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Original Paper

Petty Corruption in a Multi-Person, Multi-Stage Bureaucratic Process: Formal Models and an Experimental Assessment

David S. Murphy[1*] & Scott Yetmar[2]

[1] Department of Accounting, University of Lynchburg, Lynchburg, VA, USA

[2] Department of Accounting, Cleveland State University, Cleveland, OH, USA

[*] David S. Murphy, Department of Accounting, University of Lynchburg, Lynchburg, VA, USA. E-mail: murphy.d@lynchburg.edu

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Abstract

This paper examines the case where a citizen faces a sequence of bureaucrats in a transaction approval process. Each bureaucrat has the authority to disapprove an application and all of the bureaucrats must approve an application for it to be accepted. Each bureaucrat also has the ability to request a facilitating payment during the review process. Models are developed to explain bureaucrat behavior when there are no sanctions present to moderate the requests for facilitating payments, and where another government official with the authority to impose penalties on corrupt behavior is included in the process. Model I demonstrated that there is no economically rational reason for a bureaucrat to forgo requesting a facilitating payment. Model II showed that relatively low sanction multipliers are required to induce a bureaucrat to forgo the opportunity to request a bribe if the bureaucrat is in the early steps in a multi-step approval process. The predictions made by Model II were then tested using students as surrogates for bureaucrats. The results indicate that wide dissemination of information about sanctions that have been imposed could have a preventive or at least moderating effect on bribe behavior by public sector employees.

Keywords

Petty corruption, bureaucratic control, mathematical modeling, economic development

1. Introduction

This paper examines the effect of "secret shoppers" in combating petty corruption in a multi-step, multi-bureaucrat setting. Petty corruption is extortion performed by low-level bureaucrats against citizens when they request (require) facilitating payments to provide needed approvals that they control as part of their job function. Facilitating payments had the lowest joint probability of detection and punishment of the five types of illegal acts included in a case-based study of corruption in the public sector in Bolivia conducted by Murphy (2004). Facilitating payments are the payments extorted from the public in cases of petty corruption.

Studies have shown that petty corruption is costly for both firms and households in developing countries (Clarke, 2011). Fisman and Svensson (2007) reported that both tax rates and bribery were negatively correlated with firm growth in a developing country. Their results indicate that corruption retards firm growth to a greater extent than does taxation.

Klitgaard (1998) identified government monopoly, discretion in interpreting law or procedures, and a lack of direct accountability as the conditions that, when present, give minor government officials the ability to extort facilitating payments or petty bribes. González, Lopez-Córdova and Valladares (2007) showed that corruption appears to be more common in countries with excessive regulation and where democracy is weak. Kaufmann (2010, p. 88) noted that "Excessive regulations not only do not address the more fundamental causes of corruption, but often create further opportunities for bribery". It would thus appear that a highly bureaucratic environment, one where government has monopoly control over many transactions, would create a fertile environment for corruption.

A government monopoly exists whenever a government requires that specific types of transactions be registered or approved. For example, requiring a building permit to build or modify structures gives a government monopoly control over construction. The existence of information asymmetry or the right to interpret laws, regulations or procedures to either facilitate or impede the timely processing of a transaction gives minor government officials the ability to impede transaction approval and registration processes, or to facilitate such approvals when an appropriate facilitating payment is made. Officials often request facilitating payments (bribes), which are common in developing countries, in exchange for performing their normal job functions efficiently and potentially in the citizen's favor. There is little control over the actions of a government functionary dealing with a citizen and so little control over the requests for or payment of facilitating payments. This is where the role of a "secret shopper" comes into play.

A secret shopper is a government official with the authority to sanction other government functionaries who, in the conduct of a transaction with the secret shopper, request or demand a facilitating payment. The objectives of undercover operations which make use of secret shoppers to combat petty corruption are to (1) reduce the harm imposed on citizens by corrupt government functionaries, (2) reduce the perception that corruption is pervasive and hence transform the culture a governmental entity where a culture of corruption has evolved, and (3) combat corruption with minimal cost. The use of secret

shoppers in an undercover operation reduces that probability of the use of entrapment as a defense should the undercover operations result in legal action.

2. Formal Models

Murphy and Yetmar (2016) examined the case where a citizen faced a single bureaucrat who had the power to approve or disapprove a project or transaction and the ability to request a facilitating payment or bribe for the approval of the submitted application. In this paper, we extend our previous analysis to encompass the case where the citizen faces a sequence of N bureaucrats where $N \geq 2$. Each of the bureaucrats has the authority to disapprove an application and all of the bureaucrats must approve an application for it to be accepted.

A citizen, C, has engaged in a transaction which must be approved and registered with the appropriate governmental agency. The approved and registered transaction has a value V to the citizen. The citizen has decided to prepare the necessary application form with a preparation cost (A) that is proportional to the value of the transaction such that $A = aV$, where $a \leq 1$. In addition, when the application is submitted, the citizen must pay a mandated application fee (P) which is also proportional to the value of the transaction such that $P = cV$ where $c \leq 1$.

The application specifies the conditions that must be met for a transaction to be approved and registered. The degree to which an application meets the legal requirements is specified by Q, and if $q = 1$ then the application meets all of the legal requirements, otherwise $q = 0$. Thus an application either meets or does not meet the requirements for registration. The bureaucrats who control the approval process have private knowledge about the interpretation of relevant law, regulations and procedures and so may approve an application even when $q = 0$ if an appropriate bribe is paid.

In the first model we look at the simple case where a citizen faces a sequence of bureaucrats in the approval process. In the second model we expand that case to include the possibility that the citizen is in fact a government official charged with reducing corrupt behavior and whose real identity is not known to the bureaucrats. In the second case the bureaucrats are faced with a risk-assessment problem and with a risk that will affect the expected value of their actions.

2.1 Model I

In this model bureaucrats may each request a facilitating payment or bribe (b_n) where $b_n \geq 0$ for the n^{th} bureaucrat in the sequence. Bureaucrat n in the approval sequence does not know the amounts of the individual bribes that have been requested at the earlier steps in the approval process and which may already have been paid, or the total amount of the bribes previous paid by the citizen for the application currently under review. However, bureaucrat n knows that all requested bribes, if any, have been paid in the case were $q \neq 1$. Were it not so, the application would have been rejected at the point where a requested bribe was not paid. If $q = 1$, then an application may have been approved at the prior steps with a delay (D) without the payment of a bribe. Consequently, bureaucrat n is uncertain about the

willingness of C to pay bribes. The cost of approval delay to C at each step in the process is given by $D = d_nV$, where $0 \leq d \leq 1$ at step n in the approval process.

The sequence events in this process are as follows:

Step 1: *C* engages in a transaction which must be recorded,

Step 2: *C* prepares the necessary application form with a cost of $A = aV$,

Step 3: *C* submits the transaction for approval and pays the mandated transaction processing fee $P = cV$,

Repeat Steps 4 through 6 for each B_n for $n = 1$ *to* N

Step 4: B_n decides whether or not transaction approval criteria have been met and demands a non-negative bribe $b_n \geq 0$ and B_n estimates the probability that *C* will pay a facilitating payment if one is requested, denoted as e_n, where $0 \leq e_n \leq 1$.

Step 5: *C* decides whether to pay the bribe to B_n $(p_n = 1)$ or forgo the bribe $(p_n = 0)$, and

Step 6: If *C* paid the bribe to B_n, then the transaction is approved at step n in the approval process and $(t_n = 1)$ whether or not $q = 1$. If *C* did not pay the bribe $(p_n = 0)$, then the transaction is approved at step n with a probability of $t_n = q < 1$ and C incurs the delay cost at step n of D_n.

Step 7: If all N bureaucrats have approved the application, then the application is approved and registered. This occurs when

$$N = \sum_{n=1}^{N} t_n \quad (1)$$

The expected value of the project to C is given by the following:

If $p_n = 1$ for at least one n then $EV_{C1} = V - [\, aV + cV + \sum_{n=1}^{N} b_n + \sum_{n=1}^{N} d_nV\,]$ (2)

If $p_n = 0$ for all n then $EV_{C2} = V - [\, aV + cV + \sum_{n=1}^{N} d_nV\,]$ (3)

In equation (2) C has the ability to pay a bribe and avoid the delay cost, or if q=1, refuse to pay a requested bribe and absorb the delay cost. This is a rational decision when $b_n > d_nV$. Setting equation (2) equal to equation (3) and solving for b, we find that *C* would be indifferent between paying and not paying bribes only if $\sum_{n=1}^{N} b_n = 0$, a rather intuitive conclusion. On the other hand, if *C* decides to pay all requested bribes, then the delay cost is eliminated as in equation (4)

If $p_n = 1$ for all n then $EV_{C1} = V - [\, aV + cV + \sum_{n=1}^{N} b_n\,]$ (4)

Now setting equation (4), the all-bribe case equal to equation (3), the no-bribe case we find that *C* would be indifferent between paying a bribe or absorbing the delay cost only when they are equal. That is, when

$$\sum_{n=1}^{N} b_n = \sum_{n=1}^{N} d_n. \quad (5)$$

A rational *C* would select the lower of the cost of a bribe or the cost of delay. The expected value to a bureaucrat of accepting a bribe, ignoring legitimate compensation, is simply

$$EV_{Bn} = e_n\,(b_n) \quad (6)$$

Where

e_n = probability that a requested bribe will be paid

b_n = bribe amount requested by bureaucrat n

Given that $e_n \geq 0$ and $b_n > 0$ there is no incentive or reason for B not to request a bribe. There is no penalty for requesting a bribe and if $V_{Bn} = 0$ then B is no worse off than he or she would have been had no bribe been requested.

2.2 Model II

In this section, we extend the simple and intuitive model presented in Model I and introduce the possibility that any given C is really a government official *(G)* with the power to impose sanctions on B_n. The sanction or fine *(F)* is assumed to be a function of the bribe requested such that $f = mb_n$, where $m > 1$. That is, the monetary cost of the sanction, whether it be a fine or job termination, is greater than the amount of the requested bribe. It is presumed, that when G issues a sanction F, the knowledge is public and so all other bureaucrats are aware of *G's* identity and processing of the application ceases.

Each bureaucrat must now assess the possibility that C will pay a requested bribe, and also that if a bribe is requested it will be made to a G rather than a C. If the bribe is requested of a G then there is a further probability that the G will forego the sanction to progress further up the application authorization chain and "catch larger fish". However, a foregone sanction is the same as no sanction, so the two actions are combined into a single act. As noted above, the probability that C will pay a facilitating payment if one is requested, denoted as e_n, where $0 \leq e_n \leq 1$.

To simplify the analysis, we assume that every B has made the same subjective risk assessment *(R)* that a C is really a G and that the subjective risk assessment applies equally in every step of the process. Thus, the first G in a sequence expects with probability r that the C is really a G. The second G in the sequence now has a joint probability assessment or $(r)(r) = r^2$ that the C is a G. In general, the subjective probability assessment by the n^{th} B that a C is really a G is given by r^n. Consequently, the subjective risk assessment that a C is a G as made by a B decreases the further down the application review and approval process an application moves. In essence, this captures the idea that if no one before me was caught, then I probably will not be caught either.

Now the expected cost of being sanctioned for corrupt behavior is given by

$$F_n = r^n(m)b_n \tag{7}$$

The expected values for the actions of bribing and not bribing are given in equations (8) and (9). If B_n requested a bribe then:

$$EV_{Bn} = (1 - r^n)(e_n)(b_n) - r^n(m)b_n \tag{8}$$

And if B_n did not request a bribe then:

$$EV_{Bn} = (1 - r^n)(e_n)0 = 0 \tag{9}$$

Setting equation (8) equal to equation (9) and solving for m we find that:

$$m = \frac{e(1-r^n)}{r^n} \tag{10}$$

This value of m, the sanction multiplier, is the point at which B_n would be indifferent between not requesting a bribe and requesting a bribe with the risk of being sanctioned. The value of r^n in the

denominator decreases exponentially as *n* increases. In addition, the term $(1-r^n)$ in the numerator approaches 1 as *n* increases. Consequently, as r^n approaches 0, *m* begins to grow exponentially. Table 1 below shows the computed values of *m* assuming that *B's* subjective assessment of *e* is 50 percent, that citizens will pay bribes 70 percent of the time, and that *B's* subjective assessment of *r*, the risk at a *C* is a *G* who will sanction the bureaucrat is just 10 percent.

Table 1. Values of m Given e = .7 and r = .1

n	***m***
1	6.3
2	69.3
3	699.3
4	6,999.3
5	69,999.3
6	699,999.3
7	6,999,999.3
8	69,999,999.3
9	699,999,999.3
10	6,999,999,999.3

3. Experimental Assessment

Our mathematical model suggests that bribe behavior could be moderated by the probability and size of a penalty and by the information or experience that a bureaucrat may have about the penalties imposed on those who request bribes. These propositions were assessed in an experimental setting using a 2x2 factorial design where the position of the bureaucrat in the approval process and that individual's knowledge about the imposition of penalties were manipulated. The factorial design is summarized in Table 2 below.

Table 2. Experimental Design

	Knowledge of Sanctions	
Position in Processing Que	***No Knowledge***	***Prior Knowledge***
	NO	***YES***
First	Case 1	Case 2
Last	Case 3	Case 4

The null form hypotheses to be tested in this design are:

H_1: The position of a bureaucrat in the approval process will not affect the likelihood that a bribe will be requested.

H_2: The position of a bureaucrat in the approval process will not affect the amount of a requested bribe.

H_3: The knowledge that a bureaucrat has about the history of bribe sanctions will not affect the likelihood that a bribe will be requested.

H_4: The knowledge that a bureaucrat has about the history of bribe sanctions will not affect the amount of a requested bribe.

These hypotheses were tested in an experimental setting using students as surrogates for a government bureaucrat. The four cases were randomized to reduce the probability of hypothesis guessing by the experimental subjects.

The subjects were told that the average proposal processed by the bureaucrat's department had a project budget of $30 million and that the average proposal submission fee was $5,000. In addition, the subjects were told that the bureaucrat's monthly salary was $1,500. In addition, the subjects were told that the National Audit Office, in an attempt to reduce public sector corruption, had implemented a "secret shopper" program and that secret shoppers had the authority and discretion to impose a fine or other sanction if a bribe was requested, or to pay a bribe and continue through the approval process and possibly receive a larger bribe request.

The subjects were also informed that the bureaucrat was the first (last) individual in the approval process, and that the bureaucrat had never been fined or sanctioned by a secret shopper and did not know of anyone else who had been sanctioned, or that although the bureaucrat had never been fined or sanctioned by a secret shopper, the individual did know of others who had been sanctioned.

3.1 Students as Surrogates

Previous research leads to the conclusion that students are adequate surrogates for accounting practitioners in decision-making experiments (Liyanarachchi, 2007). Studies that have focused on decision-making, such as this study, have reported similarities between students and professionals (Ashton & Kramer, 1980; Houghton & Hronsky, 1993; and Liyanarachchi & Milne, 2005). The accounting literature suggests that an ability to make judgments consistent with professional standards is an important quality of audit decisions (Bedard, 1991). Such knowledge and ability is gained through formal accounting education as well as through modeling the behavior of more experienced professionals in the work place. The students used in this study were highly educated; they were upper-division accounting majors and graduate students. In addition, the use of advanced-level accounting students as surrogates for accounting practitioners is supported in relatively structured decision contexts (Mortenson, Fisher, & Wines, 2012). Therefore, we concluded that the students that were used are adequate surrogates for the purposes of this study.

3.2 Subjects

The subjects were 62 students enrolled in accounting classes at a large, public university. Subject demographic measures are summarized in Table 3 below. Most of the subjects had at least one year of full-time work experience with an experience range in years from zero to thirty-seven. Years of

full-time work experience was the only potential covariate that was significantly correlated with bribe likelihood (Pearson Correlation = -0.169, two-tailed significance = 0.008). Subjects with more full-time work experience made lower bribe likelihood assessments. In addition, both bribe amount and the subject's confidence in her or his bribe assessment were positively correlated with bribe likelihood (Pearson Correlation = 0.329, two-tailed significance = 0.000, and Pearson Correlation = 0.245, two-tailed significance = 0.000 respectively). None of the other potential covariates were significantly correlated with the independent variables, bribe likelihood and bribe amount.

3.3 Data Analysis

Tables 4 and 5 summarize bribe likelihood and bribe about by the experimental treatments, the position of a bureaucrat in the approval process (Position) and the bureaucrat's knowledge that a bureaucrat has about the history of bribe sanctions (Knowledge).

Table 3. Subject Demographics

	Total	***Percent***
n	62	100%
Current degree program		
Undergraduate	54	87.1
Master of Accountancy	8	12.9
Undergraduate Major		
Accounting	53	85.5
Finance	3	4.8
Management	4	6.5
Non-business	2	3.2
Average full-time work experience		
Mean Years	3.355	
Standard Deviation	(6.558)	
Average part-time work experience		
Mean Years	3.581	
Standard Deviation	(2.612)	
Work Experience Field		
Financial services	8	12.9
Manufacturing	3	4.8
Public accounting	6	9.7
Retail	19	30.6
Services	25	40.3
Wholesale/Distribution	1	1.6

Age		
Mean Years	25.1	
Standard Deviation	(7.815)	
Gender		
Female	20	32.3
Male	42	67.7
Career Objective		
Public accounting	24	38.7
Corporate accounting	23	37.1
Governmental accounting	7	11.3
Non-accounting	8	12.9
Developing Country Experience		
Yes	16	25.8
No	46	74.2

Table 4. Mean Bribe Likelihood (Standard Deviation)

	Knowledge of Sanctions		***Total***
Position in Processing Que	***NO***	***YES***	
First	2.98	1.92	2.45
	(0.914)	(0.874)	(1.079)
Last	3.50	2.05	2.77
	(1.198)	(1.015)	(1.324)
Total	3.24	1.98	
	(1.091)	(0.946)	

Table 5. Mean Bribe Amount (Standard Deviation)

	Knowledge of Sanctions		***Total***
Position in Processing Que	***NO***	***YES***	
First	$3,795.16	$1,913.71	$2,854.44
	(3,854.715)	(2,284.484)	(3,293.891)
Last	$8,476.61	$3,896.77	$6,189.69

	(8,804.636)	(3,809.973)	(7,139.594)
Total	$6,135.89	$2,905.24	
	(7.165.070)	(3,283.030)	

As is evident in Table 5 the mean bribe amount increases when the bureaucrat's position in the approval process changes from first to last in line. The mean bribe amount decreased from $6,136 when the bureaucrat had no prior knowledge of individuals being sanctioned to $2,905 when they had such knowledge. The implications of this are discussed in the conclusion section.

A t-test of bribe likelihood based on position resulted in a t value of -26.939 (2-tailed significance = 0.000). The same t-test based on knowledge resulted in a t value of -21.849 (2-tailed significance = 0.000). T-tests of bribe amounts based on position and knowledge resulted in t values of -12.289 (2-tailed significance = 0.000) and -12.288 (2-tailed significance = 0.000) respectively. The mean values of both bribe likelihood and bribe amount for the two experimental treatments (position and knowledge) are statistically different.

ANOVA was used to test H_1 and H_3. The dependent variable in the test of these two hypotheses was bribe likelihood, and the independent variables were the position of a bureaucrat in the approval process (H_1) and the knowledge that a bureaucrat has about the history of bribe sanctions (H_3). The two covariates that were significantly correlated with the dependent variable, years of full-time work experience and subject's self-assessed confidence in bribe likelihood, were included in the model. The results of the ANOVA of bribe likelihood are shown in Table 6.

Table 6. ANOVA of Bribe Likelihood

$R^2 = 0.371$

Adjusted $R^2 = 0.358$

Source	***Sum of Squares***	***df***	***Mean Square***	***F***	***Sig***
Corrected Model	131.785	5	26.357	28.596	.000
Intercept	116.272	1	116.272	126.149	.000
Full-time Work Experience	12.554	1	12.554	13.621	.000
Assessment Confidence	14.790	1	14.790	16.047	.000
Position	4.009	1	4.009	4.350	.038
Knowledge	91.449	1	91.449	99.217	.000
Position * Knowledge	2.189	1	2.189	2.374	.125
Error	223.054	242	.922		
Total	2048.000	248			
Corrected Total	354.839	247			

As shown in Table 6 both the position of a bureaucrat in the approval process and the knowledge that a bureaucrat has about the history of bribe sanctions had a significant effect on the likelihood that a bribe will be requested. Thus the null hypotheses that (H_1) the position of a bureaucrat in the approval process will not affect the likelihood that a bribe will be requested, and (H_3) the knowledge that a bureaucrat has about the history of bribe sanctions will not affect the likelihood that a bribe will be requested are rejected. The combined effect of position and knowledge was not significantly significant. However, the covariates, years of full-time work experience and decision assessment confidence were statistically significant. It appears that subjects with more years of work experience assessed the likelihood of a bribe as being lower, possibly because that had not seen or experienced that behavior in their careers.

ANOVA was also used to test H_2 and H_4. The dependent variable in the test of these two hypotheses was bribe amount, and the independent variables were the position of a bureaucrat in the approval process (H_2) and the knowledge that a bureaucrat has about the history of bribe sanctions (H_4). The two covariates used in the test of H_2 and H_4 that were not significantly correlated with the dependent variable were excluded from this analysis (Note). The results of the ANOVA of bribe likelihood are shown in Table 7.

Table 7. ANOVA of Bribe Amount

$R^2 = 0.175$

Adjusted $R^2 = 0.161$

Source	*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig*
Corrected Model	1448402782	3	482800927.4	17.225	.000
Intercept	5068004879	1	5068004879	180.814	.000
Position	688444516.1	1	688444516.1	24.562	.000
Knowledge	647098225.8	1	647098225.8	23.087	.000
Position * Knowledge	112860040.3	1	112860040.3	4.027	.046
Error	6839027339	244	28028800.57		
Total	1.336E+10	248			
Corrected Total	8287430121	247			

As shown in Table 7, both the position of a bureaucrat in the approval process and the knowledge that a bureaucrat has about the history of bribe sanctions had a significant effect on the amount of a requested bribe. Thus the null hypotheses that (H_2) the position of a bureaucrat in the approval process will not affect the amount of a bribe will be requested, and (H_4) the knowledge that a bureaucrat has about the

history of bribe sanctions will not affect the bribe amount are rejected. The combined effect of position and knowledge was significantly significant at 0.05.

3.4 Discussion

Table 4 indicated that subjects in the last step of an approval process would be more likely to request a bribe than they would in the first stage of the proposal review process. For example, the overall likelihood of requesting a bribe increased by 11.6 percent when the position of the bureaucrat changed from first to last in the review and approval process. In addition regardless of the position of the subjects in the review and approval process the probability of requesting a bribe was higher in the cases where the subject did not have prior knowledge about the imposition of sanctions. When the subjects had prior knowledge about sanctions the overall likelihood of requesting a bribe decreased by 38.9 percent. It appears, just from Table 4, that individuals are more likely to request a bribe in the later stages of the review and approval process. Perhaps they believe that a citizen who has made it almost through the approval process has much to gain and little to lose by paying the last bribe. It also appears that knowledge about prior sanctions is at least a moderate deterrent to bribe behavior. For individuals in the first step of the approval process the likelihood of requesting a bribe decreased by 35.6 percent when they had prior knowledge about bribe sanctions. For those in the last step of the process, the probability of requesting a bribe decreased by 41.4 percent. The percentage changes in bribe likelihood were large within treatment groups. For example, the mean likelihood of requesting a bribe decreased by 35.7 percent when experimental subjects were in the first step in the process and knowledge changed from no prior knowledge to prior knowledge. However, when the subjects were in the last stage of the process and knowledge changed from no knowledge to knowledge the likelihood of requesting a bribe decreased by 41.4 percent.

Similar changes are seen in bribe amount in Table 5. The mean bribe amount increased from $2,854.44 to $6,186.69, a percentage increase of 116.7 percent when the position of the subjects in the process changed from first to last. The mean bribe amount decreased from $6,135.00 to $2,905.24, a decrease of 52.7 percent when knowledge changed from no prior knowledge about sanctions to knowledge of prior sanctions. These changes again indicate that bribe amounts are higher when experimental subjects were at the final stage of the approval process. Both the subject (surrogate for a bureaucrat) and the citizen knew that the process was at the final stage and that the citizen had as higher incentive to pay a bribe and exit with the proposed project approved. However, knowledge of prior sanctions again affected the requested bribe amount. Requested bribe amount decreased by 50.4 percent for subjects in the first position in the process when they had prior knowledge of sanctions, and by 46.0 percent when the subjects were in the final stage of the process.

4. Conclusions and Recommendations for Future Research

Model I demonstrates that, in the absence of sanctions, there is no economically rational reason for a bureaucrat to forgo the opportunity to request a facilitating payment (i.e., a bribe). Model I also illustrates that citizens will pay requested bribes as long as the total cost of all bribes is less than the total delay cost. In such a situation there is an incentive for bureaucrats to make the delay cost as high as possible to incentivize bribe payment. Delay costs can be increased by increasing the processing time for transactions or, for example, by misplacing the citizen's application.

Citizen expected values were not changed in Model II however this model did introduce a risk parameter for the bureaucrats. Model II shows that relatively low sanction multipliers (m) are required to induce a bureaucrat to forgo the opportunity to request a bribe if the bureaucrat is in the early steps in a multi-step approval process. However, the required size of the sanction multiplier increases rapidly the farther along a bureaucrat is in the approval process. This occurs because the perceived joint probability of being sanctioned decreases at each step in the multi-step approval process.

This suggests that in practice, bureaucrats in the early steps of a multi-step approval process should be the targets of enforcement activities. When individuals in the early steps of an approval process are punished for corrupt behavior a signal is sent to all of the actors in the approval process that is likely to change their risk assessment and, consequently, their behavior.

The experimental test of the model also indicated that there was a larger decrease in bribe likelihood for subjects in the last stage of the approval process when knowledge about sanctions was manipulated. However, the percent decrease in bribe amount was slightly higher for those in the first state of the process when knowledge was manipulated. This change is consistent with what was projected by the model.

4.1 Implications for Practice

In Table 6, the ANOVA analysis of bribe likelihood and Table 7, the ANOVA analysis of bribe amount, both treatment variables, position in the approval process and knowledge about sanctions, were statistically significant. The position of a bureaucrat in an approval process may be difficult to change, especially if the individual has position-specific expertise or knowledge that is critical in the approval process. Nevertheless, officials charged with the responsibility to monitor and reduce the levels of corruption in the public sector can use this knowledge to more closely monitor the activities of bureaucrats in the later stages of approval processes.

It is evident, at least in this experimental setting, that both the likelihood of requesting a bribe and the amount of the requested bribe were informed by subject's knowledge of prior sanctions imposed on bureaucrats caught requesting bribes. It thus appears that the wide dissemination of information about sanctions that have been imposed could have a preventive or at least moderating effect on bribe behavior by public sector employees.

4.2 Future Research

This analysis is based on the assumption that individuals are economically rational and that their behavior will be consistent with the predictions made by the models. This study only addressed the position of a bureaucrat in the approval process and prior knowledge about sanction imposition on bribe behavior (likelihood and amount). This study did not address the model's assertion that larger sanction multipliers are required to induce indifference in the latter steps of the multi-step approval process. Future research should address the effect of different sanction multipliers both in single stage approval processes and multi-stage processes.

This research addressed the issue of bribe behavior from the point of view of the bureaucrat who is in a position to request a bribe. Future research should address the behavior of the other party in the process, that is, the citizen. Future research might address citizen sensitivity to bribes both in terms of amounts and timing in a multi-step approval process. In addition, future research should address the effect of the existence and size of whistleblower rewards on the bribe-related behavior of both parties in the approval process. For example, a model could be developed and tested to determine the point at which a citizen is indifferent between paying a bribe for transaction approval, and becoming a whistleblower and receiving a whistleblower reward at the risk of having the transaction rejected, although knowing that the transaction could be resubmitted possibly to another bureaucrat.

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Note

An initial ANOVA was run for bribe amount with the inclusion of the two covariates from Table 5. The significance values for the two covariates were 0.913 for full-time work experience and 0.958 for bribe confidence. Removal of these two variables from the model did not affect the model's R^2 or the significance of the independent variables.