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**What difference can performance ratings make?
Difference-in-difference estimates of impact
on local government responsiveness in the Philippines**

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What difference can performance ratings make? Difference-in-difference estimates of impact on local government responsiveness in the Philippines

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Abstract

In many countries that have decentralized, improving the accountability of local officials is increasingly emphasized to make them more responsive to their constituents' needs. This paper provides evidence that the public announcement of performance ratings can induce local governments to become responsive. The evidence is based on application of a difference-in-difference method on a unique household-level dataset collected during the three-year pilot test of a rating system in 12 municipalities and cities in the Philippines. The results are consistent with the predictions of political agency models of incumbent behavior. Some policy guidelines on the design and implementation performance benchmarks are made.

JEL Codes: H11, H30, H77, C93

Key words: Local governments, political agency, performance ratings, decentralization

1. Introduction

Many developing countries in Asia, Africa and Latin America have adopted fiscal decentralization policies with the objective of improving the delivery of frontline public services like primary health and education, municipal roads and waste management, and social welfare (White and Smoke 2005, Bird and Vaillancourt 1998). The improvements are expected since local officials, relative to central government bureaucrats, are presumed better informed about local needs or conditions and, therefore, better positioned to respond to these needs (Oates 1972). Indeed, decentralization led to some positive gains, like improvements in the delivery of infrastructure services in China (Peterson and Muzzini 2005) and of education services in East Asia (King and Guerra 2005), innovations in many local governments in the Philippines (Brillantes 2001), and greater responsiveness to local needs in Bolivia (Faguet 2004). However, other countries that likewise decentralized failed to realize similar gains overall or outside a few areas.

Many reasons have been put forward for the unrealized decentralization payoffs, including mismatches in the assignment of devolved functions, and lack of local technical and financial capacity (Bird and Vaillancourt 1998, Ter-Minnasian 1997). One other reason that has been emphasized is weak accountability mechanisms that possibly lead to the capture of the local government by interest groups or elites (Prud'homme 1995, Bardhan and Mookherjee 2006). As Bardhan (2002) pointed out, local officials respond better not because of their superior information per se, but rather due to their direct accountability to their constituents. Local officials will take the effort to make informed decisions if by doing so convinces their constituents to elect or re-elect them and, thereby, continue to enjoy the perks and prerogatives of their offices.

In Indonesia, local governments are found only partly responsive to increasing local needs, and also partly captured by local elites (Lewis, 2005). In their multi-country review of the impact of decentralization on service delivery, Ahmad et al. (2005) also report mixed results, but which can be explained with the changes in the accountability relationships between the local leaders, service providers and population/service clients under decentralization. Also showing both fulfilled and unfulfilled expectations since the implementation of the Local Government Code of 1991, the Philippines also experienced further entrenchment of middling or corrupt leaders under decentralization (Lacaba 1995). Further, some local officials in the Philippines are found not to use their supposed superior information when making fiscal decisions (Azfar, Kahkonen and Meagher 2001), perhaps partly due to weak political institutions including deficient electoral laws and procedures (Hutchcroft and Rocamora 2003, de Dios 2007). In contrast to these country experiences, the results in other countries where accountability measures such as the citizen's Report Cards in Bangalore, India (Paul 2002) or social audits of public services in Pakistan (Public Affairs Foundation et al. 2007) were instituted have been encouraging: public service providers listened to their clients more and provided better services. If such measures can be scaled up, replicated or adapted to basic public services on which the poor depend, then they can help alleviate poverty and raise overall welfare.

However, the replication of such measures elsewhere does not guarantee similar results perhaps because of institutional or idiosyncratic factors. Moreover, the impact indicators used may not be sharp enough to isolate the effects of the accountability mechanism from those of possible confounding factors. In the Philippines, for example, various performance indicators have been introduced to make the local governments

more accountable. The more notable ones are the Local Productivity and Performance Measurement System of the Department of the Interior and Local Government, the Human Development Index of the Philippine Human Development Network, Philippine Cities Competitiveness Ranking of the Asian Institute of Management, and the Minimum Basic Needs Index of the Department of Social Work and Development. These were introduced in various places and times, and use both primary and secondary sources of information, and employ different methods of generating their indicators or indices. However, the impact of these performance ratings or indicators systems have yet to be established conclusively (Capuno 2007). But since the replication of such mechanisms will involve real resources, it would help policy makers and other stakeholders to decide if they know the payoffs to be real and substantial.

This paper attempts to provide such evidence. In particular, it tests the proposition that public announcements of performance ratings can make local officials more responsive by evaluating the impact of a pilot project conducted in 2001-2003 in 12 municipalities and cities in the Philippines (as described in section 2). In section 3, the evaluation framework is introduced with detailed discussion of the household-level dataset and the difference-in-difference methods. The impact estimates are presented and analyzed in section 4 and section 5, respectively. The last section contains the conclusions and some policy implications of the study.

2. A pilot project on good local governance

The dataset used in this study was generated under the Good Governance and Local Development (GGLD) Project of the Philippine Center for Policy Studies, a non-government organization. The GGLD Project aimed to develop and advocate the institutionalization of a set of indicators of good local governance. First formulated in 2000, the Governance for Local Development Index (GI) was piloted to investigate, among others, the impact of public dissemination of local government performance on the on the responsiveness of the local officials as assessed by their constituents and on citizens' civic participation and trust in local officials. The pilot test was conducted for two years (2001-03) in 12 component local government units (LGUs) of the provinces of Bulacan and Davao del Norte.

The two provinces and the 12 pilot sites within each of them were randomly selected from clusters of highly developed and less developed areas to control for differences in levels of socioeconomic conditions and geographic factors that may influence the impact of the GI. From the group highly developed province, Bulacan, just north of Manila, had in 2000 a better than national average rating in the Human Development Index and incidence of poverty. From the group of less developed provinces, Davao del Norte, located in the southern island of Mindanao, had lower than national average ratings in both the HDI and poverty incidence in 2000 (Human Development Network, 2002; National Statistical Coordination Board, 2004).

From the clusters of highly developed and less developed component LGUs within each province, three from each clusters were randomly selected, two of which are designated as treatment sites and the other as control site. In Bulacan, the four treatment

sites are San Jose del Monte City and the municipalities of Angat, Baliwag and Guiguinto, and the two control sites are Bustos and Plaridel. In Davao del Norte, the treatment sites are the Island Garden City of Samal, Panabo City and the towns of Braulio Dujali and Sto. Tomas, and the control sites are Tagum City and Sto. Tomas.

In 2001, San Jose del Monte City and the Island Garden City of Samal were newly created cities, while Braulio E. Dujali was a newly created municipality. Of the then 12 incumbent mayors at the start of the pilot test, nine were re-elected and three (mayors of Sto. Tomas, Tagum City and Bustos) were newly elected in the May 2001 local elections. The residents in the 12 areas were predominantly Christians, although Muslims and indigenous tribes can be found in Davao Del Norte.

The average fiscal revenues per capita in 2000 of the pilot LGUs in Davao del Norte were about 1,442 pesos, or twice the 714-peso average of the pilot LGUs in Bulacan. The pilot LGUs in Davao del Norte appear richer than those in Bulacan only because of their greater shares in national government revenues, which are based on land area, population size and equity. In 2003, the mean official poverty incidence rates of the pilot sites in Davao del Norte and Bulacan were 31.7 and 7.5, respectively. Also, the range of poverty rates among the pilot sites was narrower in Bulacan than in Davao del Norte. In Bulacan, the range is from 6.9 in Guiguinto to 10.8 in Angat. In Davao del Norte, the range is from 15.4 in Tagum City to 44.9 in Asuncion.

In the eight treatment sites, the main pilot activities were the generation of the GI scores and the public dissemination of the scores. In the four control sites, only the generation of the GI scores was undertaken. In each of the 12 sites, a local partner was contracted and provided training and logistic support in the conduct the pilot activities. In

each province, the local partners in the four treatment sites were two LGUs (local planning and development office) and two civil society organizations (NGOs, business groups or academic institutions), and those in the two control sites were civil society organizations (Table 1).

[Insert Table 1 here.]

The GI assesses the LGUs along three performance domains. The first domain is *public service needs*, which is measured with five indicators of access to and adequacy of basic services and the perceived effectiveness of the LGU in improving family welfare. The second domain is *expenditure prioritization*, which is indicated by the share of health, education and other basic services in total fiscal outlays. The last domain is *participatory development*, which captures with four indicators the extents of the functioning of the local consultative bodies and of the public consultations at the barangay (village) level. Ranging from zero (lowest) to 100 (highest), the scores in the GI indicators were calculated based on household surveys, and on official audited financial reports and the minutes of the meetings of the local consultative bodies.

During the course of the pilot test, most of the sites experienced a decline in their GI scores between 2001 and 2002, except in two treatment sites (Guiguinto and San Jose del Monte City) and one control site (Tagum City) (Table 2). The biggest percentage drop was in Asuncion (31.1), Angat (29.3) and Sto. Tomas (22.7). The scores were announced in each treatment sites for at least three times in a year. In 2002, an additional forum was held exclusively for key local officials. In 2001, the total numbers of participants in the public fora were 496 and 428 in Bulacan and Davao del Norte, respectively. In the following year, the corresponding totals were 565 and 596. In each year, at least 15 per

cent of the forum participants worked in government. In addition, the local partners disseminated the GI ratings through posters, stickers and *komiks*, a popular reading fare using comic strips translated into Tagalog for the Bulacan areas and Bisaya for the Davao del Norte areas (Table 3). These GI materials were distributed in public places like transport terminals, municipal halls, and marketplaces. Some materials were delivered to households.

[Insert Table 2 and Table 3 here.]

The immediate reactions of local public officials to the announced performance ratings varied. As witnessed during their participation in the fora, a few took their ratings as 'wake up calls" and vowed to attend to their constituents' concerns immediately. For example, the then mayor of Guiguinto had to publicly order the then municipal health officer to conduct regular visits to barangay health stations to attend to the health needs of those unable to visit the rural health unit in the poblacion. In areas where the local planning and development office was the pilot partner, some changes in the budget process were also introduced. Again in Guiguinto, certain budget items were reclassified to better reflect the allocations for social and economic services. The GI was also used as reference during budget hearings for the municipality's Annual Investment Plan for 2002. In Panabo City, the GI was used an input in their City Development Strategy (CDS)[1] and in the mayor's executive agenda which contains the mayor's vision, mission, and priority projects and programs. However, many local officials were not as positive in their announced ratings, and questioned the methodology used in the surveys and the validity

[1] The CDS is a World Bank-sponsored project in selected Philippine cities aimed at developing local action plans to improve governance and to enhance the cities' global competitiveness.

of the indicators, especially when compared against other performance indicators then being used and in which they were rated highly.[2]

Besides the adjustments in the budget process, actual budget allocations were also possibly influenced by the announcement of the GI ratings. The expenditures on social services (i.e., education, health, nutrition and social welfare and income from local sources (i.e., excluding central fiscal transfers) of the 12 sites are shown in Table 3. Over the period 2001-03, the average annual percentage change in real, per capita spending on social services is positive in six of the eight treatment sites, namely Angat (4.97), Baliwag (6.49), Guiguinto (20.80), San Jose del Monte City (30.54), Braulio E. Dujali (23.81) and Island Garden City of Samal (0.88). It was also positive in only one control site (Bustos, 9.17). But since the increases in spending could be due to their higher shares in the national government's internal revenues, a better measure then of preference for social services then would be its share in total expenditures.

In this case, the average annual percentage change in the share of social services in total expenditures is positive in half of the treatment sites (Guiguinto, San Jose del Monte City, Braulio E. Dujali and Island Garden City of Samal) and, likewise, in half of the control sites (Bustos and Tagum City). Arguably, however, part of the incremental spending on social services in Baliwag, Guiguinto, San Jose del Monte City and Braulio E. Dujali were due to their greater efforts at mobilizing locally-sourced revenues such as

[2] At the time of the pilot test, the Local Productivity and Performance Measurement System, the Human Development Index and the Minimum Basic Needs Index were already introduced in some of the pilot sites. The LPPMS is a self-rating performance indicator system whose results were not publicly announced, while the HDI is a province-level indicator system. Both provinces and the town of Bustos (in Bulacan) have won *Galing Pook* Awards for their innovations in public service delivery, and some of their component LGUs won *Clean and Green* awards for environmental services, and other special awards for specific projects.

real property taxes, fees and charges. Interestingly, none of the control sites had both increasing spending on social services and income from local sources during the period. While the spending patterns suggest that the local governments in the treatment areas prioritized basic services during the pilot period, these patterns cannot be tied conclusively to the GI ratings.

Possibly, however, the announcement of the GI ratings could influence the behavior of the incumbent mayors if they believe that their constituents know about the ratings enough to influence election outcomes in 2004. Of course, if the voters are in fact aware of the ratings, then the incumbent leaders will be more compelled to act. They can hold regular barangay-level consultations, attend at once on the suggestions or complaints of their constituents, or be more hands-on managers. If local leaders indeed became more responsive, then their constituents should have directly experienced or at least perceived the pro-active behavior on the part of the leaders. To validate whether local officials have become responsive, as assessed by their constituents, during the pilot test than before and in treatment sites than in the control sites, the impact of the GI ratings will be evaluated using the evaluation framework described in the next section.

3. Evaluation framework

As mentioned above, the GI was piloted to see if performance ratings can influence the behavior of local leaders and their constituents. In particular, the leaders are expected to provide better services and to improve their relations with the people, who, in turn, are expected to become informed and active participants in civic activities. The framework

for estimating of the impact on mayor's responsiveness and the dataset used are described in this section.

Data

Whether local officials were pressured or motivated to respond to their constituents needs more greatly than before or without the GI ratings can be substantiated using three rounds of household surveys conducted in the 12 pilot sites. In each round, 100 household respondents were randomly selected and interviewed using the same sampling design and survey instrument[3]. The survey questionnaire was designed to elicit information on household-level socioeconomic and demographic characteristics, knowledge of the GI, civic participation and their assessment of the responsiveness of local officials.

The first round was conducted in April-May 2001 (Year01) and before the local partners first undertook their assigned activities in June-August 2001. Conducted mid-way through the project, a second survey followed in February- March 2002 (Year02). And then the final round was accomplished in February-March 2003 (Year03) and after the local partners completed all their own tasks in March –September 2002. Thus, the pooled cross-section dataset allows comparison of the respondents' assessments of the responsiveness of key local officials before and after the GI ratings were announced in the treatment and control sites. To minimize the biases that can invalidate the comparison

[3] The sampling weights were calculated based on household sizes and age distribution of the local population.

of different units from different times, the comparison is restricted between treatment and control units with the same observable characteristics.[4]

The descriptive statistics of the variables representing the various socioeconomic, demographic and some area-level characteristics of the respondents are presented in Table 4, and the variables' definitions are given in Table 5. Out of the original 3,600 respondents, only 3,458 had valid or complete responses. There were 1,151 samples in the baseline survey, 1,146 samples in the 2nd round survey, and 1,161 in the 3rd round survey. For the entire sample, the average age is 42 years, 30 percent were males, 80 percent were married, 39 percent were household heads, 46 percent were spouses, 26 percent had some college education, and 36 percent has knowledge of other LGU performance indicators. The average monthly electric bill of the households is 462 pesos while the mean monthly income is about 8,686 pesos. The average family size is five. About 57 percent of the respondents had regular jobs, six percent work in government offices, and 67 percent were owners of the house they live in. Of the total samples, only 9.5 percent in 2002 and 8.25 percent in 2003 read a GI komiks, saw a GI poster or leaflet, or attended a public presentation of the GI ratings.

The respondents are further classified in terms of residence in high-income barangays, and in an LGU with a re-elected mayor. Of the 12 mayors in the pilot sites, nine were re-elected while the three from Sto. Tomas, Tagum City and Bustos were newly elected in the May 2001 local elections. All of the then mayors then were eligible to run in the May 2004 elections for at least one more term.

[Insert Table 4 and Table 5 here.]

[4] To minimize the biases from impact evaluations, Heckman and Smith [1995] suggest that treatment units should be compared against control units with the same observable characteristics, and the samples from which both types were drawn used the same survey design and instrument.

The *p*-values in Table 4 indicate that in general the respondents in the treatment sites and control sites do not differ significantly in terms of observable characteristics, except in income, awareness of other indices and headship status. By design, however, those in the treatment sites are differentiated from those in the control sites by their exposure to the GI ratings. The differential impact of this exposure on local responsiveness can be discerned from the responses to the following survey questions:

(1) On the whole, are you satisfied with the improvements in public services in your barangay ? (*Satisfactory improvements in public services*)

(2) Do you think the mayor attends to complaints against other local officials in the municipality (*Mayor attends to complaints*)

(3) Do you think the mayor/barangay councilors/barangay captain readily responds to the needs of your barangay? (*Mayor*/*barangay councilors*/*barangay captain responds to the needs of the barangay*.)

From these survey questions, five binary responsiveness indicators are developed. For each indicator, the means for the treatment sites and the control sites are then compared in three ways. First, the samples in the baseline (Year01) are compared with those in the first year of GI ratings (Year02). Second, the same baseline samples are compared with those in the second year of the pilot test (Year03). Last, the baseline samples are compared with those from two years of GI ratings (Year02&Year03). The three sets of comparisons will serve to show if the GI ratings has possible time-varying impacts on responsiveness.

Possibly, the effects of the GI ratings could vary as well across types of local partners. Arguably, an LGU partner can directly internalize the implications of the

ratings. It may not respond in the same way however if the ratings were done and announced by another party, whose motives and competence can be questioned to invalidate the ratings. Hence, as it were, the messenger's own credibility can confound the effects of the message on local government responsiveness. To investigate this issue, sub-sample comparisons by type of local partners are also performed.

Difference-in-difference method

The differential impact of GI ratings may be reflected in the improvements in the overall assessment of LGU responsiveness in the treatment sites before and after the GI was introduced, or relative to the changes that may have occurred in the control sites over the same period. A focus on the changes in the treatment sites alone may not yield unbiased impact estimate if there are confounding factors that are site specific. In Bulacan, for example, the then provincial governor was very active in promoting her own projects with the participation of some mayors, whose heightened responsiveness then can be easily misconstrued as the consequence of the performance ratings. Such biases can be minimized by comparing the treatment sites with control sites after the GI ratings were introduced. Yet another type of bias could arise in this case since it could be possible that even before the GI ratings introduced the leaders in the treatment sites ratings were already more responsive or predisposed to do better than those in the control sites. For example, the mayors who won with slim majority or had strong political rivals could have been motivated, even without the ratings, to perform at their best to secure re-election. Thus, by taking the difference in the improvement in the treatment sites and that in the control site, an unbiased estimate of the effect of the GI rating on the LGU responsiveness can be obtained.

To eliminate the time-varying or site-specific biases and obtain an unbiased estimate of the treatment effects (i.e., impact of the GI ratings on local government responsiveness), the difference-in-difference (DD) approach is used. The DD technique is applied on the pooled cross-section dataset described above that comprises different individuals from the same population but from different periods to control for individual covariates that could predispose them to favorable or unfavorable assessments of their leaders' behaviors (Wooldridge 2002, Ravallion 2005, Heckman, Lalonde and Smith 1999).

Following Wooldridge (2002), the DD estimator of the treatment effect is obtained first by running the following probit regression model,

$$\mathbf{Prob}(R_i|T_i\boldsymbol{Z},\boldsymbol{X}) = \alpha + \beta T_i + \gamma t_i + \delta(T_i * t_i) + \varphi \boldsymbol{Z}_i + \boldsymbol{\theta} \boldsymbol{X}_i + \varepsilon_i, \qquad (1)$$

where i is an index for the ith individual, R is a responsiveness indicator that assumes a value of one if the LGU or local official is deemed responsive and zero if not, T_i is the treatment indicator that assumes a value of one if the individual i belongs to the treatment group and zero if in the control group, t_i is a dummy variable indicating whether individual i is observed after the GI ratings were announced (i.e., after baseline survey), and the vectors $\boldsymbol{Z}_i$ and $\boldsymbol{X}_i$ include individual -level characteristics and area-level characteristics, respectively. The variable ε_i is the error term.

From (1), the difference in the probabilities of responsiveness in the treatment sites before and after the GI ratings were introduced is captured by the marginal probabilities due to the variables t_i and (T_i*t_i). The difference in the probabilities of

responsiveness in the control sites over the same period is captured by the marginal probabilities due to the variable t_i. Subtracting the second difference from the first difference yields the DD estimate of the treatment effect. In other words, an unbiased estimate of improved assessment in responsiveness due to the GI ratings is given by the marginal probability due to the interaction term (T_i*t_i). The marginal effect of the interaction term is derived using the non-linear approach of Ai and Norton (2003) and Norton et al. (2004).[5]

Equation (1) is estimated with sampling weights. The individual-level covariates used are age (in years), income (in logarithm), attainment of college education, monthly household electric bill, regular job, position in government (if government employee), ownership of house and lot residing in, marital status, relationship to the household head, gender (male). Site fixed-effects are also controlled for with dummies for residence in high-density barangays or in a municipality with re-elected mayor, and awareness of other index (i.e., other performance rating system), and the specific municipality or city of residence.

A crucial assumption of the DD approach is that the growth rates in outcomes are not systematically different in the control and treatment sites in the absence of the intervention, otherwise the estimated treatment effect will be biased (Blundell and Costa-Dias, 2008). Such bias is minimized in our data since the pilot sites were randomly assigned and that the officials in the control sites were not informed of their ratings[6].

[5] According to this approach, the interaction effect is calculated using the cross differences of *T* and *t*. Therefore, $\delta = \frac{\Delta^2 F(\cdot)}{\Delta T \Delta t}$ where $F(\cdot)$ is the conditional mean $E(R|T,t,X)$.

[6]This is to insure that the local officials in the control sites do not improve their performance simply on account of their GI scores. Otherwise, the average treatment effect for the treated may be underestimated.

4. Estimates of impacts on responsiveness

This section discusses the difference-in-difference estimates of the effects of GI ratings on local government responsiveness as assessed by local constituents. Separate estimates are provided for each of the five responsiveness indicators and three comparison groups. As shown in Table 6, the impact estimates are expressed in terms of incremental probabilities.[7]

[Insert Table 6 here.]

Satisfactory improvements in public services

The first responsiveness indicator is the incidence and satisfactoriness of improvements in local public services, such as health, education, public works and infrastructure, environment, and peace and order. Basically, this indicator is a summary assessment of the overall responsiveness of the local government itself, rather than of any particular local official. When comparison is made between the control units and all treatment areas, it can be seen from Table 6 that the treatment areas are more likely to have better assessments of satisfactory enhancements in local public services. The estimated incremental probabilities are as much as 22.2 percentage points in 2002 and 10.1 percentage points in 2003. When the samples comprise the two years when the GI was introduced, the increment is about 15 percentage points. All DD estimates are statistically significant.

The increases in probabilities are likewise positive and statistically significant in sub-sample comparison between the control groups and the treatment areas where the LGUs

[77] The results of the probit regressions for the pooled samples comprising baseline and the two years of GI ratings are shown in Appendix 1- Appendix 2. The results of the probit regressions for the sub-sample comparisons by type of local partner (LGU or CSO) are available from the authors.

themselves were the local partners. The marginal probabilities range from 13.3 percentage points in 2003 to 28.5 percentage point in 2002.

Interestingly in areas where the treatment partner was a civil society organization (CSO) or a non-government organization, the GI ratings had their desired effects only after the first time they were announced. In 2002, there was about 11.5 percentage point increase in the likelihood of positive assessment about the changes in public services in the treatment sites. However, there were no statistically significant differences between the treatment and CS0-run control sites in the second year of GI ratings (2003).

Mayor attends to complaints against other local officials

Another responsiveness indicator used is based on the samples' assessment of whether the mayor acts on or attends to complaints against other local officials. In many places in the Philippines, constituents go directly to mayors for favors and assistance, and to bring their concerns when usual bureaucratic channels do not work. In Table 6, the effect of the GI ratings on the on the perceived responsiveness of the mayor to complaints against other local officials is 11.1 percentage points but only in 2002, when no all treatment sites are compared against the control areas. However, the estimated impact varies across types of local partners.

For 2002, the estimated impact is 18.2 percentage points in treatment areas where the GI ratings were administered by the LGU themselves, whereas no statistically significant effects are found in the CSO-administered areas. For 2003, however, the estimated treatment effects in CSO-administered are negative and statistically significant (-8.9 percentage points), whereas no discernible impact is found in the LGU-administered sites.

Mayor responds to the needs of the barangay

The third responsiveness indicator tries to measure the extent of local chief executive's concern for the needs of the barangay where the respondent lives. As in the previous indicator, the effect of the GI ratings varies across type of local partners. In treatment sites where the LGU themselves proclaim the GI scores in 2002, the mayors were about 10.6 percentage points more likely than their counterparts in the control sites to be considered responsive. By 2003, there were no discernible differences in mayor's responsiveness between the two sites. For the same year, however, the mayors in treatment sites administered by the civil society groups were about 17 percentage points less likely than those in the control sites to be favorably assessed.

Barangay councilors respond to the needs of the barangay

Relative to the mayors, the barangay officials – captains and councilors – are arguably more aware of the barangay-level problems. They are also more compelled to address such concerns because their actions are more observable to the voting population. The fourth responsiveness variable is an indication of how well barangay councilors respond to local needs.

The DD estimates for treatment sites run by LGUs are all positive and statistically significant. The estimates range from 19.8 percentage points in 2003 and 25.8 percentage points in 2002. In contrast, none of the DD estimates are statistically significant in treatment sites run by civil society groups.

Barangay captain responds to the needs of the barangay

As the highest ranking executive officer in the barangay, the barangay captain can direct resources and services to meet the needs of his or her constituents. In this case, the

statistically significant treatment effects are found only in CSO-administered treatment areas. For 2002, the estimated effect is about 17.1 percentage points. For the combined samples in 2002 and 2003, the DD estimated about 11.2 percentage points. Since there is no statistically significant treatment effect found in LGU-administered treatment sites, the estimated overall effect of 11.3 percentage points can be said to be largely driven by the results in sub-samples comprising CSO-run treatment areas and control sites.

5. Discussion

The overall results of the impact evaluation show that the public disclosure of GI ratings can influence the behavior of key local officials. Thus, the evidence presented here support to the hypothesis derived from political agency models and provide empirical basis for the usual policy prescription to enhance accountability mechanisms under decentralization. However, the results also indicate that performance ratings could have a varying impact across time, types of local officials and performance raters.

In treatment areas where the LGU itself undertakes the ratings of its performance, as it were, the impact on responsiveness could be positive and immediate. This is because the local officials internalize at once the implications of the ratings. This is especially true of mayors and barangay captains who are the chief executive officials with the direct control of fiscal powers and resources of the local governments. Since they cannot refute the ratings without losing credibility in this case, they will have to become more responsive to fulfill their campaign promises or improve their prospects for another term in office. Consistent to this finding, officials in treatment areas where CSOs perform the ratings may not feel as pressured since they can always refute the ratings without losing

credibility. However, the results also indicate that they cannot ignore such ratings indefinitely since the public can now make informed assessments. In fact, the assessments of the mayor's responsiveness are negative for 2003 in CS-administered sites.

The impact of the ratings also manifest at the level of barangay officials. The treatment effects on barangay councilors are positive and statistically significant in LGU-administered sites. This means that even local legislative officials may be induced to pass the appropriate ordinances or resolutions with publicly disseminated ratings. On the part of the barangay captains, the pressure to respond to the needs of the barangay constituents appears greater when the ratings are done by CSOs or NGOs.

The results confirm the predictions of the political agency models of incumbent behavior. In the moral-hazard versions of these models, following the classic works of Barro (1973) and Ferejohn (1986), elections are construed as disciplining devices that compel the incumbent political agent (mayor) to align her interest with that of the principals (voters). When agent's effort is unobservable or not contractible, the principal can assess the performance of the agent by benchmarking it against the performances of other comparable agents (yardstick competition) or against some reservation level (Besley and Case 1995, Persson and Tabellini 2002: pp. 77-81). In these models, the principals re-elect the incumbents who meet the benchmarks, and the incumbents exert the necessary efforts to meet them.

In a way, the voters in the treatment sites were informed about certain performance aspects of their local governments. Presumably, the informed voters gained better understanding and, possibly, raised their expectations of their local governments. Since

the key officials in the treatment sites also knew of the GI ratings and the public announcements of the scores, they could have anticipated and possibly tried as well to meet the elevated public expectations. Whatever motive the mayors in the treatment sites harbored, be it a genuine concern for their voters' welfare or pursuit of personal political goals, their increased responsiveness as assessed by the local population is consistent with the prediction of the political agency models.

The differences in the impact of local governments and civil society groups as GI partners can also be explained using the political agency models. When the local government itself publicly announces the GI ratings, it implicitly acknowledges the validity of the ratings. It is therefore under greater pressure to internalize the implications of the scores than when it can question the motives and competence of another rating party. In Angat, Sto. Tomas and Island Garden City of Samal, the civil society groups tapped to undertake the GI activities faced difficulty in securing public documents and arranging presentations of the GI ratings before local officials. The negative DD estimates for CSO-administered treatment sites would imply that local officials can "shoot" the messenger and ignore the message at their own peril.

Finally, the vanishing impact effects in the second year of the pilot phase can be explained as a possible end-game result. From the point of the local official, the second-round results will not matter anymore since the scores will be forgotten a year later when they had to run for re-election in 2004. By the same logic, however, it can also be argued that they should have ignored as well the first-round results. But the positive and statistically significant DD estimates suggest that they did not. These suggest that local officials may continually respond to performance ratings that are institutionalized.

Putting it differently, significant and sustained improvements in local public services are possible when local governments are rated publicly, credibly and long enough to influence election outcomes.

6. Conclusion

In summary, the GI ratings have been shown to induce local governments to serve better. The evaluation results are consistent with the anecdotes and other causal observations made during the public presentation of the GI ratings where local farmers, fisher folks and ordinary citizens were heard and recognized. In these meetings, the participants also identified the most pressing problems in their communities and the local officials present were asked to respond to these problems and discuss the constraints they face in developing and implementing local public programs and projects.

The results have two broad policy implications. The first implication concerns the usefulness of performance rating system as accountability mechanism. The experience with the GI rating system shows that it need not be complex or comprehensive to have the desired effect. Rather than measuring everything from inputs to outputs, the ratings can be limited to core performance domains. Besides easy to generate, simple indicators are also easy to communicate.

The second implication is that public disclosure of the scores is at least as important as the technical validity of the scoring system in obtaining desired responses from local officials. In the pilot test, the GI ratings were generated for all 12 sites, but had their desired effects in the treatment sites where they were announced as well. This is

consistent with experience of the Indian cities of Bangalore and Calcutta where Report Cards were adopted to provide citizen's feedback to local schools (Gopakumar 1998).

However, to obtain more robust results, similar studies should be undertaken to cover more local governments units various settings and time coverage. The effects of performance ratings may be less, if not nil, in areas where local officials are already on their last term, belong to dominant political clans, or are known to use "guns, gold or goons" to win elections. Also, less educated voters may not also react to ratings systems in the same manner as more educated voters. Moreover, the same local performance ratings may not have the similar impact in metropolitan areas where local and national or regional concerns are easily confused.

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Table 1. The Pilot areas and the local partners

Relative Levels of Development	Bulacan			Davao del Norte		
	Treatment Areas		Control Areas	Treatment Areas		Control Areas
	LGU Partner	Civil Society Partner	Civil Society Partner	LGU Partner	Civil Society Partner	Civil Society Partner
High	San Jose del Monte City (City Planning and Development Office)	Baliwag (Soroptimist International of Baliwag)	Plaridel (Bulacan State University-Bustos Campus*, Rotary Club of Bustos**)	Panabo City (City Planning and Development Office)	Sto. Tomas (Davao Provinces Rural Development Institute, Inc.)	Tagum City (St. Mary's College-Tagum City*, University of Southeastern Philippines**)
Low	Guiguinto (Municipal Planning and Development Office)	Angat (Rotary Club of Angat)	Bustos (Bulacan State University-Bustos Campus*, Rotary Club of Bustos**)	Braulio E. Dujali (Municipal Planning and Development Office)	Island Garden City of Samal (LAWIG Foundation)	Asuncion (PhilNet-Rural Development Institute*, University of Southeastern Philippines**)

Notes: Names in parentheses are those of the local area partners.
* Local partner in 2001-2002 only.
** Local partner in 2002-2003 only.

Table 2. GOFORDEV Index, 2001 and 2002

Pilot sites	Scores		
	2001	2002	Percent change
Bulacan			
Angat	41	29	-29.3
Baliwag	61	60	-1.6
Bustos	44	35	-20.5
Guiguinto	68	72	5.9
Plaridel	48	44	-8.3
San Jose Del Monte City	52	63	21.2
Davao del Norte			
Asuncion	61	42	-31.1
Braulio E. Dujali	79	76	-3.8
Island Garden City of Samal	60	58	-3.3
Panabo City	58	55	-5.2
Sto. Tomas	44	34	-22.7
Tagum City	60	64	6.7

Table 3. Expenditures on social services and income from local sources, 2001-03

Pilot sites	Expenditures on social services								Income from local sources			
	Real per capita (in 2000 prices)				Percent share in total expenditures							
	2001	2002	2003	Ave annual change (%)	2001	2002	2003	Ave annual change (%)	2001	2002	2003	Ave annual change (%)
Bulacan												
Angat	1.50	1.43	1.64	4.97	18.98	18.98	16.80	-5.77	3.51	3.36	2.87	-9.35
Baliwag	1.48	1.67	1.68	6.49	21.28	22.01	20.17	-2.45	3.51	3.76	3.53	0.48
Bustos	1.26	1.48	1.50	9.17	18.32	20.21	19.49	3.39	2.25	2.11	1.59	-15.33
Guiguinto	1.98	2.00	2.81	20.80	24.23	23.51	27.00	5.94	4.11	4.82	5.31	13.77
Plaridel	2.57	1.42	1.40	-22.91	36.86	29.87	21.59	-23.35	2.99	3.51	3.26	5.21
San Jose d. Monte	1.31	2.15	2.08	30.54	26.55	29.74	29.37	5.39	1.66	2.11	2.07	12.41
Davao del Norte												
Asuncion	1.23	1.17	1.13	-4.00	17.11	15.58	13.77	-10.26	0.81	0.86	0.99	10.37
Braulio E. Dujali	1.21	1.30	1.82	23.81	12.06	12.37	16.13	16.51	1.77	1.64	2.06	9.10
Samal	3.11	3.21	3.17	0.88	14.65	14.83	15.50	2.87	2.96	2.30	1.44	-29.81
Panabo City	2.18	1.21	1.44	-12.80	26.19	11.07	9.05	-37.98	3.32	4.53	4.80	21.26
Sto. Tomas	1.03	0.95	0.80	-12.07	15.38	11.38	11.31	-13.30	2.16	2.08	2.33	4.17
Tagum City	2.13	2.41	1.93	-3.58	12.46	15.76	12.42	2.64	6.91	6.66	6.00	-6.75

Table 4. Socioeconomic and demographic characteristics of respondents

	Baseline (Year01)			2nd round (Year02)			3rd round (Year03)			
Variables	Mean Control	Mean Treatment	p-value	Mean Control	Mean Treatment	p-value	Mean Control	Mean Treatment	p-value	Total
Other index	0.446	0.500	0.081	0.455	0.344	0.000	0.256	0.199	0.026	0.360
Age	40.390	41.361	0.226	41.751	41.949	0.836	43.315	42.492	0.382	41.895
Income(ln)	8.657	8.696	0.486	8.712	8.587	0.049	8.710	8.502	0.000	8.628
College	0.302	0.292	0.711	0.221	0.248	0.302	0.238	0.248	0.703	0.260
Electric bill	488.39	458.11	0.404	411.24	478.23	0.185	452.43	467.70	0.653	462.29
Regular job	0.526	0.512	0.640	0.616	0.629	0.648	0.601	0.532	0.026	0.566
Government employee	0.063	0.064	0.964	0.062	0.064	0.893	0.069	0.061	0.598	0.064
Owner	0.753	0.745	0.773	0.551	0.601	0.106	0.711	0.678	0.250	0.674
Married	0.834	0.801	0.177	0.795	0.778	0.513	0.790	0.800	0.698	0.798
Household head	0.335	0.354	0.547	0.468	0.419	0.119	0.409	0.360	0.100	0.386
Spouse	0.542	0.509	0.298	0.382	0.398	0.593	0.455	0.481	0.415	0.462
Family size	5.307	5.200	0.462	5.042	5.127	0.534	5.197	5.342	0.293	5.210
Male	0.317	0.296	0.449	0.278	0.325	0.107	0.297	0.306	0.731	0.305
Re-elected Mayor	0.501	0.870	0.000	0.494	0.886	0.000	0.501	0.886	0.000	0.751
High-density barangay	0.798	0.676	0.000	0.800	0.679	0.000	0.798	0.679	0.000	0.719
No. of observations	397	754		385	761		391	770		3458

Table 5. Variable definitions

Variable	Definition
Satisfactory improvements in public services	1= if there are desired changes in the delivery of public services; 0= otherwise
Mayor attends to complaints	1=if the mayor responds to complaints against other local officials; 0= otherwise
Mayor responds to the needs of the barangay	1=if the mayor responds to complaints against other local officials; 0= otherwise
Barangay councilors responds to the needs of the barangay	1=if the barangay councilors responds to complaints against other local officials; 0= otherwise
Barangay captain responds to the needs of the barangay	1=if the barangay captain responds to complaints against other local officials; 0= otherwise
Treatment	1=if the respondent resides in the treatment site; 0= otherwise
Year01	1=if year 2001; 0=otherwise
Year02	1=if year 2002; 0=otherwise
Year03	1=if year 2003; 0=otherwise
Other index	1=if aware of the Human Development Index, Minimum Basic Needs, Galing Pook Awards or Clean and Green Awards; 0=otherwise
College	1=if the respondent went to or finished college; 0=otherwise
Age	Age in years of the respondent
Male	1=if the respondent is male; 0=otherwise
Household head	1=if the respondent is the household head; 0=otherwise
Spouse	1=if the respondent is the spouse of the household head; 0=otherwise
Family size	Number of family members
Electric bill	Average monthly electric bill for the last six months (in pesos)
Regular job	1= if the respondent has a regular job or a source of income for the past six months; 0=otherwise
Government employee	1=if the respondent is a government employee or worker; 0=otherwise
Income (ln)	Natural logarithm of monthly family income
High density barangay	1=if resident in highly populated barangays (village); 0=otherwise
Owner	1=if the respondent or his/her family is the owner of the house and lot they reside in; 0=otherwise
Married	1=if respondent is married; 0=otherwise
Re-elected Mayor	1=if the current city/municipal mayor was re-elected in the May 2001 local elections; 0=otherwise
Angat	1= if respondent lives in the municipality of Angat; 0=otherwise
Plaridel	1= if respondent lives in the municipality of Plaridel; 0=otherwise
San Jose Del Monte	1= if respondent lives in the city San Jose del Monte; 0=otherwise
Guiguinto	1= if respondent lives in the municipality of Guiguinto; 0=otherwise
Panabo City	1= if respondent lives in the city of Panabo; 0=otherwise
Tagum City	1= if respondent lives in the city of Tagum; 0=otherwise
Samal Island	1= if respondent lives in the Island Garden City of Samal; 0=otherwise

Baliwag	1= if respondent lives in the municipality of Baliwag; 0=otherwise
Sto. Tomas	1= if respondent lives in the municipality of Sto.Tomas; 0=otherwise
Bustos	1= if respondent lives in the municipality of Bustos; 0=otherwise

Table 6. Difference-in-difference estimates of the effects GI ratings on responsiveness, by local partner

Responsiveness indicators/ interaction terms	All		LGU		Civil Society/NGO	
	Esti-mates*	z-statistic	Esti-mates*	z-statistic	Esti-mates*	z-statistic
Satisfactory improvements in public services						
Treatment × Year02 & Year03	0.148[a]	3.419	0.198[a]	3.092	0.055	1.098
Treatment × Year02	0.222[a]	4.341	0.285[a]	2.369	0.115[b]	2.108
Treatment × Year03	0.101[b]	2.392	0.133[b]	3.740	0.056	1.157
Mayor attends to complaints against other local officials						
Treatment × Year02 & Year03	0.029	0.670	0.115[b]	2.232	-0.089[b]	-1.902
Treatment × Year02	0.111[a]	2.201	0.182[b]	2.326	0.002	0.033
Treatment × Year03	-0.070	-1.424	0.038	0.668	-0.089[a]	-3.649
Mayor responds to the needs of the barangay						
Treatment × Years02 &03	-0.026	-0.611	-0.048	0.915	-0.115[b]	-2.426
Treatment × Year02	0.033	0.661	0.106[c]	1.472	-0.066	1.221
Treatment × Year03	-0.098[b]	-2.067	-0.004	-0.100	-0.170[a]	-3.018
Barangay councilors respond to the needs of the barangay						
Treatment × Year02 & Year03	0.129[a]	3.108	0.200[a]	3.827	0.035	0.870
Treatment × Year02	0.174[a]	3.488	0.258[a]	2.969	0.065	1.304
Treatment × Year03	0.070	1.361	0.198[a]	3.444	0.019	0.463
Barangay captain responds to the needs of the barangay						
Treatment × Year02 & Year03	0.060	1.532	-0.017	-0.434	0.112[b]	2.333
Treatment × Year02	0.113[b]	2.345	0.009	0.175	0.171[c]	1.847
Treatment × Year03	-0.011	-0.303	-0.049	-1.099	0.100	1.956

*Marginal probabilities of the interaction term (Treatment × Year__) using Ai and Norton [2003] method.
[a] significant at 0.01 level.
[b] significant at 0.05 level.
[c] significant at 0.10 level.

Appendix 1. Probit estimates: Satisfactory improvements in public services

Independent variables	Year01- Year03		Years 01 & Year02		Year 01 & Year 03	
	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic
Treatment	-0.388[a]	-2.91	-0.360[b]	-2.33	-0.832[a]	-5.47
Year02			-0.979[a]	-8.59		
Year03					-0.078	-0.69
Year02 & Year03	-0.558[a]	-5.8				
Treatment × Year02			0.649[a]	4.62		
Treatment × Year03					0.307[b]	2.21
Treatment × Years02 & Year03	0.437[a]	3.63				
Other index	0.272[a]	4.43	0.414[a]	5.77	0.393[a]	4.81
Age	-0.002	-0.86	0.001	0.26	-0.003	-1.28
Income (ln)	-0.035	-1.03	-0.041	-1.02	-0.004	-0.08
College	0.075	1.07	0.046	0.54	0.067	0.75
Electric bill	-0.00003	-0.72	-0.00004	-0.71	-0.00009	-1.24
Regular job	0.025	0.42	-0.064	-0.87	0.100	1.35
Government employee	0.323[a]	2.68	0.369[b]	2.44	0.222	1.41
Owner	0.011	0.18	-0.0104	-1.39	-0.012	-0.16
Married	0.109	1.29	0.198	1.87	0.028	0.27
Household Head	-0.096	-0.99	-0.166	-1.34	-0.100	-0.83
Spouse	-0.206[b]	-2.01	-0.375[a]	-2.83	-0.164	-1.27
Family size	0.011	0.82	0.009	5.52	0.001	0.04
Male	-0.112	-1.46	-0.187[b]	-2.0	-0.071	-0.68
High-density barangay	-0.182[a]	-2.66	-0.167[b]	-1.98	-0.226[a]	-2.61
Re-elected Mayor	0.601[a]	5.05	0.756[a]	4.46	0.651[a]	4.46
Constant	0.695[b]	1.98	0.841[b]	2.13	0.736[c]	1.72
Angat	-0.473[a]	-4.29	-0.806[a]	-5.78	-0.121	-0.89
Plaridel	-0.061	-0.54	-0.322[b]	-2.31	-0.347[b]	-2.3
San Jose Del Monte	-0.346[a]	-3.09	-0.672[a]	-4.74	-0.113	-0.82
Guiguinto	0.210[c]	1.8	-0.207	-1.45	0.322[b]	2.23
Panabo City	-0.651[a]	-5.93	-0.641[a]	-4.6	-0.634[a]	-4.63
Tagum City	0.270 [b]	1.69	0.239	1.71	0.101	0.72
Samal Island	0.468[a]	3.92	0.187	1.27	0.834[a]	5.28
Baliwag	-0.319[a]	-2.86	-0.640[a]	-4.52	-0.054	-0.39
Sto. Tomas			0.004	0.02	0.295	1.45
Bustos	0.200	1.24				
Pseudo R^2	0.062		0.093		0.077	
Wald χ^2	267.037		251.235		200.317	
Number of obs.	3458		2297		2312	

[a] significant at 0.01 level.
[b] significant at 0.05 level.
[c] significant at 0.10 level.

Appendix 2. Probit estimates: Mayor responds to complaints

Independent variables	Year01- Year03		Years 01 & Year02		Year 01 & Year 03	
	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic
Treatment	-0.179	-1.3	0.023	0.15	-0.022	-0.15
Year02			-0.057	-0.52		
Year03					0.380[a]	3.41
Year02 & Year03	0.117	1.24				
Treatment × Year02			0.312[b]	2.28		
Treatment × Year03					-0.206	-1.51
Treatment × Years02 & Year03	0.074	0.62				
Other index	0.265[a]	4.34	0.261[a]	3.66	0.449[a]	5.74
Age	-0.0007	-0.31	-0.002	-0.63	-0.002	-0.71
Income (ln)	-0.072[b]	-2.15	-0.086[b]	-2.18	-0.100[b]	-2.19
College	-0.109	-1.56	-0.071	-0.83	-0.121	-1.42
Electric bill	-0.00006	-1.49	-0.0001[c]	-1.95	-0.00004	-0.55
Regular job	0.163[a]	2.79	0.130[c]	1.80	0.189[a]	2.65
Government employee	0.433[a]	3.50	0.557[a]	3.52	0.162	1.08
Owner	0.091	1.52	0.062	0.85	0.158[b]	2.09
Married	0.094	1.12	0.063	0.61	0.262[b]	2.49
Household Head	-0.029	-0.31	-0.026	-0.21	-0.009	-0.08
Spouse	-0.162	-1.62	-0.143	-1.13	-0.252[b]	-2.01
Family size	-0.0008	-0.06	0.003	0.17	-0.008	-0.50
Male	-0.094	-1.23	-0.090	-0.98	-0.231[b]	-2.29
High-density barangay	-0.115[c]	-1.71	-0.062	-0.76	-0.139[c]	-1.68
Re-elected Mayor	0.889[a]	7.28	-0.227[c]	-1.65	0.163	1.17
Constant	0.234	0.67	1.321[a]	3.42	0.968[b]	2.34
Angat	-0.203[c]	-1.8	-0.155	-1.11	-0.201	-1.44
Plaridel	-0.039	-0.33	0.225	1.61	0.033	0.23
San Jose Del Monte	-0.214[c]	-1.87	-0.259 [c]	-1.84	-0.322 [b]	-2.29
Guiguinto	0.004	0.04	-0.035	-0.25	-0.062	-0.43
Panabo City	-0.029	-0.25	-0.079	-0.56	-0.087	-0.62
Tagum City	0.204	1.24	-0.764[a]	-5.66	-0.288[b]	-2.09
Samal Island	-0.762[a]	-6.73	-0.613[a]	-4.38	-0.904[a]	-6.33
Baliwag	-0.343[a]	-3.02	-0.237[c]	-1.69	-0.370[a]	-2.64
Sto. Tomas			-1.218[a]	-5.99	-0.558[a]	-2.79
Bustos	0.756[a]	4.54				
Pseudo R^2	0.052		0.056		0.062	
Wald χ^2	226.535		148.801		173.97	
Number of obs.	3458		2297		2312	

[a] significant at 0.01 level.
[b] significant at 0.05 level.
[c] significant at 0.10 level.

Appendix 3. Probit estimates: Mayor responds to the needs of the barangay

Independent variables	Year01- Year03		Years 01 & Year02		Year 01 & Year 03	
	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic
Treatment	0.232[c]	1.70	0.538[a]	3.53	0.412[a]	2.7
Year02			0.051	0.47		
Year03					0.689[a]	5.96
Year02 & Year03	0.307[a]	3.22				
Treatment × Year02			0.107	0.78		
Treatment × Year03					-0.228	-1.63
Treatment × Years02 & Year03	-0.055	-0.47				
Other index	0.164[a]	2.64	0.185[a]	2.59	0.375[a]	4.64
Age	0.003[c]	1.67	0.005[c]	1.82	0.002	0.68
Income (ln)	-0.024	-0.72	-0.027	-0.70	-0.006	-0.14
College	0.014	0.20	0.069	0.81	-0.018	-0.21
Electric bill	-0.00003	-0.73	-0.00002	-0.37	-0.00007	-1.01
Regular job	0.072	1.22	0.046	0.64	0.103	1.42
Government employee	0.293[b]	2.40	0.263[c]	1.78	0.132	0.89
Owner	0.056	0.93	0.0003	0.00	0.082	1.06
Married	0.042	0.51	-0.012	-0.12	0.280[a]	2.63
Household Head	0.057	0.58	0.065	0.53	0.019	0.16
Spouse	0.024	0.23	0.053	0.41	-0.134	-1.03
Family size	0.025[c]	1.95	0.018	1.18	0.015	0.98
Male	0.054	0.70	0.045	0.48	-0.082	-0.79
High-density barangay	-0.163[b]	-2.38	-0.139[c]	-1.66	-0.168[b]	-1.98
Re-elected Mayor	0.518[a]	4.17	-0.221[c]	-1.68	-0.099	-0.70
Constant	-0.443	-1.26	0.207	0.54	-0.073	-0.17
Angat	-0.323[a]	-2.81	-0.447[a]	-3.19	-0.440[a]	-2.99
Plaridel	0.242[b]	2.09	0.462[a]	3.39	0.303[b]	2.1
San Jose Del Monte	-0.412[a]	-3.54	-0.617[a]	-4.33	-0.634[a]	-4.33
Guiguinto	0.041	0.34	-0.191	-1.33	-0.059	-0.38
Panabo City	-0.129	-1.11	-0.263[c]	-1.85	-0.255[c]	-1.71
Tagum City	0.129	0.78	-0.495[a]	-3.76	-0.393[a]	-2.79
Samal Island	-0.093	-0.79	-0.250[c]	-1.74	-0.210	-1.38
Baliwag	-0.389[a]	-3.35	-0.537[a]	-3.78	-0.492[a]	-3.33
Sto. Tomas			-0.886[a]	-4.46	-0.555[a]	-2.66
Bustos	0.518[a]	3.12				
Pseudo R^2	0.035		0.034		0.063	
Wald χ^2	126.562		97.448		138.304	
Number of obs.	3458		2297		2312	

[a] significant at 0.01 level.
[b] significant at 0.05 level.
[c] significant at 0.10 level.

Appendix 4. Probit estimates: Barangay councilors respond to the needs of the barangay

Independent variables	Year01- Year03		Years 01 & Year02		Year 01 & Year 03	
	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic
Treatment	-0.142	-0.95	0.127	0.77	0.001	0.01
Year02			-0.271[b]	-2.42		
Year03					0.563[a]	4.23
Year02 & Year03	0.047	0.49				
Treatment × Year02			0.525[a]	3.76		
Treatment × Year03					0.359[b]	2.25
Treatment × Years02 & Year03	0.424[a]	3.48				
Other index	0.127[c]	1.87	0.204[a]	2.70	0.377[a]	4.14
Age	0.002	0.99	0.003	1.01	-0.0004	-0.16
Income (ln)	-0.046	-1.26	-0.038	-0.93	-0.068	-1.36
College	-0.137[c]	-1.81	-0.147[c]	-1.66	-0.157	-1.62
Electric bill	0.000	0.07	0.000	-0.03	0.00002	0.19
Regular job	0.149[b]	2.38	0.165[b]	2.21	0.204[b]	2.56
Government employee	0.270[b]	2.03	0.293[c]	1.83	0.093	0.55
Owner	0.146[b]	2.26	0.042	0.54	0.232[a]	2.70
Married	0.011	0.12	-0.011	-0.10	0.147	1.27
Household Head	0.042	0.40	0.015	0.12	-0.042	-0.31
Spouse	0.067	0.61	0.006	0.05	-0.062	-0.43
Family size	0.029[b]	2.08	0.022	1.41	0.033[c]	1.95
Male	0.036	0.42	-0.008	-0.08	0.037	0.31
High-density barangay	-0.305[a]	-4.10	-0.333[a]	-3.80	-0.323	-3.43
Re-elected Mayor	0.207	1.45	0.190	1.38	0.122	0.80
Constant	0.729[c]	1.89	0.748[c]	1.87	0.792[c]	1.68
Angat	-0.564[a]	-4.48	-0.680[a]	-4.57	-0.448[a]	-2.61
Plaridel	-0.408[a]	-3.4	-0.401[a]	-2.88	-0.410[a]	-2.69
San Jose Del Monte	-0.711[a]	-5.65	-0.950[a]	-6.31	-0.871[a]	-5.21
Guiguinto	-0.511[a]	-4.0	-0.804[a]	-5.38	-0.494[a]	-2.88
Panabo City	-0.061	-0.47	-0.286[c]	-1.86	-0.158	-0.9
Tagum City	0.230	1.23	0.369[a]	2.66	0.372[b]	2.31
Samal Island	-0.008	-0.06	-0.244[a]	-1.55	0.1823	0.95
Baliwag	-0.439[a]	-3.43	-0.575[a]	-3.8	-0.478[a]	-2.79
Sto. Tomas			-0.240	-1.12	-0.139	-0.58
Bustos	0.006	0.03				
Pseudo R^2	0.066		0.063		0.131	
Wald χ^2	187.818		147.045		187.864	
Number of obs.	3458		2297		2312	

[a] significant at 0.01 level.
[b] significant at 0.05 level.
[c] significant at 0.10 level.

Appendix 5. Probit estimates: Barangay captain responds to the needs of the barangay

Independent variables	Year01- Year03		Years 01 & Year02		Year 01 & Year 03	
	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic	Coeffi-cients	*z*-statistic
Treatment	0.038	0.25	0.278[c]	1.65	0.198	1.10
Year02			-0.266[b]	-2.25		
Year03					0.581[a]	3.99
Year02 & Year03	0.035	0.34				
Treatment × Year02			0.345[b]	2.35		
Treatment × Year03					0.083	0.48
Treatment × Years02 & Year03	0.232[c]	1.77				
Other index	0.039	0.55	0.106	1.35	0.262[a]	2.72
Age	-0.002	-0.77	-0.002	-0.73	-0.005[c]	-1.67
Income (ln)	-0.051	-1.27	-0.028	-0.62	-0.079	-1.39
College	-0.148[c]	-1.86	-0.182[b]	-1.97	-0.103	-0.99
Electric bill	-0.00003	-0.77	-0.00002	-0.50	-0.00008	-1.03
Regular job	0.125[c]	1.90	0.143[c]	1.86	-0.089	1.05
Government employee	0.373[b]	2.47	0.434[b]	2.37	0.201	1.00
Owner	0.145[b]	2.17	0.057	0.73	0.216[b]	2.39
Married	0.028	0.30	-0.027	-0.24	0.103	0.81
Household Head	0.052	0.48	0.120	0.94	-0.160	-1.09
Spouse	0.041	0.35	0.055	0.40	-0.105	-0.68
Family size	0.004	0.30	0.002	0.11	0.007	0.35
Male	-0.035	-0.41	-0.115	-1.15	0.089	0.71
High-density barangay	-0.221[a]	-2.83	-0.233[a]	-2.58	-0.228[b]	-2.25
Re-elected Mayor	0.245[c]	1.71	-0.066	-0.47	-0.167	-1.04
Constant	1.050[b]	2.54	1.148[a]	2.68	1.654[a]	3.11
Angat	-0.382[a]	-2.99	-0.442[a]	-2.92	-0.260	-1.51
Plaridel	0.044	0.35	0.113	0.78	0.084	0.52
San Jose Del Monte	-0.454[a]	-3.52	-0.601[a]	-3.91	-0.586[a]	-3.49
Guiguinto	-0.291[b]	-2.22	-0.538[a]	-3.52	-0.276	-1.59
Panabo City	0.011	0.08	-0.154	-0.98	-0.108	-0.61
Tagum City	0.434[b]	2.28	0.301[b]	2.07	0.195	1.12
Samal Island	0.023	0.17	-0.155	-0.98	0.328	1.61
Baliwag	-0.266[b]	-2.05	-0.346[a]	-2.24	-0.328[c]	-1.93
Sto. Tomas			-0.484[a]	-2.23	-0.486[b]	-2.01
Bustos	0.204	1.09				
Pseudo R^2	0.036		0.035		0.087	
Wald χ^2	86.695		65.836		101.447	
Number of obs.	3458		2297		2312	

[a] significant at 0.01 level.
[b] significant at 0.05 level.
[c] significant at 0.10 level.