $\Pi_o(b, R) = 50 + 1.2b - 0.025n$. The firm is convicted with a probability $p = 0.01$. If convicted, the firm loses all its income from previous periods. Its payoff is $\Pi_f(b, R) = -\sum_{1}^{p} \Pi_f$). Otherwise, its payoff equals $\Pi_f(b, R) = 45 - 0.025n$.

The game tree for our experiment is summarized in Figure 1.

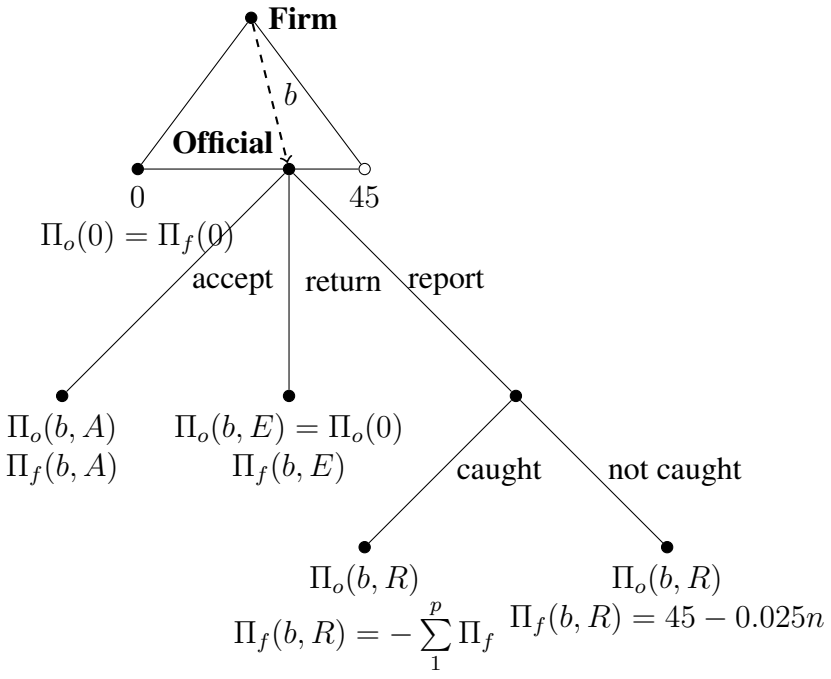


Figure 1: Game tree

We use two treatments to investigate the expected effect of staff rotation. In control treatment T0, both players played together for the entire time, and no rotation occurred. In the staff-rotation treatment T1, each firm was paired with a new official at the beginning of each new period.

The experiment was held at the Faculty of Economics and Administration in 2015. Participants were students of different faculties of Masaryk University. In total, 94 subjects participated

(43.6% male; 40.4% from Faculty of Economics and Administration). There were 4 experimental sessions (2 sessions per treatment), each with 24 subjects, with each session lasting about one hour. The experiment was organized and participants were recruited with the software hroot (**?**). At the beginning of each session, subjects were randomly assigned to their seats as they entered the laboratory. The experiment was programmed and conducted using z-Tree (**?**).

3 Results

This section presents the findings and discusses the results. First, we show the effect of staff rotation on the behavior of public officials and firms. Then, we explain the choices of firms by using a quantal response equilibrium of the one-shot game.

3.1 Effect of staff rotation

Public officials have three actions to choose from once they are offered a bribe: accept, return, or report the bribe. In the control treatment (T0), there exist a subgame perfect equilibrium in which officials accept the bribe, while in the staff-rotation treatment (T1), the subgame prefect equilibrium choice is to report.

Figure 2 shows the observed behavior. As predicted by theory, public officials are more likely to report and less likely to accept the bribe in the staff-rotation treatment, T1. If we discard the results of the first 10 periods to deal with the learning effect apparent in Figure 2, the ratio of accepted bribes in T0 and T1 is 0.68 and 0.27, respectively. Complementary to this, the ratio of reported bribes is 0.24 in T0 and 0.71 in T1. Using the two sample t-test, we found a difference between the treatments for acceptance and for the reporting of bribes to be statistically significant ($p < 0.001$).

According to theory, firms always offer bribes in the control treatment, T0, and never in the staff–rotation treatment, T1. Figure 3 depicts the share of officials who decided to offer a positive bribe for periods 1—30. If the data from periods 1—10 are eliminated, there is no significant difference in the share of firms that offer bribes between the treatments. The frequnecy

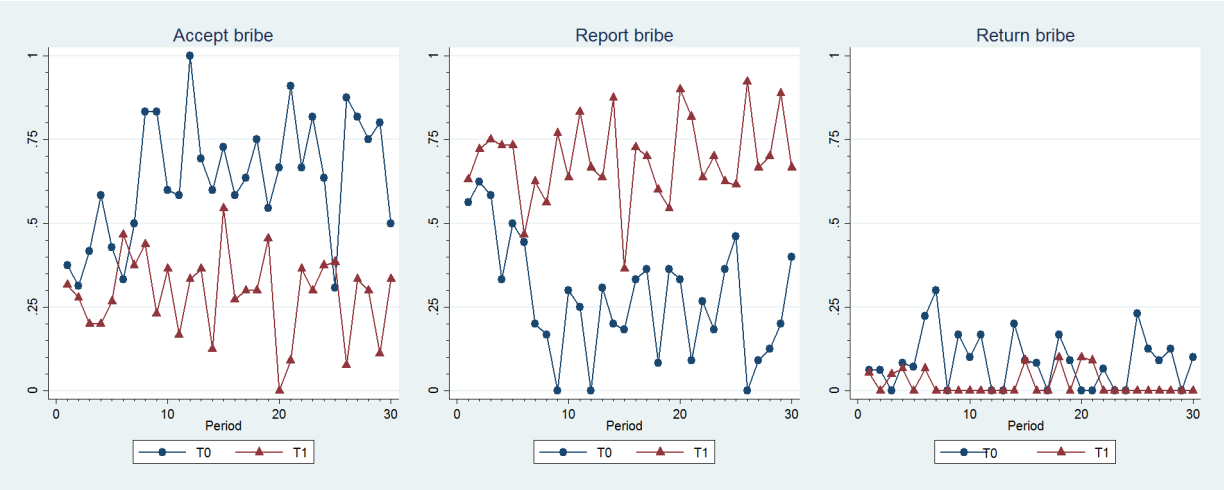


Figure 2: Proportions of public officials choosing to accept, report, or return in periods 1–30.

of bribe offers is 0.48 in T0 and 0.44 in T1. The bribing behavior of firms therefore differs from the SPE predictions. In particular, it is puzzling why the firms in the staff-rotation treatment offer bribes so frequently.

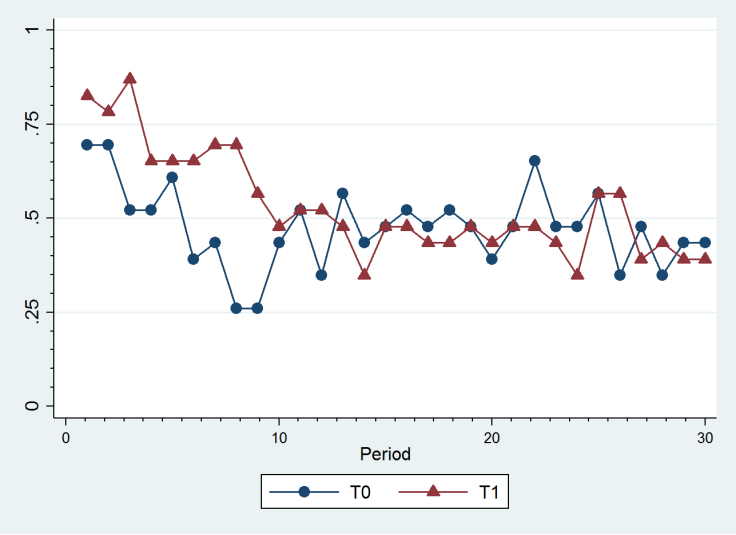


Figure 3: Percentage of firms that offer bribes in periods 1–30.

3.2 Quantal response equilibrium of the one-shot game

The results suggest that staff rotation has an impact on officials' behavior, as they report bribe offers more frequently. On the other hand, firms have not changed their behavior, as they are willing to accept bribes similarly in both treatments. These results can be accounted for by supposing that the players do not always have the best responses, but they still make better choices more frequently.

In this section, we argue that the above findings are consistent with the quantal response equilibrium (QRE) (**?**). QRE is a generalization of the Nash equilibrium that allows for errors in decisions in which pure strategy is in play. QRE players do not always choose the best response with the probability of one, but they still make better choices more frequently. The principle of the equilibrium is maintained in QRE by assuming that the player's beliefs about the opponent's choices and the opponent's choice probabilities have to be consistent. Because of this, the concept of QRE may explain the behavior of the firms in the rotation treatment. Minor deviations from the public official's best response may cause significant changes in the firm's payoffs structure and thus in the firm's behavior, as the firm correctly anticipates the official's choice probabilities.

To illustrate this argument formally, consider the logit variant of the QRE. The firm's behavior is derived as follows. The firm believes that the public official will accept bribe b with probability π_o^a, report the bribe with probability π_o^r, and reject the bribe with probability π_o^e. The firm's expected profit from offering the bribe b is

$$\Pi_f(b) = \pi_o^a \Pi_f(b, A) + \pi_o^r \Pi_f(b, R) + \pi_o^e \Pi_f(b, E) \tag{7}$$

where $\Pi_f(\cdot)$ is the corresponding expected profit of the firm. The probability of the choice to offer bribe π_f^o is specified as a ratio of exponential functions, where $\Pi_f(0)$ is the firm's profit from not offering the bribe.

$$\pi_o^f(b) = \frac{e^{\lambda \Pi_f(b)}}{e^{\lambda \Pi_f(b)} + e^{\lambda \Pi_f(0)}} \tag{8}$$

Parameter λ measures how close is the behavior of the players to the best response prediction.

If $\lambda = 0$, the behavior of the players is completely noisy, and all actions are equally likely regardless of their payoffs. As λ goes to infinity, the choices are close to those dictated by best responses.

The choice probabilities of the official are again defined as a ratio of the exponentials of the payoffs scaled by the parameter λ. In particular, the probability that the official will accept the bribe b is given as follows

$$\pi_o^a(b) = \frac{e^{\lambda \Pi_o(b,A)}}{e^{\lambda \Pi_o(b,A)} + e^{\lambda \Pi_o(b,R)} + e^{\lambda \Pi_o(b,E)}} \tag{9}$$

Figure 4 illustrates how QRE may explain the observed behavior. It depicts the unique equilibrium choice probabilities for a given value of the "noise parameter" λ. The calculation of the choice probabilities is based on two assumptions. It is assumed that the value of the bribe is 36, which is the median value of the bribes observed in the data. It is also assumed that the firms pays a fine equal to 1386, if the firm is convicted of bribery. The value of the fine is equal to the median cumulative payoff observed in the periods 10 to 30.

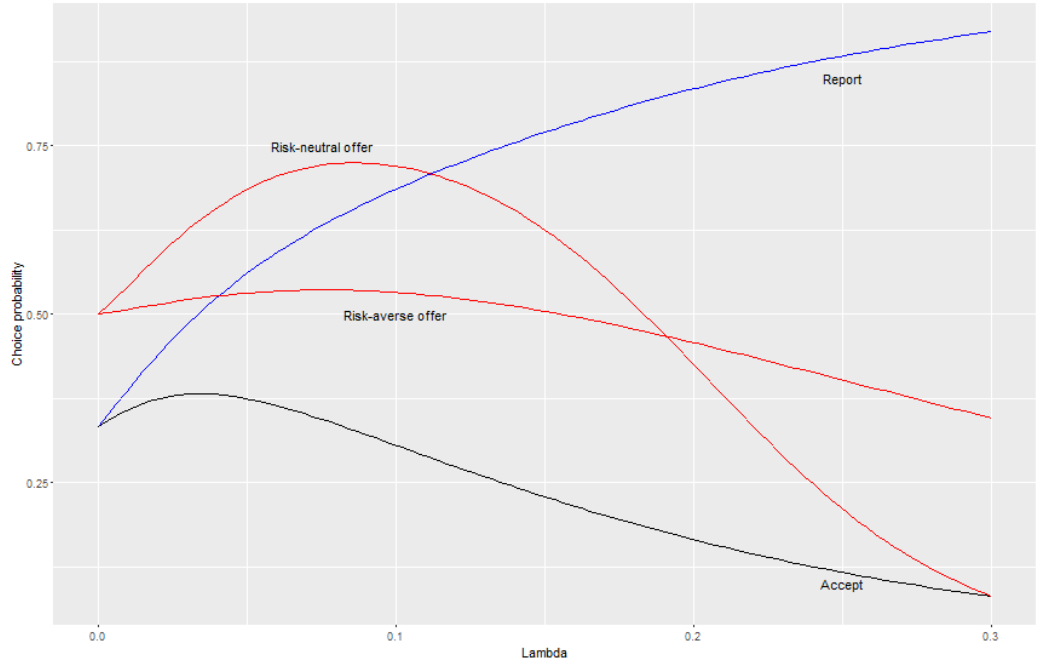


Figure 4: Quantal response equilibrium simulation of the choice probabilities

The impact of the noise parameter on the official's choice probabilities is intuitive. If $\lambda = 0$, the bribe is accepted or reported with the same probability of $\frac{1}{3}$. As λ increases, the probability that the bribe is reported approaches 1 as in the subgame prefect equilibrium. We can see that the choices generated by $\lambda = 0.15$ roughly correspond to the frequnecy of accepted and reported bribes observed in the experiment.

The figure also shows that the predicted probability of bribe offer for $\lambda = 0.15$ is approximately 0.63, which is higher than what we would observe in the experiment. This discrepancy between the simulated and observed bribe offers can be explained from the assumption that the players are risk averse. Suppose that the players have a constant relative risk aversion (CRRA) utility function

$$U(x) = \frac{x^\theta}{\theta},$$

, where $1 - \theta$ is the Arrow-Pratt coefficient of relative risk aversion. The line risk-averse offer in figure 4 shows the probability of offering the bribe for different values of λ and $\theta = 0.8$. We can see that the discrepancy between the predicted and actual choice probabilities disappears when we allow for risk-averse players.

To summarize up to this point, while the subgame prefect equilibrium outcome does not organize the data in the roation treatment well, the combination of QRE and risk aversion is able to do so. Still, the previous calculation relies on the assumption regarding a particular value of the bribe and fine (equal to the cumulative profit). Hence, the next step is to estimate the parameters λ and θ from the observed data. Contrary to the previous simulation excercise, we use actual bribe offers and actual cumulative profits in the estimation. The problem is that we do not observe the value of the bribe when no bribe has been offered. In such cases, we again assume that the bribe would be equal to 36. Table 1 presents the maximum likelihood estimates based on period 10-30. The results are similar to the results depicted in figure 4.

	Estimate	Standard error
λ	0.204	0.022
θ	0.87	0.013

Table 1: Maximum-likelihood estimation

We test that the behavior is not completely random by examining the null hypothesis that the noise parameter λ is zero. The likelihood ratio test statistic for the restricted model is $\chi^2(1) = 208$, which firmly rejects the null hypothesis (p–value < 10^{-8}). We also test the hypothesis whether the subjects are risk neutral by imposing the restriction $\theta = 1$. The likelihood ratio test statistic for this restricted model is $\chi^2(1) = 134$; hence, we reject the hypothesis that the subjects are risk neutral (p–value < 10^{-8}).

The puzzling behavior in the rotation treatment may therefore be explained by the notion of QRE. Although public officials report bribes relatively often, they sometimes accept bribes. Firms corretly anticipate this, and the expected payoff from offering a bribe is therefore higher than the sure payoff from not offering a bribe. Still, firms do not offer bribes all the time, as they also make mistakes and are risk averse.

4 Conclusion

This paper studies the effect of staff rotation on petty corruption. In contrast to the experimental study of Abbink (2004), we assume that public officials are committed to provide corrupt services if they accept bribes. This allows us to study the effect of staff rotation in many situations were Abbink's design without commitment does not seem realistic. In addition, we assume low levels of punishment for the reported bribers: the probability of being convicted and paying a fine if the bribe is reported is only 1%, and the difference between the payoff if no bribe is offered and the bribe is offered and reported, but not convicted, is only a small transaction cost of corruption. We consider these levels of punishment quite realistic in situations with petty corruption. Compared with Abbink (2004), our design provides a test of the efficiency of staff rotation in different conditions. As the levels of punishment for the reported bribers are low, firms are expected to have a low sensitivity to the decisions of public officials. Thus, firms might continue offering bribes even if they are reported more frequently. This design therefore provides a test of staff rotation under adverse conditions.

We find that staff rotation reduces the share of interactions in which public officials accept bribes and therefore leads to less manipulated decision making by public officials. This result

emerges even though staff rotation does not influence the share of firms offering bribes. Staff rotation thus seems to sever the long-term corruption ties and therefore leads to more efficient outcomes, even if the opportunity to accept bribes is the same as that without staff rotation.

Our results suggest that in the never-ending combat against corruption, periodic rotation in public administration might be a powerful policy. Although rotation does not affect the frequency of bribe offers, it has - together with whistle-blowing - a substantial impact on the willingness to accept a bribe. Rotation does serve its main purpose, to break any emerging or existing relationship between those who offer bribes and those who serve the public in office, especially in the case of petty corruption.

5 Acknowledgments

This article was written as a part of research project no. MUNI/M/0045/2013 at Masaryk University.

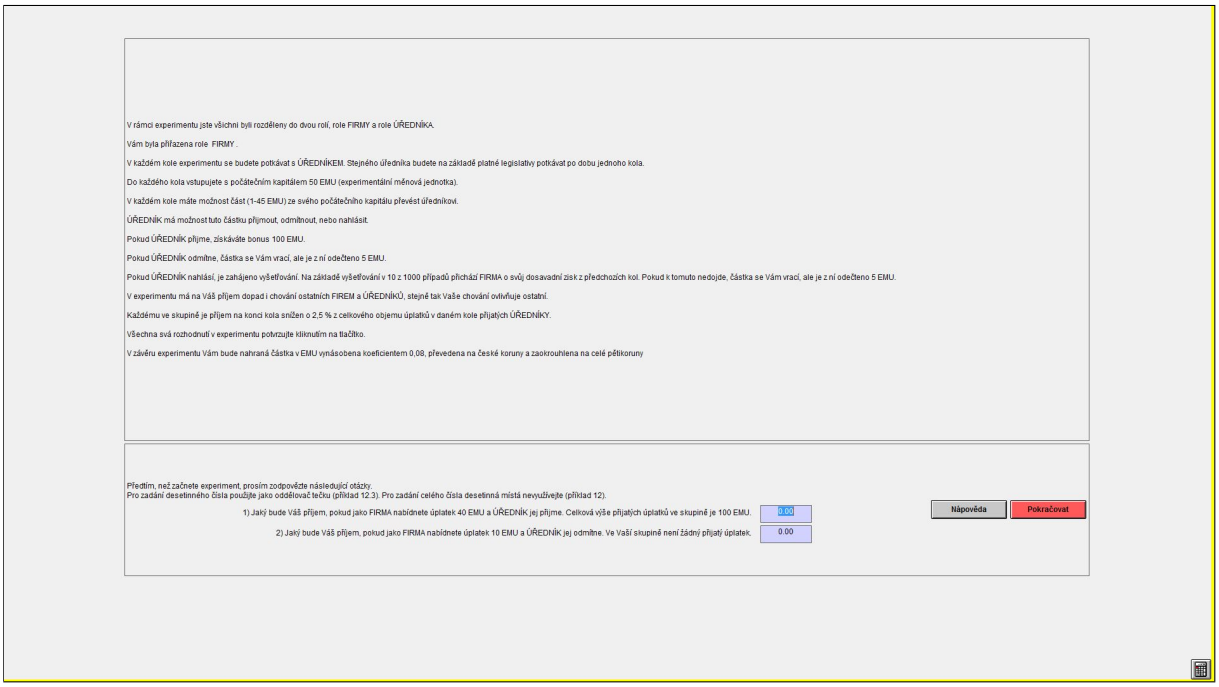
References

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

Gaspar, V. and Hagan, S. (2016). Corruption: Costs and Mitigating Strategies. *IMF Staff Discussion Note*, (SDN/16/05):1–47.

Appendix A Instructions

A.1 For the player in the role of firm



Translation of the screen:

In the experiment, all participants are assigned to one of two roles – PRIVATE FIRM and PUBLIC OFFICIAL.

Your assigned role is the PRIVATE FIRM.

In each period, you meet a PUBLIC OFFICIAL. According to the rules , you will meet the same public official for one period (in T0: for the entire experiment).

You begin each period with an initial endowment of 50 EMU (experimental monetary unit).

In each period, you have the opportunity to offer or not to offer a bribe (1-45 EMU) to the public official.

The PUBLIC OFFICIAL can accept, reject, or report this amount.

If the PUBLIC OFFICIAL accepts it, you receives a bonus of 100 EMU.

If the PUBLIC OFFICIAL rejects it, the amount is returned to you but 5 EMU is deducted.

If the PUBLIC OFFICIAL reports it, an investigation begins. In 10 cases out of 1,000, the PRIVATE FIRM loses its profit from previous periods. In all other cases, the amount is returned to you and 5 EMU is deducted.

In the experiment, the behavior of other PUBLIC OFFICIALS and PRIVATE FIRMS has an impact on you and your behavior influences them.

The profit of everyone in the group is lowered by 2.5% of the total amount of bribes accepted by PUBLIC

OFFICIALS during the period.

Confirm all of your decisions in the experiment by clicking the given button.

At the end of the experiment, your final profit in EMU will be multiplied by 0.08, converted to CZK, and rounded to a multiple of five.

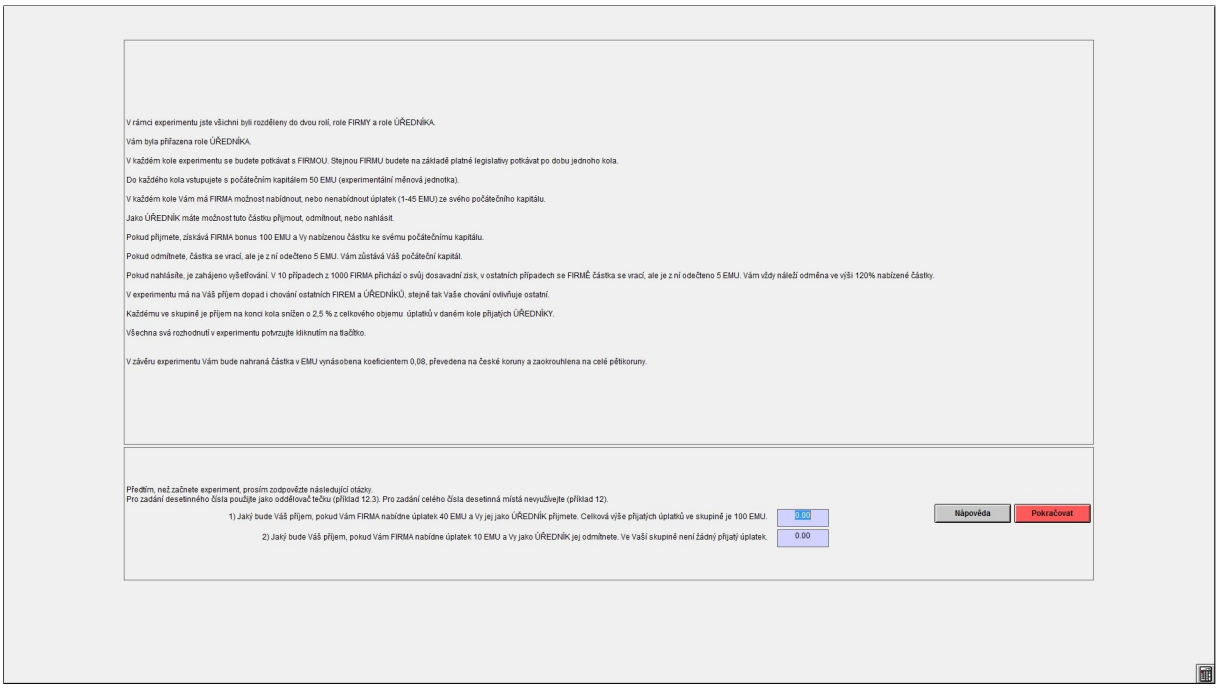
Before the experiment begins, please answer the following questions.

To enter a decimal number, use a decimal point (e.g., 12.3). To enter an integer, do not use the point (e.g., 12).

1) What will your profit be when you as the PRIVATE FIRM offer a bribe of 40 EMU and the PUBLIC OFFICIAL accepts it? The total amount of accepted bribes in the group is 100 EMU.

2) What will your profit be when you as the PRIVATE FIRM offer a bribe of 10 EMU and the PUBLIC OFFICIAL rejects it? No bribes have been accepted in the group.

A.2 For the player in the role of public official



Translation of the screen:

In the experiment, all participants are assigned to one of two roles - PRIVATE FIRM and PUBLIC OFFICIAL.

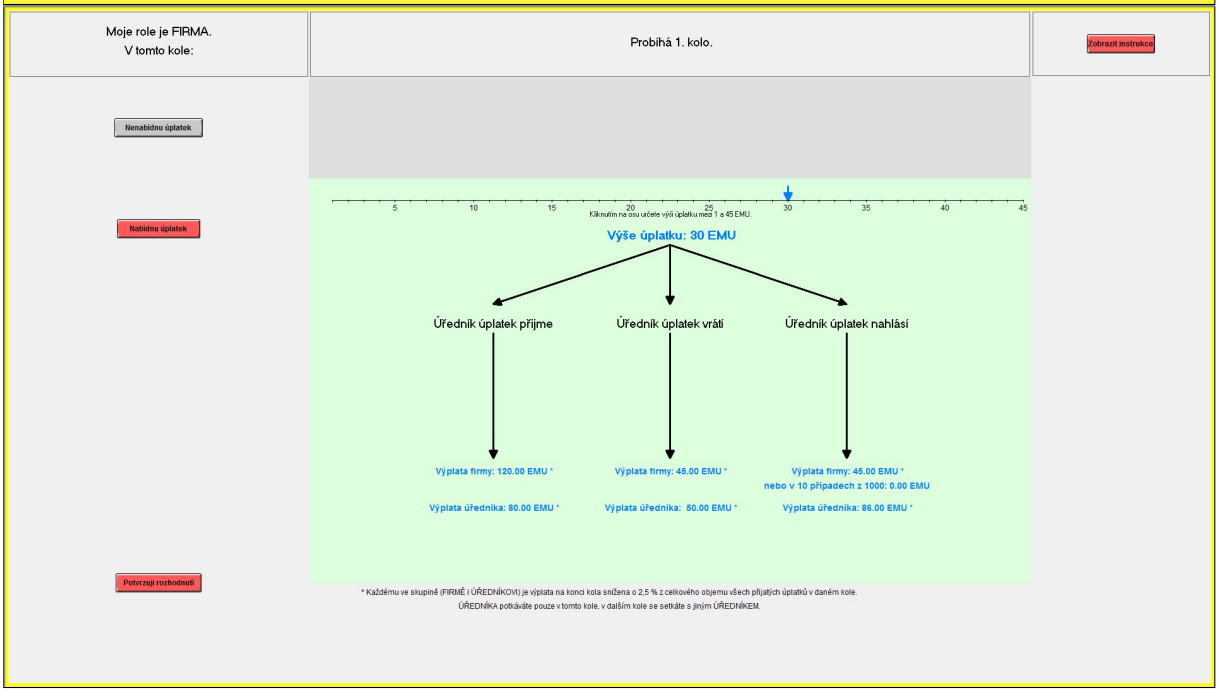
Your assigned role is the PUBLIC OFFICIAL.

In each period, you meet a PRIVATE FIRM. According to the rules, you will meet the same PRIVATE FIRM for one period (in T0: for the entire experiment).
You begin each period with an initial endowment of 50 EMU (experimental monetary unit).
In each period, the PRIVATE FIRM has the opportunity to offer or not to offer you a bribe (1-45 EMU) from its initial endowment.
As the PUBLIC OFFICIAL, you can accept, reject, or report this amount.
If you accept it, the PRIVATE FIRM receives a bonus of 100 EMU and you add the offered amount to your initial endowment.
If you reject it, the amount is returned but 5 EMU is deducted. You keep your initial endowment.
If you report it, an investigation begins. In 10 cases out of 1,000 the PRIVATE FIRM loses its profit from previous periods. In all other cases, the amount is returned to the PRIVATE FIRM and 5 EMU is deducted. You always receive a bonus of 120% of the offered amount.
In the experiment, the behavior of other PUBLIC OFFICIALS and PRIVATE FIRMS has an impact on you and your behavior influences them.
The profit of everyone in the group is lowered by 2.5% of the total amount of bribes accepted by PUBLIC OFFICIALS during the period.
Confirm all of your decisions in the experiment by clicking the given button.
At the end of the experiment, your final profit in EMU will be multiplied by 0.08, converted to CZK, and rounded to a multiple of five.

Before the experiment begins, please answer these questions:
To enter a decimal number, use a decimal point (e.g., 12.3). To enter an integer, do not use the point (e.g., 12).
1) What will your profit be when the PRIVATE FIRM offers a bribe of 40 EMU and you as the PUBLIC OFFICIAL accept it? The total amount of accepted bribes in the group is 100 EMU.
2) What will your profit be when the PRIVATE FIRM offers a bribe of 10 EMU and you as the PUBLIC OFFICIAL reject it? No bribes have been accepted in the group.

Appendix B The game screen shots

B.1 Decision-making of the firm

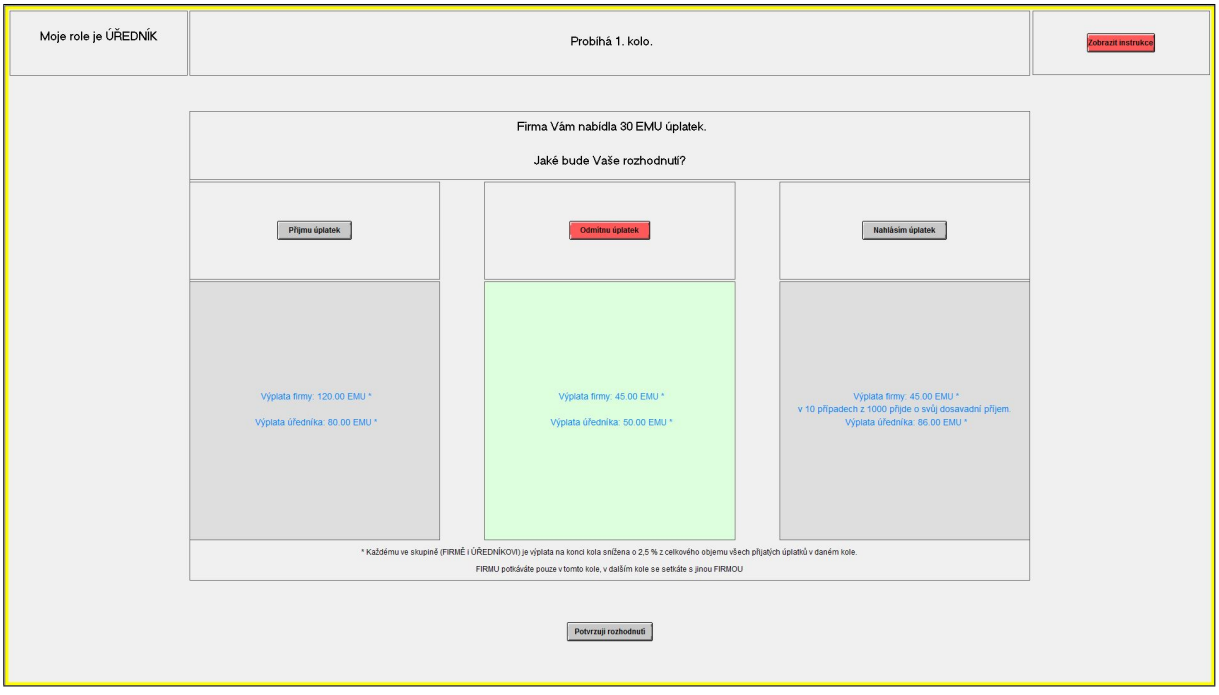


Translation of the screen:

- My role is FIRM. In this period:

- I do not offer the bribe. Firm's payoff: 50.00 EMU* Public official's payoff: 50.00 EMU*
- I offer the bribe.
  - Click the line to indicate a bribe value between 1 and 45 EMU.
  - The bribe value: 30 EMU.
    1. The public official accepts the bribe. Firm's payoff: 120.00 EMU* Public official's payoff: 80.00 EMU*
    2. The public official returns the bribe. Firm's payoff: 45.00 EMU* Public official's payoff: 50.00 EMU*
    3. The public official reports the bribe. Firm's payoff: 45.00 EMU* or in 10 cases out of 1,000: 0.00 EMU Public official's payoff: 86.00 EMU*
  - *The profit of everyone in the group (FIRMS and PUBLIC OFFICIALS) is lowered by 2.5% of the total amount of bribes accepted during this period. You will meet this PUBLIC OFFICIAL only in this period;; in the next period you will meet a new PUBLIC OFFICIAL. (in T0 -1487668550 the last sentence is left out)

B.2 Decision-making of the public official



Translation of the screen:

- My role is PUBLIC OFFICIAL.

- The FIRM offered you a bribe 30 EMU.
- What is your decision?
    1. I accept the bribe. Firm's payoff: 120.00 EMU* Public official's payoff: 80.00 EMU*
    2. I return the bribe. Firm's payoff: 45.00 EMU* Public official's payoff: 50.00 EMU*
    3. I report the bribe. Firm's payoff: 45.00 EMU* or in 10 cases out of 1,000: 0.00 EMU Public official's payoff: 86.00 EMU*
- *The profit of everyone in the group(FIRMS and PUBLIC OFFICIALS) is lowered by 2.5% of the total amount of bribes accepted during this period. You meet this FIRM only in this period; in the next period you will meet a new FIRM. (*in T0: the last sentence is left out*)

MUNI Econ Working Paper Series (since 2018)

2019-01 Fišar, M., Krčál, O., Staněk, R.,Špalek, J. 2019. *The Effects of Staff-rotation in Public Administration on the Decision to Bribe or be Bribed*. MUNI ECON Working Paper n. 2019-01. Brno: Masaryk University.

2018-02 Guzi, M., Kahanec, M. 2018. *Income Inequality and the Size of Government: A Causal Analysis*. MUNI ECON Working Paper n. 2018-02. Brno: Masaryk University.

2018-01 Geraci, A., Nardotto, M., Reggiani, T.,Sabatini, F. 2018. *Broadband Internet and Social Capital*. MUNI ECON Working Paper n. 2018-01. Brno: Masaryk University.

ISSN electronic edition 2571-130X
MUNI Econ Working Paper Series is indexed in RePEc:
https://ideas.repec.org/s/mub/wpaper.html