Do better monitoring institutions increase leadership quality in community organizations? Evidence from Uganda.

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Abstract

We offer a framework for analyzing the impact of monitoring — a commonly recommended solution to poor leadership — on the quality of democratically elected leaders in community organizations in low-income countries. In our model, groups may face a trade-off between leader ability and effort. If the group's ability to monitor the leader is low, then the leader may exert too little effort. A higher level of monitoring increases leader effort, raising the value of the public good. However, more intense monitoring may also drive higher ability members to opt-out of candidacy, reducing public goods value. The result is an inverted U-shaped relationship between the level of monitoring and the value of the public good. The trade-off between leader effort and ability, however, only exists in the presence of sufficient private income opportunities. These predictions are assessed using original data gathered from Ugandan farmer associations.

Keywords: Leadership quality; Community organizations; Public goods; Monitoring

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1 Introduction

Recently, awareness has grown about the important role community organizations play in affecting citizens' welfare in developing countries (Gugerty & Kremer, 2008; Fearon *et al.* , 2011; Beath *et al.* , forthcoming). For example, during the 1990s, the World Bank increased the share of projects with a community-based component by about ten-fold to over USD 7 billion (Mansuri & Rao, 2004). Approaching development through community organizations has a number of potential advantages, including that these local organizations likely have better information about the needs and preferences of community members. This, in turn, can improve the match between needs and the type of assistance provided, as well as the targeting of aid to those in need. In addition, localizing development can facilitate citizen participation, thereby increasing ownership over development projects while helping overcome collective action problems (Labonne & Chase, 2011). Despite these potential advantages, community-driven development projects have often achieved mixed success (Casey *et al.* , 2012; Mansuri & Rao, 2013).

This study focuses on one important determinant of the success of community organizations: the quality of their leadership. To counter poor leadership, which is often thought to stem from an accountability deficit that allows corruption and shirking (Platteau & Gaspart, 2003; Bardhan, 2002), increased monitoring is often proposed as a solution (Olken, 2007; Björkman & Svensson, 2010). This solution is premised on the notion that increasing citizen information on politicians' behavior will increase the responsiveness of incumbents to the preferences of their constituents (Ashworth, 2012, pp. 192-3). However, we argue that there are reasons to question the assumption that an increase in the level of monitoring necessarily results in superior outcomes.

Several recent papers have highlighted the potential negative consequences of improved monitoring on the behavior of elected leaders in national political units. Instead, in this paper we focus specifically on the features of community organizations. This is an important departure because many of the mechanism that may drive the relationship between greater transparency and outcomes in larger political units—such as "expert" leaders (Prat, 2005), political polarization (Stasavage, 2007), and the level of uncertainty over the preferences of politicians (Stasavage, 2004) as well as their "types" (Humphreys & Weinstein, 2012)—are likely to be less important, or even irrelevant, in community organizations. For example, we demonstrate below the potential adverse effects of monitoring even when community members have full information on candidates' types and when the preferences of community members and leaders are perfectly aligned. The starting point of this paper is the idea that existing political economy models of the relationship between monitoring and accountability, designed for national politics, cannot be simply applied to community organizations without appropriate modifications.

The first contribution of this paper is to offer a model that can be used to analyze the relationship between monitoring and leader quality, tailored specifically for relatively small democratic community organizations. Our model builds on the citizen-candidate framework (Osborne & Slivinski, 1996; Besley & Coate, 1997). In the model, leaders divide their time between public and private employment based on the relative benefits of those activities. Monitoring induces leader effort by increasing the penalties faced by a leader who shirks once in office, which we term the *discipline effect*. However, these increased penalties may also cause some group members to choose

not to become candidates for the leadership position, which we call the *self-selection effect*. High ability members will opt out of the candidacy pool first because they face greater outside income opportunities (Caselli & Morelli, 2004; Messner & Polborn, 2004). Thus, groups face a trade-off between leader effort and leader ability. The mechanism we consider is likely to be particularly important in the community organization setting, where the rewards from holding office are generally not large relative to private income opportunities. The first main prediction of our theory is that as monitoring of leaders increases, this will increase leader effort but may decrease leader ability. This core prediction, to the best of our knowledge, has not been theoretically derived nor empirically tested in past studies. The result of the trade-off between leader effort and ability is an inverted U-shaped relationship between monitoring and the value of the public good produced.

This paper's second contribution is to highlight how local economic conditions affect the trade-off between leader effort and ability that communities face. In particular, we show that outside income opportunities play a key role in determining the relationship between monitoring and leader quality. In the model, the higher are outside income opportunities, the less likely are high-ability group members to run for the leadership position, since ability and outside income opportunities are complements. Thus, communities with greater outside income opportunities will face a stronger trade-off between leader effort and ability. In contrast, when there are few outside income opportunities, high levels of monitoring can induce more leader effort without driving high-ability members to forgo candidacy. This insight is important as it helps identifying the conditions under which we might worry about the negative effects of enhanced monitoring.

The third contribution of this paper is to test the model predictions with original micro-level data. These data were collected through an extensive survey of over 3,000 members and leaders, drawn from a sample of 50 farmer associations in Uganda. These associations, recently established through a USAID-funded program, provide a good context for testing the model because we are able to look across a large number of groups, with relatively similar structures and purpose, yet which vary in terms of monitoring institutions. This variation results from a number of factors, most importantly the idiosyncratic preferences of the program field trainers who helped the farmers establish their associations. Naturally, locations also vary with respect to the availability of private income opportunities, reflecting local economic conditions. Exploiting variations in both monitoring institutions and in local private income opportunities allows us to assess the capacity of the model to explain the determinants of leader quality in community organizations.

This paper highlights the adverse effect of monitoring levels on candidate *self-selection*. Past studies, mentioned above, demonstrating the potential negative effects of greater transparency, have focused on incumbent's behavior. In contrast, we emphasize a mechanism in which monitoring levels may cause high-ability group members to opt-out of becoming a candidate for the leadership position, thereby undermining citizen welfare. This mechanism may be less of a concern in larger political units where the returns from office are often quite large (Eggers & Hainmueller, 2009).

Finally our study contributes to the formal literature on political accountability that considers the influence that the rewards from holding office, and the monitoring of incumbents, can have on incumbents' behavior. In those models, the benefit incumbents derive from holding office

depends on reelection and voters face a trade-off in determining a cutoff level of performance that they will require from the incumbent leader in order to get reelected. Voters want to extract maximum effort from the incumbent, but setting the reelection cutoff point too high will cause the incumbent to give up on reelection, and reduce effort or expropriate funds. There are several differences between our approach and studies in this vein.

First, unlike pure moral hazard accountability models (Austen-Smith & Banks, 1989; Ferejohn, 1986; Barro, 1973) group members are heterogeneous in their ability in our setting, so we find that requiring more effort from leaders may also affect the ability of the leader. This second dimension of leadership quality plays a key role in our story. Second, even in selection accountability models that allow for candidates' heterogeneity (for example, Fearon (1999); Besley (2006); Humphreys & Weinstein (2012)) candidates vary on a single dimension. In this study, candidates' quality is a two-dimensional attribute, thereby allowing us to explore the trade-off between candidates' ability and effort. Third, in our model the level of monitoring directly affects the remuneration of incumbents. In contrast, in models using reelection cut points, the level of monitoring has no affect on citizens' optimal performance criterion and only affects outcomes by improving the ability of citizens to sort a 'good' type from a 'bad' type (Ashworth, 2012, pp. 191-192). Thus in Fearon (1999) as well as in Snyder & Stromberg (2010), better monitoring necessarily improves citizen welfare. Finally, in our model communities are able to directly reward leader effort, rather than having to reward effort through reelection. We think that this is an important avenue to explore when considering community organizations, which are likely to have an advantage in offering leaders high-powered incentives (Besley, 2005).

Individual elements of our theory have been explored in several recent papers. Caselli & Morelli (2004) and Messner & Polborn (2004) show that the ability of candidates for leadership positions will depend on the rewards for holding office. Ferraz & Finan (2011) explore the relatioship between leader effort and the rewards of holding office. Gagliarducci & Nannicini (2013) focus on the impact of politicians' wages on both the ability and effort of politicians. The impact of outside income opportunities on politicians' effort once in office is explored by Gagliarducci *et al.* (2010). What distinguishes our paper from these past studies is that we investigate the relationship between monitoring, outside income opportunities, leader effort, and leader ability in a single framework. Our empirical contribution is distinguished by our ability to observe each of these features in the data.

In the next section we present the theoretical model and derive several testable predictions. The following sections describe the Ugandan farmer associations used to test the model, and the data collection procedure. The empirical analysis is presented in Section 5, followed by a brief case study of associations from two Ugandan districts (Section 6). Section 7 concludes.

2 Theory

Because we focus on leadership quality in small community organizations, we adapt our model to that setting by altering existing theories in several important ways. First, unlike large political units where each citizen knows only a few of his or her fellows, in relatively small communities

members generally know each other well and incomplete information is not a key factor in determining election outcomes. To reflect this, our model allows ability to be perfectly observable by group members. Also, because they have more information about leaders' activities, smaller groups will have an advantage over larger political units in offering incentive schemes that condition remuneration on effort.[1] Second, community organizations are often formed with a specific purpose in mind, so that members' goals are generally more closely aligned with respect to the public good than in larger political units. To reflect this, the preferences of group members are perfectly aligned in our model: all members benefit from a higher value of the public good. Third, participating in community organizations, even as the leader, is generally a part-time affair since these groups rarely have the resources to employ full-time or professional leaders, as is common in larger political units. Thus, in our setting, group leaders must decide how to divide their time between producing the public good and generating private income. Fourth, in community organizations, the leader receives significant benefits from the public good that is produced. In contrast, in larger political units, the value that leaders derive from the public good they produce is often small relative to the amount of effort they exert or the overall value of the public good. As a result, in our model leaders will take into account the benefits that they receive from the production of the group public good.

2.1 Model setup

The model considers a group of N members, indexed by $i \in (1, ...N)$. The members elect a leader who is responsible for producing a group public good. Members are heterogeneous in their ability $A_i \in (0, \bar{A})$, such that group members can be strictly ordered by ability. Each member is endowed with one unit of effort that can be allocated between generating private income and public goods production. Members' ability is perfectly observed, but effort is not.

The value of the public good produced depends on the effort exerted by the leader and the leader's ability according to $P(A_l, e_l, \eta_P)$ where e_l is the share of the leader's effort devoted to public good production and η_P is a random noise term with a mean of zero. For simplicity, members other than the leader do not participate in public goods production.[2]

The private income of individual i is produced with ability and effort according to the function $I(A_i, 1-e_i, \eta_I)$ where η_I is a random noise term with mean zero, drawn from the same distribution as η_P, ensuring that members face no risk trade-off when choosing between the public good and private income. Because only the leader is responsible for public goods production, all other group members will set $e_i = 0$ and receive private income $I(A_i, 1, \eta_I)$.

The functions $I(A_i, 1 - e_i, \eta_I)$ and $P(A_i, e_i, \eta_P)$ are increasing in the effort and ability arguments, concave in the $1 - e_i$ and e_i terms, respectively, and twice differentiable in the ability and effort terms. The random terms η_I and η_P can be thought of as additive noise induced by external

[1] See Besley (2004, 197-198) which provides a thoughtful discussion on the problems that large political units face in trying to devise high-powered incentives for politicians.

[2] Results would not change if members were to put a fixed amount of effort towards public good production. The more complex possibility that there may be complementarities between leader quality and the amount of effort that members devote to public goods production is beyond the scope of this paper.

forces, so for example, $I(A_i, 1-e_i, \eta_I) = I(A_i, 1-e_i) + \eta_I$. When no member chooses to become a candidate, and no leader is elected, the public good value is $P(0, 0, \eta_P) = \eta_P$. We assume that Inada conditions hold in both private income generation and public goods consumption as $1 - e_i \to 0$ and $e_i \to 0$, respectively, and that there is a complementarity between ability and effort in either task: $\partial^2 I(A_i, 1-e_i, \eta_I)/\partial A_i \partial(1-e_i) > 0$ and $\partial^2 P(A_i, e_i, \eta_P)/\partial A_i \partial e_i > 0$.[3]

One feature of the $I()$ and $P()$ functions is that they both incorporate an effort-ability trade-off, in the sense that the same amount of output can be produced by a low ability leader who exerts more effort as by a high ability leader who exerts less. Individuals take this trade-off into account when deciding how much effort to exert at each task and whether to seek the leadership position.

Group members derive utility from their income, Y_i according to an increasing and concave utility function $U_i = U(Y_i)$. The income of a member i who does not become a candidate (nor the leader) is given below, where the leader is some individual l.

$$Y_i = I(A_i, 1, \eta_I)\alpha + P(A_l, e_l, \eta_P)(1-\alpha) \tag{1}$$

In this equation, the parameter α represents the availability of private income opportunities relative to the value of the public good. Though we focus primarily on how α is affected by the availability of private income opportunities, in practice, the value of α may also depend on factors affecting the potential value of the public good. It is important to note that α represents income opportunities that are outside of the group and are not affected by the level of the group public good. Also, α is a group-level parameter, which applies to all group members. Individual-level variation in private income opportunities is captured instead by each individual's ability.

The income for an individual who becomes a candidate but is not elected to be the leader is the same as Equation 1, less the cost of candidacy $\phi > 0$, which may be monetary or social. The income of the member who becomes the leader is given by Equation 2.

$$Y_l = I(A_l, 1-e_l, \eta_I)\alpha + P(A_l, e_l, \eta_P)(1-\alpha) - C(m, e_l) - \phi \tag{2}$$

The leader's income differs from that of other group members in two ways. First, to be elected, the leader must pay the candidacy cost ϕ. Second, the leader faces some additional costs or rewards from holding office $C(m, e_l)$. These depend on the level of monitoring of the leader undertaken by the group, m, and the effort exerted by the leader in public goods production e_l. The $C(m, e_l)$ function is assumed to be increasing and weakly convex in m, decreasing in e_l, and twice

[3] Assuming complementarity between ability and effort is important. The intuition here is that effort is the means through which ability is translated into results. For example, high-ability individuals that spend no time at a task will achieve no results, but will achieve positive results if they devote an hour to the task. Thus, the product of their ability depends on the effort exerted. Similarly, a low-ability individual who spends an hour on a task may achieve poor results, while a high-ability individual that spends the same hour will achieve good results. So the payoff to an hour of effort also depends on ability. Our results, however, continue to hold if we set the complementarity between ability and effort to zero, as long as there is still complementarity in generating private income. This is an important point because the empirical results do not provide strong evidence that ability and effort are complements in public goods production in the farmer associations herein.

differentiable. Also, the greater the level of monitoring, the greater the benefit of increasing effort: $\partial^2 C(m, e_l)/\partial m \partial e_l < 0$. For simplicity, we also assume that $\partial^2 C(m, e_l)/\partial e_l^2 = 0$.

The level of monitoring undertaken by the group, $m \geq 0$, is the second key parameter in the model. The monitoring level is an exogenous parameter, which depends on the institutional monitoring technology available to the group, such as the existence of a committee responsible for overseeing the leader. Treating monitoring levels as an exogenous parameter fits the empirical setting that we study well, as discussed in Section 3. It also matches the existing literature on this topic, which generally takes the costs and rewards of office as exogenously given (Messner & Polborn, 2004; Gagliarducci *et al.* , 2010).[4]

The assumption that $C(m, e_l)$ is increasing in m is particularly important. This reflects the citizen-candidate framework, in which the institutional structures are fixed, or only change slowly over time. In practice, this means that we do not allow groups to adjust the leader's remuneration (which is also included in the $C(m, e_l)$ function) in response to their monitoring technology and the available candidate pool.[5] In order to reduce the ability of leaders to manipulate the returns to leadership to their own advantage, democratic organizations often have institutional structures that are largely fixed, or change only very slowly. These structures are generally enshrined in constitutions. In Appendix A.5 we describe in more detail why the citizen-candidate framework with a fixed institutional structure is a better fit for the democratic organizations that we study.

Monitoring institutions are necessary since effort is not perfectly observed, and cannot be inferred based on the public good value due to the unobserved random noise term η_P. Monitoring can be thought of as a mechanism that detects whether the leader is failing to perform some leadership tasks.[6] There are potentially three ways to compensate leaders. If the relationship between leader quality and the value of the public good is easily observable, then it may make sense to reward or sanction leaders based on the value of the public good they produce. However, there is generally a great deal of noise obscuring the relationship between leader quality and the public good value, as represented by η_P.[7] Remunerating the leader based on this noisy signal would introduce a high level of uncertainty into their income stream, reducing the benefits of remuneration to individuals with positive risk aversion. Thus, in many settings this may not be a reasonable approach. Alternatively, since leader ability is observable in our context, this could be a basis for rewarding the leader. While such a system could eliminate the self-selection effect, in practice we are not aware of a setting in which such a rewards system is used. This leaves us with effort as the basis for incentivizing the leader. See Appendix A.6 for a formalization of this logic.

[4] An exception is Caselli & Morelli (2004) who suggest that incumbent politicians can reduce the benefits of holding office in order to increase their chances of reelection.

[5] This strong assumption is standard in citizen-candidate theories. If democratic groups were to adjust the contracts offered to leaders, they would be reliant on group leaders to design these contracts, putting incumbents in the position of acting as both the principal and the agent, with negative consequences. See Caselli & Morelli (2004) for the negative consequences of allowing incumbents to influence the future returns to holding office.

[6] As an example from our empirical setting, some farmer groups do not review the accounts put together by the group leader. In other groups, one of the group representatives may review the books. Other groups hire external auditors. Each of these represents a very different level of monitoring of the group leader.

[7] High uncertainty in the value of the public good fits our empirical setting well, where the prices negotiated by the leader depend on external forces – such as volatile world coffee prices, the exchange rate, or changes in the structure of local competition – and members have great difficulty in obtaining information about these market conditions.

2.2 Timing

The model has three stages. First, members decide whether to offer themselves as a candidate for the leadership position. Members base this decision on a comparison of payoffs from being the leader to their payoffs from being a regular group member. Next, members vote to choose a leader out of the pool of available candidates. In the final stage, the elected leader decides how much effort to devote to producing the public good, knowing that devoting effort to producing the public good reduces the amount of effort he can put towards generating private income. Once the leader's effort is chosen, the values of η_I and η_P are realized, the public good is produced, members receive their payoffs, and the game ends.

Members begin the model with perfect information on the ability of other group members, the group's level of monitoring, and the availability of private income opportunities. In contrast, the amount of effort exerted by the leader is not perfectly observed. The ability of the group to assess the leader's effort will depend on the available monitoring institutions. The values of the random variables η_I and η_P are also unobserved by group members.

To solve the model, we work backwards, starting with determining the effort that each member would exert if they were the leader. Members use these expected effort levels to determine whom to elect in the second stage, given each potential set of candidates. Moving back another step, the expected election outcomes are used in members' candidacy choices.

2.3 Leader effort

If member i is the leader, he will decide how to allocate effort between public goods production and generating private income by solving the optimization problem below. For simplicity, we will abuse notation slightly by writing the expected value of the I() and P() functions as follows: $I(A_i, 1-e_i) = E(I(A_i, 1-e_i, \eta_I))$ and $P(A_i, e_i) = E(P(A_i, e_i, \eta_P))$.

$$\max_{e_i} I(A_i, 1-e_i)\alpha + P(A_i, e_i)(1-\alpha) - C(m, e_i) - \phi$$

The optimal effort level, denoted e_i^*, is the solution to the first order condition.[8]

$$-\frac{\partial I(A_i, 1-e_i)\alpha}{\partial e_i} + \frac{\partial P(A_i, e_i)(1-\alpha)}{\partial e_i} - \frac{\partial C(m, e_i)}{\partial e_i} = 0 \tag{3}$$

One implication of allowing the leader to divide effort between public goods production and generating private income is the possibility that higher-ability members may make worse leaders. This will occur if higher-ability members, when leaders, substitute so much effort away from public goods production that the reduction in effort offsets the benefits of their ability. While this is an interesting possibility, in this paper we consider only situations in which high-ability members are better leaders; i.e., situations in which $dP(A_i, e_i^*)/dA_i > 0$ for all possible parameter values. To

[8] An interior solution is ensured by the functional form assumptions.

do so we will make Assumption 1, which amounts to placing restrictions on the complementarity of ability and effort in generating private income relative to public goods production.

Assumption 1 *The public good value produced in equilibrium is increasing in leaders ability.*

$$\frac{dP(A_i, e_i^*)}{dA_i} = \frac{\partial P(A_i, e_i^*)}{\partial A_i} - \frac{\partial P(A_i, e_i^*)}{\partial e_i^*} \left[\frac{\frac{\partial^2 I(A_i, 1-e_i^*)\alpha}{\partial A_i \partial e_i^*} - \frac{\partial^2 P(A_i, e_i^*)(1-\alpha)}{\partial A_i \partial e_i^*}}{\frac{\partial^2 I(A_i, 1-e_i^*)\alpha}{\partial e_i^{*2}} - \frac{\partial^2 P(A_i, e_i^*)(1-\alpha)}{\partial e_i^{*2}} - \frac{\partial^2 C(m, e_i^*)}{\partial e_i^{*2}}} \right] > 0$$

According to this expression, the change in the public good value due to the direct effect of higher ability, $\partial P(A_i, e_i^*)/\partial A_i$, is greater than the change due to the indirect effect of effort, $(\partial P(A_i, e_i^*)/\partial e_i^*)$ multiplied by the change in the leader's optimal effort level induced by the higher ability, $\partial e_i^*/\partial A_i$. We impose this assumption for three reasons. First, under most circumstances, higher-ability members will make better leaders. Our empirical evidence confirms that this is the case in the setting that we investigate. Second, eliminating this additional complexity makes it easier to focus on the mechanisms that we are most interested in. Third, this assumption is consistent with most of the existing literature on this topic (e.g., Caselli & Morelli (2004), and Messner & Polborn (2004)), making it easier to compare our work to previous results.

2.4 Elections

Given a set of candidates, group members vote based on the value of the public good that candidates are expected to produce. Because individuals know the ability of all other group members they are able to calculate the effort that each candidate is expected to exert if elected, e_i^*, and the expected value of the public good that they would produce. Members can then rank the available candidates according to $P(A_i, e_i^*)$.[9] Each member has one vote, which must be used to vote for one candidate, if any are available. If no candidates are available, no vote takes place, and no leader is elected. We consider only strategies that are not weakly dominated.[10] In equilibrium, each member will always either vote for the candidate delivering the highest public good value or themselves (if the rewards from holding office are great). The candidate delivering the highest public good value will be elected.[11]

2.5 Candidacy Choice

Each member's candidacy choice will depend on a comparison between his expected utility from being the leader and his utility from not being the leader. The key trade-off is that, as the leader,

[9] This is possible given Assumption 1, which ensures that since no two members have the same ability, and public good production is strictly increasing in ability, no two members will deliver the same public good value.

[10] This rules out weakly dominated strategies in which members vote for a candidate other than their preferred candidate, but no one has incentive to change their vote because none of them represent the decisive vote.

[11] If rewards from holding office embodied by the $C(m, e_i)$ function are set too high, then all members may choose to run and vote for themselves. In such a case we assume that the members must vote again until a tie is broken, at which point the best available candidate will be elected.

the member benefits from the public good he produces, but producing the public good requires substituting effort away from generating private income.

Candidacy choice is a game played simultaneously by all members. We will look for Nash Equilibrium solutions to this game in pure strategies. Each group member will choose between two strategies: {*Run, Not Run*}. Under most circumstances, multiple equilibria exist, because higher-ability members (those delivering higher public good values if elected) may choose Run if they believe that lower-ability members will choose Not Run. In such case it is optimal for low-ability members to choose Not Run. On the other hand, lower-ability members may choose Run if they believe that higher-ability members will choose Not Run. This will occur if higher-ability members prefer to free ride on a lower quality leader rather than to run themselves. The following four conditions are necessary and sufficient for equilibrium existence.

EC 1 *There is at most one member who chooses Run in each equilibrium.*

This condition must hold because no member i would choose Run, given that another member j with $P(A_j, e_j^*) > P(A_i, e_i^*)$ also chooses Run, since member i would never be elected under these conditions but would still have to pay the cost of candidacy.

EC 2 *If a member i chooses Run, that member must have a non-negative payoff from choosing Run relative to a situation in which no leader is chosen, i.e., $CP_i \geq 0$ where,*

$$CP_i(A_i, \alpha, m) = I(A_i, 1 - e_i^*)\alpha + P(A_i, e_i^*)(1 - \alpha) - C(m, e_i^*) - \phi - I(A_i, 1)\alpha \tag{4}$$

This holds because member i will never choose Run if he would be better off with no public good.

EC 3 *If some member i chooses Run, then no other member j, who would deliver a higher public good value than i ($P(A_j, e_j^*) > P(A_i, e_i^*)$), has a positive payoff from choosing Run given that member i chooses Run. I.e, $CP_j - P(A_i, e_i^*) \leq 0$ where CP_j is as in Equation 4.*

This must hold because, in an equilibrium in which i chooses Run, it cannot pay for a better potential leader j to also prefer Run, or else j would run, and i would not.

EC 4 *If no member chooses Run, then it must be the case that no member has a positive payoff from choosing Run relative to a case in which no one runs, i.e., $CP_i \leq 0$ for all i.*

2.6 Candidacy Incentives

The relationship between a member's ability and his incentive to become a candidate is central to the model. To address this relationship, we first define the term 'candidacy incentives.'

Def. 1 *High-ability members have* **greater candidacy incentives** *relative to low-ability members when* $dCP_i/dA_i > 0$*. Low-ability members have relatively greater candidacy incentives when* $dCP_i/dA_i < 0$*.*

Candidacy incentives are driven by a trade-off, faced by leaders, between having less time to spend producing private income and producing and benefiting from a higher value public good. Low-ability members will have greater candidacy incentives if the benefits of being the leader fall for higher-ability members, because the higher public good value they produce does not compensate them for the foregone private income.[12] In the upcoming analysis, we will clearly separate results which hold only when low-ability members have greater candidacy incentives relative to high-ability members, which we will call Condition 1.

Condition 1 *High-ability members have less incentive to be the leader than low-ability members, i.e.,* $dCP_i/dA_i < 0$*.*

This condition features in the upcoming analysis. First, we test how the model behaves when Condition 1 holds. Second, we identify the parameter values under which Condition 1 holds.

2.7 Predictions

Next we derive the predictions of the model, which will later be taken to the data. We first consider how the leader's effort is affected by the parameters of the model, and then consider how the parameters work through members' candidacy decisions to affect the ability of the elected leader. Lastly, we consider how the sum of these effects determines the value of the public good produced.

2.7.1 Discipline Effect

Our first prediction is the discipline effect: holding the identity of the leader constant, an increase in monitoring increases the leader's optimal effort level and thus the value of the public good. Conversely, an increase in private income opportunities reduces the leader's optimal effort level. We derive proposition 1 by applying the implicit function theorem to Equation 3 (Appendix A).

Proposition 1 *Holding the identity of the leader constant, the amount of effort allocated to producing the public good is increasing in the level of monitoring,* m*, and decreasing in the level of private income opportunities,* α*. I.e.,* $de_i^*/dm > 0$ *and* $de_i^*/d\alpha < 0$*.*

[12] This is the case in Caselli & Morelli (2004), where the benefit that leaders derive from the public good they produce is set to zero, so low-ability candidates will always have greater candidacy incentives. However, in the smaller group setting considered here, leaders benefit from the public good they produce, which opens up the possibility that higher-ability individuals may have greater candidacy incentives. See also Messner & Polborn (2004).

2.7.2 Self-selection Effect

Our second prediction is that high private income opportunities and monitoring can work together to cause high-ability members to self-select out of candidacy. The argument is divided into three propositions. To begin, we show that an increase in monitoring reduces a group member's payoff from choosing Run, and can lead him to always prefer Not Run in equilibrium.

Proposition 2 *Consider an equilibrium with monitoring level m in which member i chooses Run, implying $CP_i(A_i, \alpha, m) > 0$. There exists a monitoring level $\bar{m}_i > m$ for member i such that $CP_i(A_i, \alpha, \bar{m}_i) = 0$. For any $m' > \bar{m}_i$, $CP_i(A_i, \alpha, m') < 0$ and member i does not choose Run in equilibrium.*

The intuition is that an increase in monitoring increases the leader's expected sanctions (or decreases the expected rewards), thus reducing the attractiveness of holding office. Thus, for each member, there will exist some monitoring level $\bar{m}_i$ at which he is indifferent between choosing Run and Not Run given that no other member runs, and for any monitoring level greater than $\bar{m}_i$, he will choose Not Run. A formal proof is available in Appendix A. Next, we show that when Condition 1 holds, the cutoff monitoring level $\bar{m}_i$ is lower for higher-ability members.

Proposition 3 *Suppose that Condition 1 holds, so that low-ability members have greater candidacy incentives, and $A_i > A_j$. Then $\bar{m}_i < \bar{m}_j$.*

Under Condition 1, a higher-ability member will always have lower candidacy incentives. This implies that $CP_i(A_i, \alpha, m) < CP_j(A_j, \alpha, m)$ when $A_i > A_j$. Thus, individual i will become indifferent between Run and Not Run given that no other member runs ($CP_i(A_i, \alpha, m) = 0$) at a lower monitoring level than individual j. A formal proof is available in Appendix A. Given the results above, it is important to know the parameter values under which low-ability members have greater candidacy incentives (Condition 1 holds). These will be the conditions under which, in equilibrium, higher monitoring levels will cause high-ability members to opt out of the candidate pool before lower-ability members. The following proposition shows that Condition 1 holds for high levels of private income opportunities.

Proposition 4 *There exists a level of private income opportunities $\bar{\alpha} < 1$ such that for all $\alpha > \bar{\alpha}$, Condition 1 holds, i.e., $dCP_i(A_i, \alpha, m)/dA_i < 0$.*

The intuition here is that, when private income opportunities are high, members face greater opportunity costs from allocating their time to public goods production, and these costs will be greater for higher-ability members because the private income gains that they forgo are larger than for a lower-ability members due to the complementarity between effort and ability. A formal proof is available in Appendix A. Putting Propositions 2 - 4 together, we obtain Corollary 1.

Corollary 1 *When private income opportunities are sufficiently high ($\alpha \geq \bar{\alpha}$), lower-ability members have relatively greater candidacy incentives (Condition 1 holds). When Condition 1 holds, high-ability members choose Not Run at a lower level of monitoring than lower-ability members. Moreover, the highest ability candidate in the candidate pool will be the first to opt-out of candidacy as the level of monitoring increases.*

Corollary 1 is one of the study's main theoretical results. It shows that private income opportunities and monitoring can work together to drive high-ability members out of the candidate pool. It is this three-way relationship that is taken to the data in Section 5.

Simulation results, available in the online appendix, confirm the patterns described above. In particular, under reasonable parameter assumptions we observe that, as monitoring increases, leader effort increases but at high levels of monitoring leader ability begins to fall. The result is an inverted U-shaped relationship between monitoring and the value of the public good produced. This pattern is stronger the higher are private income opportunities, and for low levels of private income opportunities, the negative relationship between monitoring and the value of the public good, represented by the right half of the inverted U-shape, completely disappears.

3 Empirical Setting

In this section we test the model's predictions using original data on farmer associations, which are a pivotal community organization in many low-income countries. Farmer associations members join voluntarily to gain access to the services produced by the group, of which the most important is securing higher output prices through collective marketing. Other services include securing lower input prices and providing agriculture training.

3.1 APEP: The Development Project

All the surveyed farmer associations were created as part of one of Uganda's largest recent development projects: the Agriculture Productivity Enhancement Project (APEP). APEP's goal was to support smallholder farmers' transition into commercial farming. Between 2004 and 2008 it organized over 60,000 farmers into more than 2,500 village-level producer organizations (POs), which were further organized into 220 farmer associations, known as Depot Committees (DCs). These associations, which serve, on average, 200 members from ten POs, were designed to exploit economies of scale and to bargain for better prices based on quality and volume. Each association covers a relatively small geographical area—a parish, which in Uganda typically covers a cluster of ten nearby villages, approximating natural communities—so members tend to have a high level of information about each other, which fits our theoretical framework well.

Studying the APEP groups presents several advantages. First, the groups' relative proximity ensures the homogeneity of the political and legal environments. Second, APEP groups have similar governance structures and leadership positions whose roles and functions are comparable across sites. A manager, who we henceforth refer to as the "leader," leads each association. Leaders' responsibilities include organizing the collection of crops from members, searching for buyers, negotiating input and output prices, coordinating training activities and facilitating the diffusion of information to group members. Two representatives from each PO are chosen to serve on the DC council, representing their village at the association-level. Importantly, these representatives form the pool of potential candidates out of which the association leader is chosen. While the

leader is responsible for the day-to-day management of the group's affairs, the council representatives are responsible for monitoring the work of the DC leadership, representing the opinions of PO members at the associational level, moving information to and from the POs, and helping to implement decisions at the village level. Thus, we can differentiate between three types of members: ordinary group members, council representatives, and the DC leader (see organizational structure chart, Appendix, Fig. 10). All of the groups we study share this basic structure.

4 Data, Measurement and Identification Strtegy

This section briefly describes the data used in this paper and how it was collected. To reduce crop-related variability, we limited the target population to only those associations that marketed coffee, the most common cash crop sold by APEP groups. We then sampled 50 associations out of 5 district-areas (regions) using a stratified, random, multistage cluster design. A map of these regions is in the Appendix.

Quantitative data for the empirical analysis was collected between July and September 2009 by a team of local interviewers. First, we obtained individual-level surveys of ordinary group members by sampling six POs from each association, for a total of 287 village-level groups.[13] From each sampled PO, we surveyed, on average, six members, for a total of 36 members per association.[14] Sampled members were surveyed in person in the respondents' local language, for a total of 1,781 surveys. Second, we surveyed all members of the DC council; i.e., the complete pool of potential candidates for the DC leadership position for a total of 1,316 interviews. These "representatives' surveys" were tailored to capture the representatives' roles and responsibilities within the association governance structure. We collected additional data at both the village and associational-level using questionnaires completed by the group's executive committee members.[15] Data on the DCs' economic activities were also collected from the associations' books.

4.1 Measurement of Key Variables

The main variables in the empirical analysis include group level measures of the value of the public good produced, availability of private income opportunities, monitoring and leader effort, as well as individual-level measures of ability and wealth.

To measure the *public good value*, we use individual marketing decisions, rather than crop prices, since collective marketing is the farmer associations' central activity. This is also because prices are a rather noisy signal of leader performance due to their dependence on many exogenous factors. In the analysis, we use two measures of members' marketing decision, averaged to

[13] Where the DC had fewer than seven POs, we sampled all of the association's POs.

[14] The number of sampled members from each of the six sampled POs was proportional to the size of the PO, ensuring that the sample is self-weighted.

[15] The executive committee is comprised of the DC manager, and the council chairman, secretary and treasurer. Prestigious positions, such as the council chairman, tend to be contested and decided through some voting procedure. Allocation to other positions depends on the interests, expertise and time constraints of council representatives.

the group level, to proxy the value of the public good: (1) an indicator variable capturing whether a member sold his crops via the association at least once in the past season, and (2) the share of a member's total seasonal coffee yield that was sold via the farmer group in the past season.

The availability of *private income opportunities (PIO)*—a group-level variable—plays a key role in our model.[16] Using the 2002 census, PIO is constructed as the share of adults in the area that is serviced by the farmer cooperative that are self-employed or paid-employees in any sector other than agriculture.[17] Importantly, the census data *predates the foundation of the farmer associations*, ensuring that our PIO measure is independent of group effectiveness.

Measuring the remaining key variables in the model is a more complex task. For some of the variables—leader effort, group monitoring and members' ability—a number of questions were asked relating to different aspects of the theoretical concept. We then use the method proposed by Anderson (2008) to collapse the related variables into a summary index.[18] This approach improves statistical power while being robust to over-testing because each summary index represents a single test. More so, summary indices minimize the risk that researchers cherry-pick proxy measures as well as the risk that researchers misinterpret the importance of individual proxy measures that may be statistically significant simply due to random chance. The summary index is a weighted mean of the related variables, where the weights (the inverse of the covariance matrix of the related variables, which have been standardized) are used to maximize the amount of information captured by the index.

To measure a group's *leader effort* spent producing the public good, we combined effort ratings from sampled members and from the DC representatives. We also used information on the number of times the leader organized collective marketing in the past season – the associations' most important activity. All of these variables were positively and highly correlated, with Cronbach's alpha of 0.79. As a further reliability check, we find that leaders with high effort scores also report working longer hours and have greater knowledge about whether members are following the association's rules and by-laws.

To construct a measure of *ability*, we used information on respondents' literacy level, educational attainment, and English proficiency, as English is the lingua franca of the business and political class. Respondents also completed two cognitive tests.[19] All of the variables are positively correlated with Cronbach's alpha of 0.82. This variable is available for 42 groups, since we were not able to obtain cognitive tests for all group leaders.[20] Several checks increase our confidence in the ability summary measure. First, members who hold high-skilled off-farm jobs have

[16] In the model, α measures the value of private income opportunities (PIO) relative to the *potential* value of the public good. Because we are unable to accurately measure the latter, we proxy α using a measure of PIO.

[17] Parishes in the study area have about 5,800 residents (approximately 2,350 are over the age of 18), residing in a cluster of nearby small villages. Our results are robust to other possible measures of PIO – e.g., using only Ugandan males, increasing/reducing the age cutoff point, or including agriculture activities other than crop farming. Note that our measure of PIO includes those who work both within and outside the parish boundaries.

[18] See Humphreys & Weinstein (2012) and Casey *et al.* (2012) for two recent application.

[19] The cognitive tests included solving a simple maze in less than two minutes and solving a raven test comprised of 12 questions in two minutes.

[20] An alternative ability variable that is constructed using only information on the leaders' education and language skills is available for an additional three groups, and yields similar results.

significantly higher ability scores than those who do not. Second, ability scores are increasing with the leadership role in the association: the mean ability score of council representatives is 0.45 standard deviations higher than the mean ability score of 'ordinary' members (p-value=0.00). Third, the ability summary measure is highly correlated with wealth (online appendix, Fig. 3).

To test whether higher values of the group public good have positive *welfare effects*, we construct a measure of the change in a member's wealth since joining his farmer group. The measure was constructed using questions about ownership of 12 assets, such as bicycles and livestock, which reflect farmers' purchasing power.[21] For each asset, respondents were asked to provide information on the number of items they currently have and the number of items they had in the year prior to joining the group. Measurement errors, typical in survey-based recall questions, are reduced given that (i) the median member joined her group merely three years ago, (ii) the creation of the farmer group is considered a major milestone to the majority of members, and (iii) the included assets are central to households in rural Uganda.

Among the key variables in the model, monitoring is arguably the most difficult to measure. We use three variables to construct a monitoring summary index. The first, *Monitor assigned*, is a binary measure, derived from the representatives' survey and averaged to the DC level, of whether there is anyone responsible for monitoring the DC manager; i.e. making sure the association leader does his job diligently and transparently.[22] The second and third variables *Audit committee* and *Finance committee*, are binary, derived from the DC questionnaire, measuring whether the DC has an audit and a finance committee. Audit committees are responsible for monitoring the DC books, records and bank account, as well as matching between inputs, outputs and receipts. Finance committees have control over expenses and revenues, such that money cannot be deposited or drawn out without the committee's approval. In several groups the finance committee also reviews members' loan applications. Both committees, therefore, constrain the ability of the manager to shirk his responsibilities. Given the centrality of monitoring, we report the main regression results using all four alternative monitoring measures. As both the model and our empirics assume the exogeneity of a group's monitoring institutions, we now turn to describe the study's identification strategy.

4.2 Identification Strategy

Early on in the intervention, APEP hired field trainers, experienced extension agriculture officers, to assist neighboring villages to form larger federated associations (DCs). A 22-page manual that outlined the steps for establishing a DC informed the process of group formation, which took place during three workshops led by the field-trainers. The manual did not address, however, every aspect of group formation. Importantly, it did not detail explicitly the nature of some governance institutions such as the selection rule for the DC manager position or the organizations' level of monitoring. In personal interviews, field trainers explained that their recommendation of a

[21] Using asset ownership to measure households' wealth is a commonly used technique in poor developing countries where monetary measures of income and wealth are problematic (Filmer & Pritchett, 2001).

[22] The question wording is "Is there anyone [in the council] who is responsible for making sure the DC manager does his job diligently and transparently?"

specific governance institution was based on what *they* considered to be 'best practices' .

Our claim that groups' monitoring institutions are plausibly exogenous rests upon the following assumptions: (a) project field trainers played a pivotal role in establishing the community organizations; (b) almost all farmer associations followed their field trainer's recommendation of governance institutions; (c) the deployment of trainers was 'as-good-as-random' with respect to the trainers' recommendations; (d) APEP trainers' recommendations were based on personal preferences that are very likely orthogonal to characteristics of the groups; and (e) the facilitation process did not vary significantly, apart from the recommendation of governance institutions. Once established, groups, by and large, retained the recommended governance institutions, usually enshrined in constitutions.[23]

The centrality of the trainers in the process of group formation (assumptions (a) and (b)) is attested to by the fact that all APEP groups, regardless of the trainer's identity, have a similar organizational structure and power division between the POs and the DC. Assumption (c) is based on the fact that the deployment of field-trainers was unrelated to their preferences of governance rules nor to their experience. Instead, the deployment of field trainers was influenced by proficiency in the local language, and by APEP's decision not to assign trainers to their district of residence to reduce the likelihood that they engage in income-generating activities unrelated the development project. Assumption (e) is based on the fact that due to the large area of coverage and the large number of villages assigned to each trainer, after group formation, the field-trainers had essentially no active role in the groups' activities.

We now turn to provide support to the plausibility of assumption (d). Had field-trainers conditioned their recommendation of governance rules on group characteristics, then (1) monitoring institutions would likely be correlated with, at least some, group covariates, and (2) field-trainers would be expected to make different recommendation to different groups. The data at hand is, however, not consistent with these predictions.

First, we regress a large set of group level covariates on groups' monitoring variables. Results, reported in Table 1 suggest that group monitoring institutions are orthogonal to group observable characteristics. Importantly, we also do not find that monitoring institutions are correlated with other governance institutions such as term limits or the method for selecting the DC manager (Table 1, panel 3).[24] Secondly, we examine the level of variability in the groups' monitoring level within and between field-trainers. Consider for example, the existence of a finance committee, which is a one of our proxy measures of monitoring. Table 2 demonstrates that almost always (47 DCs out of 50), groups created by the same trainer have also the same coding for the binary indicator of finance committee. This finding is consistent with the idea that field-trainers made

[23] All constitutions we examined had quorum and super-majority rules for making constitutional amendments. Leaders' compensation can serve as a good example for the resilience of the DCs' governance institutions. When established, APEP facilitators encouraged new groups to keep monetary remuneration to leaders as low as possible. Our data confirms that 3-5 years after their creation, only one association paid its manager any regular salary.

[24] In about half of the DCs the manager is directly elected by the group member, and in the remaining DCs the manager is a pointed by the DC council. The correlation between the leader selection rule (*'Direct election'*) and both audit committee (0.25) and finance committee (0.35) is relatively low. We, nonetheless, control for groups' leader selection rule in all our regressions.

COVARIATES BALANCE: MONITORING LEVEL

Monitoring measure:	Summary Index		Monitor assigned		Finance committee		Audit committee	
	Est	p-value	Est	p-value	Est	p-value	Est	p-value
Members covariates (sample)								
Male	-0.010	0.835	-0.026	0.892	0.008	0.889	-0.029	0.633
Age	-0.004	0.996	0.630	0.852	-0.393	0.791	-0.197	0.888
Education index	-0.031	0.840	0.462	0.226	-0.309	0.345	-0.246	0.523
Wealth index	0.033	0.504	0.229	0.384	0.009	0.930	-0.010	0.925
Church attendance	0.016	0.729	0.074	0.686	0.024	0.649	0.007	0.894
Born in village	-0.058	0.213	-0.202	0.321	-0.064	0.365	-0.074	0.263
Total land in Acres	1.131	0.534	4.663	0.574	-1.533	0.459	2.401	0.467
Years growing coffee	-0.767	0.674	-0.802	0.915	-2.634	0.347	-1.237	0.671
Council representatives covariates (complete set)								
Male	0.024	0.412	0.111	0.337	-0.004	0.885	0.029	0.598
Age	0.217	0.805	0.348	0.906	0.827	0.516	0.240	0.831
Education index	0.039	0.848	0.123	0.865	-0.217	0.418	0.186	0.555
Wealth index	-0.148	0.260	-0.624	0.575	0.102	0.790	-0.256	0.153
Church attendance	0.035	0.377	0.216	0.204	-0.029	0.313	0.024	0.572
Born in village	-0.080	0.218	-0.221	0.455	-0.112	0.145	-0.128	0.200
Total land in Acres	-1.001	0.752	-8.643	0.597	0.720	0.726	0.867	0.747
Years growing coffee	-0.314	0.883	1.670	0.849	-1.915	0.482	-1.283	0.667
DC covariates and 'Other' Governance Rules								
Age of DC	0.172	0.389	1.218	0.100	-0.114	0.769	0.003	0.991
Project years	-0.033	0.823	0.304	0.656	-0.020	0.944	-0.301	0.193
Term limits (chairperson)	0.087	0.200	0.261	0.290	0.109	0.307	0.131	0.436
Term limits (manager)	-0.022	0.642	-0.292	0.193	0.101	0.013	0.027	0.858
Direct elections	0.152	0.461	0.453	0.602	0.164	0.455	0.244	0.463
Sub-county covariates								
Education attainment	-0.004	0.682	-0.018	0.646	-0.003	0.804	-0.004	0.815
Literacy rate	-0.009	0.486	-0.008	0.857	-0.016	0.602	-0.021	0.436
Poverty head-count	0.124	0.953	4.854	0.629	-1.848	0.285	-1.497	0.498
Poverty gap	-0.121	0.907	0.259	0.951	-0.106	0.913	-0.575	0.677
Gini inequality index	-0.277	0.901	-2.397	0.779	0.197	0.923	0.246	0.945
Population density	-30.384	0.558	-107.196	0.609	-42.856	0.406	-34.200	0.685

Table 1: **Balance test of covariates across the measures of group monitoring.** Estimates and p-values are derived from a set of OLS regressions in which each of the group covariates is regressed on the group's monitoring, clustering standard errors by region (strata). Importantly, none of the group covariates is significant *notwithstanding the measure of monitoring used*. See text for information on the construction of the monitoring measures.

recommendations based on what they view as 'best-practices' rather than adjusting recommendations to fit group characteristics. It also attests to the fact that groups, by and large, adopted their trainer's recommendation.

Finally we examine the distribution of the monitoring index by project trainers. If unobserved group characteristics were significantly impacting groups' monitoring institutions, then the variability of monitoring between groups *across* trainers should be quite similar to the variability of

FINANCE COMMITTEE BY APEP FIELD TRAINER

	Finance committee		
APEP Field Trainer	**No**	**Yes**	**Total**
Wilburforce Tibairira	5	0	5
David Baligindwire	0	6	6
George Atum	5	0	5
Vincent Okoth	7	0	7
Daniel Kambale	3	0	3
Edison Kawalya	0	4	4
Noa Kuluse	0	6	6
Elisa Tegyeza	4	2	6
Joseph Katto	7	1	8
Total	31	19	50

Table 2: **Finance Committee by APEP Field Trainer** Table provides information on the distribution of finance committees by APEP field trainers.

monitoring levels *within* field trainers. This, however, is not the case, as Figure 1 makes clear. In fact, the standard deviation in monitoring levels across facilitators (0.69) is almost two times larger than the standard deviation in monitoring within facilitators (0.39). This finding is consistent with our key identification assumption that monitoring institutions are, to a large degree, a function of the idiosyncratic preferences of field trainers that are independent of group characteristics.

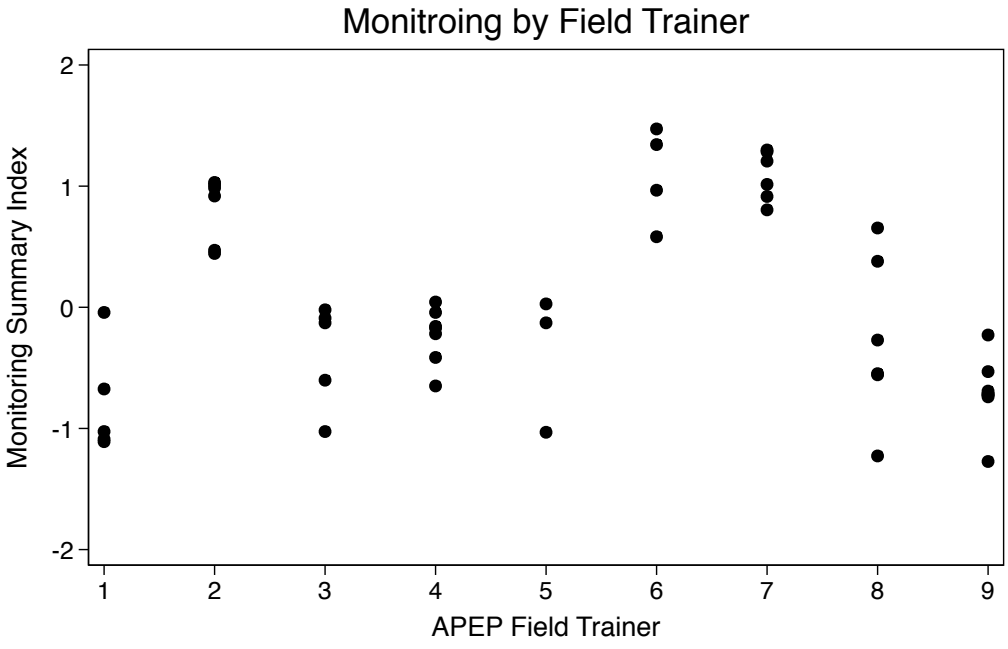

Figure 1: Monitoring Summary Index by APEP's nine field-trainers.

5 Empirical Analysis

In this section we use regression analysis to test the main predictions of the model: the discipline effect, the self-selection effect, and the impact that these have on the value of the public good and on group members' welfare.

5.1 Effort, Ability, and the Value of the Public Good

The model assumes that greater leader effort and ability result in a higher public good value. We examine this assumption by plotting public goods values against leader effort and ability. As Figure 2 makes clear, both leader effort and ability are positively related to the value of the public good, though the relationship appears to be much stronger for effort.

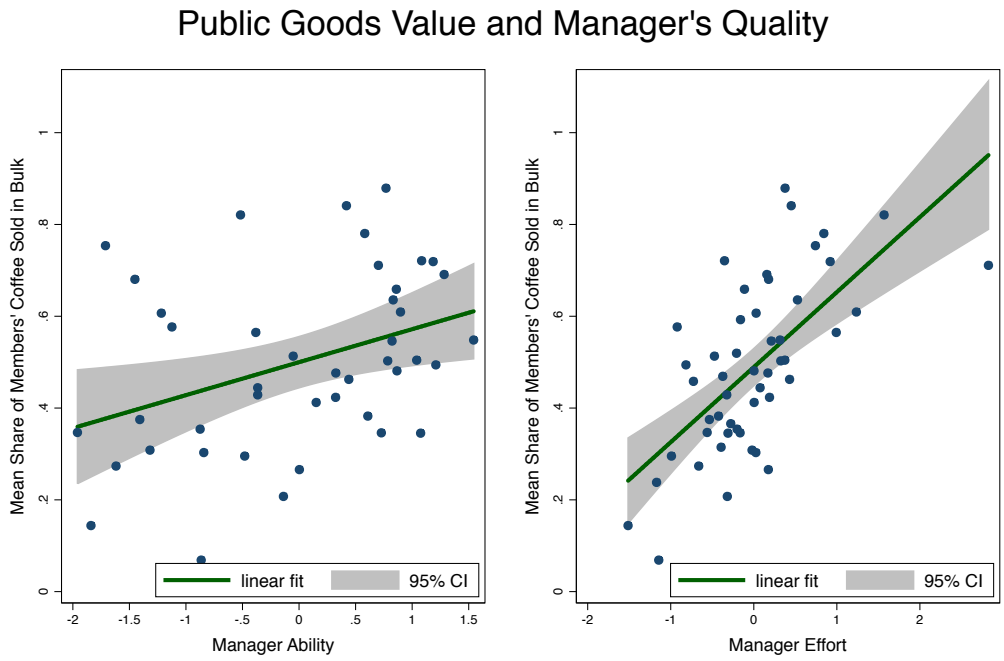

Figure 2: Relation between the value of the public good (measured as the share of members selling through the association in the past season) and manager effort and ability, using group-level data ($n = 50$).

5.2 Discipline Effect

One prediction of the model is that an increase in the level of monitoring (m_j) by association j, increases the amount of effort exerted by the group leader (e_j). To explore this prediction, we run the following random effects model,[25]

[25] An alternative specification would be to include region indicators, which would produce regional intercepts that are not themselves modeled (fixed effects). Modeling the varying region intercepts using a random effects (multilevel)

$$e_{js} = \beta_0 + \beta_1 m_{js} + \beta_2 \alpha_{js} + \beta_3 (m_{js} \times \alpha_{js}) + \Gamma_1 X_{js} + \zeta_s^{(2)} + \epsilon_{js} \quad (5)$$

where the dependent variable e_{js} is the standardized summary score of the leader's effort of group j from region s; m_{js} is the group's level of monitoring (summary index); and α_{js} is private income opportunities. In some models we also include the manager's ability and the following group-level controls (X_{js}): number of group members, age of the group and a measure of ethnic fractionalization.[26] To account for the nested nature of the data we include $\zeta_s^{(2)}$, a random intercept for region s; finally ϵ_{js} is the residual error term. Regression results, shown in Table 3, suggest that, in accordance with the discipline effect, there is a positive, substantial, and significant relationship between groups' level of monitoring and the amount of effort exerted by the group leader.

5.2.1 Self-selection Effect

The second prediction of the model, presented formally in Corollary 1, is that an increase in the monitoring level *decreases* the likelihood that high-ability members will be candidates (and thus the probability that they become the group leader), *but only in areas with sufficiently high private income opportunities*. In particular, the model predicts that when there are ample private income opportunities and monitoring levels are high, high-ability members will opt out of candidacy. We explore this prediction by looking at how the ability of the elected leader is affected by the interaction of the monitoring level and private income opportunities. We run a group-level random effects regression:

$$A_{js} = \beta_0 + \beta_1 m_{js} + \beta_2 \alpha_{js} + \beta_3 (m_{js} \times \alpha_j) + \Gamma_1 F_{js} + \Gamma_2 X_{js} + \zeta_s^{(2)} + \epsilon_{js} \quad (6)$$

where the dependent variable is a standardized measure of the ability of the manager of farmer group j from region s. The key independent variables are the group's monitoring level (m_{js}), private income opportunities (α_{js}), and the interactions between these variables. F_{js}, a vector of variables, includes the mean, maximum and minimum ability scores of all representatives, which form the entire pool of potential candidates, and X_{js} is a set of group controls as in Equation 5. To account for the nested nature of the data we include $\zeta_s^{(2)}$, a random intercept for region s.

The main coefficient of interest in this analysis is β_3, the coefficient on the interaction between monitoring and private income opportunities. Based on the model's predictions we should expect a negative coefficient, since an increase in monitoring should *decrease* the probability that a higher-ability individual is the leader when there are more private income opportunities. Since the self-selection effect is the key model prediction, we provide findings for both the monitoring summary

model is preferred when the data is unbalanced (Gelman & Hill, 2007), as is our case. The random effects regression models the varying intercepts of regions by using a weighted average that reflects the amount of information available on each region and the average of all regions. In our case, a fixed effects model over-fits data within each region, making individual regions look more different than they actually are.

[26] The ethnic fractionalization index is constructed using a simple Herfindahl concentration index: $ELF = 1 - \sum_{i=1}^{n} s_j^2$ where s_j is the share of group j, and $(j = 1 \ldots n)$.

RELATION BETWEEN MONITORING AND REALIZED EFFORT

	DV: Leaders' realized effort			
	(A)	(B)	(C)	(D)
Monitoring	0.28*	0.26*	0.24*	0.30*
	(0.10)	(0.10)	(0.11)	(0.10)
N members (units of 50)		0.03	0.03	0.01
		(0.04)	(0.04)	(0.04)
Age of DC		0.01	0.02	0.04
		(0.06)	(0.06)	(0.06)
Direct Elections		0.11	0.14	0.11
		(0.15)	(0.16)	(0.16)
ELF		0.35	0.30	0.35
		(0.42)	(0.43)	(0.40)
PIO			-0.06	0.03
			(0.07)	(0.08)
Monitoring × PIO			-0.02	-0.02
			(0.07)	(0.06)
Manager ability				0.16*
				(0.07)
Monitoring × Manager ability				-0.15*
				(0.05)
PIO × Manager ability				0.11
				(0.08)
Intercept	0.15	0.10	0.08	0.20
	(0.39)	(0.45)	(0.44)	(0.45)
$\sqrt{\psi_{(2)}}$	0.87	0.98	0.97	0.99
	(0.29)	(0.34)	(0.34)	(0.34)
σ_e	0.41*	0.40*	0.39*	0.34*
	(0.04)	(0.04)	(0.04)	(0.04)
Observations	50	50	50	43
Log Likelihood	-35.54	-34.92	-34.40	-24.83

Standard errors in parentheses

* $p < 0.1$

Table 3: Relation between a group's monitoring level and the leader's realized effort. Results from multilevel random effects regression models using group-level data. The dependent variable, leader realized effort, is a standardized composite measure. Controls, centered on their mean values, include the number of association members (in units of 50), the DC age and its ethnic homogeneity (ELF). $\sqrt{\psi_{(2)}}$ refers to variability between regions, and σ_e is the estimated standard deviation of the overall error term.

index as well as for the constituent proxy variables that make up the index. Results, displayed in Table 4, generally support this prediction.

ABILITY OF THE ASSOCIATION'S LEADER

Monitoring measure:	Summary Index		Monitor assigned		Finance committee		Audit committee	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
Monitoring	-0.01	0.08	-0.04	0.10	0.13	0.15	-0.11	-0.08
	(0.14)	(0.15)	(0.14)	(0.14)	(0.12)	(0.14)	(0.10)	(0.11)
PIO	-0.11	-0.08	-0.08	-0.05	-0.12	-0.09	-0.05	-0.09
	(0.09)	(0.11)	(0.10)	(0.11)	(0.09)	(0.10)	(0.10)	(0.12)
Monitoring × PIO	-0.18*	-0.21*	-0.19*	-0.23*	-0.20*	-0.20*	0.20	0.15
	(0.10)	(0.11)	(0.10)	(0.11)	(0.09)	(0.10)	(0.13)	(0.13)
N. reps in council	0.02	0.00	0.02*	0.00	0.02	0.01	0.04*	0.02
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
Mean reps ability	2.10*	2.03*	2.03*	2.02*	2.17*	2.04*	1.76*	1.97*
	(0.39)	(0.39)	(0.39)	(0.39)	(0.38)	(0.39)	(0.38)	(0.40)
Max reps ability	-0.21	0.22	-0.14	0.36	-0.37	0.03	-0.03	0.19
	(0.47)	(0.53)	(0.46)	(0.53)	(0.47)	(0.54)	(0.46)	(0.54)
Min reps ability	0.54*	0.44*	0.59*	0.43*	0.45*	0.45*	0.68*	0.41*
	(0.20)	(0.19)	(0.21)	(0.19)	(0.19)	(0.19)	(0.20)	(0.20)
SD reps ability	5.09*	4.95*	5.11*	4.91*	5.09*	5.00*	5.05*	4.72*
	(0.82)	(0.79)	(0.81)	(0.78)	(0.80)	(0.77)	(0.80)	(0.82)
DC controls		X		X		X		X
Intercept	-3.94*	-4.04*	-3.95*	-4.17*	-3.77*	-3.99*	-4.11*	-4.39*
	(0.81)	(0.86)	(0.78)	(0.85)	(0.81)	(0.85)	(0.80)	(0.91)
$\sqrt{\psi_{(2)}}$	0.26*	0.00*	0.30*	0.00*	0.16	0.00	0.43*	0.00*
	(0.18)	(0.00)	(0.17)	(0.00)	(0.27)	(0.00)	(0.19)	(0.00)
σ_e	0.57*	0.57*	0.56*	0.57*	0.58*	0.56*	0.54*	0.59*
	(0.07)	(0.06)	(0.07)	(0.06)	(0.08)	(0.06)	(0.06)	(0.06)
Observations	42	42	42	42	42	42	42	42
Log Likelihood	-38.59	-36.13	-38.50	-36.00	-37.57	-35.37	-38.52	-37.39

Standard errors in parentheses

* $p < 0.1$

Table 4: Relation between leader ability, group's monitoring and private income opportunities controlling for group representatives' mean, minimum, maximum and standard deviation ability. The dependent variable, leader ability, is a standardized composite measure. Controls, centered on their mean values, include the number of association members (in units of 50), the DC age and its ethnic homogeneity (ELF) using a simple Herfindahl concentration index. $\sqrt{\psi_{(2)}}$ refers to variability between regions, and σ_e is the estimated standard deviation of the overall error term.

When private income opportunity is low (1 s.d below the grand mean), the marginal effect of monitoring on the ability of the group leader is about 0.29. However, above the grand mean (zero), the marginal effect turns negative. Consistent with the model predictions, when the availability of private income opportunities is high (2 s.d. above the grand mean), a one unit increase in monitoring is associated with a 0.35 standard deviation *decrease* in the manger's ability score. These relationships are explored graphically in Figure 1 in the appendix.

5.2.2 Welfare Effects

In the last part of the empirical analysis, we examine the relationship between leadership quality, its determinants (private income opportunities and monitoring), the value of the public good and members' welfare. In groups with a high public good value, we expect a larger wealth increase since members joined their association. To test this prediction, we fit three models. In all regression specifications the dependent variable is the change in a member's wealth since joining his or her farmer group, which is measured using asset ownership, as described above. The value of the public good is measured as the average number of members who sold their coffee via their farmer group at least once in the past season (Table 5, columns 1-3) or the average share of annual coffee production that each member sold via the group (columns 4-6). Columns (1) and (4) show the strong positive relationship between public goods and the change in members' wealth.

We have argued that the ability and effort of the leader are a key determinant of public good value. In columns (2) and (5) we, therefore, use leader ability and effort as instruments for the value of the public good. We find that both effort and ability are positively related to the value of the group public good, though the ability relationship is not statistically significant. The instrumented group public good measure, in turn, is positively related to the change in members' wealth. Finally, we have argued that leader effort and ability are also endogenous variables – themselves driven by group monitoring and the availability of private income opportunities. Thus, in columns (3) and (6), we use a three-stage least squares approach in which private income opportunities, monitoring, and the interaction between the two are used as instruments for leader effort and ability (in separate regressions). The predicted values of leader effort and ability are then used as instruments for the public good value, and the predicted value of the public good is then to explain the change in members' wealth. The observed results are consistent with our predictions: monitoring is the primary driver of leader effort, while leader ability depends on the interaction between monitoring and the availability of private income opportunities. Both leader effort and ability are positively related to the value of the public good, and the public good value has a strong positive relationship to a change in group members' wealth.

6 Case study: Kamuli district vs. Mubende district

We complete our empirical analysis with a case study analysis of the experience of farmer associations from two district-areas, Mubende and Kamuli. The goal of the case study is to provide an illustrative application of our theoretical argument. Compared to Kamuli, Mubende is a relatively well-off district. The top panel of Table 6 show that on average farmers in Mubende were more educated, had more land, and were wealthier than those in Kamuli. In contrast, Panel 2 shows evidence that the farmer groups in Kamuli were more successful than those in Mubende, with a significantly higher proportion of farmers selling their produce through the group. Thus, it appears that the farmer groups in Kamuli district were more successful at producing the most important group public good.

Our model suggests that the value of the public good is driven to a large extent by the effort

CHANGE IN A MEMBER'S WEALTH SINCE JOINING THE FARMER GROUP

	Percent Members Bulking			Share of Crop Bulked		
	(OLS)	(2sls)	(3sls)	(OLS)	(2sls)	(3sls)
Public goods value	0.64*	1.24*	0.88*	0.58*	1.30*	0.94*
	(0.15)	(0.27)	(0.22)	(0.17)	(0.34)	(0.23)
Dependent variable: value of public good (collective marketing)						
Manager ability		0.09	0.08		0.11	0.14
		(0.14)	(0.16)		(0.16)	(0.17)
Manager effort		1.00*	1.03*		0.92*	0.90*
		(0.28)	(0.48)		(0.30)	(0.52)
Manager ability × effort		-0.20	-0.25*		-0.13	-0.22
		(0.17)	(0.14)		(0.18)	(0.14)
Dependent variable: Manager effort						
Monitoring			0.30*			0.30*
			(0.14)			(0.14)
PIO			-0.06			-0.05
			(0.06)			(0.06)
Monitoring × PIO			0.00			-0.01
			(0.08)			(0.08)
Dependent variable: Manager ability						
PIO			-0.06			-0.08
			(0.10)			(0.09)
Monitoring			-0.31			-0.31
			(0.21)			(0.21)
Monitoring × PIO			-0.26*			-0.20
			(0.13)			(0.13)
Controls	X	X	X	X	X	X
Regions fixed effects	X	X	X	X	X	X
Observations	50	43	42	50	43	42
Log Likelihood	-52.71	-50.33	-121.15	-54.69	-56.56	-125.80

Standard errors in parentheses

* $p < 0.1$

Table 5: **Value of the Public Good and change in Wealth.** The dependent variable is change in a farmer's wealth since joining the group. The key independent variable is the value of the public good proxied by two measures of collective marketing. Columns 1 and 4 report OLS estimate; columns 2 and 5 report two-stage-least-square estimates, where the value of the public good is instrumented by the manager's ability and effort; and columns 3 and 6 report results from three-stage-least-square models, in which the manager's ability and effort are instrumented by private income opportunities (PIO), the association's monitoring level, and their interaction.

and ability of the leader. In line with this prediction, the third panel of Table 6 shows that the group leaders in Kamuli were exerting significantly more effort than those in Mubende. Even more surprising is that leaders in Kamuli had higher ability than those in Mubende, despite the fact that

group members in Kamuli had, on average, lower ability than those in Mubende. This suggests that high-ability group members were opting out of candidacy in Mubende district. A likely cause of this is found in Panel 4, which shows that the level of monitoring was significantly higher in Mubende than in Kamuli, as was the availability of private income opportunities. According to the theory, both of these factors should drive high-ability members in Mubende to drop out of the candidate pool. The model also predicts that the high level of private income opportunities in Mubende should act to reduce leader effort there, counteracting the influence of the higher monitoring level. In contrast, with few outside income opportunities, leaders in Kamuli should have every reason to exert effort in producing the public good. Thus, the patterns observed in these districts are consistent with those predicted by the theory.

Panel 1. Characteristics of group members				
	Kamuli	Mubende	Difference	p-value
Total land size (acres)	4.73	12.24	7.51	0.08
Size of coffee gardens (acres)	<1	1.8	0.85	0.02
Member education (sd)	-0.63	0.29	0.91	0.04
Member wealth (sd)	-0.35	0.11	0.46	0.00
Panel 2. Measures of farmer group success				
	Kamuli	Mubende	Difference	
% members selling via DC	67%	59%	0.23	
Panel 3. Effort and ability of group leaders (relative to leaders' mean)				
	Kamuli	Mubende	Difference	p-value
Leader effort index (sd)	0.29	-0.45	0.74	0.00
Leader ability index (sd)	0.59	-0.09	0.68	0.10
Panel 4. Factors influencing leader quality (relative to sample mean)				
	Kamuli	Mubende	Difference	p-value
Monitoring summary index (sd)	0.27	1.09	0.82	0.00
PIO index (sd)	-0.29	0.42	0.71	0.17

Table 6: **A comparison of farmer associations in Mubende and Kamuli.** sd denotes that the variable has been standardized, in which the grand mean equals zero and the standard deviation equals one. Thus, for example, the average effort exerted by Mubende leaders is 0.44 below the grand mean of zero, whereas the effort exerted by Kamuli leaders is about a quarter of a standard deviation above the grand mean. P-values in this section are based on a two-tail, group mean-comparison test with unequal variances.

7 Conclusions

This paper provides a framework for studying leadership quality in community organizations with democratically elected leaders. Our results show that these communities may face a trade-off between the ability of their leader and the amount of effort the leader exerts, with consequences for the quality of leadership obtained, the value of the public good produced, and the welfare of community members. A group's monitoring institutions drive this trade-off. High levels of

monitoring incentivize the leader to exert more effort for the group, but may also drive higher-ability leaders to self-select out of the candidate pool. Whether this trade-off exists depends on the private income opportunities available to group members. Evidence from the sample of Ugandan farmer associations that we surveyed is consistent with the predictions of the theory.

From a theoretical perspective, our results are closely related to recent political accountability models, designed for large poetical units, which demonstrate the possible adverse effects of increased monitoring on *leaders' behavior* (Prat, 2005; Stasavage, 2004, 2007). First, we complement those important contributions by offering a model tailored specifically for the different features of community organizations. Second, by demonstrated that monitoring may drive high-ability members to forgo leadership positions, our paper points towards a new mechanism by which monitoring can undermine citizen welfare. This insight has important implications for future work: studies that evaluate the impact of increased monitoring by focusing only on leader behavior could be misleading if they overlook changes in the underlying characteristics of the leaders, such as ability.

While we have tested the theory in one context, our framework could conceivably be applied to a broad set of small community organizations with democratically elected leaders who work to produce a group public good. Future work may seek to test our model's predictions on other community organizations—such as school PTAs, local community boards, or micro-lending groups—that are widespread in both developing and developed countries and play important political and economic roles. Our results do not generalize, however, to organizations that do not rely on democratically elected leaders, such as firms or government agencies. Finally, future work should also incorporate into the analysis the effect of other governance institutions such as term limits, which was beyond the scope of the current paper.

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A Theory

A.1 Proof of Prop. 1

Let,

$$g(m, e_l^*(m)) = -\frac{\partial I(A_i, 1-e_i)\alpha}{\partial e_i} + \frac{\partial P(A_i, e_i)(1-\alpha)}{\partial e_i} - \frac{\partial C(m, e_i)}{\partial e_i} = 0.$$

Applying the implicit function theorem, we have,

$$\frac{de_l^*}{dm} = \frac{-\partial g(m, e_l^*)/\partial m}{\partial g(m, e_l^*)/\partial e_l^*} = \frac{\frac{\partial^2 C(m, e_l^*)}{\partial e_l^* \partial m}}{\frac{\partial^2 I(A_l, 1-e_l^*)\alpha}{\partial e_l^{*2}} + \frac{\partial^2 P(A_l, e_l^*)(1-\alpha)}{\partial e_l^{*2}}}.$$

Given the functional form assumptions, the numerator in the expression above is positive while the denominator is negative, so the overall relationship is positive. If the same exercise is done for α rather than m, the numerator we obtain is,

$$-\frac{\partial I(A_i, 1-e_i)}{\partial e_i} + \frac{\partial P(A_i, e_i)}{\partial e_i} > 0,$$

so overall we find $\partial e_l^*/\partial \alpha < 0$.

A.2 Proof of Prop. 2

Two conditions must hold to prove this Proposition. First, we need. $dCP_i(A_i, \alpha, m)/dm < 0$. Taking this derivative, we have the following.

$$\frac{dCP_i(A_i, \alpha, m)}{dm} = -\frac{\partial C(m, e_i^*)}{\partial m} < 0$$

Second, we need $\lim_{m \to +\infty} CP_i(A_i, \alpha, m) < 0$. This must hold given the result above and the weak convexity of $C(m, e)$ with respect to m. These two results, together with the continuity of the $CP_i(A_i, \alpha, m)$ function imply that as m increases eventually a monitoring level $\bar{m}_i$ is reached at which $CP_i(A_i, \alpha, \bar{m}_i) = 0$ and any further increases in m result in $CP_i(A_i, \alpha, m) < 0$.

A.3 Proof of Prop. 3

We have two members with $A_i > A_j$. Under Condition 1, this implies that $CP_i(A_i, \alpha, m) < CP_j(A_j, \alpha, m)$ Suppose that $m = \bar{m}_i$ is such that $CP_i(A_i, \alpha, m) = 0$. This implies that $CP_j(A_j, \alpha, m) > 0$. Given Prop. 2, it must be the case that $\bar{m}_i < \bar{m}_j$.

A.4 Proof of Prop. 4

This proof requires two steps. First, we need to show that dCP_i/dA_i is decreasing in α. To do this, we show that $d^2CP_i/dA_i d\alpha < 0$. The second step involves showing that there exists some $\bar{\alpha} \in (0,1)$ such that $dCP_i(A_i, \bar{\alpha}, m)/dA_i \leq 0$ for all m.

Step 1

We start with,

$$\frac{dCP_i}{dA_i} = \frac{\partial I(A_i, 1-e_i^*)\alpha}{\partial A_i} + \frac{\partial P(A_i, e_i^*)(1-\alpha)}{\partial A_i} - \frac{\partial I(A_i,1)\alpha}{\partial A_i} + \left(\frac{\partial I(A_i, 1-e_i^*)\alpha}{\partial e_i^*} + \frac{\partial P(A_i, e_i^*)(1-\alpha)}{\partial e_i^*} - \frac{\partial C(m, e_i^*)}{\partial e_i^*} \right)$$

Using Equation 3, this simplifies.

$$\frac{dCP_i}{dA_i} = \frac{\partial I(A_i, 1-e_i^*)\alpha}{\partial A_i} + \frac{\partial P(A_i, e_i^*)(1-\alpha)}{\partial A_i} - \frac{\partial I(A_i,1)\alpha}{\partial A_i}$$

Taking the derivative with respect to α, we obtain the following.

$$\frac{d^2CP_i}{dA_i d\alpha} = \left[\frac{\partial I(A_i, 1-e_i^*)}{\partial A_i} - \frac{\partial I(A_i,1)}{\partial A_i} \right] + \left[\frac{\partial^2 I(A_i, 1-e_i^*)}{\partial e_i^* \, \partial A_i}\alpha + \frac{\partial^2 P(A_i, e_i^*)}{\partial e_i^* \, \partial A_i}(1-\alpha) \right] \frac{de_i^*}{d\alpha}$$

Note that $de_i^*/d\alpha < 0$, $\partial^2 I(A_i, 1-e_i^*)/\partial A_i \partial e_i^* < 0$, and $\partial^2 P(A_i, e_i^*)/\partial A_i \partial e_i^* > 0$. Thus, all terms are negative except $(\partial^2 I(A_i, 1-e_i^*)/\partial A_i \partial e_i^*)(de_i^*/d\alpha) > 0$. Denote $-de_i^*/d\alpha = \Delta > 0$. We rewrite the equation above by splitting the first term into two.

$$\begin{aligned} \frac{d^2CP_i}{dA_i d\alpha} &= \left[\frac{\partial I(A_i, 1-e_i^*)}{\partial A_i} - \frac{\partial I(A_i, 1-e_i^*+\Delta)}{\partial A_i} \right] + \left[\frac{\partial I(A_i, 1-e_i^*+\Delta)}{\partial A_i} - \frac{\partial I(A_i,1)}{\partial A_i} \right] \\ &- \left[\frac{\partial^2 I(A_i, 1-e_i^*)}{\partial e_i^* \, \partial A_i}\alpha + \frac{\partial^2 P(A_i, e_i^*)}{\partial e_i^* \, \partial A_i}(1-\alpha) \right] \Delta \end{aligned}$$

Next, we take a linear approximation of the first term on the right-hand side.

$$\begin{aligned} \frac{d^2CP_i}{dA_i d\alpha} &\approx \Delta \frac{\partial^2 I(A_i, 1-e_i^*)}{\partial A_i \partial e_i^*} + \left[\frac{\partial I(A_i, 1-e_i^*+\Delta)}{\partial A_i} - \frac{\partial I(A_i,1)}{\partial A_i} \right] \\ &- \left[\frac{\partial^2 I(A_i, 1-e_i^*)}{\partial e_i^* \, \partial A_i}\alpha + \frac{\partial^2 P(A_i, e_i^*)}{\partial e_i^* \, \partial A_i}(1-\alpha) \right] \Delta \end{aligned}$$

Rewriting,

$$\begin{aligned}\frac{d^2CP_i}{dA_i d\alpha} &\approx \left[\Delta\left(\frac{\partial^2 I(A_i, 1-e_i^*)}{\partial A_i \partial e_i^*}\right) - \Delta\left(\frac{\partial^2 I(A_i, 1-e_i^*)}{\partial A_i \partial e_i^*}\right)\right]\alpha \\ &+ \left[\Delta\left(\frac{\partial^2 I(A_i, 1-e_i^*)}{\partial A_i \partial e_i^*}\right) - \Delta\left(\frac{\partial^2 P(A_i, e_i^*)}{\partial e_i^* \, \partial A_i}\right)\right](1-\alpha) \\ &+ \left[\frac{\partial I(A_i, 1-e_i^*+\Delta)}{\partial A_i} - \frac{\partial I(A_i, 1)}{\partial A_i}\right] < 0\end{aligned}$$

Step 2

We are looking for an $\bar{\alpha}$ such that $dCP_i/dA_i \leq 0$ for all values of m. To begin, set $dCP_i/dA_i = 0$ to get a cutoff $\bar{\alpha}(m)$ given a particular monitoring level m.

$$\bar{\alpha}(m)\left(\frac{\partial I(A_i, 1-e_i^*)}{\partial A_i} - \frac{\partial I(A_i, 1)}{\partial A_i}\right) + \left(\frac{\partial P(A_i, e_i^*)}{\partial A_i}\right)(1-\bar{\alpha}(m)) = 0$$

Applying the implicit function theorem to this formula, we can show that $d\bar{\alpha}(m)/dm > 0$. Thus, we need to find $\bar{\alpha} = lim_{m\to+\infty}\bar{\alpha}(m)$. As $m \to +\infty$, $e_i^* \to 1$. Thus, the $\bar{\alpha} \in (0,1)$ which satisfies $dCP_i/dA_i \leq 0$ for all m is implicitly defined by the following equation.

$$\bar{\alpha}\left(\frac{\partial I(A_i, 1)}{\partial A_i}\right) = \left(\frac{\partial P(A_i, 1)}{\partial A_i}\right)(1-\bar{\alpha})$$

A.5 Choice of the citizen-candidate framework

The theory presented in this paper is built on the citizen-candidate framework. One of the primitives of this approach is that there is a fixed institutional framework (constitution) under which the political process plays out. One way that this approach is reflected in our model is by the function $C(m, e_l)$ that specifies the direct costs and rewards of being the leader given some exogenous level of monitoring institutions m, in which we have assumed that $C(m, e_l)$ is increasing in m. The groups take these structures as given, and the political process plays out within this system. Note that this function includes a fixed level of remuneration paid to the group leader. However, it does not allow this remuneration level to vary with m.

An alternative to this approach is to think of the groups as generating a new contract for the leader, as in a standard principal-agent framework. In this approach, the groups actively seek to offer an optimal contract that allows them to maximize some group objective function. This approach is fundamentally different from the citizen-candidate approach we have chosen. The main difference is that it requires the assumption that the group is able to act effectively as a principal when designing the contract for the group leader. We view this assumption as unrealistic. In democratic organizations, such as the one we study, generating a contract requires that there be a leader, or group of leaders, who write the contract. This is different from, say, a firm, in which one or more owners can design a contract for their employees. Thus, the group leaders would

themselves be required to generate the contract offered to the group leaders. They would, in effect, be acting simultaneously as the principal and the agent, which is likely to be an unworkable situation.

One result of this feature of democratic organizations is that the political process often plays out under constitutions that change very slowly, even if those constitutions may be suboptimal at any point in time. The difficulty involved in making changes to these structures is likely to reduce the ability of current leaders to manipulate the system to their advantage. We believe that the citizen-candidate framework provides a more realistic approach when dealing with these types of democratic organizations.

One way to test this intuition is to look at the theoretical implications of different approaches and compare them to our empirical results. In the following analysis, we consider the possibility that groups are able to make ex ante adjustments to the wage paid to the leader. We show that this may lead to a case in which $C(m, e_l)$ is decreasing in m. We then describe the predictions obtained under such an assumption and compare these predictions to the empirical findings. We find that $C(m, e_l)$ decreasing in m yields predictions which do not match the empirical evidence, providing additional support for our assumption that $C(m, e_l)$ is increasing in m.

Suppose that groups can choose to adjust the leaders wage ex ante, taking into account the monitoring institutions. Then groups with higher monitoring levels may choose to set a higher wage, offsetting the additional cost that the leader faces due to a higher level of monitoring by the group. To see why groups may want to do this, suppose that groups maximize some value function over the public good, given by $V(A_l, e_l^*) - w$ where $w \geq 0$ is the wage paid to the leader. This function is increasing in both leader effort and leader ability, and these inputs are complements in public goods production, so that $\partial^2 V(A_l, e_l)/\partial A_l \partial e_l > 0$.

Now suppose that the group is considering paying a higher wage in order to induce a member with ability A_1 to become a candidate, while if no wage is paid the group ends up with a leader with ability A_0, where $A_0 < A_1$. The benefit to the group of paying this additional wage is,

$$V(A_1, e_1^*) - V(A_0, e_0^*).$$

The additional cost that the group must pay in order to induce the member with ability A_1 to become a candidate is,

$$w = I(A_1, 1)\alpha - I(A_1, 1 - e_1^*)\alpha - P(A_1, e_1^*)(1 - \alpha) + C(m, e_1^*) + \phi.$$

Next, consider how these costs and benefits are affected by a change in the level of monitoring. The impact of an increase in m on the wage that must be paid is given by,

$$\frac{\partial w}{\partial m} = \left.\frac{\partial C(m, e_l)}{\partial m}\right|_{e_l = e_1^*} > 0.$$

As the monitoring level increases, groups will need to offer a higher wage in order to induce

the higher ability group members to become candidates. The impact of an increase in m on the benefits of obtaining the higher ability leader is,

$$\left.\frac{\partial V(A_1, e_l)}{\partial e_l}\right|_{e_l=e_1^*} \left.\frac{de_l}{dm}\right|_{e_l=e_1^*} - \left.\frac{\partial V(A_0, e_l)}{\partial e_l}\right|_{e_l=e_0^*} \left.\frac{de_l}{dm}\right|_{e_l=e_0^*}.$$

It is not clear whether the benefits of paying the additional wage are increasing in m, but this is a possibility depending on the exact functional forms. If the benefits of paying the additional wage are strong enough, then an increase in m may induce a wage increase which is large enough to more than offset the additional cost to the leader of the higher monitoring level. In this case, we may have a function $C(m, e_l)$ which is decreasing in m (recall that the leader's wage is included in $C(m, e_l)$).

What does the theory predict in a case in which $C(m, e_l)$ is decreasing in m? One effect of this difference is to overturn Proposition 2. Now it is no longer the case that an increase in the level of monitoring will drive high ability individuals out of the candidacy pool. In fact, with $C(m, e_l)$ decreasing in m, we would have $d\,CP/d\,m > 0$. When Condition 1 holds, this would lead to high ability members being more likely to opt out of the candidate pool when m is low. This prediction runs counter to our empirical results, suggesting that a theory which predicts $C(m, e_l)$ decreasing in m does not provide a satisfactory description of the patterns we observe.

A.6 Incentive Mechanism

This subsection argues that, when there is a great deal of uncertainty regarding the value of the public good produced, an incentive scheme based on leader's effort will be preferred to one based on the public good value. The driving force behind this idea is that members are risk averse. Compensating the leader based on the public good value forces him to accept additional uncertainty in his utility function, reducing the utility that he derives from being the leader. Compensation based on effort, which is more easily observed, avoids the disutility generated by this additional uncertainty. This advantage must be weighed against the fact that compensation based on the value of the public good allows higher ability members to exert less effort than lower ability member and still receive the same costs or benefits from holding office. This reduces the opportunity cost of holding office for high ability members, relative to low ability members, increasing the chances of high ability members choosing to become candidates. These issues have been analyzed by a number of previous authors, such as Lazear (1986) and Baker (2000), and so we only revisit them briefly here.

Consider two incentive schemes. The first is based on effort and denoted $C_1(m, e_i)$. The second is based on the public good value and denoted $C_2(P(A_i, e_i, \eta_P))$. The utilities of the leader under an effort-based and output-based performance scheme, respectively, are given below.

$$U_1 = U[I(A_l, 1 - e_l, \eta_I)\alpha + P(A_l, e_l, \eta_P)(1 - \alpha) - C_1(m, e_l) - \phi]$$

$$U_2 = U[I(A_l, 1 - e_l, \eta_I)\alpha + P(A_l, e_l, \eta_P)(1 - \alpha) - C_2(P(A_l, e_l, \eta_P)) - \phi]$$

Now consider the effect of an increase in the variance of η_P (with a commensurate increase in the variance of η_I). The effect on the utility through the first and second terms inside the U() function will be equivalent regardless of the incentive scheme, all else equal. However, an increase in the variance of η_P will also act through $C_2(P(A_l, e_l, \eta_P))$ under the output-based incentive scheme, which will cause U_2 to decrease more rapidly in η_P than U_1. Thus, if there is sufficient uncertainty in the value of the public good, the returns to being a leader may be lower under an output-based incentive scheme than under an effort-based incentive scheme. This would motivate groups to offer effort-based incentive schemes, such as the scheme posited in this paper.

A.7 Monitoring Mechanism

The monitoring technology in this theory can be motivated as follows. Suppose that there is a set of T tasks that the group leader should fulfill. If the leader allocates an effort level $e_l^* \in [0, 1]$ to the leadership position, then a fraction e_l^* of these tasks are completed, while $1 - e_l^*$ of them remain undone. The monitoring technology $m \in [0, T]$ allows the group to look at m of these tasks and observe whether they were completed. The leader is then punished based on the number of tasks identified that are incomplete. If we consider a large number of tasks then this is equivalent to a variable with a binomial distribution, where the probability of identifying an incomplete task, per observation, is $1 - e_l^*$ and m gives the number of observations obtained. The expected number of incomplete tasks observed is then $m(1 - e_l^*)$ with variance $me_l^*(1 - e_l^*)$.

In order to simplify the model it is helpful to modify the framework above to eliminate the uncertainty. One way to do this is to assume that the expected value is always achieved, i.e., that the group always observes $m(1-e_l^*)$ incomplete tasks given an effort allocation e_l^* and monitoring level m. This simplification allows us to ignore the impact of the member's risk aversion on their effort allocation, greatly simplifying the analysis. Note that the resulting function $C(m, e_l^*)$ satisfies the model assumptions.

A.8 Simulations

To illustrate the forces at work in the model, we undertake a set of simulation exercises (details available below). Figures 3 and 4 show, respectively, the average level of leaders' effort and ability as a function of monitoring, for various levels of private income opportunities. Figure 3 demonstrates the *discipline effect:* an increase in monitoring increases the amount of effort exerted by the leader. Figure 4 demonstrates the *self-selection effect:* as monitoring increases, the expected ability of the leader decreases. This effect binds earlier at higher levels of private income opportunities. Figure 5 shows the result of these combined effects on the value of the public good. There is a clear inverted U-shaped relationship between monitoring and public goods value. Whereas the discipline effect dominates at lower monitoring levels, the self-selection effect dominates at higher levels. The higher the private income opportunities, the earlier this inflection point is reached.

However, at low levels of private income opportunities the self-selection effect disappears. In this case, high-ability members prefer to run and they exert a high level of effort once elected.

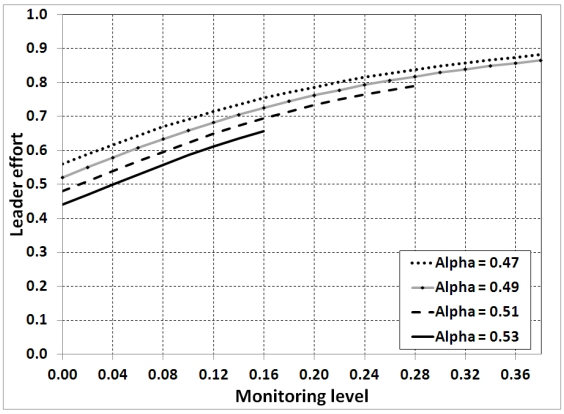

Figure 3: Simulated Leader Effort and Ability

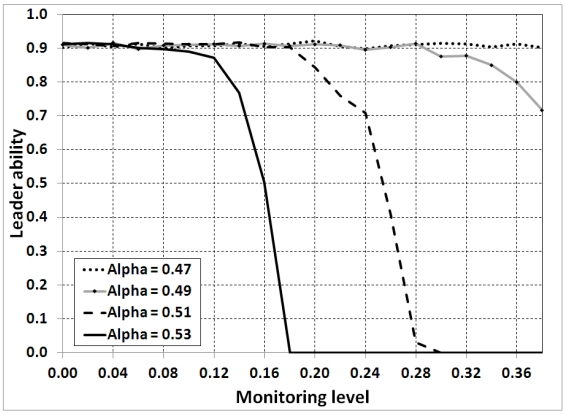

Figure 4: Simulated Leader Effort and Ability

The simulation results are generated by generating groups of 10 members whose abilities are drawn from a uniform [0,1] distribution. We then use the model to derive the candidate pool, identify the leader, and calculate the public good value obtained by each group. We repeat this procedure 200 times for each set of parameter values. When there are multiple equilibria, the results presented in the main text focus on the equilibrium delivering the highest possible public good value.

The functional forms and parameter values used are consistent with the model's assumptions and allow us to display a range of possible scenarios. The following functional forms are used in the simulation exercise.

$$I = A_i^{\beta}(1-e_i)^{1-\beta} \qquad P = p * A_i^{\beta} e_i^{1-\beta} \qquad C = m(1-e_i)$$

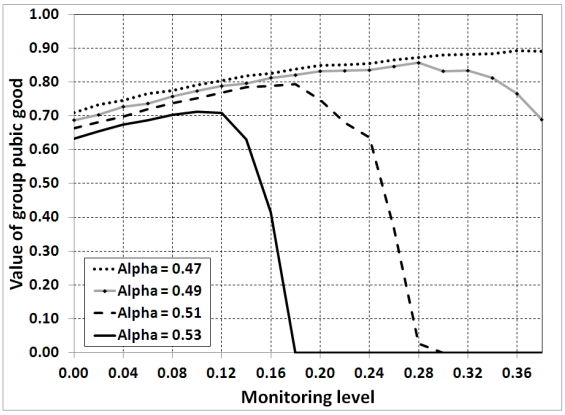

Figure 5: Simulated Public Good Values

The parameter values used for the simulations are $N = 10$, $\beta = .5$, $\phi = .1$, and $p = .1$. The simulations are run for values of m from 0 to 0.4 by steps of .02 and for $\alpha = \{0.47, 0.49, 0.51, 0.53\}$.

Figure A.8 presents additional results from the simulation exercise. The data are constructed by ranking the individuals in each group by their ability, with 10 being the highest and 1 being the lowest ability member. It shows the ranking of the member that ultimately becomes the leader. The main point here is that not only is leader ability falling, but that it is falling even though higher ability members are available.

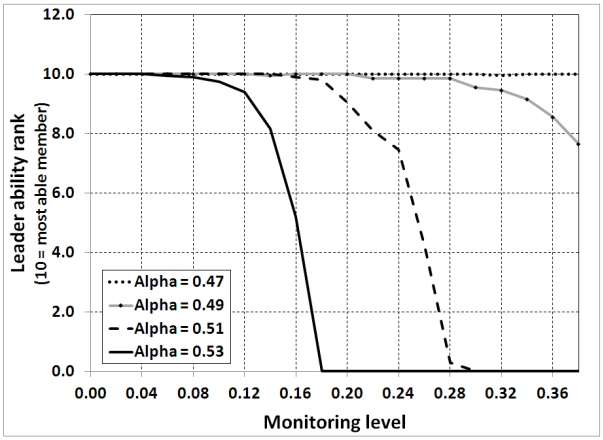

Figure 6: Simulated Leader Ability Rank

We also calculate results in which we take average values over all equilibria, rather than just the equilibrium that delivers the best manager, for each set of parameter values. The average leader effort, leader ability, and public good value produced are displayed in Figures 7 and 8 below. These show the same results as obtained when we focused only on the best available equilibrium. Note that in some cases there will be a single equilibrium and that under these conditions these results will be exactly the same as those displayed in Figures 1 and 2 in the main text.

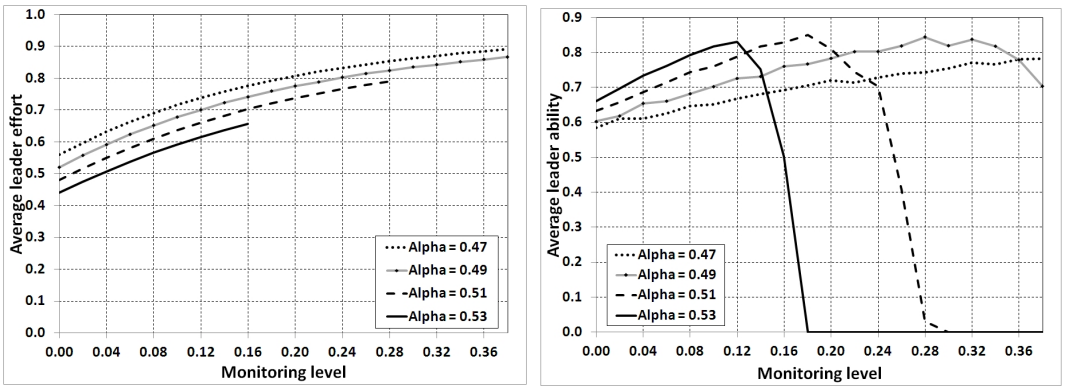

Figure 7: Simulated Leader Effort and Ability Averaged Over All Equilibria

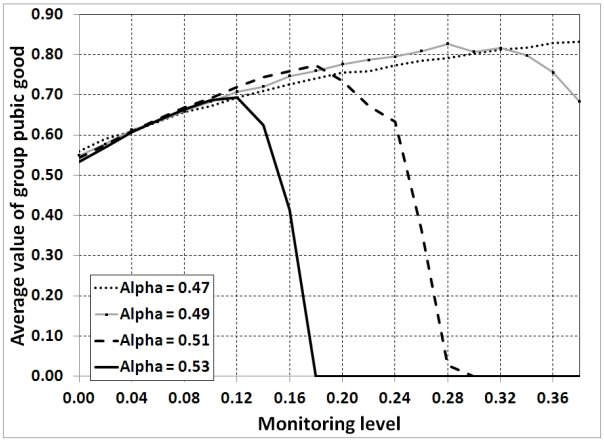

Figure 8: Simulated Public Good Value Averaged Over All Equilibria

B Empirics

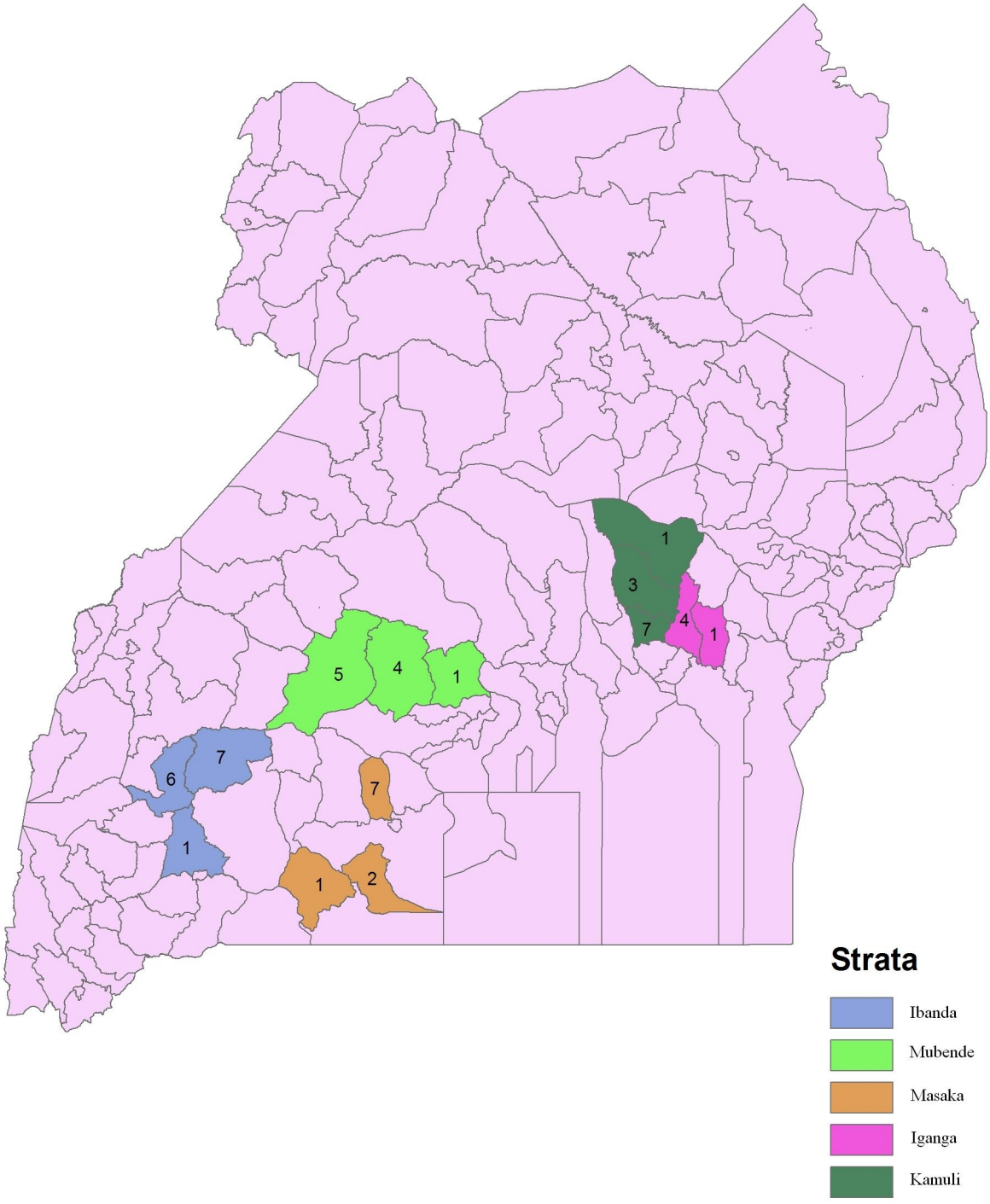

Figure 9: DC location. Numbers represent the number of farmer cooperatives in each district.

Table 7: **Descriptive Statistics**

	Mean	SD	Min	Max	Obs
'Ordinary' Members: sample					
Male	0.68	0.16	0.17	0.97	50
Age	45.67	3.92	34.4	51.7	50
Education index	0	1.00	-1.57	2.88	50
Wealth index	0	0.33	-0.56	0.72	50
Church attendance	3	0.14	2.68	3.32	50
Born in village	0.51	0.19	0	0.92	50
Total land in Acres	7.72	6.69	2.59	41.2	50
Years growing coffee	19.34	5.70	5.92	28.8	50
Share seasonal yield sold via DC	0.49	0.19	0.07	0.88	50
Bulked at least once with DC	0.61	0.20	0.09	0.95	50
Council representatives: complete set					
Male	0.81	0.13	0.48	1	50
Age	46.81	3.59	37.1	55.7	50
Education index	0	1.00	-2.15	2.51	50
Wealth index	0	1.00	-1.75	1.87	50
Church attendance	3	0.12	2.73	3.23	50
Born in village	0.52	0.21	0.07	0.93	50
Total land in Acres	12.01	11.0	3.08	56.0	50
Years growing coffee	19.05	5.76	6.82	32.7	50
Association (DC) level data					
Manager ability score	0	1.00	-1.96	1.54	43
Manager effort summary index	0	0.74	-1.51	2.83	50
Monitoring Summary Index	0	0.80	-1.27	1.47	50
Audit committee	0.34	0.48	0	1	50
Finance committee	0.38	0.49	0	1	50
Monitoring responsibility	0.57	0.19	0.22	0.95	50
Private income opportunities	0.09	0.064	0.024	0.34	50
Age of DC	2.84	1.00	1	5	50
N members (units of 50)	4.24	2.23	1.22	10.7	50
Ethnic fractionalization	0.27	0.31	0	0.80	50
Project years	3.66	1.12	2	6	50
Term limits (chairperson)	0.34	0.48	0	1	50
Term limits (manager)	0.22	0.42	0	1	41
Direct elections	0.48	0.50	0	1	50
Mean reps ability score	0	0.33	-0.90	0.85	50
Max reps ability score	1.37	0.26	0.88	1.90	50
Min reps ability score	-2.30	0.97	-3.69	-0.48	50
SD reps ability score	0.96	0.25	0.51	1.50	50

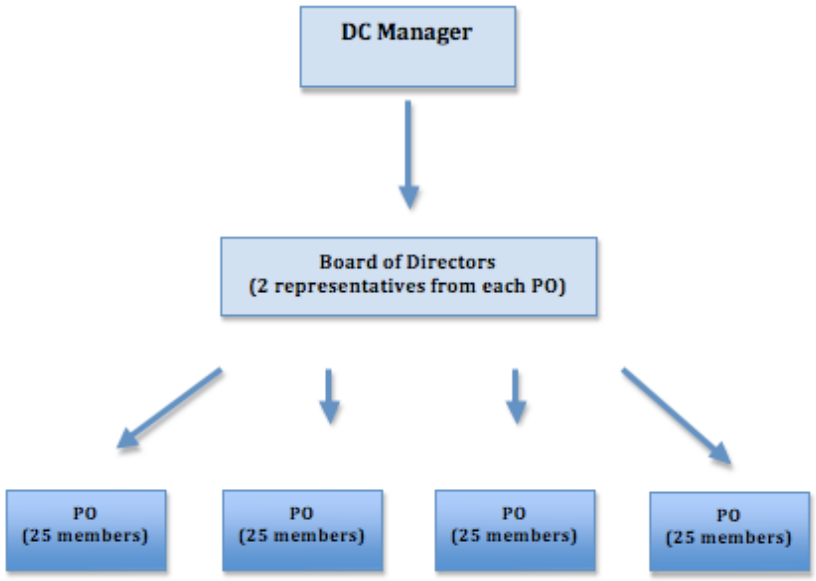

Figure 10: APEP Farmer association organizational structure. Each association (known as DC) is comprised of about 10 village-level producer organizations (POs), themselves comprised of about 20-25 members.

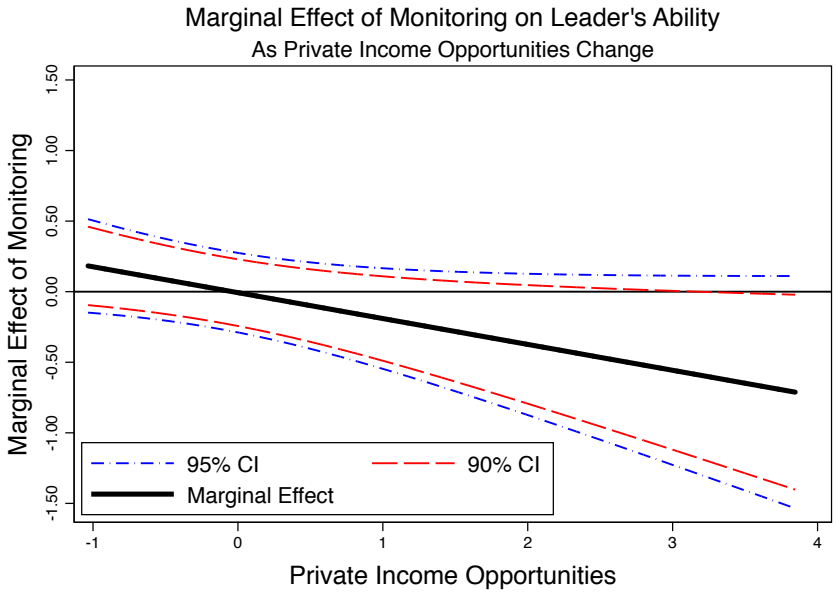

Figure 11: Monitoring effect on leader's ability as private income opportunities increase over its entire range ($n = 42$).