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PUBLIC GOOD PROVISION IN INDIAN RURAL  
AREAS: THE RETURNS TO COLLECTIVE ACTION BY  
MICROFINANCE GROUPS

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UNIVERSITY  
OF NAMUR

WP 1119

DEPARTMENT OF ECONOMICS  
WORKING PAPERS SERIES

# Public Good Provision in Indian Rural Areas: the Returns to Collective Action by Microfinance Groups

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November 2011

## Abstract

Self-Help Groups (SHGs) are the most common form of microfinance in India. We study the impact of collective actions undertaken by these groups, composed of women only, on the variety of public goods the elected local authorities deal with. We provide a simple model that suggests two hypotheses that we test and confirm using first hand data. The first hypothesis states that local authorities provide a larger variety of public goods when SHGs undertake collective actions, compared to a situation with exclusive provision by the local authority. The second hypothesis states that local authorities begin or increase the provision of public goods preferred by SHGs and that these might include goods that exert a negative externality on other villagers. We provide evidence of an important non-financial benefit of microfinance: it provides a platform that allows socially disadvantaged women to meet regularly and discuss problems. When they undertake collective actions to solve those problems, these are recognized by the local authorities. Problems that are closer to the needs of women seem to find their way into the political agenda.

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# 1 Introduction

Self-Help Groups (SHGs) are the most common form of microfinance in India. Their primary aim is to help the poor to save and borrow: members pool their savings to create a common fund and give out small loans to one another. SHGs can also open savings accounts and apply for loans in commercial banks. In rural Orissa, where we conducted our survey, women are relatively disadvantaged. They are restricted in their physical mobility, their public role is minimal and access to information is limited. In such a context, SHGs also provide a platform that allows women to meet regularly.

Economic theory suggests that repeated interaction between individuals can help building social capital. Feigenberg et al. (2011) provide some experimental evidence of this. They show that microfinance clients are more likely to develop friendships and social ties if they meet more frequently. However, they suggest that, since the scope of the meetings is financial intermediation, microfinance mainly affects economic cooperation. We provide evidence that cooperation can go beyond economic motives. We describe how SHG members undertake collective actions aiming to solve problems affecting their villages.

A number of studies provide evidence that men and women have diverging preferences for some public policies (Lott and Kenny, 1999; Edlund and Pande, 2002). Still, in many countries, women's preferences hardly find their way into the political agendas. Some governments have imposed political reservations in an attempt to bias policy choices in favor of women. This proved to have a significant impact (see, for instance, Chattopadhyay and Duflo (2004)). In our paper, we explore an alternative channel through which the preferences of women can sway political decisions. We document how the collective actions undertaken by SHGs influence the variety of public goods the local authorities take care of.

The Gram Panchayat, the lowest official authority in rural India, consists of several wards.<sup>1</sup> A *ward member* is elected in each of those wards. He is the official spokesperson of the villagers, in charge of informing the relevant officers of the ward's problems and needs. These issues should then be solved by the local government. The ward member is the only *official* body with the duties described above. But other *unofficial* bodies visit functionaries on their own initiative. We distinguish between three different types of such bodies: SHGs, Individuals and, as a residual category, Other Groups. Under this last label we include different sorts of groups which meet regularly but for reasons different from financial intermediation. They mostly focus on specific activities like, for example, the protection of

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<sup>1</sup>Wards can be different from villages: some villages have several wards and some wards consist of several villages.

forests.

The main focus of the paper is on SHGs. The SHGs we analyze were all created by an NGO, PRADAN, without any intervention of the local governments. The programme has no explicit socio-political agenda.<sup>2</sup> In these respects, SHGs are different than Other Groups. In our sample, 24.5% of Other Groups are created thanks to the direct intervention of an officer.

In September 2010, we conducted a survey to ask SHG members what kind of problems they had faced in their ward and what they had done to solve them. Some groups merely discussed problems during their meetings, but others undertook collective actions to tackle them. These actions consisted either of a direct intervention or of a visit to an officer to ask for a solution. Our data shows that SHGs mainly focus on issues related to excessive alcohol consumption, and forest and school problems.

We asked similar questions to ward members. Their main focus is on the major responsibilities of the Gram Panchayat: village infrastructure and welfare schemes. But we provide evidence that the range of public goods ward members take care of is also influenced by the activities of SHGs: when SHGs are active, ward members are more likely to deal with problems that are closer to the preferences of women. We propose a simple theoretical explanation for this observation. In a political economy framework, we model the interaction between the institutional public good provider (the ward member) and the SHGs. The ward member maximizes the total welfare in his ward. But his ward is composed of a heterogeneous population, with possible conflicting preferences over the types of public goods that should be provided. The SHGs, after observing the behavior of the ward member, decide whether or not to complement the ward member's provision by undertaking collective actions. The model suggests some hypotheses that we test with an econometric analysis.

Our first hypothesis states that collective actions by SHGs should lead the ward members to provide a larger variety of public goods. Our second hypothesis states that the ward members begin or increase the provision of public goods that SHGs prefer. These include goods that exert a negative externality on other villagers. Both hypotheses are confirmed by our empirical results. We find that ward members deal with on average one extra type of good after SHGs started undertaking actions. Moreover, the ward member is more likely to deal with the topics SHGs are interested in: he is on average 28% more likely to deal with alcohol issues, 25% more with forest issues and 22% more with school problems. There is no

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<sup>2</sup>By contrast, the Grameen Bank in Bangladesh has a clear social development agenda. Members are required to obey *16 Decisions* which have a clear social connotation. For example, Decision 7 states: "We shall educate our children and ensure that they can earn to pay for their education."

significant influence on the probability of taking care of village infrastructures and welfare schemes, the two main problems ward members already focus on.

Some of the extra problems the ward members deal with are related to public goods that can exert a negative externality on subgroups of villagers. The best example is alcohol production and consumption. It is not surprising that ward members were less likely to deal with it before SHGs started undertaking collective actions. Most ward members are men, and men are more likely to consume alcohol. They might also be reluctant to act against their neighbors or friends, since they are an important part of their electorate. It is worth remarking that, though SHGs have a positive influence on the probability that ward members deal with alcohol problems, the effect is stronger when the ward member is a women.

Our work is related to different strands of the literature. The most closely related is the approach suggested by Chowdhury et al. (2004). They discuss why, in evaluating the impact of microfinance programs, non-clients beneficiaries ought to be considered. We follow a very similar approach in describing how the behavior of SHGs can influence the governance of rural Indian communities.

There are also a growing number of works evaluating the social, non-financial impact of microfinance. Many of them give special consideration to the role of women. Karlan and Valdivia (2011) study the marginal impact of adding business training to a Peruvian group lending program for female. Maldonado and Gonzalez-Vega (2008), evaluate the influence of microfinance programs on a rural household's demand for schooling. Pitt and Khandker (1998) is one of the first papers studying the impact of group based microfinance on socio-economic variables like, schooling, labor supply and intra-household distribution of resources. One of their most interesting findings is that participation in microfinance programs has a different impact on women and men.

Several authors study the incentives for private provision of public goods and propose several theoretical explanations for the fact that people, in reality, are more active than what theory predicts. Polborn (2008) emphasizes the role of reputation, whereas Andreoni (1989) proposes impure altruism (warm glow). These different views have been recently reconciled in a comprehensive model by Bénabou and Tirole (2006). We do not model explicitly the motives behind SHGs' actions, and we rather draw on the findings of Feigenberg et al. (2011) who provide evidence that the frequency of meetings is a determinant of long-run increases in social interaction.

Our theoretical model is based on the framework proposed by Besley and Coate (2003), that has also been applied by Besley et al. (2004) to Indian local governments. In its

original formulation, the model studies the trade-off between centralization and decentralization of public good provision. We modify this set-up by introducing private provision by microfinance groups: both SHGs and local government are active providers and interact strategically to determine the type and the quantity of public goods to produce.

The paper is organized as follows. In Section 2 we describe our data set, the village organization and the collective actions undertaken. In Section 3, we propose a simple model suggesting the hypotheses that we test in Section 4. In Section 5 we conclude.

## 2 Background information

### 2.1 Data set

Data collection was assisted by our partner NGO, named PRADAN (Professional Assistance for Development Action). It is specialized in the creation of SHGs, consisting of women only, that it considers as an effective tool to strengthen the livelihood of socio-economically disadvantaged people (PRADAN, 2005).

In 2006, Baland, Somanathan and Vandewalle surveyed all PRADAN SHGs created in the Mayurbhanj and Keonjhar districts of Orissa (independent of whether the groups were still actively meeting or not). They collected information on 532 SHGs and 8,599 women who, at some point, belonged to these groups (Baland et al., 2008). In the autumn of 2010, we complemented this dataset in three ways. First, we revisited those SHGs to gather information on the collective actions they undertook. Second, we did an elaborate village survey to collect data on the activities of local authorities. As PRADAN started working in Orissa in 1998 and as we need information dating back to the period before the creation of the first SHG, we interviewed the ward members elected in 1992, 1997, 2002 and 2007.<sup>3</sup> We also recorded the activities of Other Groups and Individuals who visited officers with a particular request. Third, we obtained information on the female population in villages from the Census of India 2001.

In total, we gathered information on 425 SHGs, 462 ward members, 94 Other Groups, 132 Individuals who visited officers and 844 Individuals who never visited one, covering 112 villages and 147 wards.<sup>4</sup>

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<sup>3</sup>Elections take place every 5 years. Ward members can be re-elected. They are replaced in case of death.

<sup>4</sup>We were not able to resurvey 72 SHGs and the villages in which they are located because of social tensions created by a private mining firm. Another 35 groups that no longer meet were not willing to sit with the research team.

## 2.2 Village structure

In rural India, the lowest official authority is the Gram Panchayat. It is composed by a group of 5 to 15 contiguous villages. The 73rd Amendment Act 1992 of the Constitution of India empowers the State Legislature “*to endow the Panchayats with the power and authority necessary to prepare the plans and implement the schemes for economic development and social justice*”. The main responsibilities passed onto the Gram Panchayat are managing local infrastructure and identifying villagers who are entitled to welfare schemes (Xaxa, 2010).

Each Gram Panchayat is divided into *wards* and is governed by one Sarpanch and several **ward members**. One ward member (henceforth WM) is elected in each ward. WMs have the right to access the records of the Gram Panchayat, to question any officer about the administration and to inspect the actions undertaken by the Gram Panchayat. They are the spokesperson of the villagers who inform the Sarpanch about ward level problems or needs. As the Gram Panchayat is mainly responsible for managing village infrastructures and welfare schemes, these public goods are the main responsibility of the WMs too (Xaxa, 2010).

As described in the introduction, though **SHGs** are created for financial intermediation, we find evidence that members also discuss non-financial issues at their weekly meetings. Moreover, they participate in collective actions aiming at the resolution of problems concerning their ward. If they visit an officer, they do not send a delegation but go as a *group*: at the moment of the first collective action, out of the on average 15 members, 11 are actively involved. WMs are usually aware of these actions. In our sample, 63.1% of the groups informed the WM before they visited an officer for the first time.<sup>5</sup>

**Other Groups** consist of villagers who gather on average once a month, for a specific, non-financial reason. They are mainly *forest committees* (69.2%), some of which are created by officers of the forest department (35.4%).<sup>6</sup> Other formed for *village help* (26.6%), cultural activities (3.2%) and farming issues (1.0%). 90% of those which do not gather for forest issues are created by neighbors. The remaining 10% were founded by an NGO. 59.6% of the wards

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<sup>5</sup>The first action mostly concerns village infrastructure (33.6%), forest issues (26.1%) and alcohol problems (21.9%). See Section 6 for a description of the problems.

<sup>6</sup>As most villages are located close to the forest, households depend on it for cooking and as a source of income (for example, an important source of income is making leaf plates). The increasing population rose the pressure on the forest. To prevent excessive deforestation, villagers formed voluntary forest committees. Later, the forest department started supporting existing committees and created new ones. They provide training, supplies and introduce new ways of sustainable exploitation of the forest.

have at least one Other Group.

We label as **Individuals** the villagers who visited an officer on their own personal initiative. They did not join any group, but dealt themselves with the issues they were interested in. Although we might not have been able to identify all Individuals, we believe we interviewed an important subset of them. Our main motivation to survey Individuals is being able to tell them apart from villagers who joined either an SHG or an Other Group.

Table 1 shows the characteristics of WMs, members of SHGs, members of Other Groups and Individuals who visited an officer at least once (columns (1) to (4)). Other Groups differ from SHGs in several respects. Their members have a quite different profile: they are mainly men, are more educated and own more land. SHGs consist of women who did not finish primary school (5 years of education) and whose households own about 1 acre less. SHG members differ also from WMs and Individuals: the latter are better educated and own more land. The percentage of female WMs is close to what we expect based on the reservation of seats imposed by the Indian Law.<sup>7</sup> Women rarely visit officers alone (2.3%).

Table 1: Characteristics of WMs, members of SHGs, members of Other Groups and Individuals.

	Bodies who visited officer				Bodies who did not visit officer			
	Ward	SHGs	Other	Individuals	SHGs	Other	Individuals	
	members		groups			groups	female	male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
# of groups	N.A.	360	87	N.A.	65	7	N.A.	N.A.
# of members	462	5,860	711	132	1,006	46	79	765
Woman (%)	31.0	100.0	13.4	2.3	100.0	15.2		
Average education level (years)	6.8	2.7	7.5	9.0	1.7	8.1	3.3	4.8
Can read and write (%)	84.3	31.0	82.6	96.2	19.6	91.3	36.7	57.9
Land (acres)	2.4	1.6	2.6	3.3	1.8	3.2	2.6	1.8
Number of children	2.8	2.6	2.6	2.8	2.8	2.6	1.9	2.6
Age (years)	44.7	35.4	40.9	47.7	36.0	39.3	37.0	42.4
Caste category: ST (%)	72.4	62.4	66.7	64.4	76.9	71.7	77.2	66.7
Caste category: SC (%)	7.5	9.9	4.0	4.5	1.7	15.2	1.3	6.5
Caste category: OBC (%)	19.7	26.3	28.8	28.8	21.1	13.1	21.5	26.7
Caste category: FC (%)	0.4	1.4	0.5	2.3	0.3	0.0	0.0	0.1

The columns (5) to (8) show the characteristics of members of SHGs, members of Other Groups and Individuals who never visited an officer. To gather information on Individuals, we interviewed in each village a random selection of people, who belong neither to an SHG

<sup>7</sup>One-third of the seats must be reserved for women. The reservation of seats is allotted by rotation of the different wards (Xaxa, 2010).



nor to an Other Group and who did not visit an officer individually. We find that SHG members are slightly less educated in groups which never visited an officer. The profile of Other Group members is not much different among groups which visited an officer and groups which did not. Female Individuals are slightly more educated and own more land than SHG members. We find the opposite for male Individuals: they are less educated and own less land than Other Group members and Individuals who visited an officer.

## 2.3 Collective actions

We asked WMs, SHGs and Other Groups, which kind of public good problems they faced. We also asked whether they discussed those problems within groups and whether they tried to solve them by intervening directly or by visiting an officer to ask for a solution. A brief explanation of the different problems is given in the appendix (Section 6).

Table 2 shows, for each of the problems, the percentage of WMs, SHGs and Other Groups that tried to solve it by visiting an officer at least once (columns (1), (3) and (5) respectively). The columns (2), (4) and (6) give the percentage of WMs, SHGs and Other Groups that tried to solve a problem by *either* visiting an officer *or* by intervening directly. The data show that WMs and, except for forest issues, Other Groups are unlikely to intervene directly in the village. If they deal with a particular problem, they mostly do it by visiting the officer in charge. SHGs instead, intervene directly for several issues. The most important ones are alcohol and forest problems. Table 2 suggests several observations:

- As expected, WMs are most likely to deal with village infrastructure and welfare schemes: these are the main responsibilities of the Gram Panchayat.
- Other Groups mainly deal with forest related issues. Note also that they mainly focus on one specific topic: on average, they visit an officer for only slightly more than one public good.
- SHGs are most likely to tackle alcohol issues. Some groups visit an officer to request the suspension of alcohol licences. Other SHGs did not visit an officer, but intervened directly by organizing anti-alcohol campaigns or talking to alcohol-producing households. This is quite interesting since anecdotal evidence suggests that women considered alcohol consumption as a “right” of men. Therefore, they rarely undertook legal actions, even in case of domestic violence or abuse. Still, even in villages where women can drink, it is likely that the negative effects of excessive alcohol consumption

Table 2: Public good activities of the WMs, SHGs and Other Groups

	WMs		SHGs		Other Groups	
	% visit officer	% visit or intervene	% visit officer	% visit or intervene	% visit officer	% visit or intervene
	(1)	(2)	(3)	(4)	(5)	(6)
Village infrastructure	79.0	<b>79.9</b>	43.3	53.7	31.9	36.2
Alcohol problems	12.3	13.0	33.7	<b>59.8</b>	6.4	7.5
Ration shops (pds)	4.8	5.6	11.5	<b>15.1</b>	0.0	1.1
School problems	12.1	12.3	9.9	<b>16.5</b>	4.3	6.4
Dowry and child marriage	0.0	0.0	1.7	2.8	0.0	1.1
Forest issues	33.1	33.1	35.3	55.1	69.2	<b>74.5</b>
Welfare schemes	63.9	<b>63.9</b>	2.1	2.1	0.0	1.1
Other	4.8	4.8	3.5	3.5	7.5	9.6
Average number of different issues (conditional on at least one)	2.2	2.3	1.7	2.3	1.3	1.4
Number of observations	462	462	425	425	94	94

are discussed during group meetings. Women seem to recognize that alcohol consumption can, for example, reduce the budget available for primary expenses (See, for example, Mishra (1999)). Although, most likely, women were aware of alcohol related problems before joining an SHG, we could not find any woman undertaking actions alone.

- SHGs also intervene for ration shops and school problems. This is in line with the common finding that women generally spend more time and resources on family welfare than men (See for instance Anderson and Baland (2002) and Bruce (1989)). School problems are mainly related to low school quality.<sup>8</sup> SHGs are also responsible for providing midday meals at schools in 22% of the villages in our survey. They opened a ration shop in 7% of the villages.
- SHG members also care about forest issues. They, for example, demand the protection of forest, as many households' livelihood depends on it. Moreover, 29.7% of the groups received training from PRADAN to improve their forest-based sources of income.

We want to understand whether public good actions of SHGs influence the activities of the WM. Unfortunately, we cannot measure changes in the productivity of WMs: we do not

<sup>8</sup>For example, a group requested the replacement of a teacher who was regularly absent because he had to come from another village.

know precisely how often each problem appeared, how often the WM tried to solve it and how successful he was. But we do know the issues he tackles and this is what we exploit in what follows.

As mentioned in the introduction, the main focus of the paper is on SHGs. The SHGs we analyze were all created by the NGO PRADAN. To start the SHG programme, PRADAN selects villages in administrative blocks with high levels of rural poverty. In Orissa, where we conducted our study, there was no involvement of the government in this decision; and there is no evidence that the government has ever opposed the creation of SHGs in any of the selected villages. Furthermore, the SHG programme has no explicit socio-political agenda. Therefore, we believe it is reasonable to assume that the creation of SHGs is not influenced by the elected WMs. This is not necessarily the case for Other Groups, as an important subset of them is created thanks to interventions of government officers and for socio-political reasons. For completeness, we check whether the inclusion of Other Groups in the empirical analysis changes the results (Section 4.5).

Table 3 shows, for each public good problem, the percentage of WMs who dealt with it. What matters for our analysis is the timing of the WM's mandate as compared to the creation and evolution of SHGs. Thus, we first classify WMs depending on whether their mandate finished before the first SHG was created in the ward (column (1)) or after (column (2)). These simple descriptive statistics document a sharp increase for most of the problems.

This preliminary analysis can be slightly refined by taking into account that SHGs do not visit officers from the very start of their existence. As described in the introduction, SHGs are created for financial intermediation, and not for public good provision. For this reason, on average, they visit an officer for the first time after about two years of weekly meetings.<sup>9</sup> Thus, if the activities of the WMs are influenced by the collective actions of SHGs, we might observe a change only when SHGs start showing interest. In other words, the mere creation of an SHG might not matter. For this reason, we further split the time frame *after* the

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<sup>9</sup>Mishra (1999) describes the process towards other forms of cooperation (within SHGs) as a three-stage evolution over time. In the first stage, group members have a minimum level of awareness and have to shed their prejudices. In the next stage, the critical/normative one, groups may experience pressure from both outside and inside. That helps the emergence of a group leader and shapes internal norms. Groups reach the third stage when they have an agreement about the group's objective. They start functioning as a team, notice common problems or issues and act collectively irrespective of whether it is an economic or a social one. Therefore, we can assume that groups do not deal with elaborated non-financial issues before they reached a minimum level of financial stability. A purpose of SHGs is to be linked with a commercial bank. On average, groups receive their first bank loan after 20 months of weekly meetings only.

creation of SHGs. We report the percentage of WMs who dealt with a problem depending on whether his mandate finished after the creation of the first SHG but before an SHG visited an officer in his ward (column (3)) or after the first SHG visited an officer (column (4)). For most issues, we observe an increase after the creation of the first SHG in the ward, but the main increase occurs after a first SHG went to visit an officer.

Table 3: Public good activities of the WMs, before and after the start of SHGs

	% of WMs visiting an officer			
	Before the creation of SHGs (1)	Creation After the creation of SHGs (2)	Creation vs being active After the creation of SHGs (3)	Since SHGs visit officers (4)
Village infrastructure	72.1	81.7	75.8	84.0
Alcohol problems	2.3	16.2	1.1	22.3
Ration shops (pds)	0.8	6.3	1.1	8.4
School problems	5.4	14.7	1.1	20.2
Dowry and child marriage	0.0	0.0	0.0	0.0
Forest issues	21.7	37.5	17.9	45.4
Welfare schemes	35.7	74.8	62.1	79.8
Other	3.1	5.4	4.2	5.9
Average number of different issues (conditional on at least one)	1.7	2.4	1.8	2.7

Table 2 and 3 suggest that SHGs influence the behavior of WMs with their actions. In Section 3, we provide an intuitive explanation of why WMs might deal with problems that go beyond their main responsibility. We believe it to be a strategic response to the collective actions of SHGs. Our model suggests two hypotheses that we test in Section 4.

### 3 The model

We propose a simple model to provide an intuitive explanation of the phenomena described by our data. We want to understand why and if WMs have incentives to provide a different set of public goods as a response to the collective actions of SHGs. We model the decision

process of WMs and SHGs to check whether our conjecture makes economic sense. We then test our prediction with a careful econometric analysis. The model we propose is close to the ones of Besley and Coate (2003) and Besley et al. (2004).

Suppose there are two different types of villagers (1 and 2) and that the public goods can be classified in two different categories, also labeled with 1 and 2. Let  $g_1$  and  $g_2$  be the number of public goods of type 1 and 2 respectively. A villager of type  $i$  has a (weak) preference for goods of type  $i$ , with  $i \in \{1, 2\}$ , but also benefits/suffers an externality induced by goods of type  $-i$ . This is described by the following utility function:

$$U_i(g_1, g_2, \lambda_i) = \log(g_i) + \lambda_i \log(g_{-i})$$

where  $\lambda_i \in [-1, 1]$  denotes the level of externality that good  $-i$  generates for type  $i$ . When  $\lambda_i > 0$  the externality is positive, whereas it is negative when  $\lambda_i < 0$ . Without loss of generality, we can think of villagers of type 1 as being men and public goods 1 as being goods men are particularly interested in. Hence, villagers of type 2 are women.

We solve two different specifications of the model. In the basic set-up, we model the situation before the SHG programme started in the ward: the WM is the only public good provider.<sup>10</sup> Next, we enrich the model with an SHG that can undertake collective actions to provide public goods. Since SHGs consist of women, only type 2 villagers can form a group. We consider the decision to form an SHG as exogenous and for simplicity we assume that *all* women belong to it. In these wards, public goods can be provided by both the WM and the SHG. We model the competitive interaction between these two players in a sequential way. We assume that a WM can provide a total number of goods  $T \in [0, T_{max}]$  by incurring a total linear cost  $kT$ , with  $k > 0$ .  $T$  can be interpreted as the time spent addressing ward problems, or as the total amount of resources available to the WM. The SHG incurs a cost  $c$  per unit provided, with  $c > 0$ .<sup>11</sup>

### 3.1 Basic set-up

We first model a situation in which the WM is the only public good provider. The WM chooses the total number of public goods  $T$  to provide and how to allocate it between  $g_1$  and  $g_2$ . Let  $g = (g_1, g_2)$  and  $\lambda = (\lambda_1, \lambda_2)$ . We assume he maximizes, in two steps, the following

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<sup>10</sup>For simplicity and without loss of generality we do not consider public good provision by single villagers.

<sup>11</sup>The assumption that WMs and SHGs incur linear costs are taken for the ease of exposition. Assuming convex costs would not change our results.

function:

$$\begin{aligned} \max_{T,g} \quad & W(T, g, \lambda, \mu) = \mu U_1(g, \lambda_1) + (1 - \mu) U_2(g, \lambda_2) - kT \\ \text{s.t. :} \quad & g_1 + g_2 = T \\ & T \leq T_{max} \\ & g_i \geq 0 \quad i = 1, 2 \end{aligned}$$

where  $\mu \in [0, 1]$ . The WM maximizes the weighted sum of the utilities of both types of users, subject to its budget constraint and a non-negativity constraint for  $g_i$ . We consider the weight  $\mu$  as an exogenous variable that can be interpreted in different ways: a value of  $\mu > 1/2$  can describe a WM biased towards type 1 villagers, for example because he is a type 1 himself;  $\mu$  can also represent the proportion of type 1 villagers, or can be the result of a decision process maximizing the probability of the WM being reelected. Thus, the model applies also to situations in which the WM is not fully benevolent.

We first determine the optimal allocation  $g_1$  and  $g_2$  for any given  $T$ , and then we determine the optimal  $T$ . The results are summarized in the next proposition.

**Proposition 1.** *When the WM is the only public good provider, he sets  $\hat{g}_1, \hat{g}_2, \hat{T}$  such that:*

$$\begin{aligned} \hat{g}_1 &= \max \left\{ 0, \frac{\lambda_2(1 - \mu) + \mu}{k} \right\} & \hat{g}_2 &= \max \left\{ 0, \frac{1 - (1 - \lambda_1)\mu}{k} \right\} \\ \hat{T} &= \min \left\{ T_{max}, \frac{1 + \lambda_2 + \mu(\lambda_1 - \lambda_2)}{k} \right\} \end{aligned}$$

Note that  $\hat{g}_2$  is decreasing in  $\mu$ , whereas  $\hat{g}_1$  is increasing. This is intuitive: when type 2 villagers have less importance for the WM, a smaller amount of resources is devoted to the provision of their favorite goods. Moreover, when  $\lambda_1 < \lambda_2$ ,  $\hat{T}$  is decreasing in  $\mu$ . If type 2 goods generate a smaller spillover on type 1 villagers, the WM provides a smaller number of public goods as  $\mu$  increases. The decrease of  $\hat{g}_2$  is larger than the increase of  $\hat{g}_1$ , so that  $\hat{T}$  decreases.

The solution shows that, as negative externalities between the two types of public goods are possible, there are situations in which the WM decides not to provide one type of goods. To see that, consider  $g_2$  and note that  $\hat{g}_2 = 0$  if  $\lambda_1 \leq \frac{\mu-1}{\mu}$ . Since  $\mu \in [0, 1]$ , this condition implies that goods  $g_2$  will not be provided if  $\lambda_1$  is negative and sufficiently small. A similar condition applies for  $\hat{g}_1$ . In case of negative externalities, the WM trades off the benefit a public good produces on one type of villagers with the disutility it creates for the other type. When the disutility outweighs the benefit, the WM prefers not to provide it at all.

If goods of type 2 are not provided (or under-provided), the SHG, which we assumed to be of type 2 villagers, can have incentives to take care of their provision. This is what we model in the next subsection.

### 3.2 Private and public provision

The SHG provides  $g_{2c}$  goods of type 2 to complement the WM's provision. Actions are taken sequentially with the following timing:

- $t = 1$ : The WM chooses the optimal  $T$  and how to allocate it between  $g_1$  and  $g_2$
- $t = 2$ : The SHG observes  $g_1$  and  $g_2$  and chooses  $g_{2c}$

Our choice of the timing stems from the observation of the relationship between WMs and SHGs. First, note that WMs provided public goods well before the start of the SHG programme. More importantly, as described in Section 2.2, 64% of the groups contacted the WM before undertaking their first action. Thus, the WM is aware of the fact that SHGs are active and, as a first mover, can modify his behavior taking into account the reaction of the SHGs.<sup>12</sup>

We calculate the Subgame Perfect Nash Equilibrium by backward induction. Hence, we first analyze the maximization problem of the SHG. It solves the following problem:

$$\max_{g_{2c}} U_2^c(g_1, g_2, g_{2c}, \lambda_2) = \log(g_2 + g_{2c}) + \lambda_2 \log(g_1) - cg_{2c}$$

where  $g_1$  and  $g_2$  are the WM's provisions, considered as constants at this stage. The best-reaction function is:

$$g_{2c}(g_1, g_2) = \max \left\{ \frac{1}{c} - g_2, 0 \right\} \quad (1)$$

Since the best-reaction function depends on  $g_2$  only, we denote it with the shorter notation  $g_{2c}(g_2)$ . The WM's maximization problem is similar to the one explained in the

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<sup>12</sup>In this type of sequential model, the first mover strategy has the value of a strong commitment. We believe it is more natural to expect such a commitment from the WMs, since they are elected and are institutionally assigned the task to take care of ward problems. The interest in a particular type of ward problem can, for instance, be declared in the local electoral campaign. The SHGs are created for a different reason, so that it is more realistic to think their provision as a reaction to the observation of the WM's strategy. Moreover, since  $g_2$  and  $g_{2c}$  are substitutes, the first mover has a competitive advantage that fits better to the role of the WM.

previous subsection. But now the WM takes into account the reaction of the SHG. Let  $g = (g_1, g_2, g_{2c}(g_2))$  and  $\lambda = (\lambda_1, \lambda_2)$ . The WM maximizes the following function:

$$\begin{aligned} \max_{T, g_1, g_2} \quad & W(T, g, \lambda, \mu) = \mu U_1(g, \lambda) + (1 - \mu) U_2^c(g, \lambda) - kT \\ \text{s.t. :} \quad & g_1 + g_2 = T \\ & T \leq T_{max} \\ & g_i \geq 0 \quad i = 1, 2 \end{aligned}$$

This formulation leads to a particularly simple solution. By replacing  $g_{2c}(g_2)$  and the budget constraint into the objective function we get:

$$W(T, g, \lambda, \mu) = \mu[\log(g_1) + \lambda_1 \log(1/c)] + (1 - \mu)[\log(1/c) + \lambda_2 \log(g_1) - c(1/c - (T - g_1))] - kT$$

The WM first chooses the optimal  $g_1$  and  $g_2$  for any given  $T$ . It can be easily calculated that:

$$\bar{g}_1 = \frac{\lambda_2(1 - \mu) + \mu}{c(1 - \mu)} \quad \bar{g}_2(T) = T - \frac{\lambda_2(1 - \mu) + \mu}{c(1 - \mu)}$$

that depend only on  $\lambda_2$ . In fact,  $\lambda_1$  becomes irrelevant since the action of the SHG no longer allows the WM to control the externality that  $g_2$  exerts on type 1 villagers. Intuitively, if the SHG provides goods of type 2, the externality generated by  $\lambda_1$  cannot be avoided, no matters what the WM does. We can replace  $\bar{g}_2$  into  $g_{2c}(g_2)$  and calculate the optimal choice of the SHG:

$$g_{2c} = \frac{\lambda_2(1 - \mu) + 1 - cT(1 - \mu)}{c(1 - \mu)}$$

Because of equation (1), it is clear that  $g_{2c} = 0$  whenever  $\bar{g}_2 \geq 1/c$ . Noting that the objective function is linear in  $T$ , we get the following results:

**Proposition 2.** *Suppose that  $c(1 - \mu) \geq k$ . Then, in the Subgame Perfect Nash Equilibrium of the sequential game, the WM sets  $g_1^*$ ,  $g_2^*$  and  $T^*$ :*

$$g_1^* = \bar{g}_1 \quad g_2^* = \min \left\{ \frac{1}{c}, \bar{g}_2(T_{max}) \right\} \quad T^* = T_{max}$$

*The SHG provides*

$$g_{2c}^* = \max \left\{ 0, \frac{\lambda_2(1 - \mu) + 1 - cT_{max}(1 - \mu)}{c(1 - \mu)} \right\}$$

*If  $c(1 - \mu) < k$ , the WM sets  $T^* = g_1^* = \bar{g}_1$ ,  $g_2^* = 0$  and  $g_{2c}^* = \frac{1}{c}$ .*<sup>13</sup>

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<sup>13</sup>When  $c(1 - \mu) = k$  the WM gets the same utility for any  $T$ , so there is a continuum of equilibria. For simplicity, for this very special case, we select the welfare maximizing one.



The condition  $c(1 - \mu) > k$  implies that the marginal cost of provision borne by SHG members should be bigger than the marginal cost faced by the WM.<sup>14</sup> The condition is required to ensure that the WM's objective function has a positive slope. Since  $W(T, g^*, \lambda, \mu)$  is linear in  $T$ , when  $c(1 - \mu) > k$ , the WM sets  $T$  as high as possible, namely  $T = T_{max}$ . This is because he internalizes the cost borne by the SHG and prefers to take care of the provision himself at a lower marginal cost. When instead  $c(1 - \mu) < k$ , the WM prefers to free ride letting the SHG provide goods of type 2.

Note that  $g_1^*$  is increasing in  $\mu$ , whereas  $g_2^*$  is decreasing. Since, by equation (1) the total number of type 2 goods is  $1/c$ ,  $g_{2c}$  is increasing in  $\mu$ : the provisions of the WM and of the SHG are substitutes. This is intuitive: when  $\mu$  is large, the WM prefers to provide a smaller number of type 2 goods. Therefore, the SHG provides them itself.

These results allow us to shed some light on the role that the SHG plays in the public good provision. It is particularly interesting to compare the provision of type 2 goods. It can be easily verified that when  $c$  takes intermediate values, then  $g_2^* > \hat{g}_2$ , i.e. the WM's provision of  $g_2$  is larger in the joint provision model.

**Proposition 3.** *There exists an interval  $[\underline{c}, \bar{c}]$  and a  $\underline{k} \geq 0$  such that for any  $c \in [\underline{c}, \bar{c}]$  and for any  $\underline{k} < k < c(1 - \mu)$ ,  $g_2^* > \hat{g}_2$ , i.e. the WM provides a larger number of public goods of type 2 when the SHG is active.*

*Proof.* See Appendix B. □

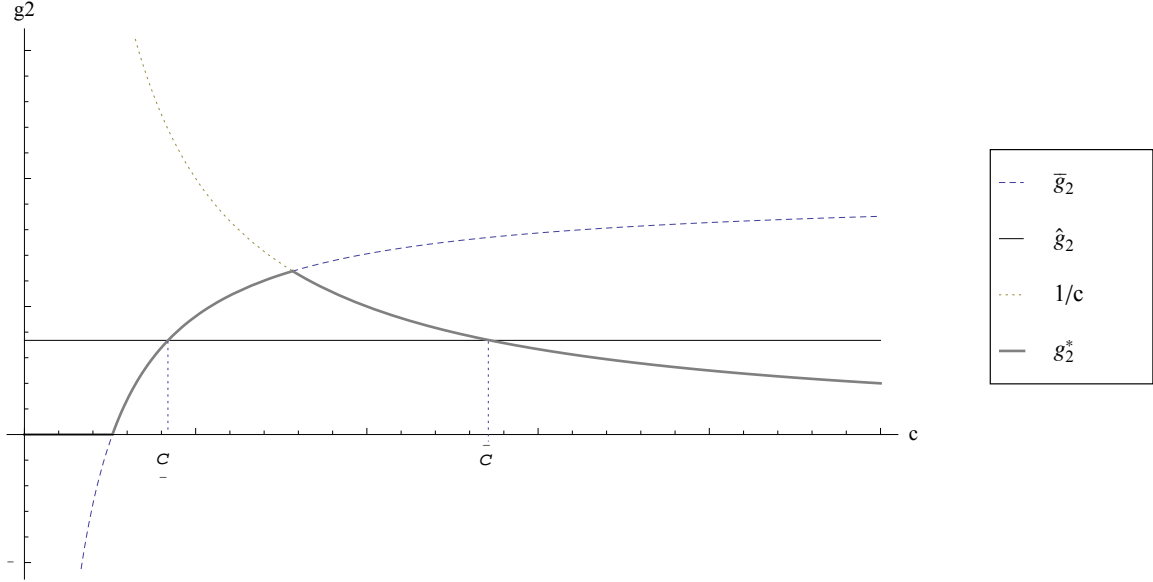
The value of  $\underline{k}$  is defined in Appendix B. Intuitively, if  $g_2$  is low, the SHG has an incentive to provide the good at a cost  $cg_{2c}$ . Since this cost has a negative influence on the welfare function, the WM tries to reduce it by providing part of the good himself. As the marginal cost  $c$  increases, the WM provides more and more  $g_2$ , until the point in which  $g_2^* = \frac{1}{c}$  and  $g_{2c}^* = 0$ . This is illustrated in Figure 1. When  $c$  is too large, the activities of the SHG can become wasteful, so that the exclusive provision by the WM is more efficient. However, when  $\lambda_1 \leq \frac{\mu-1}{\mu}$ ,  $\hat{g}_2$  is equal to zero, so that the continuous horizontal line in Figure 1 corresponds to the horizontal axis. In this case, the upper bound  $\bar{c}$  goes to infinity. The result holds for  $k$  large enough ( $k > \underline{k}$ ). In fact, if the marginal cost of provision is very low, the WM can always do better than the SHG.

Finally, note that in the sequential model, if  $c(1 - \mu) > k$ , the WM sets a (weakly) larger value of  $T$ : our model predicts that, when the SHG is an active public good provider,

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<sup>14</sup>We believe that this condition fits well the situation we are describing. In rural India, social actions have a larger cost for women (see also the previous section for a wider discussion).

Figure 1: Provision of public good 2 by the WM (function of  $c$ )



the WM takes care of a larger number of village issues. To understand why, we report the following simple result:

**Proposition 4.** (i) Suppose  $c(1 - \mu) > k$ . Then  $g_1^* < \hat{g}_1$ , i.e. the WM provides a smaller number of public goods of type 1 when the SHG is active. (ii) Moreover, for any  $k \in [\tilde{k}, c(1 - \mu)]$  and for any  $c > 0$ ,  $|g_1^* - \hat{g}_1| < |g_2^* - \hat{g}_2|$ .

*Proof.* See Appendix B □

The value  $\tilde{k}$  is defined in Appendix B. The result shows that there is some substitution between goods of type 1 and 2. When  $k$  is very small, the WM can provide a large number of public goods in the basic set up:  $\hat{g}_1$  and  $\hat{g}_2$  increase as  $k$  decreases. Conversely,  $g_1^*$  does not depend on  $k$ . For this reason, for small values of  $k$ , the WM provides a smaller number of type 1 goods when the SHG is active (point (i)).

Point (ii) states that for some values of  $k$ , the increase of  $g_2^*$  is not completely offset by the decrease of  $g_1^*$ . This is possible thanks to the increase of  $T$ . In fact, note that  $|g_1^* - \hat{g}_1|$  is decreasing in  $k$ , whereas  $|g_2^* - \hat{g}_2|$  is increasing. Under the assumptions in point (i) and in proposition 3,  $g_2^* > \hat{g}_2$ , so that as  $k$  increases,  $\hat{g}_2$  decreases and the gap widens; the opposite happens for  $g_1$ , as  $g_1^* < \hat{g}_1$ . So, when  $k$  is large enough ( $k > \tilde{k}$ ), the presence of an SHG has a larger impact on type 2 than on type 1 goods.

### 3.3 Discussion

The model suggests some simple hypotheses that we test in Section 4.

-*Hypothesis 1*: The *active* presence of an SHG leads to an increase in the overall public good provision by the WM, as measured by a larger variety of goods.

-*Hypothesis 2*: The WM begins or increases the provision of public goods preferred by the SHG ( $g_2^* > \hat{g}_2$ ). These include public goods that exert a negative externality on other villagers ( $\lambda_1 < 0$ ). The increase in type 2 goods is *not* offset by a decrease of type 1 goods.

Hypothesis 1 is related to two findings of our model. First, when the SHG is active there is an increase in the total number of public goods provided by the WM. Second, both types of goods are provided in a positive quantity. Exclusive provision by the WM, instead, can lead to no provision of one of the goods (goods 2 in our model). The *extra* public goods the WM deals with are the goods that are also provided by the SHG (goods 2 in our model). These goods can exert a negative externality on other villagers (hypothesis 2).

Our results depend on the size of the marginal costs of provision. Although it is hard to estimate the marginal cost of undertaking collective actions, we believe our conditions are reasonable given the phenomena we are describing. The provision has an important psychological cost for SHG members. As described in the introduction, women are restricted in their physical mobility and public voice in the region where we did our survey.<sup>15</sup> Although visiting an officer is not necessarily expensive, it can require a substantial amount of time. Moreover, as most of the SHGs take actions as a group, they also exert a significant effort in the organization. For these reasons, we believe that the marginal cost faced by SHGs is substantially larger than the one faced by WMs ( $c(1 - \mu) > k$ ). Still, WMs are not full-time government employees: they have another activity as primary occupation. Thus, also for them, the cost of provision  $k$  is not negligible.

## 4 Empirical strategy and results

In this section, we test the hypotheses suggested by our model. Hypothesis 1 is tested in Section 4.1 and hypothesis 2 in Section 4.2. We discuss the role of SHGs in Section 4.3. In Section 4.4 we argue that our results are not spurious by showing that WM characteristics

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<sup>15</sup>Indeed, we found evidence that women rarely visit an officer alone (cfr. Table 1).

do not predict an SHG becoming active. Finally, we provide robustness checks in Section 4.5.

#### 4.1 Hypothesis 1: Number of issues discussed by the WM

To test whether the active presence of SHGs leads to an increase in the overall public good provision by WMs, we measure the impact of SHGs on the number of different problems the WM visited an officer for. Using OLS, we estimate the following regression:

$$y_{ij} = A_{ij}\beta + G_{ij}\gamma + T_{ij}\delta + \mu_j + \epsilon_{ij} \quad (2)$$

where  $y_{ij}$  is the total number of different issues discussed by WM  $i$  in ward  $j$ .  $A_{ij}$  consists of two dummies included to compare the activities of WMs operating before an SHG was created to those operating after. We investigate whether the increase in public good provision that we observe in the data, results from either SHGs showing interest in collective actions or their creation itself. Thus, we distinguish between WMs whose mandate finished before SHGs started visiting officers and WMs whose mandate finished after the first SHG went:

- *SHG created* = 1 if an SHG is created in the ward
- *SHG active* = 1 if an SHG visited an officer in the ward

$G_{ij}$  is a set of controls describing the WMs' characteristics. It includes the education level, the land ownership, the total number of children, age, caste category and a dummy indicating whether the WM is a man.<sup>16</sup>  $T_{ij}$  is a set of dummies included to control for the year in which the WM was elected (*elected in '97, '02 or '07*). The omitted category is *elected in '92*. We include these dummies to control for a possible trend, as the quality of the WMs might increase over time. Finally,  $\mu_j$  is a ward fixed effect and  $\epsilon_{ij}$  is the error term.

The dummy *SHG active* might potentially be endogenous as, for instance, a WM particularly sensitive to women issues might encourage SHGs to become active. As discussed before, we consider the creation of SHGs as a plausible exogenous event. Therefore, we also run the regression taking into account the creation of SHGs only.

Table 4 shows, by year of election, the percentage of WMs during whose mandate SHGs were present and/or active. SHGs were mainly created during the mandate of WMs elected in 1997 and 2002, and they mainly started visiting officers during the mandate of WMs elected in 2002 and 2007. Note that, by 2007 all wards had at least one SHG.

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<sup>16</sup>Castes are classified in the following categories: ST (scheduled tribe), SC (scheduled caste), OBC (other backward caste) and FC (forward caste).

Table 4: Percentage of WMs during whose mandate SHGs were present and/or active (by election year)

	Elected in			
	1992	1997	2002	2007
	(1)	(2)	(3)	(4)
CREATION OF SHGs VERSUS SHGs BEING ACTIVE				
Non-active SHGs present (%)	3.2	30.5	33.3	9.5
Active SHGs present (%)	6.5	19.9	66.7	90.5
CREATION OF SHGs				
SHG groups present (%)	9.7	50.4	100.0	100.0
Average number of issues discussed by WMs	1.7	1.9	2.4	2.7

The results of our regressions are given in Table 5. Column (1) and (3) do not include the trend, while column (2) and (4) do. First, we take into account the creation of SHGs only (column (1) and (2)). Next, we differentiate between WMs whose mandate finished before or after an SHG visited an officer for the first time (column (3) and (4)).

The creation of an SHG influences positively the number of problems WMs deal with. As expected, when we use both the dummies *SHG created* and *SHG active*, only the latter is significant and the estimated impact (about 1.2 extra issues) is larger. These results confirm our first hypothesis: the *active* presence of SHGs leads to an increase of the overall public good provision by the WM, as measured by a larger variety of goods. We also find that male WMs deal with fewer issues and so do those who own more land.

#### 4.1.1 A Political Economy Explanation

We want to explore a complementary explanation. Since WMs are democratically elected, we can expect the impact of SHGs to be stronger when the number of SHG members is larger.

To check this explanation, we construct two different variables measuring the electoral weight of SHGs. The first variable, *SHG members per ward* counts, for each ward and each WM, the maximum number of women who belonged to SHGs for at least one day of the mandate. Ideally, we would like to divide this number by the voting female population in the ward. Unfortunately we do not have this information. The Census of India provides only the number of female above 6 *per village*. Since there is no one-to-one correspondence between villages and wards (some villages have several wards and some wards consist of several villages), we construct a second variable, *SHG members per village*. It measures,

Table 5: Total number of ward problems addressed by the WMs

	(1)	(2)	(3)	(4)
SHG created	0.9032*** (0.1239)	0.5989*** (0.2003)	0.2174 (0.1432)	0.2322 (0.1933)
SHG active			1.2255*** (0.1300)	1.1662*** (0.2162)
Male	-0.2958** (0.1449)	-0.3025** (0.1442)	-0.3278** (0.1288)	-0.3359** (0.1337)
Education level (years)	0.0265 (0.0201)	0.0248 (0.0197)	0.0264 (0.0195)	0.0246 (0.0193)
Land (acres)	-0.0452*** (0.0116)	-0.0422*** (0.0110)	-0.0416*** (0.0115)	-0.0407*** (0.0115)
Number of children	-0.0184 (0.0349)	-0.0153 (0.0336)	-0.0105 (0.0341)	-0.0119 (0.0332)
Age	0.0105 (0.0344)	0.0493 (0.0339)	0.0481* (0.0288)	0.0578* (0.0296)
Squared age	-0.0001 (0.0003)	-0.0004 (0.0003)	-0.0005 (0.0003)	-0.0005* (0.0003)
Caste category: SC	-0.0474 (0.2223)	-0.1185 (0.2196)	0.0032 (0.2257)	-0.0404 (0.2221)
Caste category: OBC/FC	0.0550 (0.1693)	0.0583 (0.1657)	0.1067 (0.1612)	0.0979 (0.1623)
Elected in '97		0.0527 (0.1583)		0.0535 (0.1506)
Elected in '02		0.2624 (0.2391)		-0.0058 (0.2282)
Elected in '07		0.6459*** (0.2424)		0.1784 (0.2431)
Constant	1.4108 (0.8561)	0.2963 (0.8415)	0.4178 (0.7329)	0.1355 (0.7540)
Ward fixed effects	yes	yes	yes	yes
<i>N</i>	448	448	448	448

Standard errors clustered at the ward level are given in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6: Political Economics Variables

Variable	Mean	Minimum	Maximum
SHG members per ward	30	0	135
SHG members per village	0.15	0	1
SHG members per ward conditional on SHG being created	43	9	135
SHG members per village conditional on SHG being created	0.22	0.023	1

for each village and each WM, the maximum number of women who belonged to SHGs for at least one day of the mandate, as a percentage of the female population above 6. This measure relies on the assumption that the distribution of women over age is comparable across villages and constant over time. The variables are summarized in Table 6.

The results, when we use these independent variables instead of the variable *SHG created* in column (2) of Table 5, are shown in Table 7. The variables of interest have a positive and significant coefficient, suggesting that a larger number of SHG members might correspond to a wider set of problems WMs feel responsible for. The average impact is comparable to what we found in column (2) of Table 5: for *SHG members per ward*, we find the increase is about 0.46 ( $0.0108 \times 43$ ) and for *SHG members per village* about 0.5 ( $2.2572 \times 0.22$ ).

## 4.2 Hypothesis 2: Extra issues discussed by the WM

Table 5 shows that WMs deal with a larger variety of ward problems as a response to actions of SHGs. We now want to examine which are the extra issues generating this increase. To do that, we adapt regression (2) and run the following OLS regressions:

$$y_{ijt} = A_{ij}\beta + G_{ij}\gamma + T_{ij}\delta + \mu_j + \epsilon_{ijt} \quad (3)$$

where  $y_{ijt}$  is a dummy equal to one if WM  $i$  in ward  $j$  visited an officer for issue  $t$ .

Table 8 shows the results when we only take into account the creation of SHGs. In Table 9 we differentiate between creation and becoming active.

Table 8 shows that the probability that WMs visit officers for alcohol and school problems increases by about 10%. For forest issues, the increase is about 13%. There is no significant impact on village infrastructure and welfare schemes, which are the two main responsibilities of the WMs. The results are qualitatively similar when we also consider the dummy *SHG active* (Table 9). The creation of SHGs is no longer significant, but their first action makes WMs on average 28% more likely to visit an officer for alcohol, 22% for school

Table 7: Total number of ward problems addressed by WMs

SHG members per ward (#)	0.0108*** (0.0031)	
SHG members per village (% of female population)		2.2572*** (0.5541)
Male	-0.3017** (0.1423)	-0.3058** (0.1454)
Education level (years)	0.0294 (0.0209)	0.0307 (0.0212)
Land (acres)	-0.0462*** (0.0099)	-0.0469*** (0.0106)
Number of children	-0.0078 (0.0340)	-0.0119 (0.0344)
Age	0.0574* (0.0340)	0.0529 (0.0341)
Squared age	-0.0005* (0.0003)	-0.0005 (0.0003)
Caste category: SC	-0.0686 (0.2227)	-0.0121 (0.2157)
Caste category: OBC/FC	0.0468 (0.1629)	-0.0083 (0.1666)
Elected in '97	0.1505 (0.1343)	0.1576 (0.1312)
Elected in '02	0.2935 (0.2078)	0.2704 (0.1977)
Elected in '07	0.7407*** (0.1947)	0.7262*** (0.1955)
Constant	0.1714 (0.8509)	0.3014 (0.8513)
Ward fixed effects	yes	yes
<i>N</i>	448	439

Standard errors clustered at the ward level are given in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



Table 8: Probability, per problem, of WM visiting an officer (creation only)

	Alcohol issues (1)	School issues (2)	Ration shop (3)	Forest issues (4)	Village infrastructure (5)	Welfare scheme (6)
SHG created	0.0973* (0.0567)	0.1034* (0.0551)	0.0022 (0.0322)	0.1343* (0.0699)	0.0842 (0.0858)	0.1416 (0.0891)
Male	-0.1035** (0.0421)	-0.0679 (0.0444)	0.0085 (0.0281)	-0.0517 (0.0445)	0.0691 (0.0541)	-0.1564*** (0.0504)
Education level (years)	0.0117* (0.0060)	-0.0003 (0.0068)	-0.0045 (0.0041)	-0.0063 (0.0073)	0.0089 (0.0080)	0.0115 (0.0076)
Land (acres)	-0.0089 (0.0081)	-0.0104*** (0.0031)	-0.0005 (0.0018)	-0.0078 (0.0071)	-0.0109 (0.0068)	-0.0022 (0.0048)
Number of children	-0.0129 (0.0085)	0.0065 (0.0095)	0.0017 (0.0073)	-0.0028 (0.0131)	-0.0255 (0.0177)	0.0135 (0.0141)
Age	-0.0022 (0.0116)	0.0051 (0.0085)	0.0017 (0.0062)	0.0021 (0.0100)	0.0209 (0.0152)	0.0235* (0.0121)
Squared age	0.0001 (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	-0.0002 (0.0002)	-0.0003** (0.0001)
Caste category: SC	-0.0731 (0.0586)	0.0544 (0.0734)	0.0198 (0.0428)	-0.1458* (0.0744)	-0.0933 (0.0940)	0.1421 (0.1063)
Caste category: OBC/FC	-0.1356** (0.0574)	0.0720 (0.0450)	0.0508 (0.0348)	-0.0427 (0.0461)	-0.0225 (0.0491)	0.1678*** (0.0615)
Elected in '97	0.0383 (0.0355)	-0.0634 (0.0438)	-0.0078 (0.0230)	0.0214 (0.0456)	0.0120 (0.0790)	0.0390 (0.0686)
Elected in '02	0.0730 (0.0671)	-0.0675 (0.0639)	0.0289 (0.0403)	0.0756 (0.0783)	0.0231 (0.1060)	0.1446 (0.1060)
Elected in '07	0.0617 (0.0670)	0.1133* (0.0679)	0.0834** (0.0411)	0.1101 (0.0751)	-0.0440 (0.1049)	0.2957*** (0.1050)
Constant	0.0750 (0.3037)	-0.0825 (0.2403)	-0.0342 (0.1539)	0.2814 (0.2759)	0.2079 (0.3769)	-0.1583 (0.3381)
Ward fixed effects	yes	yes	yes	yes	yes	yes
<i>N</i>	448	448	448	448	448	448

Standard errors clustered at the ward level are given in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9: Probability, per problem, of WM visiting an officer (creation vs activity)

	Alcohol issues (1)	School issues (2)	Ration shop (3)	Forest issues (4)	Village infrastructure (5)	Welfare scheme (6)
SHG created	-0.0224 (0.0580)	0.0263 (0.0486)	-0.0310 (0.0379)	0.0627 (0.0757)	0.0685 (0.0822)	0.0958 (0.0889)
SHG active	0.2824*** (0.0668)	0.2227*** (0.0728)	0.0536 (0.0335)	0.2451*** (0.0706)	0.1084 (0.1079)	0.2126** (0.1060)
Male	-0.1144*** (0.0382)	-0.0750* (0.0430)	0.0054 (0.0278)	-0.0582 (0.0432)	0.0676 (0.0546)	-0.1606*** (0.0502)
Education level (years)	0.0117** (0.0057)	-0.0004 (0.0066)	-0.0045 (0.0042)	-0.0064 (0.0072)	0.0089 (0.0081)	0.0114 (0.0076)
Land (acres)	-0.0084 (0.0074)	-0.0101*** (0.0034)	-0.0003 (0.0017)	-0.0075 (0.0072)	-0.0109 (0.0069)	-0.0020 (0.0050)
Number of children	-0.0118 (0.0080)	0.0073 (0.0091)	0.0020 (0.0072)	-0.0021 (0.0128)	-0.0253 (0.0178)	0.0139 (0.0142)
Age	0.0006 (0.0101)	0.0069 (0.0087)	0.0025 (0.0065)	0.0038 (0.0093)	0.0213 (0.0151)	0.0246** (0.0120)
Squared age	0.0000 (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0001)	-0.0001 (0.0001)	-0.0002 (0.0002)	-0.0003*** (0.0001)
Caste category: SC	-0.0476 (0.0583)	0.0708 (0.0724)	0.0269 (0.0434)	-0.1306* (0.0760)	-0.0900 (0.0940)	0.1519 (0.1078)
Caste category: OBC/FC	-0.1226** (0.0533)	0.0803* (0.0427)	0.0544 (0.0353)	-0.0350 (0.0445)	-0.0208 (0.0494)	0.1727*** (0.0622)
Elected in '97	0.0386 (0.0338)	-0.0633 (0.0434)	-0.0078 (0.0230)	0.0216 (0.0428)	0.0120 (0.0789)	0.0391 (0.0691)
Elected in '02	-0.0145 (0.0634)	-0.1239** (0.0618)	0.0046 (0.0368)	0.0232 (0.0714)	0.0116 (0.1121)	0.1111 (0.1123)
Elected in '07	-0.0908 (0.0658)	0.0150 (0.0690)	0.0411 (0.0361)	0.0188 (0.0716)	-0.0640 (0.1159)	0.2372** (0.1184)
Constant	0.0225 (0.2665)	-0.1164 (0.2429)	-0.0487 (0.1592)	0.2500 (0.2612)	0.2010 (0.3760)	-0.1784 (0.3377)
Ward fixed effects	yes	yes	yes	yes	yes	yes
<i>N</i>	448	448	448	448	448	448

Standard errors clustered at the ward level are given in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

problems and 25% for forest issues. Furthermore, we do observe a significant impact for welfare schemes now. Interestingly, male WMs are less likely to take care of alcohol issues and welfare schemes.

In conclusion, the estimates suggest that SHGs influence WMs for the public goods they are interested in (see Section 2.2). Hypothesis 2 also states that some of the public goods preferred by SHGs might exert a negative externality on other villagers. As described in the introduction, the best example of a controversial issue is probably alcohol production and consumption.

### 4.3 The role of SHGs in the provision of public goods

In the previous sections, we found that WMs are more likely to deal with issues beyond their main responsibility when SHGs are active. This observation leads to the following two questions. First, given that villagers are interested in these public goods, why did WMs not deal with them before SHGs became active or were created? Second, why do WMs start dealing with those issues and do not let SHGs tackle the problems themselves?

A possible answer to the first question is that women, due to their lack of organization, fail to communicate their interest in public goods to the WM. Consider for example alcohol issues. Even if a woman realizes there is a problem, she is unlikely to tackle it alone. The SHG provides an opportunity to express her aversion and, supported by other members, to inform the WM.<sup>17</sup>

Our theoretical model suggests an answer to the second question: when SHGs show interest in public good provision, WMs take into account the additional cost they have to bear. In order to reduce this burden, the WM provides part of the good. A possible motivation to do so, is increasing his reputation in the ward and therefore the probability of being reelected. Indeed, in Section 4.1.1 we showed that the impact of SHGs is stronger when the number of women who participate in SHGs is larger.

### 4.4 Selection

By providing support and reducing the (psychological) cost of actions, WMs particularly sensitive to women's issues might induce SHGs to become active. In that case, the results, when using both the dummies for creation and for activity, would be spurious: if WMs any-

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<sup>17</sup>A more precise answer to this question would admittedly require more investigation, but that is beyond the scope of this paper.

how become receptive to a wider range of issues, the regressions might be capturing political trends only. In order to exclude this possibility, we check whether WM characteristics predict an SHG becoming active. An insignificant impact validates the approach we followed in the previous subsections.<sup>18</sup>

For WM  $i$  in ward  $j$ , the dummy  $active_{ij}$  equals one if the first SHG became active during his mandate, and zero if no SHG was active. We estimate the following linear probability model:

$$active_{ij} = issues_{(i-1)j}\beta + G_{ij}\gamma + T_{ij}\delta + \mu_j + \epsilon_{ij} \quad (4)$$

$issues_{(i-1)j}$  is the number of issues discussed by the previous WM in ward  $j$ .  $G_{ij}$  is a set of controls for WM  $i$ ,  $T_{ij}$  is a set of dummies included to control for the year in which the WM was elected,  $\mu_j$  is a ward fixed effect and  $\epsilon_{ij}$  the error term. The results are given in Table 10.

In column (1), we do not include the trend. In this case, an SHG becoming active is significantly and positively correlated with the number of issues discussed by the previous WM. But as we add the trend (column (2)), the correlation is no longer significant. Moreover, we cannot reject the joint null hypothesis that the coefficients for the WM characteristics are zero ( $p$ -value = 0.33). Therefore, after controlling for ward heterogeneity and time trend, the event *SHGs becoming active* is uncorrelated with both the activities of the previous WM and demographics. As expected, we obtain similar results by using a more demanding ward specific linear trend instead of the aggregate trend dummies (column (3)).

## 4.5 Robustness checks

First, although we did not find evidence of selection after including election year dummies, we examine whether our results are also robust to the inclusion of ward-level linear trends. It allows us to control better for a ward specific evolution over time. Second, we take into account that, apart from SHGs, Other Groups were created in a subset of wards. Thus far, we did not focus on those groups, as their creation might be endogenous. But, as we do not want the coefficients of *SHG created* and *SHG active* to pick up the potential influence of those Other Groups, we test whether our results still hold when we do take them into account.

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<sup>18</sup>The discussion in this subsection is based on DellaVigna and Kaplan (2007).

Table 10: Selection

	(1)	(2)	(3)
Number of issues discussed	0.1404*	-0.0614	-0.1433
by previous WM	(0.0725)	(0.0459)	(0.2997)
Male	0.3069**	0.1574*	0.0473
	(0.1262)	(0.0848)	(0.3571)
Education level (years)	-0.0067	-0.0051	0.0188
	(0.0198)	(0.0147)	(0.0548)
Land (acres)	-0.0491	-0.0164	-0.0120
	(0.0304)	(0.0213)	(0.0594)
Number of children	-0.0451	-0.0349	0.0047
	(0.0378)	(0.0255)	(0.1396)
Age	-0.0569	0.0005	-0.1097
	(0.0345)	(0.0202)	(0.1234)
Squared age	0.0005	0.0000	0.0014
	(0.0004)	(0.0002)	(0.0012)
Caste category: SC	-0.3893	-0.2815	-0.8382*
	(0.2494)	(0.2268)	(0.4806)
Caste category: OBC/FC	-0.2290	-0.1126	-0.1155
	(0.1505)	(0.0958)	(0.5322)
Elected in '97		-1.0097***	
		(0.1003)	
Elected in '02		-0.5082***	
		(0.0874)	
Elected in '07		0.0000	
		(0.0000)	
Constant	2.0057**	1.2070**	1.3416
	(0.7748)	(0.4789)	(3.2778)
Ward fixed effects	yes	yes	yes
Ward linear trend	no	no	yes
<i>N</i>	219	219	219

Standard errors clustered at the ward level are given in parentheses.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 4.5.1 A ward-level linear trend

We replace the election year dummies by ward-level linear trends. The results are given in Table 11. For the total number of issues WMs deal with (column (1)), the estimated impact

Table 11: Robustness check: Using a ward linear trend

	Total # of issues (1)	Alcohol issues (2)	School issues (3)	Ration shop (4)	Forest issues (5)	Village infrastructure (6)	Welfare schemes (7)
SHG created	-0.0568 (0.3148)	0.0389 (0.1126)	-0.1443 (0.1108)	-0.0194 (0.0525)	0.0800 (0.1149)	0.0336 (0.1382)	-0.0387 (0.1536)
SHG active	0.8389* (0.4279)	0.3625** (0.1565)	0.0390 (0.1737)	0.0518 (0.0753)	0.2592* (0.1530)	0.0600 (0.1807)	0.0572 (0.2100)
Male	-0.2941 (0.2474)	-0.1115 (0.0740)	-0.0417 (0.0813)	-0.0113 (0.0459)	-0.0689 (0.0785)	0.0901 (0.1082)	-0.1629 (0.1135)
Education level (years)	0.0248 (0.0433)	0.0083 (0.0124)	0.0021 (0.0130)	-0.0008 (0.0087)	-0.0001 (0.0159)	-0.0044 (0.0158)	0.0152 (0.0174)
Land (acres)	-0.0173 (0.0259)	-0.0137 (0.0120)	0.0010 (0.0103)	-0.0010 (0.0042)	0.0006 (0.0183)	-0.0039 (0.0164)	0.0034 (0.0104)
Number of children	-0.0395 (0.0822)	-0.0061 (0.0249)	0.0047 (0.0205)	-0.0056 (0.0181)	0.0116 (0.0298)	-0.0574 (0.0415)	0.0094 (0.0414)
Age	0.0612 (0.0710)	0.0032 (0.0288)	0.0141 (0.0168)	0.0025 (0.0129)	-0.0122 (0.0239)	0.0310 (0.0425)	0.0217 (0.0312)
Squared age	-0.0005 (0.0007)	-0.0000 (0.0003)	-0.0001 (0.0002)	-0.0000 (0.0001)	0.0001 (0.0003)	-0.0003 (0.0004)	-0.0002 (0.0003)
Caste category: SC	-0.0270 (0.5429)	-0.0290 (0.1374)	0.2307 (0.1788)	-0.0073 (0.0501)	-0.1771 (0.2263)	-0.0951 (0.1490)	0.0348 (0.2798)
Caste category: OBC/FC	0.1538 (0.2966)	-0.0072 (0.0949)	0.0273 (0.0972)	0.0148 (0.0740)	-0.0056 (0.0773)	0.0189 (0.1288)	0.0972 (0.1397)
Constant	-1.1332 (1.5646)	0.0144 (0.6352)	-0.3915 (0.4522)	-0.0526 (0.2619)	0.2023 (0.5438)	-0.2713 (0.8866)	-0.6083 (0.8170)
Ward fixed effects	yes	yes	yes	yes	yes	yes	yes
Ward linear trend	yes	yes	yes	yes	yes	yes	yes
<i>N</i>	448	448	448	448	448	448	448

Standard errors clustered at the ward level are given in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

is similar to our previous results: the creation of SHGs is not significant, but their activity has a positive influence.

In the columns (2) to (7), we show the results per issue. Once SHGs became active, WMs are on average 36% more likely to visit an officer for alcohol and 26% for forest issues. The impact on school problems is no longer significant.

### 4.5.2 Other Groups

We want to examine whether collective actions of SHGs have a similar influence on the activities of WMs, when we take into account the creation of Other Groups. The results, which are given in appendix C, show that the impact of SHGs remains strikingly similar for both hypotheses.

## 5 Conclusions

We examine the impact of collective actions undertaken by SHGs on the variety of problems ward members deal with. We provided a simple model suggesting two hypotheses that we test and confirm with an empirical study. First, we find that ward members take care of a larger variety of ward issues when SHGs undertake collective actions, compared to a situation with exclusive provision by ward members. Second, ward members begin or increase the provision of those public goods that SHGs prefer, including the goods that exert a negative externality on other villagers. Once SHGs became active in the village, local authorities are more likely to deal with alcohol, forest and school problems. With respect to issues that exert a negative externality on other villagers, the most controversial and therefore best example is probably alcohol.

A caveat of our empirical results is that we can focus on the *type* of public goods only and not on the quality and the intensity of the work done by the ward member. Knowing how often each problem appeared, how often the ward member tried to solve it and how successful he was, would have allowed us to measure the impact of SHGs more precisely. Unfortunately, it is hard to get this information. Despite this limitation, we believe that our data set allows us to give some evidence about the positive impact on the political agenda of collective actions by socially disadvantaged women.

Our results emphasize the need for more research in order to better understand the motives that lead SHGs to undertaking collective action. We believe that different incentives may simultaneously play a role, like reputation, visibility and altruism. Moreover, it is not entirely clear whether the phenomena we observe are related or not to the financial role of SHGs. We suspect that similar results could be attained by different types of groups, which are not necessarily related to microfinance. But in the context of our survey region, in which the social role of women is limited, intra-household interactions may play an important role. In this respect, the financial aim of SHGs can make a difference by providing a socially acceptable reason for women to meet regularly.

## 6 Appendix A: Different types of problems

**Village infrastructure** includes both repair and construction of wells, water pumps, roads, community buildings, etc.

**Closing of alcohol shops / stop brewing alcohol within households** In many villages, alcohol consumption is considered a “right” of the husband. Therefore, women do not undertake legal actions, even in cases of domestic violence or abuse. But even in villages where women are *allowed* to drink, the negative effects of excessive alcohol consumption on the family economy and on the family life are well-known (see for example Mishra (1999)).

**Ration shops (pds)** A public distribution system was set up to improve food security for the poor and to ensure availability at affordable prices of wheat, rice, sugar and kerosene. Ration cards entitle families, belonging to low-income groups, to a particular amount of those goods at a reduced price. The products are distributed through a network of almost half a million fair price or ration shops (Gaiha, 2003; and Ministry of Consumer Affairs, Food & Public Distribution, Government of India, 2009).

Ration shop issues include the demand for opening a shop in the village, complaints about the functioning, requests for more control, etc.

**School problems** The central government launched the National Program of Nutritional Support to Primary Education (NP-NSPE) to introduce cooked mid-day meals for all children in primary government schools, in government aided and local body schools, and since 2002 in Education Guarantee Scheme (EGS) and in Alternative and Innovative Education scheme (AIE) centers. The aim is to increase school enrollment and attendance and to simultaneously improve child nutrition. Initially, the program’s objective was to provide children 100 grams of food grains per school day, but in 2004 the nutritional value was revised to 300 calories and 8 to 12 grams of protein and in 2006 to 450 calories, 12 grams of protein and quantities of micronutrients like iron and vitamin A. Next to free food grains, the scheme also provides central support for the costs of cooking, transportation of food grains, replacing kitchen devices, evaluation and finally the costs to provide mid-day meals during the summer vacation in drought affected areas (Government of India, 2009).

Possible problems might be a bad provision or a bad quality of the meals. For example, because of corruption, money provided for the scheme, or even ingredients might “disappear”. Other school problems include for example complaints about the teacher.

**Dowry and child marriage** are not common among scheduled castes and scheduled tribes, the main caste categories in the area where we conducted our survey. Therefore, both problems barely appeared.

**Forest issues** mainly involve the protection of forest, for example against illegal cutting down of trees to sell the wood in nearby cities.

**Welfare schemes** include

- BPL: Below the Poverty Line cards.



- NREGA: National Rural Employment Guarantee Act cards, which guarantee at least 100 days of wage employment per financial year to every household whose adult members volunteer to do unskilled manual work [implemented: 2005].
- IAY: Indira Awaas Yojana housing scheme, which provides financial support for building houses [implemented: 1985/1986, extended in 1999-2000 and 1993-1994].
- IGNOAPS: Indira Gandhi National Old Age Pension Scheme, which gives financial aid to citizens above 65 years, who live below the poverty line. This pension scheme includes two other schemes, namely the Indira Gandhi National Widow Pension Scheme (IGNWPS) for BPL widows and the Indira Gandhi National Disability Pension Scheme (IGNDPS) for BPL persons with severe or multiple disabilities. In Orissa, there is no age restriction for the last two schemes [implemented: 1995, extended in 2007].
- NMBS: National Maternity Benefit Scheme, which gives BPL pregnant women a one-time payment of Rs. 500, 8 to 12 weeks before the delivery, for each of the first two births [implemented: 2001, extended in 2005].

**Other issues** include relocating a stone crusher machine and closing particular companies.<sup>19</sup>

## 7 Appendix B: Proofs

**Proof of Proposition 3.** First note that  $\hat{g}_2 \in [0, T_{max}]$  by construction and does not depend on  $c$ . We consider two cases:

(i) Let  $\lambda_2 + \mu(1 - \lambda_2) > 0$ . Then  $\bar{g}_2$  is increasing and concave in  $c$ . It goes to  $-\infty$  as  $c$  approaches zero and is bounded above by  $T_{max}$  as  $c$  increases. Thus it crosses  $\hat{g}_2$  once from below at  $\underline{c} = \frac{k(\lambda_2 + \mu(1 - \lambda_2))}{(1 - \mu)(kT - 1 + (1 - \lambda_1)\mu)}$ .

As the marginal cost  $c$  increases, the WM provides more and more  $g_2$ , until the point  $\tilde{c} = \frac{1 + \lambda_2(1 - \mu)}{T(1 - \mu)}$  in which  $g_2^* = \frac{1}{c}$  and  $g_{2c}^* = 0$ .

Finally, the curve  $1/c$  crosses  $\hat{g}_2$  from above at  $\bar{c} = \frac{k}{1 - (1 - \lambda_1)\mu}$ . The proof is completed by noting that  $\underline{c} < \tilde{c} < \bar{c}$  when  $k > \underline{k} := \frac{(1 + \lambda_2(1 - \mu))(1 - \mu(1 - \lambda_1))}{T(1 - \mu)}$ .

(ii) Let  $\lambda_2 + \mu(1 - \lambda_2) < 0$ . Then  $\bar{g}_2$  is decreasing and convex in  $c$ . So  $\underline{c} = 0$  and  $\tilde{c}$  and  $\bar{c}$  are calculated as in point (i). □

**Proof of Proposition 4.** (i) Simple algebra shows that:

$$\hat{g}_1 > g_1^* \iff \frac{\lambda_2(1 - \mu) + \mu}{k} > \frac{\lambda_2(1 - \mu) + \mu}{c(1 - \mu)} \iff c(1 - \mu) > k$$

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<sup>19</sup>Stone crusher machines fragment stones into small pieces which can be used for construction work. The use of these machines pollutes the air and causes breathing problems, especially for the elderly.

(ii) Simple algebra shows that  $|g_1^* - \hat{g}_1| < |g_2^* - \hat{g}_2|$  if and only if  $k > \frac{1+\lambda_2+\mu(\lambda_1-\lambda_2)}{T}$   $\square$

## 8 Appendix C: Including Other Groups

### 8.1 Hypothesis 1: Number of issues discussed by the WM

To test whether this hypothesis still holds, we replace  $A_{ij}$  in regression (2) by a set of dummies to compare the activities of WMs operating before *any* group was created to those operating after:

- $SHG\ created = 1$  if an SHG is created
- $SHG\ active = 1$  if an SHG visited an officer
- $Other\ Group\ created = 1$  if an Other Group is created
- $SHG\ created \times Other\ Group\ created = 1$  if both an SHG and an Other Group are created
- $SHG\ active \times Other\ Group\ created = 1$  if an SHG is active and an Other Group is created

We include the interactions to control for a possible substitution or complementarity effect between SHGs and Other Groups. We also run the regression above without differentiating between creation and first visit.  $A_{ij}$  reduces then to a set of three dummies:

- $SHG\ created = 1$  if an SHG is created
- $Other\ Group\ created = 1$  if an Other Group is created
- $SHG\ created \times Other\ Group\ created = 1$  if both an SHG and an Other Group are created

Table 12 shows, per year of election, the percentage of WMs during whose mandate SHGs and/or Other Groups were present. The number of Other Groups grew steadily over time. By 2007 all wards had at least one SHG. So, if we take only the creation of SHGs into account, the differences between WMs elected in 2002 and 2007 are due to the creation of Other Groups.

The results are given in Table 13. The impact of SHGs is strikingly similar to what we found in Table 5, i.e. when we did not take into account Other Groups. Other Groups have a positive influence on the WMs activities, but the point estimate is smaller. The negative and significant coefficient of the dummy  $SHG\ active \times Other\ Group\ created$  suggests that active SHGs and Other Groups are - to a certain extent - substitutes.<sup>20</sup>

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<sup>20</sup>In fact, in column (3) and (4), where we use both the dummies for creation and for being active, the estimated impact of SHGs is much larger. But the larger coefficients of the dummy  $SHG\ active$  are partially offset by the negative coefficients of the interaction term  $SHG\ active \times Other\ Group\ created$ . In column (1)

Table 12: Percentage of WMs during whose mandate SHGs and/or Other Groups were present (by election year)

	Elected in			
	1992	1997	2002	2007
	(1)	(2)	(3)	(4)
<b>CREATION OF OTHER GROUPS</b>				
Other Groups present (%)	30.1	39.2	46.6	59.6
<b>CREATION OF SHGs VERSUS SHGs BEING ACTIVE</b>				
Non-active SHGs present (%)	3.2	30.5	33.3	9.5
Active SHGs present (%)	6.5	19.9	66.7	90.5
Non-active SHGs and Other Groups present (%)	0.0	11.6	13.0	4.8
Active SHGs and Other Groups present (%)	3.2	9.2	33.6	54.8
<b>CREATION OF SHGs</b>				
SHG groups present (%)	9.7	50.4	100.0	100.0
SHGs and Other Groups present (%)	3.2	20.8	46.6	59.6
Average number of issues discussed by the WM	1.7	1.9	2.4	2.7

## 8.2 Hypothesis 2: Extra issues discussed by the WM

To examine which extra issues WMs discuss, we run the regressions described in regression (3), where we replace  $A_{ij}$  by the set of respectively 3 and 5 dummies we introduced in the previous subsection. The results are given in the tables 14 and 15.

Again, the influence of SHGs is similar to what we found before (Table 8 and Table 9). We find a slightly larger impact for forest issues, but Other Groups have an even larger impact. This is not surprising, given that most Other Groups are *forest committees* and rarely discuss more than one issue (Table 2). In the previous subsection we mentioned that active SHGs and Other Groups are substitutes. This result seems to be driven by forest issues.

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and (2), where we use only the creation dummy, the interaction term  $SHG\ created \times Other\ Group\ created$  is not significant. From table 12, we learn that only the creation of Other Groups varies between 2002 and 2007. Given that the total number of issues increases by 0.3 (or 30% of the total increase over the time span) the only variable it can be attributed to is the creation of Other Groups. This might dampen the negative coefficient on the interaction term.

Table 13: Total number of ward problems addressed by the WMs

	(1)	(2)	(3)	(4)
SHG created	0.8972*** (0.1377)	0.6796*** (0.2118)	0.1814 (0.1615)	0.2303 (0.2044)
SHG active			1.3676*** (0.1725)	1.3740*** (0.2433)
Other Group created	0.7505*** (0.2599)	0.6293** (0.2714)	0.7621*** (0.2517)	0.7212*** (0.2637)
SHG created×Other Group created	-0.2182 (0.2584)	-0.2693 (0.2634)	-0.0808 (0.2965)	-0.0617 (0.3012)
SHG active×Other Group created			-0.5134* (0.2745)	-0.5125* (0.2773)
Male	-0.2925** (0.1406)	-0.3063** (0.1419)	-0.3082** (0.1259)	-0.3218** (0.1305)
Education level (years)	0.0261 (0.0195)	0.0250 (0.0195)	0.0230 (0.0189)	0.0214 (0.0188)
Land (acres)	-0.0403*** (0.0114)	-0.0392*** (0.0108)	-0.0373*** (0.0108)	-0.0370*** (0.0109)
Number of children	-0.0084 (0.0348)	-0.0099 (0.0336)	-0.0052 (0.0348)	-0.0082 (0.0340)
Age	0.0036 (0.0362)	0.0397 (0.0360)	0.0430 (0.0303)	0.0513 (0.0315)
Squared age	-0.0000 (0.0003)	-0.0003 (0.0003)	-0.0004 (0.0003)	-0.0005 (0.0003)
Caste category: SC	-0.0814 (0.2252)	-0.1352 (0.2256)	0.0302 (0.2461)	-0.0074 (0.2432)
Caste category: OBC/FC	0.0657 (0.1689)	0.0716 (0.1659)	0.1152 (0.1610)	0.1093 (0.1622)
Elected in '97		0.0278 (0.1603)		0.0043 (0.1532)
Elected in '02		0.2148 (0.2440)		-0.0775 (0.2344)
Elected in '07		0.5707** (0.2528)		0.0828 (0.2544)
Constant	1.2035 (0.8966)	0.2432 (0.8773)	0.2098 (0.7556)	0.0173 (0.7805)
Ward fixed effects	yes	yes	yes	yes
<i>N</i>	445	445	445	445

Standard errors clustered at the ward level are given in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 14: Probability, per problem, of WM visiting an officer (creation only)

	Alcohol issues (1)	School issues (2)	Ration shop (3)	Forest issues (4)	Village infrastructure (5)	Welfare scheme (6)
SHG created	0.1134* (0.0655)	0.1143* (0.0613)	0.0121 (0.0406)	0.2023*** (0.0703)	0.0424 (0.0927)	0.1425 (0.0946)
Other Group created	-0.0044 (0.0927)	0.1150 (0.1047)	0.0243 (0.0548)	0.5472*** (0.1089)	0.0576 (0.1130)	-0.1542 (0.1244)
SHG created×Other Group created	-0.0401 (0.0827)	-0.0324 (0.0921)	-0.0254 (0.0440)	-0.2148** (0.0828)	0.0839 (0.0997)	0.0059 (0.1021)
Male	-0.1050** (0.0424)	-0.0665 (0.0449)	0.0082 (0.0283)	-0.0500 (0.0422)	0.0693 (0.0538)	-0.1612*** (0.0508)
Education level (years)	0.0119* (0.0061)	-0.0005 (0.0068)	-0.0045 (0.0042)	-0.0066 (0.0071)	0.0089 (0.0078)	0.0119 (0.0075)
Land (acres)	-0.0092 (0.0083)	-0.0098*** (0.0030)	-0.0005 (0.0020)	-0.0052 (0.0068)	-0.0096 (0.0069)	-0.0032 (0.0047)
Number of children	-0.0136 (0.0090)	0.0083 (0.0100)	0.0018 (0.0074)	0.0038 (0.0111)	-0.0245 (0.0181)	0.0098 (0.0145)
Age	-0.0024 (0.0127)	0.0065 (0.0092)	0.0020 (0.0067)	-0.0001 (0.0096)	0.0144 (0.0156)	0.0217* (0.0126)
Squared age	0.0001 (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	-0.0001 (0.0002)	-0.0002* (0.0001)
Caste category: SC	-0.0693 (0.0587)	0.0499 (0.0744)	0.0205 (0.0426)	-0.1612** (0.0761)	-0.1045 (0.0913)	0.1503 (0.1066)
Caste category: OBC/FC	-0.1341** (0.0579)	0.0747 (0.0459)	0.0521 (0.0344)	-0.0299 (0.0442)	-0.0275 (0.0520)	0.1655*** (0.0630)
Elected in '97	0.0398 (0.0368)	-0.0769* (0.0463)	-0.0106 (0.0249)	-0.0195 (0.0445)	0.0247 (0.0779)	0.0595 (0.0701)
Elected in '02	0.0781 (0.0674)	-0.0851 (0.0670)	0.0269 (0.0427)	0.0169 (0.0759)	0.0214 (0.1052)	0.1730 (0.1064)
Elected in '07	0.0714 (0.0683)	0.0902 (0.0737)	0.0823** (0.0414)	0.0256 (0.0716)	-0.0622 (0.1039)	0.3389*** (0.1086)
Constant	0.0837 (0.3185)	-0.1524 (0.2514)	-0.0497 (0.1610)	0.1154 (0.2571)	0.3122 (0.3899)	-0.0694 (0.3452)
Ward fixed effects	yes	yes	yes	yes	yes	yes
<i>N</i>	445	445	445	445	445	445

Standard errors clustered at the ward level are given in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 15: Probability, per problem, of WM visiting an officer (creation vs activity)

	Alcohol issues (1)	School issues (2)	Ration shop (3)	Forest issues (4)	Village infrastructure (5)	Welfare scheme (6)
SHG created	-0.0435 (0.0644)	0.0241 (0.0532)	-0.0155 (0.0447)	0.0567 (0.0660)	0.0646 (0.0972)	0.1007 (0.1019)
SHG active	0.3453*** (0.0822)	0.2600*** (0.0856)	0.0695 (0.0464)	0.3728*** (0.0810)	0.0440 (0.1199)	0.2189* (0.1145)
Other Group created	0.0239 (0.0912)	0.1358 (0.1029)	0.0353 (0.0555)	0.5573*** (0.1094)	0.0660 (0.1154)	-0.1414 (0.1202)
SHG created×Other Group created	0.0546 (0.1019)	-0.0044 (0.0902)	-0.0442 (0.0617)	-0.0318 (0.1025)	-0.0026 (0.1412)	0.0004 (0.1122)
SHG active×Other Group created	-0.1280 (0.0900)	-0.0793 (0.1046)	-0.0360 (0.0530)	-0.3095*** (0.0907)	0.1064 (0.1082)	-0.0134 (0.1128)
Male	-0.1087*** (0.0393)	-0.0706 (0.0430)	0.0048 (0.0280)	-0.0462 (0.0408)	0.0642 (0.0548)	-0.1645*** (0.0513)
Education level (years)	0.0104* (0.0061)	-0.0011 (0.0067)	-0.0044 (0.0044)	-0.0088 (0.0067)	0.0097 (0.0080)	0.0118 (0.0075)
Land (acres)	-0.0084 (0.0076)	-0.0094*** (0.0033)	-0.0004 (0.0018)	-0.0043 (0.0066)	-0.0099 (0.0069)	-0.0031 (0.0049)
Number of children	-0.0134 (0.0087)	0.0088 (0.0096)	0.0023 (0.0074)	0.0026 (0.0109)	-0.0234 (0.0183)	0.0103 (0.0145)
Age	0.0015 (0.0106)	0.0089 (0.0094)	0.0030 (0.0070)	0.0029 (0.0088)	0.0144 (0.0156)	0.0230* (0.0126)
Squared age	0.0000 (0.0001)	-0.0001 (0.0001)	-0.0000 (0.0001)	-0.0000 (0.0001)	-0.0001 (0.0002)	-0.0002** (0.0001)
Caste category: SC	-0.0243 (0.0626)	0.0753 (0.0752)	0.0278 (0.0423)	-0.1178 (0.0832)	-0.1121 (0.0922)	0.1617 (0.1097)
Caste category: OBC/FC	-0.1225** (0.0530)	0.0833* (0.0434)	0.0567 (0.0354)	-0.0261 (0.0410)	-0.0238 (0.0524)	0.1708*** (0.0636)
Elected in '97	0.0316 (0.0339)	-0.0816* (0.0462)	-0.0121 (0.0248)	-0.0270 (0.0406)	0.0258 (0.0777)	0.0573 (0.0709)
Elected in '02	-0.0181 (0.0638)	-0.1474** (0.0656)	0.0007 (0.0398)	-0.0474 (0.0685)	0.0158 (0.1111)	0.1392 (0.1122)
Elected in '07	-0.0881 (0.0664)	-0.0144 (0.0742)	0.0370 (0.0358)	-0.0758 (0.0695)	-0.0755 (0.1142)	0.2813** (0.1212)
Constant	0.0102 (0.2718)	-0.2011 (0.2540)	-0.0712 (0.1663)	0.0703 (0.2366)	0.3049 (0.3904)	-0.0965 (0.3451)
Ward fixed effects	yes	yes	yes	yes	yes	yes
<i>N</i>	445	445	445	445	445	445

Standard errors clustered at the ward level are given in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

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