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**Transparency, incentives and
incumbent performance**

by

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Transparency, incentives and incumbent performance

Rommel F. Rabanal*

Abstract

An expected utility model is used to analyze the allocation decision of an incumbent politician in dividing public funds between expenditures on public goods and pure rents. Comparative statics analysis reveals that while the result for improvements in transparency is ambiguous in terms of simultaneously improving public goods provision and reducing rent-extraction, fixing the incentives scheme faced by the politician while in office yields unambiguously welfare-increasing outcomes. As in any contract under unobservable effort, it is not practicable to insist that the agent reveal his true effort level through increased transparency. Rather, the optimal contract must specify proper incentives and a minimum contractible level of information that accurately relates observed outcomes to the actual effort level exerted by the agent. The paper concludes with empirical results from a panel data set of 115 cities in the Philippines for the years 1996-2000 supporting the predictions of the theoretical model.

Keywords: transparency, incumbent performance, rent-seeking

JEL Classification: D72, D80, H00

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“Equations are more important to me, because politics is for the present, but an equation is something for eternity.”

- Albert Einstein

1. Introduction

Aside from the conventional determinants of economic growth espoused by neo-classical as well as modern or new growth theories, the quality of governance has become a major point of focus in most recent development research. Governance matters, primarily in terms of creating a fundamentally sound social, political and economic environment conducive to proper operation of market forces, which in turn results in optimal outcomes and improved social welfare.

Toward this end, transparency in government has been identified and advocated for by various sectors as the tool of choice for promoting “good governance”. Merriam-Webster’s dictionary defines transparency as the quality or state of being transparent. In the most literal sense, transparent means fine or sheer enough to be seen through, and more broadly it is associated with qualities such as “free from pretense or deceit”, “easily detected” and “readily understood”. The Asian Development Bank (ADB) formally considers transparency, along with accountability, participation, predictability and their interlinkages as the elements of good governance or sound development management. From the Bank’s perspective, transparency refers to the availability of information to the general public and clarity about government rules, regulations and decisions. As such, transparency in government decision making and public policy implementation reduces uncertainty and can help inhibit corruption among public officials [ADB 2005].

The basic premise behind transparent governance is that when procedures and processes are readily observable and participatory, then the public can watch over every step leading to desired outcomes, thereby curbing any possible action that is contrary and detrimental to the collective goal. Not only is transparency a means to promote accountability in government, it is also considered as a desired end in itself because of the intrinsic value attached to a more informed and involved constituency. Primarily, transparency entails citizens’ access to relevant information and participation in terms of government’s decision-making and operational procedures in order to minimize, if not eliminate, opportunities for corruption or rent-seeking and reduce resource wastage potentially arising from incompetence of politicians or bureaucrats. As the public becomes more aware, fewer opportunities will be available for public officials to advance their own selfish interests while forsaking the best interests of the general public. Corruption becomes more difficult and pressure to perform increases once erring parties are more easily identified and

punished accordingly. Transparency therefore not only deters rent-seeking but at the same time ensures that government's outputs best represent the collective preferences of the general public.

However, transparency instruments are not without its share of associated costs. The act of governing becomes increasingly tedious once the politician's every move is subject to prolonged consultation and generally unnecessary documentation requirements that come under the guise of "transparency". Well-intended principles of transparency necessarily involve concomitant problems such as increased operational expenditures, red tape and limited administrative flexibility on the part of the public official that may result in delayed service delivery in times of urgent need if rules and procedures have become excessively rigid.

Recent theoretical and empirical works further elucidate positive and negative aspects of transparency. Islam [2003] empirically shows that more transparent governments, defined as those that have better information flows, tend to govern better. Transparency is measured in the said paper by the frequency of publication of economic data and by the presence of a freedom of information act or statute across countries, while governance is measured using the Kaufmann, Kraay and Zoido-Lobaton [1999] indices of the World Bank. On the contrary, Bac [2001] finds that heightened transparency may actually result, quite perversely, in increased corruption. Using a theoretical model where transparency is defined as the "openness" of a public office or agency in terms of information regarding its decision-making and operating procedures, Bac suggests that transparency may have a twofold effect. While transparency increases the probability that corruption is detected, it also improves outsiders' chances of establishing connections precisely for corruption as key decision makers in the agency are more easily identified. It is shown that under certain conditions, the connections effect may dominate the detection effect for local improvements in transparency, resulting in a net increase in corruption.

The objective of this paper is to similarly examine the value of transparency in terms of ensuring better governance outcomes. More specifically, a formal microeconomic treatment of the rent-seeking problem is undertaken. The unit of analysis is the incumbent politician facing the decision problem of whether to allocate public funds for their actual intended use or for his own personal consumption as pure rents. An expected utility model, similar to those used in the economics of criminal activity as popularized by Becker [1968] is developed in an attempt to elicit precise mathematical results regarding factors that contribute to reducing the propensity of politicians to extract rents and improve the efficiency of public expenditures. As so eloquently posited by Professor Einstein in the above quotation, such an exercise proves to be more

worthwhile than the political rhetoric that tends to dominate discussions of this nature. Econometric models are subsequently specified in order to empirically validate the qualitative results derived from the theoretical model using Philippine data.

2. The Model

This section presents a modified version of the model used by Allingham and Sandmo [1972] in analyzing the tax declaration decisions of individual taxpayers. The model developed here considers an incumbent politician's decision on how to allocate public funds. It is implicitly assumed that the politician is an opportunist who may decide to renege on his unwritten principal-agent contract with the public to provide the most-preferred level of public goods in exchange for election into public office, simply because the contract is a reward-in-advance contract that favors the agent and pre-election promises are not strictly binding. Such a decision is made under uncertainty, and the politician has a choice between two strategies: the incumbent may choose to allocate all public funds for provision of public goods and services; or he may choose to direct some portion of these funds to private coffers. The latter strategy may produce higher or lower payoffs than the first, depending on whether or not rent-seeking is detected. If rent-seeking remains undetected, then the politician is clearly better-off than he would have been if he allocated public funds properly. However, if rent-seeking is indeed detected and the corresponding penalty is levied, then the politician would be worse-off.

Another consideration is that the politician may also face the prospect of re-election for the next political term. The analysis is therefore extended to two periods, and the politician is concerned not only with rents in the first period but also with the potential second-period income that can be earned if he is re-elected into another term in power. Elections here serve as a disciplining device, wherein voters can punish the politician for an unacceptable quality of governance during the current term (i.e. excessive rent-seeking and/or low provision of public goods) by replacing him with another candidate through the power of the ballot. On the other hand, voters can also reward good governance by renewing the politician's mandate through re-election for another term of office. Thus, the relevant model is one of political agency in the tradition of Barro [1973]; Ferejohn [1986] and Persson and Tabellini [2000] among others. The approach used here details the factors that affect the incumbent politician's utility-maximization calculus when choosing optimal allocation under uncertainty regarding rent-detection and re-election possibilities. A

familiar microeconomic framework of expected utility maximization, followed by comparative statics analysis, therefore proves to be useful.

2.1 The Nature of the Optimum

Consider that the political unit of interest has an exogenous amount of fiscal resources for the present period, given by F . Assume also that these fiscal resources are collected using an optimal tax system such that F represents the public's most-preferred level of government spending. However, as noted earlier, the incumbent may choose to allocate resources between legitimate expenditures on public goods and services, g and rents, r :

$$F = g + r \tag{1}$$

Assume that the politician derives utility exclusively from income, Y . The utility function U is assumed to exhibit conventional properties, most notably that of concavity, i.e.:

$$U = U(Y); U'_Y > 0, U''_{YY} < 0 \tag{2}$$

Excluding private wealth, official wage as a public official, w , and rents if any comprise the politician's total income:

$$Y = w + r \tag{3}$$

Thus, from (1) – (3):

$$U(Y) = U(w + (F - g)) \tag{4}$$

There is a probability p that rent-seeking is detected. Upon detection, a higher authority can then impose a penalty rate α ($\alpha > 1$) on all ill-gotten wealth. That is, not only will the politician have to repay all rents extracted, he must also pay an additional amount proportionate to the degree of rent-seeking discovered. This ensures lower income in the case when rents are positive and are subsequently discovered than the case when rents are zero. Transparency is interpreted here as the degree of observability of government procedures, processes and outputs. As such, it must affect probability of detection, p . As governmental functions become more observable, it is quite acceptable to assume that corruption can be more easily detected. Another variable that can possibly affect the probability of detection is the amount of rents actually extracted, r . It is natural

to assume that as rent-seeking increases in scale, the probability of being detected and penalized also increases. Corruption of a grand scale is presumably easier to detect than small-scale acts of misallocation and misappropriation of public funds. Using the parameter θ to represent the level of transparency in the political unit of interest, the probability of detection function can be specified as:

$$p = p(\theta, r) = p(\theta, F - g); \quad p(0, r) = 0, p(\theta, 0) = 0, p(\theta, r = F) = 1$$

$$p'_{\theta}, p'_r > 0; \quad p''_{\theta\theta}, p''_{rr}, p''_{\theta r}, p''_{r\theta} \geq 0 \quad (5)$$

Of course, if $r = 0$ or $F = g$, then $p = 0$, and conversely if $g = 0$ or $r = F$, then $p = 1$ for any θ . With uncertainty regarding detection or non-detection of rent-seeking, the politician's expected utility function is therefore:

$$E[U] = (1 - p(\theta, r)) \cdot U(w + (F - g)) + p(\theta, r) \cdot U(w + (F - g) - \alpha(F - g)) \quad (6)$$

As mentioned earlier, the politician's choice problem concerns the allocation of public funds either for legitimate expenditures or for rent-extraction. An incumbent who chooses $g = F$ automatically gets $U(w)$ while one who chooses $g < F$ will either have lower or higher utility, depending on whether rent-seeking is detected or not. Also, the politician's performance in terms of providing public goods and services naturally affects his chances of being re-elected to another term in office. As the politician performs better, a greater proportion of the voting public may be convinced that the incumbent is worthy of serving for another term and therefore the probability of re-election increases. A simple specification of the probability of re-election (π) function is therefore given by:

$$\pi = \pi(g); \quad \pi(0) = 0, \pi(g = F) = 1, \quad \pi'_g > 0, \pi''_{gg} \geq 0 \quad (7)$$

From a game theoretic perspective, the probability of re-election function can be considered as the public's reaction function or best response to the politician's strategic allocation of public funds to further his own personal interests. The incumbent wins re-election with certainty if he provides $g = F$. This follows directly from the assumption that F represents the public's most-preferred level of public goods and also allows for more precise conditions for the existence of an interior solution to the politician's maximization problem, which will be discussed later. A natural corollary is when $g = 0$, then there is absolutely no chance of re-election.. The politician therefore faces a trade-off between extracting large first-period rents and maximizing his

probability of re-election by approximating the public's most preferred level of spending on public goods.

Re-election allows the incumbent to capture next-term income $Y_2 = w_2 + r_2$, discounted at a rate of δ . The politician's (nested) expected utility function therefore becomes more complicated with twin uncertainties regarding rent-detection and re-election:

$$E[U] = \pi(g) \cdot [(1 - p(\theta, r)) \cdot U(w + (F - g) + \delta Y_2) + p(\theta, r) \cdot U(w + (F - g) - \alpha(F - g))] \\ + (1 - \pi(g)) \cdot [(1 - p(\theta, r)) \cdot U(w + (F - g)) + p(\theta, r) \cdot U(w + (F - g) - \alpha(F - g))]$$

For notational convenience, let

$$A = w + (F - g) + \delta Y_2$$

$$B = w + (F - g)$$

$$C = w + (F - g) - \alpha(F - g) = w + (1 - \alpha)F - (1 - \alpha)g$$

Re-writing the politician's objective function:

$$E[U] = \pi(g) \cdot [(1 - p(\theta, F - g)) \cdot U(A) + p(\theta, F - g) \cdot U(C)] \\ + (1 - \pi(g)) \cdot [(1 - p(\theta, F - g)) \cdot U(B) + p(\theta, F - g) \cdot U(C)] \quad (8)$$

The politician's lone choice variable is g or the amount of public funds allocated for legitimate public expenditures. First-order or necessary condition for an interior maximum of (8) is:

$$-(1 - p)U'_A \pi + U(A)p'_r \pi - (1 - \alpha)pU'_C - U(C)p'_r + (1 - p)U(A)\pi'_g \\ - (1 - \pi)(1 - p)U'_B + (1 - \pi)U(B)p'_r - (1 - p)U(B)\pi'_g = 0 \quad (9)$$

Note that the structure of the model can be easily modified to allow for the possibility of corner solutions that correspond to particular types of politicians. For a benevolent politician, it may very well be that the first order condition is strictly positive, implying that his expected utility-maximizing choice will simply be $g = F$. A politician that is corrupt by nature on the other hand will choose $g = 0$, with his first-order condition for a maximum being strictly negative. This can be made admissible if the assumptions regarding the probability functions (i.e. $p(0, \theta) = 0$ and $\pi(0) = 0$) are dropped and modified. However, it is the intermediate case, where the politician provides $0 < g < F$, that is most interesting as it is the closest to reality and also lends itself to

proper comparative statics analysis. Thus, for the purposes of this paper it is assumed that the expected utility function (8) is strictly concave to ensure that the solution to (9) is a unique global maximizer in the interior of $E[U]$. With strict concavity, the second-order sufficient condition for an interior maximum is always satisfied by technical assumption. Let the second-order condition (10) be denoted hereafter as S for notational convenience. Note that the first four terms of S on the right-hand side are positive, while all others are negative. The assumption of strict concavity of the expected utility function therefore simply implies that the total absolute value of the negative terms outweighs the combined magnitude of the positive terms.

$$\begin{aligned}
S = & -[(1-p)2\pi'_g(U'_A - U'_B)] - [(U(B) - U(A))2p'_r\pi'_g] + U(C)p''_{rr} \\
& + [(1-p)\pi''_{gg}(U(A) - U(B))] - (1-\pi)2U'_B p'_r + (1-\alpha)2U'_C p'_r \\
& + (1-\pi)(1-p)U''_{BB} + (1-\alpha)^2 pU''_{CC} + (1-p)U''_{AA}\pi \\
& - 2U'_A p'_r \pi - U(A)p''_{rr}\pi - (1-\pi)U(B)p''_{rr} < 0 \quad (10)
\end{aligned}$$

Existence of an interior maximum depends upon the values of parameters in the model. In order to rule out the less interesting possibility of corner solutions at this time, expected utility should be increasing at $g = 0$ and decreasing at $g = F$. If these conditions hold, then the interior maximum exists and $0 < g^* < F$, where g^* is the result derived from the politician's optimization. Recall that at $g = 0$, $p = 1$; $p'_r = 0$; and $\pi = 0$. The condition for positive expected marginal utility at $g = 0$ can therefore be expressed as:

$$\left. \frac{\partial E[U]}{\partial g} \right|_{g=0} = -(1-\alpha)U'_C > 0 \quad (11)$$

This simplifies further to $\alpha > 1$, which is an *a priori* assumption of the model. At $g = F$, $p = 0$; $\pi = 1$; and $\pi'_g = 0$. Expected utility is therefore declining at $g = F$ if:

$$\left. \frac{\partial E[U]}{\partial g} \right|_{g=F} = -U'_A + U(A)p'_r - U(C)p'_r < 0 \quad (12)$$

Re-arranging terms yields a more interpretable expression:

$$U'(w + \delta Y_2) > [U(w + \delta Y_2) - U(w)] \cdot p'_r \quad (12')$$

A necessary condition for (12') to hold is that the politician must not be satiated at $w + \delta Y_2$. Sufficiency entails suitably high expected marginal utility at $w + \delta Y_2$, implying that $w + \delta Y_2$ is small initially relative to the politician's satiation level of income. This in turn implies a low initial official wage w . It is therefore assumed here that w and $w + \delta Y_2$ (which is just equal to $2w$ if the politician chooses $g = F$ for two periods) are sufficiently small initially to ensure the existence of an interior solution to the politician's optimization problem. With an initially low official wage, rent-seeking becomes an attractive proposition for the incumbent who may then choose to extract a portion of public funds for his own personal consumption.

2.2 Comparative Statics

With $0 < g^* < F$, it is worthwhile to examine the effects of changes in the parameters of the model and determine which parameter changes lead to higher allocations for public goods expenditures. Since $g = F$ is the most-preferred level of public goods provision, such parameter changes that result in higher g therefore increase social welfare. Statements here regarding improved social welfare or welfare-increasing effects refer to superior outcomes specifically from the general public's perspective. Let $g^* = g^*(\theta, w, F, \alpha, \delta, Y_2)$ be the optimal level of expenditures on public goods that solves the politician's maximization problem. Substituting this solution back into (9) and differentiating with respect to the different parameters individually will detail how changes in the level of transparency, official wages, the fiscal budget, the penalty rate, the politician's discount rate and potential second-period income separately affect the level of public goods and services provided by the incumbent politician.

a. Transparency

First, consider changes in the transparency parameter. Differentiating (9) with respect to θ and solving for $\partial g / \partial \theta$ yields:

$$\frac{\partial g^*}{\partial \theta} = \frac{1}{S} \cdot \left[\Phi + U(C)p_{r\theta}'' + [U(A) - U(B)]\pi_g' p_\theta' \right] \quad (13)$$

$$\text{where: } \Phi = -U_A' p_\theta' \pi + (1 - \alpha)U_C' p_\theta' - (1 - \pi)U_B' p_\theta' \\ - U(A)p_{r\theta}'' \pi - (1 - \pi)U(B)p_{r\theta}'' < 0$$

The result for transparency is not clear-cut as the sign of the bracketed expression is ambiguous. Heightened transparency in the political unit of interest may or may not increase public goods provision. The end-result quite naturally depends on the politician's preferences and the respective characteristics of the probability functions. This exposes certain limitations of transparency in terms of ensuring improved governance and reducing corruption. To gain some useful insights, ignore first the $U(C)p''_{r\theta}$ term (which may be equal to zero anyway since $p''_{r\theta} \geq 0$). If $U(A)$ is close enough to $U(B)$, then the result is likely congruent with the position of transparency advocates that heightened transparency indeed simultaneously deters corruption and improves public goods provision thereby raising social welfare.

Proximity of these two terms depends upon the concavity of the incumbent's utility function. As utility becomes more concave, $U(A)$ moves progressively closer to $U(B)$, and the positive result becomes more likely to be realized. A more concave utility function necessarily implies greater risk-aversion and the positive effect of improvements in transparency may therefore be a result of the politician's significant aversion to the risk of being detected with positive rents and incurring the corresponding penalties. Thus, only substantially risk-averse politicians will be induced to increase allocations to public goods expenditures with increased transparency.

On the contrary, if $U(A)$ is relatively large compared to $U(B)$ and the politician derives substantially more utility from capturing $w + Y_2$ than w alone given the same amount of rents, then the effect of transparency diminishes. As these two utility values move farther apart, the magnitude of the derivative decreases and the positive effect of transparency can become negligible, null or perhaps even negative. Of course, the last unintuitive result of increased shirking by the agent with a more observant principal is unlikely to occur in reality as well as in this model. The effect of transparency on an incumbent, whose utility is concave of a lesser degree making him more open to taking risks, is therefore decidedly inferior when compared to its effect on an ideal and sufficiently risk-averse counterpart. The former may be more inclined to risk being penalized and losing his opportunity to capture Y_2 in exchange for potentially capturing Y_2 along with positive first-period rents as this will substantially raise total income for the two political terms and maximize overall utility.

One important conclusion from the above discussion is that transparency may produce its desired outcomes only under particular conditions. As such, there is no guarantee that a more transparent environment will automatically result in improved allocation of public funds. This is not meant to

discount the value of transparency as seen by its advocates, since experience has shown its positive effects in most cases. Rather, the result raises the issue of identifying alternative instruments that may complement transparency in achieving its ultimate objective of improving the quality of governance.

b. Official wages

Next, consider the effects of changes in the official wage received by politicians. There is an ongoing debate regarding whether or not increased salaries would reduce public officials' propensity to extract rents. The result from this model, however, does not contribute to a clear resolution of this debate:

$$\frac{\partial g^*}{\partial w} = \frac{1}{S} \cdot \left[\Omega + (1-\alpha)pU''_{CC} + U'_C p'_r + (1-p)U'_B \pi'_g \right] \quad (15)$$

$$\text{where: } \Omega = (1-p)U''_{AA}\pi - U'_A p'_r \pi - (1-p)U'_A \pi'_g \\ + (1-p)(1-\pi)U''_{BB} - (1-\pi)U'_B p'_r < 0$$

The sign of the derivative is ambiguous and it remains unclear whether higher wages contribute to improved performance of public officials. Infinitesimally small increases in initially low wages may have a negligible impact in terms of reducing the attractiveness of rent-seeking as this still represents a viable opportunity to substantially increase utility.

c. Fiscal Resources

Changes in exogenous fiscal resources also yield an indeterminate result:

$$\frac{\partial g^*}{\partial F} = \frac{1}{S} \cdot \left[\Omega + (1-\alpha)^2 pU''_{CC} + (1-\alpha)U'_C p'_r + (1-p)U'_B \pi'_g \right] \quad (16)$$

Ambiguity arises from the presence of a lone positive term $(1-p)U'_B \pi'_g$ in the derivative. Here, the politician's degree of risk-aversion again proves to be the key determinant. For a sufficiently risk-averse incumbent, utility is concave enough such that U'_B is already close to U'_A and the positive term may be dominated by the sum of the negative terms. Then, it is more likely that legitimate expenditures increase with the availability of additional public funds. Perhaps a more interesting query would be to examine how the proportion of total public funds used on legitimate public expenditures varies with changes in the budget. This will show whether a greater portion

of additional public funds are actually used to increase public goods expenditures, or if more resources only result in proportionately more rents for the incumbent. However, the relationship is also ambiguous due to the same lone positive term appearing in the derivative:

$$\frac{\partial(g^*/F)}{\partial F} = \frac{1}{F^2} \left[\frac{F}{S} \cdot \left(\Omega + (1-\alpha)^2 p U''_{CC} + (1-\alpha) U'_C p'_r + (1-p) U'_B \pi'_g \right) - g \right] \quad (17)$$

The results for changes in the budget show no clear relationship between available resources and government outputs. Additional resources may either mean more public goods or larger rents, depending exclusively on how the incumbent chooses to allocate public funds. A moderate politician is more likely to provide more public goods with increased funds, while a greedy politician may envisage additional resources only as an opportunity to augment income by raising rent-extraction, leaving the net effect on public goods provision unclear in such a case.

d. Penalty rate

Now, consider the effect of a higher penalty rate for discovered ill-gotten wealth. The higher penalty rate serves as a greater disincentive or negative reinforcement for rent-seeking behavior. From (18) below, an increase in the penalty rate yields unambiguously positive results:

$$\frac{\partial g^*}{\partial \alpha} = \frac{1}{S} \cdot \left[-(1-\alpha) p U''_{CC} (F-g) - U'_C p - U'_C p'_r (F-g) \right] > 0 \quad (18)$$

Since $\alpha > 1$, the bracketed expression is unambiguously negative and with $S < 0$, the result is clear that imposing higher penalty rates compels the incumbent politician to increase spending on legitimate expenditures and reduce rent-extraction. A higher penalty rate ensures substantially lower income and utility if rent-seeking is discovered than when rents are equal to zero. Higher penalty rates therefore dissuade the politician from extracting rents as large as he would have appropriated for himself under lower penalty rates.

e. Potential second-period income

While a higher penalty rate serves as a disincentive for corruption, the presence of higher potential second-period income on the other hand serves as a greater incentive to perform well as the incumbent. Once the politician recognizes that the benefits from capturing a successive term are large, and that the best means of capturing these is through better performance to maximize the probability of re-election, higher potential second-period income becomes an effective

positive reinforcement for reducing rent-extraction and improving the delivery of governmental functions. Higher penalties and larger potential future income can therefore be considered as the two different sides of the same incentives coin. As such, the comparative static results for Y_2 , yields a similar unambiguously positive result:

$$\frac{\partial g^*}{\partial Y_2} = \frac{1}{S} \cdot \delta \cdot \left[(1-p)U''_{AA}\pi - U'_{Ap_r}\pi - (1-p)U'_{Ag} \right] > 0 \quad (19)$$

A higher Y_2 indeed induces higher expenditures on public goods from the politician. Conversely, in situations where future benefits from good performance and re-election are low, public goods provision would be inferior as the politician may no longer be interested in capturing Y_2 and only maximizes current-period rents instead. It is interesting to note that if the analysis is extended to include psychological or ego rents, reputation and power, the parameter Y_2 presumably takes on higher values in large, populous, resource-rich, high-income, developed and influential political units. Provision of public goods in such areas may therefore be superior to other political units.

f. Discount rate

Following from the structure of the model, the result for variations in the discount rate are very similar to the result for second-period income:

$$\frac{\partial g^*}{\partial \delta} = \frac{1}{S} \cdot Y_2 \cdot \left[(1-p)U''_{AA}\pi - U'_{Ap_r}\pi - (1-p)U'_{Ag} \right] > 0 \quad (20)$$

It is important to note here that the discount rate as used in the model is subjective in the sense that it depends on the relative preference of the politician for present and future income. If the incumbent has a high marginal rate of time preference and values present income significantly more than income to be received in the future, then he would be more inclined to maximize first-period rents and essentially forego potential second-period income. Conversely, if the incumbent has a low marginal rate of time preference and consequently a high δ , then future income yields nearly the same utility as present income and politician would be more interested capturing the benefits of re-election. Thus, public goods provision rises as the politician becomes more patient in terms of his valuation of future income streams, or as the subjective discount rate δ increases.

The results from this section clearly identify four factors that unambiguously raise social welfare through improved public goods provision while simultaneously reducing corruption. However,

from a policy standpoint, the result for the discount rate is not particularly useful since it is very difficult to ascertain, much less influence, the preferences of politicians for present or future income. Two policy instruments, specifically the penalty rate and the potential future income variable, provide a solid basis for a more incentive-driven approach to the problem of controlling politicians. Instead of focusing exclusively on guarding against rent-extraction by effectively regulating every action and decision of politicians at every step of the governance process, there is also a need to reevaluate and revamp the incentives scheme in the political market. Some policy implications include raising the penalty rate to more severe levels such that the negative reinforcement for corrupt acts becomes more binding and formidable. Also, the incentive to perform well while in office can be enhanced by increasing the effective Y_2 facing the incumbent. This can be accomplished by paying subsequently higher wages to public officials who continue to win re-election for successive political terms. Another alternative is awarding lump-sum grants to politicians who get re-elected to another term in the same political position. In any case, increasing Y_2 can be done under the premise of financially rewarding politicians who have performed well enough, based on the evaluation of their constituents, to merit re-election.

These policy implications are consistent with the general prescriptions of principal-agent theory under unobservable effort. Rather than insisting on making agent effort as observable as possible by perpetually demanding increased transparency, focus must be on improving the structure of incentives faced by the incumbent in order to align his own selfish interests with the collective concerns of his constituents. Again, following from principal-agent theory, the optimal level of transparency may therefore be limited to identifying reliable benchmarks or indicators that accurately relate agent effort with observed outcomes. An optimally designed incentives scheme can then be relied upon to ensure that the politician does not shirk or renege on the terms of his contract, thereby moving the outcome of the entire contracting process toward greater efficiency.

3. The model with term limits

If the incumbent faces a binding term limit such that re-election is no longer possible, then the relevant framework of analysis is reduced to a single period model of utility maximization. However, since uncertainty regarding detection or non-detection of rent-seeking behavior persists, the politician's problem still involves choosing the optimal allocation of public resources between legitimate public expenditures and rents to maximize expected utility. The relevant objective function is (6) and the necessary condition for an interior maximum is:

$$-(1-p(\theta, r)) \cdot U'_B + U(B) \cdot p'_r - (1-\alpha) \cdot p(\theta, r) \cdot U'_C - U(C) \cdot p'_r = 0 \quad (21)$$

The expected utility function with term limits (6) is strictly concave and the sufficient condition for an interior maximum is satisfied as all terms in the second-order condition (S') are negative:

$$S' = (1-p)U''_{BB} - 2U'_B p'_r + (1-\alpha)2U'_C p'_r + (1-\alpha)^2 p U''_{CC} - [U(B) - U(C)] p''_{rr} < 0 \quad (22)$$

In this case, existence of an interior maximum follows directly from the assumption that $\alpha > 1$ and further assumptions regarding the initial level of the official wage need not be made. A similar comparative static analysis can now be undertaken to verify the effects, if any, of the introduction of a binding term limit on the results gathered from the complete two-period model.

a. Transparency

Here, increased transparency now has an unambiguously positive effect on the level of public goods expenditures allocated by the politician:

$$\frac{\partial g}{\partial \theta} = \frac{1}{S'} \cdot \left[-U'_B p'_\theta + (1-\alpha)U'_C p'_\theta - [U(B) - U(C)] p''_{r\theta} \right] > 0 \quad (23)$$

Such a result is consistent with the advocacies of transparency proponents. As governance becomes more transparent, with more observable and participatory processes and procedures, the incumbent is compelled to reduce rent-extraction and instead increase allocations for legitimate expenditures. It is interesting to note, however, that such an effect only occurs in the presence of term limits. This is analogous to an industry where the leader firm is effectively shielded from competition, as in the case of a natural monopoly. With a natural monopoly, it is the potential entrant that faces barriers to entry. On the contrary, term limits impose the barrier to competition on the incumbent himself in the sense that he is automatically disqualified from competing for the next political term. Transparency measures here are akin to economic regulation of a monopolistic industry. In an environment where competition is imperfect or absent, such regulatory measures are more effective in disciplining the incumbent even in the political market. This may be due to outcomes initially being significantly lower than optimal with such barriers to competition such that any improvement in regulatory practices or, in this case transparency measures, automatically results in improved welfare.

b. Official wage

The same indeterminate result for changes in the official wage is maintained in this restricted model. Increased salaries for politicians facing a binding term limit may or may not result in welfare-increasing outcomes, depending on the preferences of the incumbent as well as the characteristics of the probability of detection function.

$$\frac{\partial g}{\partial w} = \frac{1}{S'} \cdot \left[(1-p)U''_{BB} + (1-\alpha)pU''_{CC} - U'_B p'_r - U'_C p'_r \right] \quad (24)$$

c. Fiscal resources

A more informative and useful result is achieved for changes in fiscal resources available to the political unit of interest:

$$\frac{\partial g}{\partial F} = \frac{1}{S'} \cdot \left[(1-p)U''_{BB} - U'_B p'_r + (1-\alpha)^2 pU''_{CC} + (1-\alpha)U'_C p'_r \right] > 0 \quad (25)$$

The terms in the bracketed expression are all negative and therefore the derivative in (26) is unambiguously positive. Actual expenditures on public goods increase as the budget expands. However, it still remains unclear whether the proportion of public funds used for public goods provision improves with additional resources:

$$\frac{\partial(g/F)}{\partial F} = \frac{1}{F^2} \left[\left(\frac{F}{S'} \cdot \left((1-p)U''_{BB} - U'_B p'_r + (1-\alpha)^2 pU''_{CC} + (1-\alpha)U'_C p'_r \right) \right) - g \right] \quad (26)$$

While g is sure to rise, the proportion of resources used for public goods expenditures may or may not improve with an increased budget. This suggests that legitimate expenditures certainly increase in absolute terms, although it is uncertain whether the greater portion of additional funds is allocated for public goods or for the politician's private consumption.

d. Penalty rate

The final result from this model with binding term limits supports the earlier conclusion about changes in the penalty rate:

$$\frac{\partial g}{\partial \alpha} = \frac{1}{S'} \cdot \left[-(1-\alpha)pU''_{CC}(F-g) - U'_C p - U'_C p'_r(F-g) \right] \quad (27)$$

Again, the result is unambiguously positive and it can be concluded that higher penalty rates are associated with better performance of incumbent politicians, regardless of their eligibility for re-election. Conversely, in regimes where penalties are low, corruption is more severe and public goods provision is inferior, to the detriment of public welfare.

4. Empirical findings

Conclusions from the preceding theory are testable hypotheses that can be subjected to empirical validation. Specifically, the positive effect of higher potential second-period income and higher penalty rates on public goods provision can be verified using actual data to determine if the predictions of theory are consistent with observed occurrences. Due to data limitations, however, the result for the discount rate and voting behavior cannot be empirically tested here. The ambiguous results from the theoretical model may also be resolved by the statistical relationships established in this section.

4.1 The data

A panel including all cities in the Philippines for the period 1996-2000 is used in the following econometric exercise. There are a total 115 cities in the sample, which was the total number of cities in the Philippines as of the year 2002. The variables in the panel data set include proxies for transparency, the official wage, the effective penalty rate and potential second period income, as well as actual data on the fiscal condition of the cities in the sample. Table 1 contains a brief description of these variables, while Table 2 presents descriptive statistics.

Since there is no natural measure of transparency, a number of proxy variables are used. Recall that transparency in the theoretical model served primarily to increase the probability that corruption will be detected. In practice, the demand for a more transparent system of governance and increased probability of detection may arise from three possible factors: a strong political opposition; a substantial proportion of constituents that did not vote for the incumbent who would therefore be more critical and observant of the incumbent; and greater media presence. These sectors are keen on exposing malfeasance on the part of the incumbent either by nature or because they have the most to gain from a shift in the political balance of power.

Table 1. Variable Definitions
Sample: 115 cities, 1996-2000

Variable	Definition
Capital Outlays	The city's total allocation for capital expenditures
PC Capital Outlays	Per-capita capital expenditures
Share of Capital Expenditures	Ratio of expenditures on capital outlays to total expenditures
IRA	Internal Revenue Allotment of the city
PC IRA	Internal Revenue Allotment per capita
Class i	i^{th} income class dummy ($i = 1, 2, 3, 4, 5, 6, \text{special}$)
Re-electionist	= 1 if the incumbent ran for re-election for the next term; = 0 otherwise
SB Case	= 1 if a graft case is filed against the incumbent with the <i>Sandiganbayan</i> ; = 0 otherwise
Share of total votes cast	Ratio of votes obtained by the incumbent to total votes cast
Winning Margin	Votes obtained by the incumbent less votes obtained by the second-place candidate
Non-party vice-mayor	= 1 if the city vice-mayor is not from the same political party as the mayor; = 0 otherwise
Opposition in Council	Ratio of non-partymates to total number of members in the local council (including the vice-mayor who heads the body)
Local Newspapers 1	Number of newspapers based or operating within the city
Local Radio Stations 1	Number of radio stations based or operating within the city
Local Newspapers 2	Number of newspapers based or operating within the city, including national broadsheets which are attributed to each city within the National Capital Region (NCR)
Local Radio Stations 2	Number of radio stations based or operating within the city, including nationwide broadcasts which are attributed to each city within the National Capital Region (NCR)

Note: Capital outlays, the IRA and their respective per-capita values are all expressed in year 2000 prices.

Thus, proxy variables measuring the degree of influence exerted by each of these three sectors are used as measures of transparency. A vice-mayor from a political party other than the incumbent's own is an ideal measure of the opposition's political power. Another is the proportion of seats in the local council occupied by non-partymates of the incumbent. The ratio of votes obtained by the incumbent to total votes cast and the winning margin gauges the strength of non-supporters, while the number of local newspapers and local radio stations in the city naturally measures the extent of media presence in the locality.

Information on the actual wages received by city mayors is very difficult to obtain. As such, a proxy is also used in the form of the city's income class. Cities in the Philippines are classified into six income classes (seven including the special income classification for Manila and Quezon City, the two richest cities) and pursuant to Republic Act No. 6758 or the Compensation and Position Classification Act of 1989, maximum salaries for positions in local government units are

now dependent upon their respective financial capabilities and resulting classification. Dummy variables for each income class are therefore introduced as proxies for city mayor salaries.

Penalties for public officials convicted of corruption are uniform for all as these are prescribed by national statutes. In order to introduce variations in the penalty rate variable, a dummy variable for a graft case filed against the incumbent in the *Sandiganbayan* (the Philippines' special court for cases of graft and corruption) is introduced. Having an actual case filed in court makes the penalties for corrupt acts more real and tangible from the point of view of the politician and the effective penalty rate faced by such incumbents can therefore be considered as more serious.

Table 2. Descriptive Statistics

Variable	Number of Observations	Mean	Standard Error	Minimum	Maximum
Capital Outlays	554	42.0	88.9	0	893.0
PC Capital Outlays	554	209.918	339.707	0	2,835.844
Share of Capital Expenditures	554	0.10126	0.10821	0	0.58624
IRA	554	192.0	205.0	11.1	1,400.0
PC IRA	554	1,096.338	806.787	131.371	4,552.588
Class 1	575	0.40870	0.49202	0	1
Class 2	575	0.12174	0.32727	0	1
Class 3	575	0.0800	0.27153	0	1
Class 4	575	0.04174	0.20017	0	1
Class 5	575	0.01739	0.13084	0	1
Class 6	575	0.00174	0.04170	0	1
Special Class	575	0.01739	0.13084	0	1
Re-electionist	560	0.63393	0.48216	0	1
SB Case	575	0.07130	0.25756	0	1
Share of total votes cast	575	0.57082	0.14491	.2352	.9177
Winning Margin	541	23,169.77	43,983.42	154	337,289
Non-party vice-mayor	575	0.34087	0.47441	0	1
Opposition in council	575	0.37335	0.29279	0	1
Local Newspapers 1	575	2.55652	3.94516	0	25
Local Radio Stations 1	575	3.55304	6.22378	0	36
Local Newspapers 2	575	3.91304	4.80412	0	25
Local Radio Stations 2	575	9.25044	15.92228	0	52

Note: All relevant figures for capital outlays and the IRA are in millions of pesos.

For potential second period income, another dummy variable is used, in this case indicating whether or not the incumbent ran for re-election for the succeeding political term. Since the sample period used (1996-2000) is divided between two political terms for local officials, 1995-1998 and 1998-2001, a few clarifications must be made here. The years 1996, 1997 and 1998 are attributed to the mayor who won the 1995 elections, while the years 1999 and 2000 are for the 1998 winner. It is more appropriate to attribute the year 1998 to the mayor elected in 1995 as he is the one who approved the budget and is therefore more accountable for the distribution of

expenditures for the said year. The same division also applies to election data used as transparency measures (i.e. the ratio of votes obtained to total votes cast and winning margin). As for the media presence transparency variables, data are from the Philippine Media Factbook as published by the Philippine Information Agency (PIA). Figures for years 1996 and 1997 are from the 1995 edition; 1998 and 1999 figures are from the 1998 edition; and the 2000 figures are from the 2000 edition of the said Factbook, as these are the only relevant years when updated editions were released.

Public funds are exogenous in the theoretical model and the Internal Revenue Allotment (IRA) is therefore a suitable measure of local resources. Expenditures on capital outlays are considered here as the indicator of total spending on public goods provision since outputs from such expenditures are more conspicuous and observable. All fiscal data are deflated to reflect year 2000 prices using provincial or city-level consumer price indices (CPI). Per-capita figures are computed by extrapolating city population totals from the 1995 and 2000 censuses. Data are from the following government agencies: Commission on Elections (COMELEC); Bureau of Local Government Finance (BLGF) of the Department of Finance; the *Sandiganbayan*; and the Philippine Information Agency.

A note on the appropriateness of the dataset used needs to be made here. The theoretical model presupposes that the mayor has sole responsibility of allocating public funds. In practice, however, this is not exactly the case as the local council in the exercise of their legislative powers must authorize the proposed budget through an ordinance before it becomes effective for the upcoming fiscal year. Nonetheless, the mayor still has the most influential position in terms of crafting the budget. Not only is the mayor responsible for the initial allocation of funds through budget preparation, he also exercises veto power over possible changes that the local council may introduce to such preliminary allotments. Further, the local council cannot increase initially proposed amounts and therefore final allotments can be considered at the most to be the mayor's preferred share for each budgetary item. Although the local council can still overturn vetoed provisions with a two-thirds majority vote, their power to influence the budget is limited by the mayor's initial limit or cap on expenditure items and the possible difficulty of amassing such a high proportion of votes to possibly overturn vetoed provisions.

4.2 Estimation results

The random-effects Generalized Least Squares (GLS) model for panel data estimation is used as the primary method in generating empirical conclusions from the aforementioned information on Philippine cities. Hausman specification test-statistics for the three models considered are all statistically significant, indicating that the random-effects model is more appropriate than fixed-effects model in this case. This may be due to the diversity of cities across the country, which necessitates the treatment of the intercepts of the regression equations as random variables. Using the random-effects model also allows for inferences regarding the entire population of local government units in the Philippines, from which the sample of cities is drawn. Other panel data estimation methods, specifically the population-averaged and maximum-likelihood models are also employed subsequently as a test of robustness of results.

a. Random-effects GLS estimates

As mentioned earlier, three alternative specifications are estimated, with (a) real capital expenditures; (b) real per-capita capital expenditures; and (c) the share of capital outlays to total expenditures, respectively, as dependent variables. Each specification uses different sets of regressors corresponding to the parameters considered in the theoretical model. The signs of the estimated coefficients can now be compared with the comparative static results derived earlier to determine if the conclusions from theory hold up to empirical scrutiny.

Consider first the results in Table 3, where real capital expenditures is specified as the dependent variable. Regression 1c corresponds to the most complete model and its resulting estimates are discussed here. Although the coefficients of the re-electionist and SB-case dummies are not statistically significant by themselves, their interaction terms with the IRA are significant at the 5-percent and 10-percent levels, respectively. This result can be interpreted by examining the effect of changes in the IRA. Disregarding the intercept, the total effect of the IRA on capital expenditures is equal to $0.13 + 0.06 \times \text{Re-electionist} + 0.07 \times \text{SB-case (lagged)}$. For non-re-electionists who also do not face a pending graft case, 13-percent or 13 centavos per peso of IRA is used for capital expenditures. On the other hand, re-electionists, regardless of pending graft charges, use 19 centavos per peso while mayors who face graft charges, regardless of re-election status, allocate 20 centavos per peso of such transfers to capital outlays. If the mayor is both a re-electionist and faces a pending charge in the graft courts then he allocates 26 centavos per peso of IRA to infrastructure projects. Average real Internal Revenue Allotment to cities for the period

Table 3. Determinants of Real Capital Expenditures
(Random-Effects GLS estimates)

Dependent Variable: Real capital expenditures of Philippine cities, 1996 – 2000.

Explanatory Variable	Regression 1a		Regression 1b		Regression 1c	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
IRA	0.16828^a (0.04440)	0.000	0.13167^a (0.04578)	0.004	0.13211^a (0.04592)	0.004
Class 1	1.28e+07 (1.69e+07)	0.451	1.04e+07 (1.68e+07)	0.538	8,849,238 (1.70e+07)	0.602
Class 2	-1.21e+07 (2.07e+07)	0.559	-6,825,547 (2.04e+07)	0.738	-7,840,690 (2.06e+07)	0.703
Class 3	-5,027,678 (2.35e+07)	0.831	1,512,209 (2.31e+07)	0.948	1,587,222 (2.35e+07)	0.946
Class 4	1,486,170 (3.46e+07)	0.966	9,825,330 (3.39e+07)	0.772	1.16e+07 (3.41e+07)	0.734
Class 5	3.40e+07 (4.72e+07)	0.471	3.91e+07 (4.61e+07)	0.397	4.06e+07 (4.65e+07)	0.383
Special Class	-8.53e+07 (6.49e+07)	0.188	-1.11e+08^c (6.38e+07)	0.081	-1.19e+08^c (6.43e+07)	0.065
Re-electionist	-8,053,412 (9,043,979)	0.373	-8,246,389 (8,955,756)	0.357	-1.04e+07 (9,091,085)	0.253
Re-electionist*IRA	0.05965^b (0.02872)	0.038	0.05648^b (0.02847)	0.047	0.06009^b (0.02885)	0.037
SB-case (lagged)	-6,266,948 (1.75e+07)	0.720	-8,891,132 (1.74e+07)	0.609	-1.04e+07 (1.74e+07)	0.549
SB-case (lagged)*IRA	0.05887 (0.04422)	0.183	0.06746 (0.04402)	0.125	0.07484^c (0.04451)	0.093
Share of total votes cast					-2.31e+07 (2.78e+07)	0.407
Non-party vice-mayor					-9,660,646 (8,045,748)	0.230
Local Newspapers 2			-2,584,640 (1,647,890)	0.117	-2,531,693 (1,653,778)	0.126
Local Radio Stations 2			2,020,955^a (561,976)	0.000	2,073,017^a (565,650)	0.000
Constant	2,773,165 (1.30e+07)	0.831	1,800,436 (1.30e+07)	0.890	1.91e+07 (2.12e+07)	0.368
R²	0.2126		0.2630		0.2639	
Prob > χ^2	0.0000		0.0000		0.0000	
N	437		437		437	

Note: Figures in parentheses are standard errors. Superscripts indicate a = statistical significance at the 1% level; b = statistical significance at the 5% level; and c = statistical significance at the 10% level.

considered is 192 million pesos. Thus, on the average, re-election prospects and the threat of a graft case are separately associated with 11.52 million and 13.44 million pesos more capital expenditures from city mayors. Congruent with the predictions of theory, these incentives variables induce higher expenditures on public goods and the combined effects of which can amount to about 25 million pesos additional capital outlays annually.

Results for real per-capita capital expenditures are presented in Table 4. Estimates from Regression 2c reveal that both the re-electionist dummy as well as its interaction term with per-

capita IRA are both statistically significant in explaining the variation in per-capita capital expenditures. While the coefficient of the re-electionist dummy is negative, the total effect of a change in re-election status is $-111.89 + 0.13 \times \text{PC IRA}$ and given that average per-capita IRA is 1,096.34 pesos, the net effect of re-election prospects is still positive at an average of 30.63 pesos. Average population in the cities considered is 214,462 and this effect sums up to around 6.57 million pesos of additional capital expenditures per year.

Table 4. Determinants of Real per-capita Capital Expenditures

(Random-Effects GLS estimates)

Dependent Variable: Real per-capita capital expenditures of Philippine cities, 1996 – 2000.

Explanatory Variable	Regression 2a		Regression 2b		Regression 2c	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
PC IRA	0.16206^a (0.03510)	0.000	0.17703^a (0.03545)	0.000	0.13702^a (0.03844)	0.000
Class 1	48.44129 (50.26554)	0.335	-2.07520 (55.56775)	0.970	-3.20454 (57.27327)	0.955
Class 2	-120.10970^c (71.94043)	0.095	-133.77760^c (71.17657)	0.060	-128.93390^c (73.10602)	0.078
Class 3	-70.91866 (83.02710)	0.393	-83.54326 (82.04251)	0.309	-116.37460 (84.07361)	0.166
Class 4	-40.64859 (115.98140)	0.726	-50.54658 (114.68480)	0.659	-61.39106 (125.62020)	0.625
Class 5	435.50690^a (149.45710)	0.004	431.10040^a (147.38250)	0.003	422.03830^a (147.00480)	0.004
Special Class	-11.78790 (146.86900)	0.936	-192.33640 (158.80390)	0.226	-228.44350 (165.34580)	0.167
Re-electionist	-67.94857 (51.03501)	0.183	-72.71814 (50.76106)	0.152	-111.89360^b (51.56043)	0.030
Re-electionist*PC IRA	0.08362^b (0.03524)	0.018	0.08625^b (0.03504)	0.014	0.13408^a (0.03730)	0.000
SB-case (lagged)	74.43209 (96.27900)	0.439	67.86982 (95.77426)	0.479	62.70042 (90.81653)	0.490
SB-case (lagged)*PC IRA	-0.02205 (0.05962)	0.711	-0.02160 (0.05926)	0.715	-0.01172 (0.05669)	0.836
Winning margin					0.00025 (0.00041)	0.534
Opposition in council					50.74896 (54.55810)	0.352
Local Newspapers 2			-3.30387 (5.83523)	0.571	-5.33460 (6.30694)	0.398
Local Radio Stations 2			4.60957^b (1.84594)	0.013	4.81008^b (1.96872)	0.015
Constant	-1.72803 (51.46805)	0.973	-18.98518 (52.66745)	0.718	-7.69942 (58.52985)	0.895
R²	0.2696		0.2894		0.3056	
Prob > χ^2	0.0000		0.0000		0.0000	
N	437		437		405	

Note: Figures in parentheses are standard errors. Superscripts indicate a = statistical significance at the 1% level; b = statistical significance at the 5% level; and c = statistical significance at the 10% level.

Using the previous approach, the total effect of a change in fiscal transfers is $0.14 + 0.13 \times \text{Re-electionist}$. For non-reelectionist mayors, 1 peso of per-capita IRA translates to 14 centavos worth of per-capita capital outlays. Conversely, re-electionists spend 27 centavos per peso of their allotments for capital expenditures. With this difference of 13 centavos per peso and given the mean per-capita IRA and mean population figures given earlier, re-electionist mayors allocate around 30.57 million pesos more annually for infrastructure and similar projects within their jurisdictions.

In terms of predicting the share of capital outlays to total expenditures, Regression 3c in Table 5 shows that the SB-case dummy is statistically significant at a 90-percent level of confidence. A city mayor facing a formal graft charge tends increase the share of capital expenditures by about 2.8 percent. With average total expenditures at 397 million pesos, this increase corresponds to around 11.12 million pesos annually in real absolute terms.

Results for the two incentives variables are therefore robust, as shown by their implied independent effects and the increased efficiency of use of the Internal Revenue Allotment by a re-electionist or a mayor with a pending graft charge. Gains in terms of increased capital expenditures attributable to the presence of potential second period income or higher effective penalty rates range from 6.57 million to as much as 30.57 million pesos annually. Using the median estimate of 11.52 million per year, the gains amount to a 34.56 million peso increase for a three year political term. The Department of Public Works and Highways (DPWH) constructs 7 meter \times 8 meter classrooms at a cost of 250, 000 pesos each [DPWH 2004]. Translating the estimated monetary value of 11.52 million into a discernible government project or output such as a classroom reveals that the incentives variables can potentially account for 46 new classrooms or 2,576 square meters of new classroom area annually for the constituents of a particular city. If the liberal estimate of 30.57 million pesos is used, the figures rise to about 122 new classrooms or an additional 6,848 square meters of classroom area per year. For one political term, the numbers sum up to 366 additional classrooms with a total area of 20,544 square meters.

Among the other explanatory variables, only the IRA (real and real per-capita) remains statistically significant in all three regression equations. Some of the income class dummies come out significant in one equation or another, although the signs of the coefficients seem to lead to conflicting conclusions. Also, from the set of transparency variables considered, only the number of radio stations operating in the city appears to positively influence the incumbent's allocation for capital outlays, although the magnitude of the coefficients are remarkably far apart.

Table 5. Determinants of the Share of Real Capital Expenditures

(Random-Effects GLS estimates)

Dependent Variable: Share of capital expenditures of Philippine cities, 1996 – 2000.

Explanatory Variable	Regression 3a		Regression 3b		Regression 3c	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
IRA	1.01e-10^b (4.91e-11)	0.039	1.37e-10^b (5.43e-11)	0.012	1.34e-10^b (5.48e-11)	0.015
Class 1	0.04093^b (0.01981)	0.039	0.04449^b (0.01998)	0.026	0.04601^b (0.02010)	0.022
Class 2	0.02122 (0.02387)	0.374	0.01937 (0.02391)	0.418	0.02145 (0.02409)	0.373
Class 3	0.02408 (0.02644)	0.362	0.01976 (0.02656)	0.457	0.02483 (0.02704)	0.358
Class 4	0.08930^b (0.03900)	0.022	0.08781^b (0.03908)	0.025	0.08823^b (0.03915)	0.024
Class 5	0.17912^a (0.05278)	0.001	0.17348^a (0.05290)	0.001	0.17888^a (0.05320)	0.001
Special Class	-0.13626^c (0.07514)	0.070	-0.17932^b (0.07977)	0.025	-0.17951^b (0.08019)	0.025
Re-electionist	0.00013 (0.00972)	0.989	-0.00052 (0.00973)	0.957	-0.00255 (0.00994)	0.798
SB-case (lagged)	0.02768 (0.01694)	0.102	0.02774 (0.01691)	0.101	0.02817^c (0.01693)	0.096
Share of total votes cast					-0.03847 (0.03788)	0.310
Non-party vice-mayor					0.00272 (0.01110)	0.806
Local Newspapers 1			-0.00153 (0.00216)	0.480	-0.00159 (0.00217)	0.465
Local Radio Stations 1			-0.00142 (0.00155)	0.362	-0.00135 (0.00156)	0.386
Constant	0.04907^a (0.01475)	0.001	0.05169^a (0.01500)	0.001	0.07275^a (0.02714)	0.007
R²	0.1181		0.1263		0.1281	
Prob > χ^2	0.0003		0.0003		0.0008	
N	437		437		437	

Note: Figures in parentheses are standard errors. Superscripts indicate a = statistical significance at the 1% level; b = statistical significance at the 5% level; and c = statistical significance at the 10% level.

b. Population-averaged and maximum-likelihood estimates

Alternative estimation procedures are considered also as a test of robustness. Since the incentives variables are simultaneously significant in Regression 1c, this is estimated again using the population-averaged and the maximum-likelihood random effects models. Estimation results from these models are compared with the original random-effects GLS estimates obtained earlier in Table 6, where only the statistically significant variables are presented. The interaction terms of the re-electionist and lagged SB-case dummy variables remain positive and statistically significant, although the levels of significance for the population-averaged estimates are both clearly higher than those of GLS. Estimated coefficients from the three procedures are practically

the same with the GLS estimates having the largest standard errors for all five statistically significant regressors.

Conveniently, these five regressors correspond to different parameters considered in the theoretical model. The results from theory can therefore be verified by checking the signs of the estimated coefficients. As discussed earlier, empirical evidence supports the theoretical conclusions for the penalty rate and the potential second period income parameters. The ambiguous result for changes in the public resources parameter may also be resolved by the consistently positive coefficient for the IRA in all regression equations considered. Based on the data, it appears that an increased budget or more accurately increased fiscal transfers from the national government, leads to unambiguously higher provision of public goods.

While ambiguous results for changes in the official wage were also obtained from theory, the sign of the coefficient for the special income class dummy variable seems to indicate that higher wages are associated with lower public goods expenditures. However, due to the crude nature of this proxy for wages, one important qualification must be made. Note that the special income class is conferred only to two of the most urbanized cities, Manila and Quezon City. Thus, lower capital expenditures may be brought about by the considerable physical infrastructure already present in these cities that make further substantial expenditures of this type unnecessary, at least perhaps for the sample period used. Most infrastructure projects in these cities are also funded by the national government due to their metropolitan nature and status as national capital or center of government.

Table 6. Alternative Estimators for the Statistically Significant Regressors in Regression 1c
Dependent Variable: Real capital expenditures of Philippine cities, 1996 – 2000.

Explanatory Variable	Random-Effects GLS		Population Averaged		Maximum - Likelihood	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
IRA	0.13211 ^a (0.04592)	0.004	0.13331 ^a (0.04495)	0.003	0.13090 ^a (0.04493)	0.004
Special Class	-1.19e+08 ^c (6.43e+07)	0.065	-1.20e+08 ^c (6.33e+07)	0.058	-1.17e+08 ^c (6.25e+07)	0.061
Re-electionist*IRA	0.06009 ^b (0.02885)	0.037	0.05971 ^b (0.02791)	0.032	0.06049 ^b (0.02847)	0.034
SB Case (lagged)*IRA	0.07484 ^c (0.04451)	0.093	0.07573 ^c (0.04307)	0.079	0.07390 ^c (0.04402)	0.093
Local Radio Stations 2	2,073,017 ^a (565,650)	0.000	2,076,341 ^a (556,188)	0.000	2,069,858 ^a (548,680)	0.000

Note: Figures in parentheses are standard errors. Superscripts indicate a = statistical significance at the 1% level; b = statistical significance at the 5% level; and c = statistical significance at the 10% level. Other regressors included are: Income class 1 to 5 dummies; Re-electionist dummy; SB-case dummy; Share of total votes cast; Non-partymate vice-mayor dummy; and Local newspapers 1.

Finally, the seemingly positive result for transparency in the form of the number of radio stations also needs to be qualified. The sheer number of radio stations based in the National Capital Region, where most of the richest and high-expenditure cities are located, may have accounted for such a large estimated coefficient. It may not necessarily follow therefore that increased media presence and a high probability of detection for rent-seeking directly result in improved allocations for capital expenditures.

In summary, the preceding empirical exercise validated the earlier theoretical predictions concerning the favorable effects of incentives variables on incumbent behavior. Ambiguity in terms of the effect of greater resources on public goods provision also seems to have been resolved through empirical analysis showing that this effect is indeed positive. The other ambiguous results, particularly for changes in the official wage and the level of transparency, however, remain unresolved as empirical findings are still inconclusive.

5. Concluding remarks

The results from this paper are consistent with the general prescriptions of classic principal-agent theory. When the agent's effort level is unobservable from the point of view of the principal, the optimal contract necessarily specifies proper incentives designed to align the former's interests with those of the latter. Identification and use of indicators that accurately relate observable outcomes to the actual effort level exerted by the agent also becomes an important aspect of the contracting process. However, while it has been generally recognized that the voter-politician relationship is clearly of this classic principal-agent type, focus on the use of transparency to control politicians seems to overlook P-A literature's standard and robust recommendations for deterring shirking behavior.

Over-reliance on transparency instruments is comparable to a principal insisting on making the agent's effort level as observable as possible. However, given that not all information is contractible, full transparency may not be attainable. It may not even be desirable when the considerable costs involved in terms of constant monitoring, consultation, documentation and auditing are taken into account. This is not meant to discount the value of transparency, which has been proven to be effective in improving the quality of governance in many cases. Rather, the results in this paper suggest that optimal transparency may not necessarily be full transparency as this amounts to an attempt to solve the moral hazard problem by forcing the agent to reveal his

true effort level. The agent in turn can simply attempt to circumvent these measures through his informational advantage in order to further his own interests.

Thus, given that such an approach is impracticable, the lessons from standard P-A theory are echoed by this paper in terms of dealing with incumbent politicians. Instead of focusing exclusively on demanding full transparency, the optimal contract for politicians must address the structure of incentives while identifying a minimum contractible level of transparency. Optimal transparency here is envisioned as the contractible level of information that can be demanded from the incumbent, which relate governance outcomes to the actual effort level exerted by the politician. As in any contract subject to unobservable effort, such indicators that accurately reflect agent effort become a vital feature of the optimal contract. Identifying such benchmarks or indicators that accurately relate government policy outputs and outcomes to the incumbent's competence and diligence in the discharge of his functions must therefore be an integral part of efforts to control politician behavior.

The structure of incentives faced incumbent politicians must also be addressed. As elaborated on in this paper, a proper incentives scheme reinforcing good governance can lead to improved outcomes for the constituency. Both incentives for efficient use of public funds and disincentives for rent-seeking behavior can lead to unambiguous improvements in social welfare. Politicians, even when acting based solely on their own selfish interests, can be compelled to perform better by reformulating incentives and effectively specifying incentives compatibility constraints in order to align their personal interests with the concerns of the political unit as a whole. A more effective system with higher rewards associated with efficient performance coupled with stiffer penalties or punishments for inefficient behavior can minimize the possibility of a politician shirking or even renegeing on his service contract with the voting public.

Note that an important assumption in the theoretical model was that the probability of re-election was based solely on the incumbent's performance or provision of public goods. This amounts to an underlying assumption that elections are competitive, free and fair. If the voting public as principals are willing and able to reward or punish the politician agent based on his performance during the previous political term through the power of the ballot, then incentives for re-election through good governance can function properly. However, if election and re-election depend primarily on idiosyncratic and other factors unrelated to the practice of governance, such incentives may be rendered inutile since the benefits from re-election can still be obtained by the incumbent while performing inefficiently. Contestability of the incumbent's position through

credible elections and the presence of qualified competitors is also of equal importance. Under such conditions, elections can truly function as a legitimate disciplining device for incumbent politicians. Transparency is also useful in this regard, reducing information asymmetry about the decisions and actions of government and enabling the voting public to make more informed choices during elections, thereby effectively increasing the efficiency of political competition.

As such, a complete and comprehensive approach to improving incumbent performance must necessarily involve a balance among complementary policies instead of focusing exclusively on imposing the stringent and often costly requirements that come with progressively higher degrees of transparency. The optimal contract for incumbents must address the structure of incentives faced by politicians while in office as well as the efficiency of political competition, while specifying a minimum contractible level of transparency that relates governance outcomes to incumbent effort. Policy reforms at the very least should therefore include:

- Identifying process, output or outcome benchmarks or indicators that are highly indicative of the competence and diligence exhibited by the incumbent in the performance of his mandated duties and functions;
- Imposition of more severe penalties for convicted corrupt public officials;
- Increasing salaries for politicians elected to successive terms;
- Removing term limits and focusing instead on ensuring contestability of an incumbent's position by minimizing, if not eliminating, the undue advantage of an incumbent in terms of influencing election results;
- Widespread and meaningful voter education programs; and
- Strengthening electoral authorities to ensure independence and competence to conduct free, fair and honest elections that truly reflect the will of the people.

As a final note, areas for future research may include: (a) resolving the other remaining ambiguous results in this paper; (b) formulating an approach to measure politicians' discount rates and empirically testing their effects on incumbent performance; (c) modeling and empirically validating the effect of other factors such as campaign finance and special interest groups on the allocation decision of incumbents; and (d) designing optimal contracts for politicians. Such lines of research can contribute to the development of a general theory on the control of politicians and the applications of which may then enhance the efficiency of government and the quality of government policies by aligning the personal interests of incumbents with the collective concerns of the general public.

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