



What motivates Ugandan NGOs to diversify:

Risk reduction or private gain?

by

Canh Thien Dang and Trudy Owens

Abstract

We examine the motives that shape an NGO's decision to diversify the activities it undertakes. We identify two primary motivations, namely the aim to reduce idiosyncratic risks related to future funding and the desire to gain private benefits. We incorporate both in a theoretical framework and derive predictions regarding how an NGO responds to a change in incentives offered by their stakeholders. We predict that under an endogenous incentive scheme, the reaction of the agent will depend on the relative magnitude of the two motivators. We exploit the 2007 historic flood in Uganda and the surge in the international aid to affected areas to examine how Ugandan NGOs change their diversification behaviour following the change in incentives from contractual funding. We find diversification is negatively related to financial incentives from stakeholders. Combining with our theoretical predictions, the result suggests that NGOs diversify mainly to reduce risks rather than to capture private gains, including ability signalling, prestige, career concerns or altruism. Policies targeting financial stability for grassroots NGOs are highly recommended.

JEL Classification: L25, L31

Keywords: NGOs, diversification, risk aversions, motivations, historic flood



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I. Introduction

Charitable organisations are often thought to engage in various activities to accommodate a wider range of social demands and beneficiaries (Edwards and Hulme, 1992, p.80). Offering multiple charitable activities, however, is costly to themselves and potentially harmful to their development effort. The lack of focus might cause wasted transaction costs and management inefficiency among donors and their respective aid agencies (Tirole, 1988; Farrington and Bebeington, 1993). More importantly, involvement in multiple roles and directions could be interpreted by the public as “mission vagueness” that could diminish the legitimacy and privileges of the NGO status (Weisbrod, 1998, p. 171). Yet, many non-profits commenced as single-activity organisations and later began to introduce more activities over time (Kistruck et al., 2013). What is, therefore, the set of motives that shape an NGO’s activity diversification and how do they interact in influencing their decisions? Our primary objective is to identify the dominant motivation underlying the diversification strategy of development NGOs. The question is important for the public, donors and governments when designing incentive schemes to foster prosocial behaviours of their contracted agents.

We first review previous studies to suggest that conceptually an NGO could diversify to both reduce idiosyncratic risks and derive personal gains (including “intrinsic motivations” and the warm glow of helping others). We then incorporate the motivations into a multitask principal-agent model with endogenous incentive contract to formalise the relationship between a stakeholder and an NGO. The stakeholder is altruistic and cares about the welfares of both their ultimate beneficiaries and their contracted NGO; whereas the NGO aims to maximise their payoffs from the benefits derived from diversification net costs associated with exerting effort and managing multiple activities. We show that the incentive scheme and the NGO’s optimal diversification level depend on five exogenous parameters: the variance of idiosyncratic risks associated with the NGO performance, the NGO’s risk aversion, the disutility of eliciting value-creating effort, the marginal cost of diversification (managing one extra activity), and the magnitude of the private gains from diversification. Our comparative statics at equilibrium allow for two scenarios. When the effect of parameters related to risk reduction motivations (risk variance and risk aversion) on the optimal diversification dominates the effect of the

remaining parameters, the diversification level decreases in incentives set by the stakeholder. In contrast, when the partial effect of parameters related to private gains dominates that of the risk reduction parameters, the optimal diversification will increase in the incentives. The intuition is that when private benefits of diversification principally motivates the NGO, any extra incentive from the stakeholder now works as further insurance for the organisation to guard against risks, allowing them to diversify more. Meanwhile, when risk reduction is the key motivator in the NGO's decision-making process, further incentives would incentivise the NGO to exert more effort instead of diffusing effort into a more complex portfolio. Most importantly, we demonstrate that exogenous variations in the disutility of exerting effort will affect the optimal diversification only through affecting the incentive offered by the stakeholder. This feature is unique to the disutility of exerting value-generating effort.

We follow the predictions and use a unique dataset of 402 Ugandan NGOs collected by Burger et al. (2011) in 2008 to identify the primary factor influencing the NGO's decision. To address the concern of joint determination between incentives and the optimal diversification inherited from the theory, we construct an instrumental variable strategy. We use the historic flood in the eastern and northern districts of Uganda from July to November 2007 as the source of variations. We rely two assumptions: (i) the timing of the 2007 flood is exogenous to both the NGOs and the incentives they received, and (ii) the surge in international aid relief and incentives toward the most affect districts was due to the worsen environment faced by the communities and NGOs working in the areas. To the extent that the assumptions hold, an increase in incentives from the stakeholders, measured as the percentage of contractual revenues coming from stakeholders such as grants, membership and user fees, will lead to a decrease in the NGO's diversification level. To address the concern of potential pre-selection into locations vulnerable to future extreme floods, we use the Dartmouth Flood Observatory global archive to construct a measure for flood vulnerability. We show that our results remain when we restrict the analysis to NGOs who have operated in the most vulnerable areas. Using an alternative strategy exploiting within-organisation variations between 2002 and 2007 and time-fixed effects, we obtain a similar result: NGOs respond to higher incentives by focusing on fewer charitable activities. Combining with our structural model, the finding suggests that Ugandan NGOs

indeed diversify to mainly reduce risks associated with the success of their missions, rather than to derive personal gains.

Our paper contributes to the vast literature on behavioural motivators. We blend two bodies of the literature on determinants of firm diversification (Campa and Kedia, 2002; Aggarwal and Samwick, 2003) and studies on expansion strategy of non-profits (Mendoza-Abarca, K. I., & Gras, 2017). Like the pioneers in the former literature, we follow an agency approach to model the relationship between donors and NGOs. As reviewed in Section II, we consider all potential motivators of diversification in our modelling. Most of the literature only focus on the impact of product diversification on the organisation's value and efficiency, treating measures of diversification as explanatory terms (Arkan and Stulz, 2016; Carroll and Stater, 2009). Such studies also generally rely on nonrandom combinations of corporations or international, large non-profits in developed markets. Little has been studied using data on development NGOs. They rely on fixed effect or sample correction models to account for endogeneity concerns (see Erel et al, 2015). We differ with a unique dataset of development NGOs in a randomly sampled survey. We also contribute to the growing body of this literature with a cleaner study using the plausibly exogenous 2007 flood.

Our paper also relates to experimental studies on designing incentives to motivate charitable efforts (see Gneezy et al., 2011 for early studies). Recently, Imas (2014) shows participants work harder for charity than for themselves only when incentive stakes are low. DellaVigna and Pope (2017) find monetary incentives work far more effectively than psychological motivators. We emphasise the complementarity as our paper also finds evidence for pragmatic incentives (to reduce risks and enhance survivability) being dominant rather than motivators such as altruism, prestige or signalling. Finally, we provide a new angle of the agency approach to model an NGO's decision (see Steinberg, 2010 for applications in the non-profit literature). Our model relates to studies on the motives underlying decisions of non-profit organisations, who often claim their acts as "voluntary" and driven by "intrinsic motivations" (Besley and Ghatak, 2005; Bénabou and Tirole, 2005).

The paper proceeds as follows. Section II reviews the benefits and downsides of diversification. Section III outlines our theoretical predictions, which are tested by two empirical strategies in Section IV. Section V concludes with notes on the methodology and policy recommendations.

II. Why do development NGOs diversify?

1. Diversification to reduce risks

A popular result in the finance literature is that firms diversify to mitigate idiosyncratic risks and the uncertainty of performance measures (Montgomery, 1994). Since for-profit firms and charitable organisations have become increasingly similar regarding organisational struggles, managerial incentives, and resource scarcity (Boris and Steuerle, 2006), it becomes highly relevant for non-profit managers to engage in various income-generated activities to hedge themselves. Idiosyncratic risks could come from two dimensions. First, an NGO's survival usually depends on funding from third parties and the organisation is vulnerable to any shock of the funding source. While NGOs in developed markets benefit from multiple streams of revenues (commercialised incomes, insurance, contract, endowments) and donations that are readily available (Trussel and Greenlee, 2004); grassroots development NGOs have far fewer choices. Hodge and Piccolo (2005), Barr et al. (2004) document that these NGOs mainly obtain funding from international donors, local development contributions or fees from beneficiaries. As a result, any changes in individual donor preferences or funding focus would lead to unexpected financial downturns for these organisations. NGOs with a narrow set of activities would struggle to adapt to new funding requirements if their single mission ceases to be targeted by funding bodies. To reduce dependence on a single source of income and the risk of interrupted funding, development NGOs could pursue a diversification strategy and engage in different activities or missions. Kistruck et al. (2013) and Keating et al. (2005) provide descriptive evidence of how diversification could provide a safety net for development NGOs and improve financial their stability. Carroll and Stater (2009) echo the result with a large sample of American non-profit organisations.

In addition, since the performance of non-profits is usually difficult to measure, an appropriately diversified portfolio of activities could be considered as a "prudent" approach to harmonise the impact of not accomplishing one activity (Young, 2009, p.34). Carroll and Stater (2009) record cases in which NGOs providing higher quality services do not reflectively attract increased funding. Scott (2003) documents that donors have begun to shift from measuring success of development activities

according to the quality of anecdotal stories to measurements of accomplishments. He argues that having a broad portfolio could be a comparative advantage and an easily visible measurement of efficiency. Martens (2005) echoes the argument that due to the non-distribution constraint NGOs could signal their superior value to for-profit counterparts by maximising the number of activities until their entire given budget is spent. Empirical evidence has generally been consistent with the arguments of Scott and Martens (Kistruck et al., 2013; Carroll and Stater, 2009).

2. Diversification for private gains

The agency theory in the corporate literature proposes several managerial benefits and downsides of diversification (see Aggarwal and Samwick, 2003 for a related review). First, NGOs and their managers may wish to signal competence by engaging in different activities. Indeed, having a well-diversified set of activities could increase the perception of the NGOs capability to the funding market since it signals experience and managerial ability. Perceived competence is particularly important for those who wish to tap into new funding. Through experiments, Aaker et al. (2010) replicate Moscarani (2007) to show that cues of credibility, if given, can serve as an effective tool to improve perceptions of competence, and thereby the likelihood of donations. Since performance remains difficult to verify and the number of activities offered is generally visible; an NGO's best strategy to enhance its credibility is thus to "vigorously" pursue a wide range set of activities (Martens, 2005, p.650). Olennick (1988) reports that institutional donors tend to avoid risks by funding well-managed non-profits with rich and established portfolios even when there exist smaller firms that could yield greater development value. In addition, managers may also wish to signal competence to improve their own future career prospects through their experience in managing complex NGOs. Evidence for such desires has been mainly drawn from the finance literature (Gibbons and Murphy, 1992).

Second, diversification could be associated with classic rent seeking and entrenchment. Managers may wish to be involved in various activities to increase their potential earnings (Murphy, 1999). A related private gain is "managerial entrenchment" (Shleifer and Vishny, 1989, p.137). An agent may engage in activities that they are uniquely capable in the hope of increasing both the principal's demand for their skills and the cost to dispose of them. For NGOs, particularly grassroots, the desire

to maintain a relationship with donors is more important as seasonal organisations could register to operate following announcements of fresh funding. As a result, NGOs may diversify to entrench themselves when other organisations could become viable replacements, or when they are applying for new grants. In line with the risk reduction approach, diversification could mitigate the employment risk. Burger and Owens (2013) provide evidence that entrenchment concerns may well exist in the non-profit world. They find that grant-giving behaviour may be strongly habitual as the grant approval in the past raises the success rate in the subsequent round. The desire to prolong the relationship could thereby induce NGOs and managers to diversify.

Third, agents can derive egoistic motivations that include prestige, privilege and improved social status from running a more diversified organisation. Stulz (1990) analyses a model that incorporates financing policies to suggest that managers derive perquisites from expanding firms' portfolios. Egoistic gains, particularly prestige and recognition by others, also play an important role in philanthropic activities (Olson, 2009; Benabou and Tirole, 2006). An NGO that manages to provide a wide range of missions could be highly regarded by peers, particularly those belonging to international networks or local umbrella organisations. Roll (1986) even suggests the hubris hypothesis behind decisions of agents to diversify. He cites the psychology literature to argue that agents become overconfident in their capability and then more inclined, whether rationally or not, to improve social prestige by diversifying. Morfit (2011) finds evidence that Malawian NGOs with lower survival rates are those who become self-persuaded to take on AIDS fighting campaigns regardless of their current skills. Pursuing social recognition in such a manner could induce charitable organisations to diversify.

The fourth source of private benefit possibly derived from performing more charitable acts is the “warm glow” feeling or impure altruism (Andreoni, 1989). Different from corporations whose objective is to maximise profits, NGOs could attempt to offer an extended set of activities to accommodate a wider range of beneficiaries. As there does not exist a generally accepted measure to study unobservable characteristics of altruism, the literature has not been able to reach a decisive conclusion for whether and how altruism affects the number of NGOs' activities. Edwards and Hulme (1992) find that despite inherent concerns of diversification, an expansionist strategy remains

desirable to both multilateral assistance donors and NGOs. The main motivation cited by Edwards and Hulme is that operational expansion permits the organisations to benefit more people. Recent evidence from experimental economics, however, indicates that altruism may not translate into a desire to see more activities. Small et al. (2007) demonstrates that individuals donate the same amount for helping one person as for helping 10 people. Linardi and McConnell (2011) find that given excuses to stop volunteering, participants in a non-profit operation do not maximise the amount of altruistic effort that they are exerting. Their study is consistent with Hsee and Rottenstreich's (2004) finding that as long as participants are working toward an altruistic activity, they may perceive the “warm glow” derived from the act independent of the amount of donations and the number of activities. This new strand of literature implies that altruism does not always motivate non-profits and their managers to extend their portfolios.

Finally, diversification can incur costs and downsides. For one, the managers can experience management fatigue due to an increased workload of managing extra projects (see Gronbjerg, 1991 for four case studies). A greater variety of activities also leads to a corresponding increase in funding conditions and implementation criteria, and satisfying one condition may preclude satisfying another. Besides adding to administrative overhead and goal conflict, diversification may nonetheless create confusion about the extent of mission accomplishment since different stakeholders may hold different views of effectiveness and goals (Tuckman, 1998). Ultimately, the public may perceive a non-profit chasing multiple roles and missions as having an unclear charitable purpose and “mission vagueness” (Weisbrod, 1998, p. 171). Such a public image may blur the distinction between the non-profit sector and their for-profit counterparts, fuelling the controversies surrounding the legitimacy of NGOs (Ferris & Graddy, 1989). Such costs may outweigh potential gains.

III. A conceptual model on incentives and diversification

We aim to model a contractual relationship between two players (an NGO and its stakeholder) that accommodate both the risk reduction motivation and private benefits of diversification. We follow the

spirit of Aggarwal and Samwick (2003) but differ in several aspects.¹ First, we relax their assumption that the principal discounts diversification from the organisation's value. Instead, we assume that the contractible performance (development value) of the NGO is linear in the NGO's (unobservable) effort only. As reviewed in Section II, whether donors discount diversification in giving grants to NGOs remains a debate in the development context. Second, we explicitly model the personal benefits and personal costs of pursuing multiple missions in the NGO's utility function. In doing so, we relax another assumption in Aggarwal & Samwick (2003)'s framework that diversification incurs no costs. Although their assumption appears reasonable in the context of managing a diverse portfolio of many stocks and shares, managing different charitable activities even within one mission requires time and effort from the management team. By contracting on one performance measure (the development value), our model of a single effort level is equivalent to a dynamic model in a continuous time frame that allows the agent to dynamically adjust their effort over time (Holstrom and Milgrom, 1987). As such, we account for dynamic strategic decisions over time taken by the donors and the NGO. Like Aggarwal & Samwick (2003), we assume the diversification level is unobservable, or at least very costly for the donor to monitor, in the main analysis. Third, we introduce a term representing the donor's empathy toward the NGO to reflect the altruism of the stakeholders. Previous literature has already captured the shared intrinsic motivation between a non-profit and their funder (Prendergast, 2008; Besley and Ghatak, 2005). In our model, we follow Levine (1988) to simply include an additive term of empathy to the stakeholder's utility function. Finally, our focus is to derive comparative statics for the total effect of the value-based incentives on the NGO's optimal diversification level, allowing exogenous parameters (defined below) to vary.

1. Building blocks

A risk-averse and effort-averse NGO (the agent) receives a mission-related payment from a risk-neutral and altruistic stakeholder (principal) in the form of grants, membership or user fees to deliver

¹ We follow the modelling approach of Rose-Ackerman (1982) which assume NGOs act as utility maximisers. We capture the non-distributional constraint by the condition that in equilibrium, the NGO would receive zero pay-offs for their choice.

a charitable mission.² The agent, conditional on accepting the contract, makes a choice of unobservable effort $e \geq 0$ and the level of diversification of their charitable activities n . We can think of the mission as assisting a depleted village, and the diversification as the number of charitable activities that the NGO decides to undertake to assist the villagers $n \geq 1$. The activities can range from building new houses, education, farm support or irrigation improvements. For example, the Ugandan Water and Sanitation NGO Network's mission is to "alleviate poverty [...] through universal access to safe, sustainable water and improved sanitation".³ Nevertheless, their activities in 2002 included advocacy and human rights, library service and educational training, raising awareness, technical assistance, and community development. The stakeholder's objective is to maximise the development value derived from the funded mission.⁴

$$v = e + \epsilon(n) \quad (1)$$

We can think of the observable development value as, for example, the number of villagers who were assisted following the contracted mission. This figure comprises of two components. First, the NGO's unobservable charitable effort e be positively correlated with the outcome. Second, a normally distributed noise in the development value $\epsilon(n)$ has a zero mean and a variance of σ^2/n . The variance captures the magnitude of idiosyncratic shocks specific to the mission. Following the literature on diversification, an organisation with a more diverse portfolio of activities would be in a better position to reduce the impact of an idiosyncratic shock that affected one particular activity. This assumption is reflected as the shock variance decreases when $n > 1$.

Since monitoring the unobservable effort x is costly, the mission-related payment is based on the noisy signal of the development value v .

² Due to the nature of a contract, we exclude cases when the NGO receives a donation, which usually comes as a gift or contribution without any contractual requirements or strings attached. In this case, it is up to the NGO to use the donation or may disburse the donation however the NGO deems appropriate. For both theoretical and empirical modelling, we refer to grants, membership and user fees as mission-related payments as these forms of funding are contractible. Other revenue sources include donations, profits on special fundraising events, income from business (such as farming, canteens and retail outlets), incomes from services rendered to government, tax refunds and property/endowment incomes (Barr et al., 2004).

³ <http://www.uwasnet.org/Elgg/>

⁴ Although several rigorous conditions are required for a linear payment scheme to be truly optimal (Holmstrom and Milgrom, 1987), such a scheme is often used in practice for simplicity and relative robustness against manipulation (Dixit, 2002)

$$w = w_0 + \alpha v \quad (2)$$

where the NGO receives a lump sum of w_0 and a value-based component of αv . If the agent chooses (e, n) , their overall wealth W increases by a monetary amount of w . In this setting, the fixed component w_0 can be interpreted as the NGO's endowment, such as equipment and vehicles, and regardless of the ultimate development value. The agent can pitch their development value through grant applications and the stakeholder, upon approval, sets a value-based sensitivity α .

In addition to the payment w , the NGO derives net private benefits from choosing a diversification level n at $p(n) = \lambda (\ln n - \frac{n}{\tau})$ and incurs a disutility from exerting the level of effort e at $K(e) = \kappa \frac{e^2}{2}$. Parameters λ and τ respectively represent the marginal private benefit of diversification and the NGO's optimal diversification level in the absence of a contract. As reviewed in Section II, private benefits may consist of prestige from managing a diversified organisation, rent-seeking motives, simply entrenchment, or the warm glow from helping others (Andreoni, 1989). Through this functional choice, we aim to reflect the reality that while diversifying could benefit the organisation when the number of missions remain relatively manageable (for example to signal their ability or maintain different sources of incomes), over-diversifying ($n > \tau$) could be harmful to the NGO due to either inefficiency (Moore, 2000; and Martens, 2005) or management fatigue. Overall, the net private benefit associated with diversification increases when $n \leq \frac{\lambda}{\tau}$ and decreases when $n > \frac{\lambda}{\tau}$, where $\beta = \frac{\lambda}{\tau}$ is the marginal cost of diversification (effort fatigue and time due to managing multiple missions).

The disutility from executing the charitable mission (κ) involves challenges and difficulties arising from current external environmental factors, such as poor infrastructure due to a natural disaster or the remoteness of the area. In our context, we can think of κ as a proxy for the conditions that where the NGO is contracted to work, that is where the beneficiaries are located. As standard in the literature, we assume $\kappa > 0$ to reflect an increasing marginal disutility. We assume (κ) is large enough for the NGO to apply for external funding from the stakeholder.

The induced wealth of the NGO for taking the contract is:

$$\varpi = w + p(n) - K(e) = w_0 + \alpha[e + \varepsilon(n)] + \lambda \ln n - \beta n - \frac{\kappa e^2}{2} \quad (3)$$

To determine the certainty equivalent (CE) for undertaking the contract, we assume that the NGO has a constant absolute risk aversion utility (CARA): $u(\varpi) = -\exp(-r\varpi)$ where r is a Pratt-Arrow absolute risk aversion coefficient. Like $\sigma^2, \lambda, \beta, \kappa$, we assume r is observable before the interaction.

2. Optimal actions and comparative statistics.

We solve the game by induction. At the second period, the agent accepts the contract and chooses (e, n) to maximise their certainty equivalent, given the first-period incentives α and their own participation constraint.

$$\max_{x,n} CE = w_0 + \alpha + \lambda \ln n - \beta n - \frac{ke^2}{2} - \frac{r}{2} \alpha^2 \frac{\sigma^2}{n} \quad (4)$$

$$s. t \quad CE = w_0 + \alpha e + \lambda \ln n - \beta n - \frac{ke^2}{2} - \frac{r}{2} \alpha^2 \frac{\sigma^2}{n} \geq u_0 = 0 \quad (5)$$

where u_0 is the reservation utility if the agent declines the contract at stage 1. To reflect the non-distributional constraint in the non-profit sector, we assume that $u_0 = 0$. That is, the participation constraint holds at equality or the NGO gains no surplus (profit) at equilibrium. For the derivation of CE (Equation 4), see Online Appendix A.

Differentiating (4) with respect to e and n respectively gives the agent's optimal choice of charitable effort e^* and diversification amount n^* .

Corollary 1. The optimal amount of charitable effort and diversification are unique at:

$$e^* = \frac{\alpha}{k} \quad (6)$$

$$n^* = \frac{\lambda + \Delta}{2\beta} \quad (7)$$

where $\Delta = \sqrt{\lambda^2 + 2\beta r \sigma^2 \alpha^2}$.

The NGO's optimal effort increases in the value-based incentive from the stakeholders and decreases in the disutility (challenges) from exerting effort. Despite seemingly counterintuitive, this prediction is evident in Uganda and Bangladesh where NGOs are less likely to work in areas with most need (hence potentially high incentives) which are often remote and challenging locations (Barr and Fafchamps, 2005; Fruttero and Gauri, 2005). Equation (7) provides an opposite prediction to the for-profit literature (Campa & Kedia, 2002): if the stakeholder provides more incentives, the agent

chooses more diversification in response. Intuitively, it is consistent with the praise for the nonprofit sector, that due to the non-distributional constraint these organisations tend to provide further services until their budgets are exhausted (Martens, 2005). However, we show below that this prediction does not hold if we allow for the stakeholder's incentive being chosen endogenously.

To calculate the optimal incentive package, the principal moves first and maximises their payoff, knowing the optimal strategy of the NGO. To capture the altruism of the stakeholder – the stakeholder's utility increases with the well-being of the beneficiaries and the contracted agents (Fehr & Schmidt, 2006) – we include two terms: the expected development value $E(v)$ representing the value of the mission toward the targeted beneficiaries, and the empathy $G(k, \alpha)$ toward the NGO. Since we assume the equilibrium payoff of the NGO is zero, we instead model the stakeholder's empathy to the NGO in two dimensions: the NGO's disutility of effort and the stakeholder's incentives toward the NGO.⁵ Intuitively, the stakeholder derives a higher level of empathy toward the NGO for a higher disutility of effort, $\frac{\partial A}{\partial k} > 0$. Similarly, the stakeholder derives a higher utility when they could provide a higher incentive to their contracted workers $\frac{\partial A}{\partial \alpha} > 0$. To allow for an explicit solution, we assume that $G(k, \alpha) = \alpha f(k)$ where $f(k)$ is an empathy function, with property $f'(k) > 0, f(0) = 0$. The first condition is consistent with our intuition that the stakeholder gains a higher utility from empathising with the NGO working in a more challenging environment. The second imposes that the stakeholder has zero empathy to the NGO if the agent faces zero challenges from working for the mission. We abstain from imposing any condition on $f''(k)$ for flexibility.

The final payoff of the stakeholder P_d is net of the contracted payment to the NGO. For simplicity, we follow Levine's (1998) modelling approach and assume that the stakeholder's payoff is linear in their components. Using the fact that the participation constraint is now satisfied with equality or

$w_0 + \alpha e - \beta n + \lambda \ln n - \frac{ke^2}{2} - \frac{r}{2}\alpha^2 \frac{\delta^2}{n} = 0$, the stakeholder's payoff can be written as follows:

$$P_d = E(v) + A(k, \alpha) - w = e^* + \alpha f(k) - \frac{k}{2}(e^*)^2 + \lambda \ln n^* - \beta n^* - \frac{r}{2}\alpha^2 \frac{\sigma^2}{n} \quad (8)$$

⁵ There is an extensive literature in Political Science discussing empathy in the stakeholder-NGO partnership for international development (see Smillie et al., 2013). It is, however, less discussed in economics studies.

Knowing the response function (e^*, n^*) of the agent as in Corollary 1, the principal moves first and sets α to maximise their net expected payoff:

$$\max_{\alpha} P_d = \max_{\alpha} E(v) + A(k, \alpha) - w = \max_{\alpha} \frac{\alpha}{k} + \alpha f(k) - \frac{\alpha^2}{2k} + \lambda \ln\left(\frac{\lambda + \Delta}{2\beta}\right) - \beta \frac{\lambda + \Delta}{2\beta} - \frac{\beta r \alpha^2 \sigma^2}{\lambda + \Delta} \quad (9)$$

The first differential with respect to α following (10) is:

$$0 = \frac{1-\alpha}{k} + f(k) - \frac{2\alpha\beta r \sigma^2}{\Delta + \lambda} \quad (10)$$

where $\Delta = \sqrt{\lambda^2 + 2\beta r \sigma^2 \alpha^2}$.

Lemma 1: There exists a unique value-based incentive $\alpha^* > 0$

Proof. To see this, let $\alpha \rightarrow 0$, the right-hand side of (10) becomes positive ($\frac{1}{k}$); while when $\alpha \rightarrow 1 + kf(k)$, the right-hand side of (10) is negative ($-\frac{2\beta r \sigma^2}{\Delta + \lambda}$). Therefore, there exists at least one interior solution on $(0, kf(k))$. It is trivial to see that the right-hand side is a strictly decreasing function of α so the interior solution is also the unique solution for the first order condition. QED.

As expected, the agent is rewarded for delivering a higher development value $\alpha^* > 0$. In addition, solving α from Equation (10) implies that any exogenous determinants that affect the decision to diversify also affect the stakeholder's optimal value-based incentive α^* . Intuitively, grants given to NGOs are not determined exogenously, but jointly determined when the stakeholder considers factors associated with the NGO. Substituting α into (7), the theory predicts the following structural form of the optimal level of diversification:

$$n^* = \frac{\lambda}{2\beta} + \frac{1}{2} \sqrt{\left(\frac{\lambda}{\beta}\right)^2 + 2\frac{r}{\beta} \sigma^2 [\alpha^*(r, s^2, \lambda, k, \beta)]^2} \quad (11)$$

Equation (11) suggests that the optimal diversification changes due to the disutility of exerting effort κ only through its effect on incentive α^* . Whereas any changes due to private benefit λ , personal cost of diversification β , risk aversion r , or the variance of shocks s would simultaneously affect both the diversification n^* and incentive α^* . Intuitively, these parameters are correlated to diversification to some extents. Corollary 2 supports the argument.

Corollary 2: Given that working in a development project imposes a sufficiently high disutility of effort (κ is high), the partial impacts of the exogenous factors on the optimal level of diversification n^* and the optimal value-based incentive α^* are as follows:

$$\frac{\partial n^*}{\partial j} > 0, j \in \{r, \sigma^2, \lambda\} \quad \text{and} \quad \frac{\partial n^*}{\partial k}, \frac{\partial n^*}{\partial \beta} < 0 \quad (12)$$

$$\frac{\partial \alpha^*}{\partial j} < 0, j \in \{r, \sigma^2, \beta, k\} \quad \text{and} \quad \frac{\partial \alpha^*}{\partial \lambda} > 0 \quad (13)$$

Proof: See the Appendix.

The NGO's disutility of effort being high is a sufficient condition for Corollary 2. We argue that this assumption reflects the development context: working in development projects (missions), particularly in Africa, is challenging and requires great dedication from aid workers. With that in mind, Array (12) illustrates how the optimal diversification varies when each of the exogenous parameters varies, holding others constant. When risk covariates and personal benefits associated with diversification increase, the NGO intuitively diversifies more to either reduce the uncertainty of the performance measure or derive more benefits. When the cost of eliciting effort increases, the NGO switches to diversification since it is relatively cheaper now to do so. Diversification in these cases becomes more appealing to the agent. In contrast, when the cost of diversification increases, NGO becomes more focused instead of diversifying, consistent with expectations from the standard theory.

Array (13) presents incentive-action relationships. As either the idiosyncratic shock variance σ^2 or the cost of diversification β increases, the stakeholder provides lower incentives since either the performance measure becomes noisier or the stakeholder knows the NGO would divert from diversifying to value-creating effort due to the increased cost of diversification. When the NGO's risk aversion or the cost of charitable effort (k) increases, the stakeholder provides lower incentives because it becomes costlier to motivate the NGO to work harder in a riskier environment. These results are consistent with previous studies in the principal-agent model literature and consistent with the findings that Ugandan and Bangladeshi NGOs tend to stay away from the more remote areas. One explanation for this finding is that stakeholders do not provide sufficient incentives for NGOs to operate in the more challenging areas. Finally, as the private benefit of diversification λ and the cost

of exerting charitable effort increase, the stakeholder provides higher value-based incentives to discourage the NGO from diversifying and to induce the NGO to focus on value-created effort.

Proposition 1 decomposes the partial differential of the optimal choice of diversification with respect to the value-based incentive.

Proposition 1: The partial incentive effects of the NGO are as follows:

$$\begin{aligned}
 \left. \frac{\partial n}{\partial \alpha^*} \right|_{\partial r} &= \frac{\frac{\partial n}{\partial r}}{\frac{\partial \alpha^*}{\partial r}} < 0 & \left. \frac{\partial n}{\partial \alpha^*} \right|_{\partial \sigma^2} &= \frac{\frac{\partial n}{\partial \delta^2}}{\frac{\partial \alpha^*}{\partial \sigma^2}} < 0 \\
 \left. \frac{\partial n}{\partial \alpha^*} \right|_{\partial k} &= \frac{\frac{\partial n}{\partial k}}{\frac{\partial \alpha^*}{\partial k}} > 0 & \left. \frac{\partial n}{\partial \alpha^*} \right|_{\partial \lambda} &= \frac{\frac{\partial n}{\partial \lambda}}{\frac{\partial \alpha^*}{\partial \lambda}} > 0 & \left. \frac{\partial n}{\partial \alpha^*} \right|_{\partial \beta} &= \frac{\frac{\partial n}{\partial \beta}}{\frac{\partial \alpha^*}{\partial \beta}} > 0
 \end{aligned} \tag{14}$$

Proposition 1 suggests that the magnitudes of the underlying variations of the exogenous parameters determine the sign of the overall effect of the stakeholder's value-based incentive on the optimal level of diversification. Taking the total derivative $\frac{\partial n}{\partial \alpha^*}$, the sign of this derivative depends on two components as specified in in Proposition 2.

Proposition 2. If the dominating motivation for a diversified portfolio is risk reduction, the total effect of the value-based incentive on diversification is negative. If the disutility intolerance and personal gain motivations are sufficiently high to offset the effect of risk reduction motivation and thereby determine the agent's choice, the effect of value-based incentive on diversification is positive.

$$\begin{aligned}
 \underbrace{\frac{\partial n}{\partial \alpha^*}}_{\text{Incentive effect of } \alpha \text{ on } n} &= \underbrace{\frac{\frac{\partial n}{\partial r}}{\frac{\partial \alpha^*}{\partial r}} + \frac{\frac{\partial n}{\partial \delta^2}}{\frac{\partial \alpha^*}{\partial \sigma^2}}}_{\substack{< 0 & < 0 \\ \text{diversify for risk reduction} \\ \text{(risk aversion and shocks)}}} + \underbrace{\frac{\frac{\partial n}{\partial \lambda}}{\frac{\partial \alpha^*}{\partial \lambda}} + \frac{\frac{\partial n}{\partial k}}{\frac{\partial \alpha^*}{\partial k}} + \frac{\frac{\partial n}{\partial \beta}}{\frac{\partial \alpha^*}{\partial \beta}}}_{\substack{> 0 & > 0 & > 0 \\ \text{diversify for personal gains} \\ \text{(private benefits, effort disutility or costs)}}}
 \end{aligned} \tag{15}$$

The implication of Proposition 2 is that if the NGO diversifies mainly to reduce related risks, they would respond to an increased value-created incentive from the stakeholder by diversifying less. Whereas, if the NGO diversifies mainly to gain personal benefits, the response to increased incentives will be to diversify more. The intuition is that if the NGO cares more about the noise of the performance measurement or the level of risk associated with the mission, they would exert more effort on value-created activities, instead of diversifying, following a higher incentive. Doing so will

guarantee a higher expected performance (development value). In contrast, if the NGO cares more about personal perks such as the benefits of diversification or the disutility of exerting effort, receiving higher incentives to undertake more charitable effort would instead allow the NGO to diversify more. The increased incentives now act as insurance for the NGO to offset risks.

To sum up, we extend an agency model to study the relationship between a stakeholder and a risk-averse and effort-averse NGO. Under the assumption that the NGO diversifies both to reduce risks associated with the mission being contracted and to derive personal gains, we show that the effect of the optimal value-based incentive on the level of diversification could be decomposed as follows:

- i. The average incentive effect is negative if the underlying motivation for diversification is to reduce risks, which should be expected from stakeholders (donors and the public). The magnitudes of variations in either or both of r, s^2 dominate the other parameters in determining the effect of value-based incentives on the NGO's diversification level.
- ii. The average incentive effect is positive if the underlying motivation for diversification is to for personal gain: to derive private benefit (λ), to avoid discomfort from working on projects (κ), or the cost of diversification is manageable (β) to overcome. The magnitude of variations in either or both of λ, k, β dominate the other parameters in determining the effect of value-based incentives on the diversification level.

IV. Empirical analysis

1. Data: the 2008 Ugandan NGO survey

We use the 2008 survey of the Ugandan NGO sector conducted by Burger and Owens (2013), following the 2002 survey procedure by Barr et al. (2005). Uganda is an interesting case due to its expanding NGO sector, particularly after the surge in promised financial aid in 2006. The survey of 402 NGOs includes information about activities undertaken and the proportions spent on each. In addition, we have a wealth of information on other characteristics of the NGOs, for example, their revenues from different funding sources, employment size, geographical coverage, managers' backgrounds and the governance structure. Burger and Owens (2013) provide further details of the data and the sampling method.

2. Empirical strategy

The objective is to identify the dominant motivation underlying an NGO's decision-making, particularly their decision to diversify. Since motivation is unobservable, we aim to observe responses of the NGO to observable incentives. Section III presents two possible scenarios where either risk reduction or personal gain dominates a NGOs decision to diversify. The model suggests that by observing the sign of the overall effect of incentives on the observed level of diversification, it is possible to imply the underlying mechanism. Ideally, we would like to estimate the structural form specified in Equation (3), however, as the exogenous parameters are not observable in our data, we instead identify the effect of interest in the following reduced form:

$$n_i^* = \gamma \text{INCENTIVES}_i + X_i' \gamma_X + \varepsilon_i \quad (16)$$

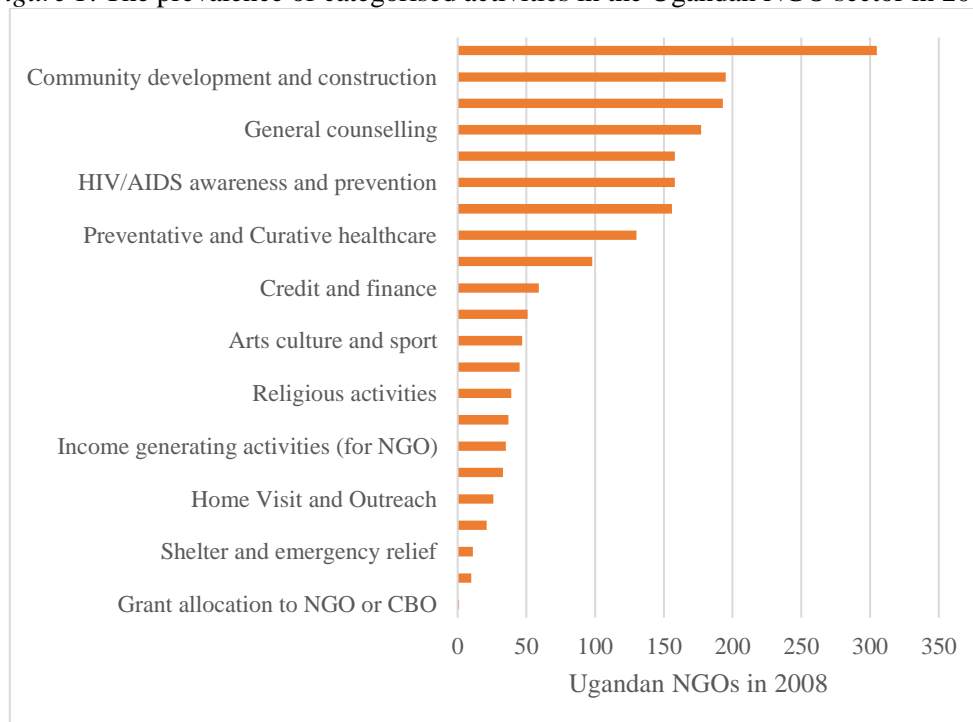
where γ is the parameter of interest: the average estimated effect of an additional unit of incentive from the stakeholders on the level of diversification, X_i' is a set of control variables adopted from previous studies to mitigate the concern of omitted variables. Following Proposition 2, the ultimate sign of γ depends on the magnitudes of the partial incentive effects when one of the five exogenous parameters $\sigma^2, \lambda, k, r, \beta$ varies while holding the rest constant. A positive coefficient, $\hat{\gamma} > 0$, indicates that the partial incentive effect caused by variations in parameters λ (private benefits), k (disutility intolerance), and β (private cost of diversification) dominates the partial incentive effect caused by variations in the parameters δ^2 (idiosyncratic uncertainty) and r (risk aversion). In contrast, a negative coefficient, $\hat{\gamma} < 0$, indicates the magnitude of the incentive effect partially caused by variations in risk-related parameters dominates the incentive effect partially caused by variations in private gain parameters.

The main challenge for estimating the total effect of value-based incentives on the diversification level is the issue of endogeneity. First, Equation (11) suggests both n^* and INCENTIVES are jointly determined by the five parameters $s^2, \lambda, k, r, \beta$. Second, there is a concern of reverse causality: NGOs who offer more activities could attract more sources of stakeholders, thereby being able to reduce their dependence on business incomes and raise revenues from grants, memberships and user fees. Failure to capture these concerns will bias the estimate of γ , even reverse the sign of the estimate of

interest. In the next section, we describe our variables of interest and discuss our empirical strategy to address these concerns.

We use two measures of activity diversification n^* : (i) a count index of the number of activities by category in 2007, and (ii) an Herfindahl-Hirschman index (HHI) to measure the diversity of the organisation’s expenditure over different categories of activities.⁶ Figure 1 presents the categorised activities and their prevalence in the Ugandan NGO sector in 2007. The most popular activities of Ugandan NGOs in 2007 include: Education and Training, Community Development, Advocacy and Human Rights, HIV/AIDS awareness and prevention, Support to farmers and farming activities, Child-related Services, Counselling, Water and Sanitation, Credit and Finance. The count index only captures the raw extent of the NGO’s diversification: NGOs who report to operate in more activities are perceived as more diversified. However, since NGOs may exaggerate their activity portfolio by listing activities whose allocated budgets are negligible, we use the HHI index to address this concern.

Figure 1. The prevalence of categorised activities in the Ugandan NGO sector in 2007.



Source: Authors’ calculation using the 2008 Ugandan NGO survey by Burger et al. (2008).

⁶ The count measure of activities capture the extent (range) of each organisation’s portfolio. Our data do not permit capturing the intensity of the categories. For example, we are unable to allocate “Advocacy” activities to a health-related or an education-related activity.

The HHI is a standard measure of economic diversity for at least three reasons. First, the relative expenditure spent on each activity becomes more important for the index than the absolute count of activities. Second, the index gives less weight to negligible activities whose allocated expenses are reported at zero. By capturing these negligible activities, the HHI index alleviates the concern that some NGOs may inflate their portfolio when answering the survey. Third, the index satisfies all criteria of a favoured index of diversification: (i) the degree of diversification is independent of the sequential ordering of activities, (ii) transferring budget from a costlier to another activity increases diversification, (iii) adding an activity with budget share zero holds the degree of diversification constant, and (iv) despite imperfectly, the index can capture both horizontal and vertical diversification (see Palan, 2010 and Hesse, 2006). The construction of the HHI index is:

$$\text{HHI} = 1 - \sum_{j=1}^n \eta_j^2 \quad (17)$$

where η_j is the reported budget share of activity j . The index is created by subtracting the self-weighted sum of the budget allocated to each activity from one. If an NGO spends most of their budget on one activity, the index reaches its lower bound at zero, that is, the NGO does not diversify. For the HHI index being one, the NGO either delivers infinite activities or allocates insignificant amounts of money into all activities. By incorporating such relative emphasis on spending, the HHI measure is capable of capturing diversification beyond the basic activity count. Like the count index, a higher ADI indicates more diversification.

To measure the value-based incentives $INCENTIVES_i$, which captures the contractual relationship of the NGO with its stakeholder(s), we use the aggregated proportion of incomes from donor grants (local and international), memberships and user fees.⁷ By construction, the measure captures the sensitivity of an organisation's income to the contractual relationship with their stakeholders. Out of

⁷ There are 85 organisations listing user fees as one of the income sources. These organisations on average offer similar services to those without user fees as one income source. Main activities include Counselling, Education and Training and HIV/AIDS prevention. Four organisations report incomes solely from user fees.

468 NGOs surveyed, we only obtained information on incomes for 402 NGOs. We construct the measure for INCENTIVES of these organisations.⁸

To mitigate the omitted variable bias, we propose a set of control variables to proxy for the exogenous parameters. To capture heterogeneity at organisational level, we include DISTRICTS that indicates the number of districts in which the NGO has staff working in 2007. A binary KAMPALA takes value 1 if the NGO has a headquarter in the capital and 0 otherwise. Two binaries GEOGRAPHICAL EXPANSION and CHANGED FOCUS take value 1 if the NGO have expanded geographically or changed its focus in the last five year, respectively; 0 otherwise. VOTE_ACTIVITY takes value 1 if the NGO requires a vote from either its oversight committee or its members or some external body before introducing a new activity; 0 otherwise. Finally, we control for the organisational size with LOGSTAFF - the logarithm of the number of staff working for the NGO. To capture heterogeneity at managerial level, we include TENURE and TENURE2 indicating how long the current manager has been with the NGO and its square to capture the standard career concerns found in the literature and a possible U-shape relationship. To proxy for altruism, we use RELIGIOUS taking value 1 if the manager holds a religious title, 0 otherwise.⁹ To proxy for time resources available for managing a diversified NGO, we include OTHER_NGOS indicating the number of other NGOs that the manager is currently involved.

Table 1 summarises the variables. On average, Ugandan NGOs operate approximately four activities in 2008; five reporting to be involved with 10 different activities and 27 focusing on one activity. The surveyed NGOs rely on contractual funding from stakeholders for on average 67% of their revenue – 117 NGOs depend exclusively on this funding source while 52 receive their revenue only from donations or business income. 40% of the surveyed NGOs have their headquarters in Kampala and on average work in 4 districts. About 40% of the NGOs require a vote from their members to introduce a new activity. Regarding the management, 25% of the managers are female; 23% hold a religious title. On average, managers have worked for more than one organisation before

⁸ We are not particularly concerned of selection problem here since balance tests show that NGOs who do not provide revenue information are not statistically different from those who provide information regarding the number of activities cited or the HHI. We repeat the tests for other observables and find no significant selection.

⁹ Adding a variable for female manager would reduce the F-stat for the excluded instruments test, but the estimates are unchanged.

their current tenure (averaged at 7 years). Over the 2002 – 2007 period, 49% have expanded their geographical coverage; 23% have changed their objective focus.

Table 1. Descriptive statistics for 402 Ugandan NGOs in 2008

VARIABLES	(1) Mean	(2) SD	(3) min	(4) max
Number of activities	4.259	1.882	1	10
Herfindahl-Hirschman index (HHI)	0.531	0.232	0	0.993
OTHER_NGOS	1.540	7.353	0	108
INCENTIVES	61.41	40.47	0	100
KAMPALA	0.402	0.491	0	1
CHANGE FOCUS	0.234	0.424	0	1
DISTRICTS	4.013	6.216	1	57
GEOGRAPHICAL EXPANSION	0.490	0.500	0	1
LOGSTAFF	2.797	1.066	0	8.468
VOTE_ACTIVITY	0.393	0.489	0	1
FEMALE	0.251	0.434	0	1
RELIGIOUS	0.232	0.423	0	1
TENURE	6.786	5.511	0.250	45
FLOOD_AFFECTED	0.218	0.413	0	1

Notes: OTHER_NGOS indicates the number of other NGOs that the manager is currently involved. INCENTIVES are the aggregate proportion of revenue from local grants, international grants, and membership and user fees in percentage term. KAMPALA takes value 1 if the NGO has the head quarter in the capital and 0 otherwise. GEOGRAPHICAL EXPANSION and CHANGED FOCUS take value 1 if the NGO expands geographically or changes its focus in the last five year, respectively; 0 otherwise. VOTE_ACTIVITY takes value 1 if the NGO requires a vote from either its oversight committee or its members or some external body before introducing a new activity. LOGSTAFF is the logarithm of the number of staff working for the NGO in 2007. TENURE and TENURE2 indicate how long the current manager has been with the NGO and its square. RELIGIOUS takes value 1 if the manager is religious, 0 otherwise.

Regardless of the richness of control variables, the concern of omitted variable bias and reverse causality remains. We address the endogeneity through an instrument variable strategy. The valid instruments must strongly correlate with INCENTIVES, namely, the proportion of revenues from stakeholders, but be uncorrelated with the error terms ε_i . To satisfy the exclusion restriction, Equation (11) suggests that the source of identification should strongly correlate with the disutility of exerting effort at a given time k , while be uncorrelated with other parameters. The theoretical mechanism is that variation in the disutility of working on charitable activities in a particular location would result in the principal changing the incentives in order to induce an NGO to undertake extra charitable effort. If the source of identification remains orthogonal to other pre-determined characteristics of the working location and the NGO, the instrumentation is plausibly valid.

Guided by the theoretical mechanism, an ideal source of identification would be an unexpected natural event that temporally causes unforeseen hardship in working conditions, obstructing NGOs from working in the area. Our conjecture is that the donor community would respond to these unexpected obstructions by raising their incentives (grants or aid relief) specifically for NGOs working in the affected area (this is the theoretical mechanism specified in Corollary 2). With that mechanism in mind, we exploit a plausibly exogenous variation in international relief aid specific to several areas in Uganda following the historic flood during July and November 2007. According to the UN Office for the Coordination of Humanitarian Affairs (UNOCHA) and the Ugandan Red Cross, the unexpected heavy rainfall led to flooding and damage across several districts in eastern and northern Uganda. As recorded in the Dartmouth Flood Observatory, the event caused nearly 520,000 people to be displaced and at least 52 casualties.¹⁰ To demonstrate the unexpectedness and severity of the event, we refer to the BBC's country profile of Uganda, in which the 2007 flood is the only weather event mentioned in the country chronology of key events, (other events included conflicts and political incidents).¹¹ Following the event, there was a sudden rise in major humanitarian responses from international aid institutions across all sectors, particularly from the UNOCHA and the Ugandan Red Cross.¹² Exploiting this surge of international aid towards districts affected by the event, we conjecture that NGOs who had a presence in the affected districts prior to the flood would see a dramatic change in their income composition in 2007: contractual revenues become a larger part of these NGOs' total income. There are two reasons. First, the surge in revenue from international aid during 2007 would allow organisations operating in the affected areas to shift focus from generating their own income towards receiving the (unexpected) funding from the new sources. Second, incomes from non-contractual sources such that local donations or business incomes is likely to significantly decrease following the flood as local inhabitants would have fewer resources left for purchasing or

¹⁰ The 2007 flood was assessed at the severity scale of 1.5 on a 1-2 scale. There are three classes. Class 1 includes large flood events with significant damage to structures or agriculture. Class 1.5 includes very large events: with a greater than 2 decades but less than 100-year estimated recurrence interval, and/or a local recurrence interval of at 1-2 decades and affecting a large geographic region (> 5000 sq. km). Class 2 includes extreme events with an estimated recurrence interval greater than 100 years.

Sources: <https://www.dartmouth.edu/~floods/Archives/ArchiveNotes.html>

¹¹ <http://www.bbc.co.uk/news/world-africa-14112446>

¹² <http://reliefweb.int/disaster/fl-2007-000138-uga>

donating. To the extent that the flood timing is as good as random, we instrument for INCENTIVES by a variable FLOOD_AFFECTED, which takes value 1 if an NGO has presence (staff or an office) in the most affected areas identified by the UNOCHA and the Ugandan Red Cross in their reports. The official list includes Soroti, Amuria, Katakwi, Bukedea, Kumi, Lira, Sironko, Bududa and Nebbi. Figure A2 in Appendix shows the district locations. Table 1 suggests that 22% of the NGOs fall into this category. We expect that having a presence in the affected areas prior to 2007 would be strongly positively correlated with the endogenous variable INCENTIVE: NGOs in these areas would have a significantly higher proportion of their revenue coming from grants, memberships and user fees.

Table 2 strongly supports this expectation. Having a presence in an affected area significantly increases the proportion of revenue from stakeholders (particularly from international and local grants). The F-statistics for excluded instruments is at 9.17, rejecting the null hypothesis of weak instrumentation under the Sanderson-Windmeijer test. The Kleibergen-Paap rk Wald F statistic suggests that the IV estimates suffer bias at less than 15% of its size (Stock-Yogo weak IV test critical value at 15% (10%) maximal IV size is 8.96 (16.38)). The Kleibergen-Paap rk LM statistic (8.11) rejects the null that the specification is underidentified. To account for the low first-stage F-statistics (smaller than the “usual” 10), we additionally report Anderson-Rubin confidence intervals in Table 3 (see Cameron and Miller, 2015; Asatryan et al., 2017 for examples). If these confidence intervals do not include zero points, it strongly suggests that our instruments have captured a significant and robust relationship even under the presence of weak instrumentation. To preview, the result from the Anderson-Rubin confidence intervals supports the result from our IV estimation.

Table 2. First stage for IV estimation

INSTRUMENTAL VARIABLES	<i>Dependent variable:</i> INCENTIVES
FLOOD_AFFECTED _i	16.25 *** (5.36)
Sanderson-Windmeijer multivariate F test of excluded instruments: (Prob > F)	9.17*** (0.00)
Stock-Yogo weak IV test critical value at 15% [10%] maximal IV size	8.96 [16.38]
Kleibergen-Paap rk LM statistic (underidentification) (p-val)	8.11*** (0.00)

Notes: *** p < 0.01. Robust standard error in parentheses unless stated otherwise. The first-stage estimation is:

$$INCENTIVES_i = \tau_1 FLOOD_AFFECTED_i + X_i' \tau + u_i$$

The Sanderson-Windmeijer F-test statistics is equivalent to the Kleibergen-Paap rk Wald F statistic used to compare against Stock-Yogo weak ID test critical value of tolerance bias. The null hypothesis of Kleibergen-Paap rk LM test is the specification is under-identified.

Our strategy of using the flood instrumentation relies on the assumption that, conditional on the controls, being affected by the unexpected flood in 2007 only affects the level of diversification in 2007, by causing more difficulties in delivering missions in the affected areas. Also, the cause for the surge in relief aid towards these areas is that the donors wish to compensate and motivate the NGOs for working in these tougher environments. The main concern with this assumption is that the allocation of NGOs to different location is *ex ante* not random: some NGOs could self-select into areas that are more prone to future floods in the hope of receiving consequential aid relief. To violate this exclusion restriction, NGOs operating in affected and unaffected areas would need to have systematically different characteristics. Section 3 discusses this issue. We find the exclusion restriction to hold.

As with all instrumental variable estimates, our 2SLS estimates reflect the average effect for observations that comply with the instrument, i.e, a local average treatment effect (Imbens and Angrist, 1994). In our context, compliers are organisations that receive relatively more international relief aid following the 2007 flood. Our 2SLS estimates are not driven by the effect of incentives from stakeholders for organisations whose composition of revenues is unaffected following the 2007 flood.

3. Empirical results

Table 3 presents our main findings. Column 1 reports estimates of the correlation between the reliance on income from stakeholders (INCENTIVES) and the level of diversification measured by the naïve count of activities. There is a positive and statistically insignificant association. The estimates in Column 2 show that the OLS relationship between diversification and incentives is unaffected by the inclusion of control variables. We find similarly small and statistically insignificant estimates. If we take these estimates as they are, it could be misleading to imply from our theory that the Ugandan NGOs, on average, diversify more to mainly derive personal perks.

However, we find once we control for potential endogeneity the overall incentive effect is negative and statistically significant. Column 3 reports 2SLS estimates using the flood instrumentation. Like the OLS estimation, the 2SLS estimates remain stable as we introduce the controls (without control estimates are unreported but available on request). Column 4 reports consistent results for the IV-

Poisson estimates which deals with the count nature of the dependent variable. Larger dependence on contractual income from stakeholders leads to a more focused portfolio of activities, suggesting that the motivation to reduce idiosyncratic risk (relating to risk aversion of the organisation leadership and the external volatility faced by the NGO) dominates the motivation over deriving personal gain (including private benefits and disutility from undertaking activities). According to the estimates using the full set of controls, a 33% increase in the dependence of the organisation's revenue on stakeholder's grants, membership, and user fees decreases the number of activities offered by one (0.33×3.38) unit. This result is consistent with the corporation literature in which studies found a "discounting effect" of incentives on diversification (see Aggarwal and Samwick, 2003). Although it is encouraging that the NGOs' decision, on average, is not dominantly determined by the motivation to derive private benefit or to avoid disutility from exerting effort over altruistic projects, the results indicate that Ugandan NGOs may have taken a corporate approach in their decision-making process.

The proxy for altruism (RELIGIOUS) appears to have an insignificant, negative association with the diversification level. Noticeably, having headquarter in Kampala is significantly associated with a lower number of activities performed, perhaps because most of these NGOs are local branches of international NGOs (63%) that already specialise in some pre-determined activities. Other control variables are consistent with expectations. Operating in more districts, having expanded geographically in the last five years and having more staff are all correlated with more activities offered. There is also a U-shaped relationship between the manager's tenure and the number of activities. This correlation is consistent with the career concern hypothesis that new managers diversify to establish their reputation but more established managers are reluctant to expand an organisation's portfolio since the signal of ability and career concerns become weaker for these managers (Gibbons and Murphy, 1992).

Table 4 presents estimates when we use the HHI index as the dependent variable. Columns 1 to Column 3 treat the HHI variable as continuous, assuming a linear relationship for our regressions. Under such an assumption, we obtain a similar pattern as Table 3: once addressing omitted variable bias and reverse causality by including controls and using our flood instrumentation strategy, we observe a negative overall effect of incentives on the diversity index. In Column 4, we use an IV-

Tobit estimator to address the fact that the HHI is a limited dependent variable (censored at the lower end of its distribution) by construction – the value of each HHI falls in the interval [0,1] and NGOs with no diversification are pooled with organisations with negative propensity to diversify at HHIs of zeros. The estimation provides asymptotically consistent and efficient estimates, overcoming weaknesses of linear probability models (Amemiya, 1984). Although we fail to replicate the significant estimates as in Table 3, the insignificant negative estimates imply that at least personal perks are not the dominant motivation underlying the diversification decision of NGOs in our sample.

Table 3. OLS and Instrumental Variable Estimations for diversification on incentives

VARIABLES	<i>Dependent variables:</i>			
	Number of activities by classifications			
	(1)	(2)	(3)	(4)
INCENTIVES	0.37 (0.23)	0.10 (0.23)	-3.38* (2.02)	-0.77* (0.43)
OTHER_NGOS		-1.28*** (0.48)	-1.99 (1.37)	-0.45 (0.29)
KAMPALA		-53.79*** (19.62)	-61.49** (25.22)	-13.75** (6.01)
CHANGED FOCUS		37.40* (21.95)	34.75 (26.73)	8.18 (6.08)
DISTRICT		3.08 (2.50)	4.74* (2.89)	1.10* (0.63)
GEOGRAPHICAL EXPANSION		31.10 (21.29)	59.00** (29.02)	12.62* (6.49)
LOGSTAFF		22.50** (9.64)	28.51** (12.51)	6.56** (2.90)
VOTE_ACTIVITY		-14.70 (18.46)	-42.20* (25.35)	-8.86 (6.04)
RELIGIOUS		10.26 (22.52)	-18.22 (31.10)	-4.24 (7.50)
TENURE		8.19** (3.50)	10.89** (4.72)	3.00** (1.34)
TENURE2		-0.26*** (0.10)	-0.31** (0.14)	-0.09** (0.05)
CONSTANT	405.14*** (16.35)	316.89*** (35.85)	503.69*** (117.63)	154.68*** (20.99)
Estimator	OLS	OLS	2SLS	IV-Poisson
Anderson-Rubin confidence intervals				[-17.1, -0.2]
Observations	402	391	391	391

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Estimates are multiplied with 100 for ease of interpretation. The dependent variable is HHI index calculated for each organisation in 2007. The activities are classified by categories to avoid overlap. INCENTIVES are the aggregate proportion of revenue from local grants, International grants, and membership and user fees in percentage term. KAMPALA takes value 1 if the NGO has the head quarter in the capital and 0 otherwise. GEOGRAPHICAL EXPANSION and CHANGED FOCUS take value 1 if the NGO, respectively, expands geographically or changes its focus in the last five year; 0 otherwise. VOTE_ACTIVITY takes value 1 if the NGO requires a vote from either its oversight committee or its members or some external body before introducing a new activity. LOGSTAFF is the logarithm of the number of staff working for

the NGO in 2007. TENURE and TENURE2 indicate how long the current manager has been with the NGO and its square. RELIGIOUS takes value 1 if the manager is religious, 0 otherwise, OTHER_NGOS indicates the number of other NGOs that the manager is currently involved to proxy for time resources available for managing a diversified NGO. Two-step GMM estimator is used for IV-Poisson.

Table 4. OLS and Instrumental Variable Estimations for diversification on incentives

VARIABLES	Dependent variables: HHI index in 2007			
	(1)	(2)	(3)	(4)
INCENTIVES	0.01 (0.03)	-0.02 (0.03)	-0.27 (0.33)	-0.25 (0.32)
OTHER_NGOS		0.11 (0.09)	0.06 (0.17)	0.06 (0.22)
KAMPALA		-6.00** (2.76)	-7.36** (3.37)	-7.45** (3.42)
CHANGED FOCUS		1.49 (2.89)	1.40 (3.07)	1.98 (3.31)
DISTRICT		2.26 (3.17)	4.02 (4.02)	0.52 (0.35)
GEOGRAPHICAL EXPANSION		0.35* (0.19)	0.49** (0.25)	3.49 (4.26)
LOGSTAFF		1.72 (2.85)	3.96 (4.29)	3.27** (1.63)
VOTE_ACTIVITY		2.66** (1.27)	3.09** (1.41)	0.53 (3.65)
RELIGIOUS		1.75 (2.66)	-0.11 (3.56)	-4.24 (4.64)
TENURE		-1.87 (3.26)	-4.27 (4.49)	0.61 (0.60)
TENURE2		0.44 (0.44)	0.54 (0.51)	-0.02 (0.02)
CONSTANT	53.399*** (2.18)	44.50*** (4.98)	58.13*** (17.96)	55.98*** (18.23)
Estimator	OLS	OLS	2SLS	IV-Tobit
Observations	330	323	323	323

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Estimates are multiplied with 100 for ease of interpretation. The dependent variable is HHI index calculated for each organisation in 2007. The activities are classified by categories to avoid overlap. INCENTIVES are the aggregate proportion of revenue from local grants, International grants, and membership and user fees in percentage term. KAMPALA takes value 1 if the NGO has the head quarter in the capital and 0 otherwise. GEOGRAPHICAL EXPANSION and CHANGED FOCUS take value 1 if the NGO, respectively, expands geographically or changes its focus in the last five year; 0 otherwise. VOTE_ACTIVITY takes value 1 if the NGO requires a vote from either its oversight committee or its members or some external body before introducing a new activity. LOGSTAFF is the logarithm of the number of staff working for the NGO in 2007. TENURE and TENURE2 indicate how long the current manager has been with the NGO and its square. RELIGIOUS takes value 1 if the manager is religious, 0 otherwise, OTHER_NGOS indicates the number of other NGOs that the manager is currently involved to proxy for time resources available for managing a diversified NGO. Two-step GMM estimator is used for IV-Poisson.

4. Assessing the excludability assumption of the flood instrumentation

Our main identification assumption is that the international aid community increases funding towards the most affected areas because of the worsening working environment and obstructions caused by the flood. The funding, thereby, is to motivate and compensate for challenges faced by the NGOs working in these areas. Our assumption is that the funding surge is not a response to changes, if any, in personal benefits or risk parameters of the NGOs following the flood event.¹³ We also posit that the unexpected flood is exogenous to the characteristics of NGOs having presence in affected areas prior to the event. Three concerns remain.

The first concern is that as our diversification measures are recorded at the end of 2007. NGOs working in the affected areas may opportunistically aim to capture the new funding by introducing or shifting focus towards humanitarian and relief activities for personal gain (such as altruistic reasons to assist affected people). If this is the case, our instrument excludability is violated since the funding surge may act as a motivation for these opportunistic NGOs to work on relief activities, instead of acting as compensation for the increased challenges of working in the affected areas (which is the IV mechanism). As such, having a presence in the most affected area could correlate with the number of activities recorded at the end of the year through parameters such as personal gain (λ) other than only through the increased disutility of working (κ). This concern will bias our estimates. Apart from controlling for whether the NGO has changed their focus in the last five years, we show that excluding NGOs working in humanitarian activities does not change our results.

Indeed, among 104 NGOs reporting to have worked in the affected areas, only three reported having activities in Shelter and Emergency Relief activities at the end of 2007. These activities possibly present the best opportunities for organisations to capture the new sources of funding. Other activities, such as water and sanitation, health, education, employment and advocacy are long-term, locally rooted and plausibly not started as a response to the unexpected heavy rainfall. As the organisations with emergency activities could be the ones who opportunistically responded to the shock, we drop them from the main analysis and find the results unchanged.

¹³ Since the youngest NGO in our sample was founded before January 2007 (before the flood), it is sensible to assume that no NGOs are founded simply to capture the new surge in funding.

The above argument does not rule out FLOOD_AFFECTED as a strong instrument, as presented in the first-stage estimation in Table 2. According to the report by UNOCHA (2008) and FAO (2008), humanitarian aid did not target only emergency missions but also other long-term activities. The first-stage mechanism would be that due to the surge in funding, NGOs in the most affected areas were able to maintain their current missions and even expand related activities. The main objection to this mechanism is that NGOs in the most affected areas might be historically more reliant on revenues from charitable sources (incentives from the NGOs' stakeholders) regardless of the 2007 flood and the surge in funding. The objection means that the first-stage estimation merely reflects the location effect instead of the effect of the funding surge on the revenue composition, invalidating our IV mechanism. Section 5 uses a fixed effect model to address this concern, showing that even when we control for time-invariant characteristics (the location effect), variations in the reliance on charitable revenue over time remains negatively correlated with variations in the number of activities.

The second concern is that the allocation of NGOs is rarely random: Some opportunistic NGOs could self-select to operate in areas that are more prone to future extreme rainfalls and extreme flood events. For this argument to hold, one would need to show that: (i) it is plausible for the organisations to predict areas that are more likely to be affected by extreme rainfalls in the future; and (ii) there are systematic differences between NGOs who have worked in the most flood-prone areas and those who have not. We demonstrate that the two scenarios are unlikely to hold in our data.

First, there is no evidence that rainfall in Uganda is a predictable phenomenon, even between districts. Using monthly records for rainfall stations across Uganda from 1951 to 2003, Bjorkman-Nvqvist (2013) shows that she cannot reject the null hypothesis that rainfall in Ugandan districts follows a white-noise process. This finding suggests that there is plausibly no statistical correlation between the past amount of rainfall and the future. Consequently, this finding supports our argument that organisations are unlikely to locate in the flood-prone areas by observing indicators for such future incidents. The locations affected by the 2007 flood are plausibly unexpected and orthogonal to the characteristics of both the districts and the NGOs working in the affected areas.

Second, we demonstrate in Table 5 that there are mostly no systematic differences between organisations who have worked in areas prone to floods and those who have not. To measure the

vulnerability to extreme floods, we use the archive of global flood events obtained from the Dartmouth Flood Observatory (updated 2017). Excluding the 2007 event, the archive identifies 18 extreme floods occurring in various regions of Uganda from 1988 to 2017 (see Appendix A1). Using the official district classifications in 2007, we identify 19 districts that have been affected by at least one extreme flood event during 1988 – 2017.¹⁴ We code these districts as `EVER_AFFECTED` taking value 1 if the district has been hit by at least one extreme flood during 1988 – 2017, 0 otherwise. Our argument is as follows. If some NGOs manage to self-select to areas most vulnerable to a future flood, we must also observe the selection between NGOs working in areas that are historically affected by an extreme flood event: areas experiencing extreme floods prior to 2007 would indicate the higher risk of being hit again in the future. In addition, it is plausible to expect areas that were affected by floods after 2007 would equally attract the NGOs who selectively located in areas affected before the 2007 flood. The rationale behind this argument is that although the NGOs could selectively locate in areas prior to 2007 in the hope that these areas would be affected by an extreme flood *at one time* in the future, it is unlikely that they would pin down when. Overall, assuming the timing (year 2007) of the flood is totally unexpected, we compare NGOs who have presence or have not presence in areas most vulnerable to extreme floods for the period 1988 – 2017. There is no observable selection concerning the NGOs characteristics.

The third concern is that NGOs working in the affected areas differ from those operating in the unaffected areas in unobservable ways. There may be some characteristics of the districts most vulnerable to floods and our specifications fail to control for associated selectivity. To alleviate this concern, we undertake a robustness check in which we restrict our sample to organisations working in areas that are historically vulnerable to floods (`EVER_AFFECTED` = 1). By doing so, we compare organisations operating in areas that are equally likely to be affected by a flood, where the timing and scale of the 2007 flood are unexpected. Consequently, these organisations plausibly have similar expectations regarding the uncertainty of the environmental effect and private benefits following any future increase in international aid relief. The 2007 flood instrument plausibly only causes variations

¹⁴ In 2010, the Act of Local Government was enacted. Several previous districts were merged and others were separated to form new official districts. We conservatively restrict our analysis to 2008 when our survey took place. For districts identified in the period 2010-2012, we match them with the pre-2010 official districts.

in the incentive package due to the increased difficulty of working in the severely affected areas as the timing is unpredictable. Our assumption is that conditional on observable controls, the NGOs are similar regarding the intention to selectively locate in the vulnerable areas.

Table 5. Balance checks for NGOs working in affected and unaffected areas by extreme floods

	Unaffected	Affected	Difference	t statistics	p-values
Number of activities	4.52	4.16	0.35	1.84	0.07
Other NGOs	1.85	1.42	0.43	0.57	0.57
Change focus	0.3	0.21	0.08	1.95	0.05
Vote activity	0.36	0.4	-0.04	-0.82	0.41
Religious	0.21	0.24	-0.03	-0.64	0.52
Tenure	7.47	6.52	0.95	1.67	0.10
Vote by committee	0.8	0.81	-0.01	-0.37	0.71
Manager travelling abroad	0.59	0.57	0.02	0.45	0.65
NGO ever monitored	0.66	0.62	0.04	0.73	0.46
Nr. Of network connected	0.68	0.7	-0.01	-0.1	0.92
Nr. Of staff	24.43	52.12	-27.69	-1.12	0.26
Vote by external body	0.34	0.36	-0.02	-0.4	0.69
Belong to a network	0.48	0.39	0.09	1.71	0.09
Pay tax on grant	0.15	0.1	0.05	1.44	0.15
Have a bank account	0.69	0.74	-0.05	-1.17	0.24
Nr or languages spoken	3.51	3.77	-0.26	-0.89	0.37
Received grant last year	0.32	0.32	0	0.09	0.93
Observations	188	280			

Notes: T-tests of characteristics between NGOs working in areas identified as ever affected by at least one extreme flood as in the Archive of Global Flood Events (Dartmouth Flood Observatory).

Table 6 presents estimates for the restricted sample for 280 NGOs who are identified as operating in areas historically affected by at least one flood during 1988 - 2017. We observe a similar negative effect of incentives on the diversification level (the estimates are less precise, possibly due to smaller sample size). Estimates of other control variables are consistent with that in the full sample.

5. Alternative identification strategy

In the main analysis, we identify the incentive effect using between-organisation variations in the reliance on income from stakeholders after the 2007 flood. A different approach would be to use variations within organisations (fixed effects) to control for the unobservable parameters that jointly determine the level of diversification and the incentive measures. The fixed effects also plausibly capture the systematic misreporting (recalling) of the NGO representative and the location effect discussed in the previous section.

Table 6. IV estimates for diversification on incentives using restricted sample

VARIABLES	Count measure		HHI index	
	(1)	(2)	(3)	(4)
INCENTIVES	-3.49 (2.37)	-0.82 (0.60)	-0.36 (0.41)	-0.38 (0.45)
OTHER_NGOS	2.06 (2.24)	0.54 (0.63)	0.76* (0.42)	0.82* (0.45)
KAMPALA	-57.79* (30.47)	-13.21* (7.50)	-7.39 (4.51)	-8.27* (4.83)
CHANGED FOCUS	31.16 (30.92)	7.39 (7.23)	2.78 (4.00)	2.99 (4.35)
DISTRICT	5.25* (3.02)	1.23* (0.68)	0.64** (0.29)	0.70** (0.32)
GEOGRAPHICAL EXPANSION	50.73 (34.21)	10.86 (7.80)	0.76 (5.47)	0.25 (5.92)
LOGSTAFF	33.23** (15.53)	7.88** (3.83)	4.55** (2.06)	4.85** (2.24)
VOTE_ACTIVITY	-56.25 (42.24)	-12.44 (9.85)	-1.16 (6.18)	-0.96 (6.72)
RELIGIOUS	39.63 (34.52)	10.42 (9.33)	5.67 (4.79)	5.66 (5.21)
TENURE	10.86 (34.70)	2.41 (8.56)	-5.21 (5.67)	-5.85 (6.17)
TENURE2	9.39* (5.21)	2.55* (1.40)	1.02* (0.61)	1.12* (0.66)
CONSTANT	481.97*** (138.78)	150.12*** (26.03)	56.77** (23.24)	55.84** (25.20)
Estimator	2SLS	IV-Poisson	2SLS	IV-Tobit
Observations	280	280	229	229

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. The sample is restricted to organisations operating in areas that are historically affected by at least one flood. The information is identified from the Archive of Global Flood Events. Estimates are multiplied with 100 for ease of interpretation. The dependent variable is alternatively the count measure and the HHI index calculated for each organisation in 2007. The activities are classified by categories to avoid overlap. INCENTIVES are the aggregate proportion of revenue from local grants, International grants, and membership and user fees in percentage term. KAMPALA takes value 1 if the NGO has the head quarter in the capital and 0 otherwise. GEOGRAPHICAL EXPANSION and CHANGED FOCUS take value 1 if the NGO, respectively, expands geographically or changes its focus in the last five years; 0 otherwise. VOTE_ACTIVITY takes value 1 if the NGO requires a vote from either its oversight committee or its members or some external body before introducing a new activity. LOGSTAFF is the logarithm of the number of staff working for the NGO in 2007. TENURE and TENURE2 indicate how long the current manager has been with the NGO and its square. RELIGIOUS takes value 1 if the manager is religious, 0 otherwise. OTHER_NGOS indicates the number of other NGOs that the manager is currently involved. To proxy for time resources available for managing a diversified NGO. Two-step GMM estimator is used for IV-Poisson.

To construct a fixed-effect estimation, we exploit several 2008 survey questions that ask the respondent to recall: (i) activities introduced since 2002 ($n_{i2007_{introduced}}$), and (ii) activities discontinued since 2002 ($n_{i2007_{discontinued}}$). We exploit within-organisation variations in the level of diversification over two periods to identify the average incentive effect of interest. The two-way fixed effect model is as follows:

$$n_{it}^* = \beta \text{INCENTIVES}_{it} + X'_{it}\alpha + \pi_i + \delta_t + \varepsilon_{it} \quad (18)$$

where $t = 2002, 2007$. $n_{i2002} = n_{i2007} - n_{i2007\text{discontinued}} + n_{i2007\text{introduced}}$. As the survey specifically asks for revenue information in both 2002 and 2007, the construction of $\text{INCENTIVES}_{i2002}$ is like that of $\text{INCENTIVES}_{i2007}$.¹⁵

Dummies π_i , δ_t are for organisation and time fixed effects. π_i captures time-invariant firm specific characteristics of the NGO, which are likely to capture the unobserved exogenous parameters: risk aversion (r), private benefit (λ), cost of diversification (β), and disutility aversion (k) of the organisation leadership due to the working location. The organisation fixed effect also captures the concern of systematic reporting bias since the information was recalled by the same individual. Second, δ_t captures the external yearly characteristics that may affect both the INCENTIVES_i and n , for example government policies toward the non-profit sector or nation-wide economic shocks. As such, δ_t captures the external volatility parameter (σ^2) faced by the NGO specified in the theory.

X_{it} is a set of time-variant variables that may affect the four parameters at the organisational level. The first source is that the characteristics of the leadership r, λ, β, k could change over time due to not only nation-wide time trends but changes in the leadership itself. We control for this source by including a binary variable `NEW_MANAGER2007` indicating whether the manager in 2007 has been with the NGO since 2002, taking value 1 if $t = 2007$ and Yes, 0 otherwise. Private benefits and disutility of project choice could possibly change overtime even under the same management if the NGO underwent any change in their focus or geographical coverage. We control for these possibilities by including two binary variables (i) `CHANGED_FOCUS` taking value 1 for $t = 2007$ and the NGO has changed its focus since 2002, 0 otherwise; and (ii) `GEOGRAPHICAL_EXPANSION` taking value 1 for $t = 2007$ and the NGO has expanded its geographical coverage since 2002, 0 otherwise.

Table 7 reports estimates from this identification strategy. The results remain as our previous estimates. Overall, when the time and organisation fixed effects are controlled for, there exists a significant, negative effect of revenues from stakeholders on the decision to diversify. The effect

¹⁵ For those NGOs who were not around in 2002 or the respondents could not recall the information, we coded the `INCENTIVES` as missing. The missing variable issue is not severe as there are only less than 5% of NGOs that did not provide the 2002 information.

remains when we use a panel IV-Poisson estimation to capture the count nature of the dependent variable in Column 5. Once we control for time-varying characteristics, particularly the geographical expansion, the effect of time trend disappears. This result suggests that NGOs in Uganda may derive their optimal diversification according to their own conditions, rather than a response to a nation-wise or a market-wise change. Since we do not have information on expenditure on activities in 2002, we are unable to use the HHI as an alternative dependent variable.

Table 7. Panel Estimations of diversification on incentives

VARIABLES	Dependent variables: Number of activities by classifications				
	(1)	(2)	(3)	(4)	(5)
INCENTIVES	0.05 [0.14]	-0.01 [0.14]	-0.26* [0.14]	-0.35** [0.17]	-0.09** [0.04]
TREND (2007 = 1)		34.18*** [9.36]	42.79*** [9.70]	14.91 [20.88]	3.90 [4.82]
GEOGRAPHICAL EXPANSION				59.06*** [19.34]	12.89*** [4.28]
CHANGED FOCUS (Yes = 1)				9.71 [22.68]	1.48 [5.11]
NEW_MANAGER2007 (Yes = 1)				0.98 [14.31]	0.22 [3.20]
CONSTANT	414.53*** [12.90]	392.47*** [14.45]	409.87*** [10.21]	464.44 [337.24]	
Time FE	-	Yes	Yes	Yes	Yes
FE	-	-	Yes	Yes	Yes
Controls	-	-	-	Yes	Yes
OLS/Poisson	OLS	OLS	OLS	OLS	Poisson
Observations	567	567	567	542	302
Number of groups	402	402	402	391	151

Notes: *** p<0.01, ** p<0.05, * p<0.1. Robusted standard errors are in brackets. Estimates are multiplied with 100 for ease of interpretation. The number of activities are reported by each organisation that they operated in 2002 and 2007. The activities are classified by categories to avoid overlap. INCENTIVES are the aggregate proportion of revenue from Local grants, International grants, Membership and User fees in percentage term. CHANGED FOCUS takes value 1 for $t = 2007$ and the NGO has changed its focus since 2002, 0 otherwise; GEOGRAPHICAL EXPANSION takes value 1 for $t = 2007$ and the NGO has expanded its geographical coverage since 2002, 0 otherwise.

V. Conclusion

We identify two motivations for diversification in the activities NGOs in Uganda undertake. We incorporate these motivations, namely to reduce risk and to gain private benefits, in a theoretical framework and derive predictions regarding how an NGO responds to a change in incentives offered by their stakeholders. We theoretically show that the answer depends on the relative magnitude of the risk reduction motivation and the private benefits underlying the decision-making mechanism of the

NGO. Exploiting the surge of international funding toward several Ugandan regions following the unexpected, historic flood in 2007, we empirically show that NGOs respond to an increase in incentives by lowering the number of activities they offer. The result is robust when we control for within-organisation variations, time fixed effects, and several time-varying characteristics using additional information of the NGO's activities and funding in 2002. According to the theory, the empirical evidence shows that Ugandan NGOs, on average, diversify primarily to reduce risks associated with their operation. As such, policies should be directed to ensure NGOs' financial survivability. Our result is encouraging since we fail to support the hypothesis that the motivation underlying NGOs' behaviour is self-benefitting, at least with respect to diversification. In the absence of experimental data, we contribute to the literature on motivation of non-profit with evidence using data on development NGOs.

Several caveats are worth mentioning. First, we are unable to distinguish between "legitimate" private benefits (such as altruism or the warm glow feeling of helping more people) and "unexpected" private benefits (such as career concerns or rent seeking) in our modelling. Such a distinction is not vital for our current study since we fail to find evidence that private benefits in general are driving NGOs' decisions. It is also important to verify our identifying assumption that when international donors respond to an unexpected disaster with a surge in funding, they principally aim to compensate for the worsening working conditions of their contracted agents and to motivate the agents to elicit effort. Our analysis also calls for a more complete treatment of heterogeneous effects of the incentives across different types of NGOs, particularly when our instrumental variable strategy only provides local average treatment effect. As such, further data collection is necessary.

Appendices

A. Proof of Corollary 2

α^* is the unique solution to:

$$0 = \frac{1 - \alpha}{k} + f(k) - \frac{2\alpha\beta r\sigma^2}{\sqrt{\lambda^2 + 2\beta r\sigma^2\alpha^2 + \lambda}} \quad (\text{A1})$$

We first prove the statics for α^* . Simplify (A1) we have:

$$t(\alpha) = \frac{2\alpha\beta r\sigma^2}{\sqrt{\lambda^2 + 2\beta r\sigma^2\alpha^2 + \lambda}} = \frac{1 - \alpha}{k} + f(k) \quad (\text{A2})$$

It is trivial that $t(\alpha)$ is increasing in α . From the Implicit function theorem and $\alpha < 1$ we have:

$$\frac{\partial \alpha}{\partial k} = -\frac{-kf'(\alpha) + \frac{\alpha - 1}{k}}{-1 - kt'(\alpha)} < 0$$

Now, rearrange (A1) as:

$$\left(\frac{1 - \alpha}{k} + f(k)\right) \frac{\sqrt{\lambda^2 + 2\beta r\sigma^2\alpha^2 + \lambda}}{\alpha} = 2\beta r\sigma^2$$

Intuitively, when holding k, r, σ^2, β constant, raising λ must be compensated by raising, though not proportionately, α . Hence, intuitively $\frac{\partial \alpha}{\partial \lambda} > 0$. Again, when holding k, λ constant, raising any

component of (β, r, σ^2) would require a decrease in α to ensure the equation. Thus, $\frac{\partial \alpha}{\partial \beta r\sigma^2} > 0$.

For statics of n , recall the formula for the optimal diversification as:

$$n^* = \frac{\lambda}{2\beta} + \frac{1}{2} \sqrt{\left(\frac{\lambda}{\beta}\right)^2 + 2\frac{r}{\beta} s^2 [\alpha^*(r, s^2, \lambda, k, \beta)^2]} \quad (\text{A3})$$

Holding others constant, it is trivial to see $\frac{\partial n^*}{\partial \lambda} > 0$ and $\frac{\partial n^*}{\partial \beta} < 0$. Since $\frac{\partial n^*}{\partial \alpha} > 0$ and $\frac{\partial \alpha^*}{\partial k} > 0$; $\frac{\partial \alpha^*}{\partial k} < 0$.

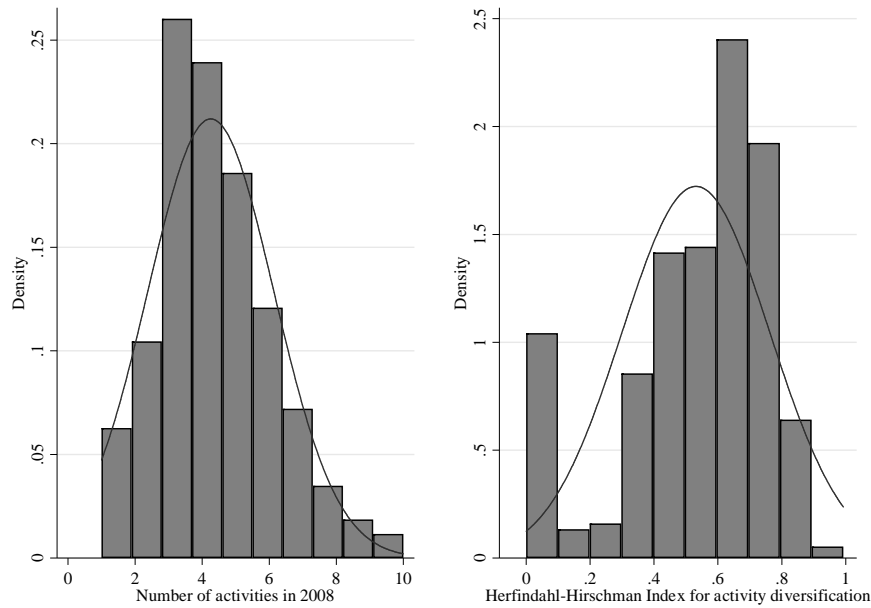
Let $T = r\sigma^2$, it suffices to show that $\frac{\partial n^*}{\partial T} > 0$. Indeed, differentiate (A3) with respect to T , we have:

$$\begin{aligned} & \frac{\partial n^*}{\partial T} \\ &= \frac{1}{\beta} \alpha^2 \times \frac{2T^2 \alpha^4 \beta^2 - 4T^2 \alpha^2 k \lambda \beta + 5T \alpha^2 \lambda \beta^3 + 3T \phi k \lambda^2 - 2\beta \phi k \lambda^3 \beta^2 + 2\lambda^4 + 2\phi \lambda^3 - 2T^2 \alpha^2 \phi^2 \beta^2}{\phi(2T^2 \alpha^4 \beta + 2T^2 \alpha^2 k \lambda + 5\lambda^2 T \alpha^2 \beta^2 + 3T \alpha^2 \phi \lambda + 2T \phi k \lambda + 2T k \lambda^3 \beta^2 + 2\lambda^4 \beta^2 + 2\phi \lambda^3 \beta)} \end{aligned}$$

where $\phi = \sqrt{(\lambda^2\beta^2 + 2T\alpha^2\beta^4)}$. The denominator is positive, we can show that the nominator is positive too because k is assumed high enough and $\phi > \lambda\beta$. Hence $\frac{\partial n^*}{\partial T} > 0$. The proof completes.

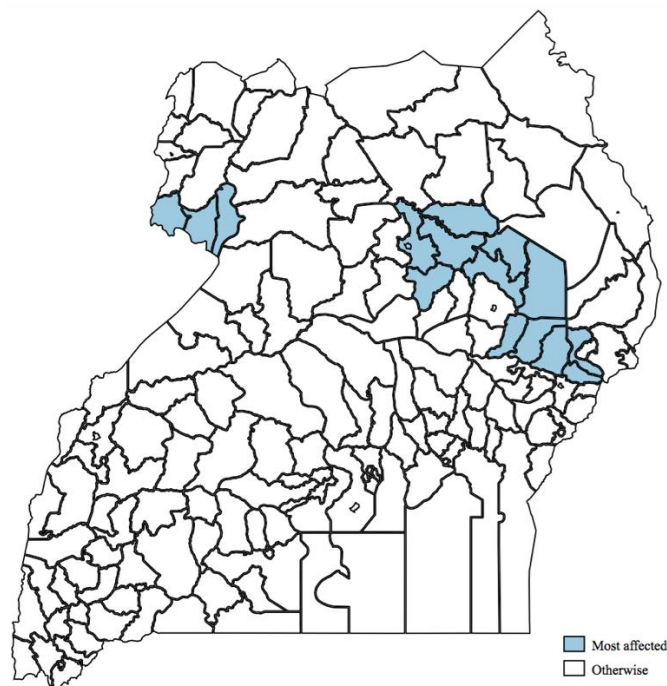
B. Additional Figures and Tables

Figure A1. Histograms of two dependent variables



Notes: The number of activities and the Herfindahl-Hirschman index are constructed using the 2008 Ugandan NGO survey. Bars represents the variable’s density. Lines represent the density of normal distributions.

Figure A2. Districts most affected by the 2007 flood



Notes: The most affected areas are identified by the UNOCHA and the Ugandan Red Cross. The official list includes Soroti, Amuria, Katakwi, Bukedea, Kumi, Lira, Sironko, Bududa and Nebbi.

Table A1. Details of extreme floods across Ugandan districts from early 1980 to 2017

ID	Detailed Locations	Began	Ended	Dead	Displaced	Main cause	Severity	Affected km ²
1	Acholi districts of Agago, Kitgum, Lamwo and Pader, northern Uganda	20-Aug-12	7-Sep-12	0	15000	Heavy Rain	1	57981.45
2	Butaleja district	20-May-12	29-May-12	0	3000	Heavy Rain	1	43315.84
3	Sere District	9-Nov-11	20-Dec-11	0	15000	Torrential Rain	1.5	22324.63
4	Bulambuli District in eastern Uganda	20-Aug-11	8-Sep-11	31	0	Heavy Rain	1.5	37846.35
5	Mazimansa, Himutu and Kachonga sub-counties	26-Sep-10	30-Sep-10	0	600	Heavy Rain	1.5	3303.97
6	Mutumba Zone, Kigwo and Kimanyika villages	7-Mar-10	12-Mar-10	0	20000	Heavy Rain	1	75196.57
7	Kampala city - Lufuka, Kajjansi and Abayita Ababiri in Wakiso district	15-Nov-07	18-Nov-07	4	3000	Heavy rain	1	552.247
8	Soroti, Amuria, Katakwi, Bukedea, Kumi, Lira, Sironko, Bududa and Nebbi	15-Aug-07	31-Oct-07	52	520000	Heavy rain	1.5	107797.14
9	Sironko District - Bumufuni, Bunambutye: Busangai, Bukhayaki, Bumbocha, Bumuyonga, Kapchorwa District -	12-Aug-06	21-Aug-06	3	1680	Heavy rain	1	4902.34
10	Northwestern Uganda - Pakwach area in Nebbi district. Apac town	8-Nov-04	10-Nov-04	0	10000	Heavy rain	1	299.295
11	Kasese District - Karusandara sub-county - Kanamba parish: (Mubuku II, Ngando and Kanyatete). Ibuga parish: Kikoga and Nyabubale	18-Oct-04	20-Oct-04	0	1500	Heavy rain	1	1127.99
12	Eastern Uganda - Mbale area - Bubulo county - Buwabwala sub-county, Busiu and Bukibino	1-Jul-03	3-Jul-03	20	700	Heavy rain	1	962.615
13	Uganda - Kampala area, Nakivubo Channel. Eastern districts: Mbale, Bugiri, Sironko. Southwestern districts: Rukungiri, Kabale and Busheny. Kenya - Nyando District, Ayweyo, Awach River.	16-Nov-02	25-Nov-02	2	2300	Heavy rain	1	15002.61
14	Masaka district: Kyazanga	15-Nov-01	16-Nov-01	0	1200	Heavy rain	1	1218.62
15	Villages around Rwebisengo headquarters. Bundibugyo town. River Semliki	20-Aug-01	29-Aug-01	0	4000	Heavy rain	1	15804.14
16	Apac district - Lake Kwania	20-Jul-98	24-Jul-98	0	20000	Heavy rain	1	3408.41
17	Mbale district, Tororo district	14-Nov-97	28-Nov-97	35	20000	Heavy rain	1	20737.67
18	Kasese district - Kyarumbar subcounty, Rwenzori Mountain slopes	30-Apr-94	2-May-94	11	0	Heavy rain	1	9570.23
19	Bundibugyo district (about 200 miles west of Kampala)	23-Nov-88	7-Dec-88	0	5000	Torrential rain	1	14344.36
20	"various parts of the northern region"	11-Aug-88	25-Aug-88	5	0	Torrential rain	1	55984.41

Notes: Data obtained from the Archive of Global Flood Events, the Dartmouth Flood Observatory (updated 2017) for Uganda.

References

- Aaker, J., Vohs, K. D., & Mogilner, C. (2010). Nonprofits are seen as warm and for-profits as competent: Firm stereotypes matter. *Journal of Consumer Research*, 37(2), 224-237.
- Aggarwal, R. K., & Samwick, A. A. (2003). Why do Managers Diversify their Firms? Agency Reconsidered. *Journal of Finance*, 58(1), 71–118. <http://doi.org/10.1111/1540-6261.00519>.
- Amemiya, T. (1984). Tobit models: A survey. *Journal of Econometrics*, 24(1–2), 3–61. [http://doi.org/10.1016/0304-4076\(84\)90074-5](http://doi.org/10.1016/0304-4076(84)90074-5)
- Andreoni, J. (1989). Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence. *Journal of Political Economy*, 97(6), 1447–1458. <http://doi.org/10.1086/261662>.
- Arikan, A. M., & Stulz, R. M. (2016). Corporate Acquisitions, Diversification, and the Firm's Life Cycle. *The Journal of Finance*, 71(1), 139–194. <http://doi.org/10.1111/jofi.12362>.
- Asatryan, Z., Bittschi, B., & Doerrenberg, P. (2017). Remittances and Public Finances: Evidence from Oil-Price Shocks. *Journal of Public Economics*. <http://doi.org/10.1016/j.jpubeco.2017.09.009>
- Barr, A., Fafchamps, M., & Owens, T. (2004). The Governance of Non-Governmental Organizations, 44(0).
- Besley, T., & Ghatak, M. (2005). Competition and Incentives with Motivated Agents. *American Economic Review*, 95(3), 616–636. <http://doi.org/10.1257/0002828054201413>.
- Bénabou, R., & Tirole, J. (2006). Incentives and Prosocial Behavior. *American Economic Review*, 96, 1652-1678.
- Björkman-Nyqvist, M. (2013). Income shocks and gender gaps in education: Evidence from Uganda. *Journal of Development Economics*, 105, 237-253.
- Boris, E. T., & Steuerle, C. E. (2006). *Nonprofits and Government: Collaboration and Conflict*. Urban Institute Press.
- Burger, R., & Owens, T. (2013). Receive grants or perish? The survival prospects of Ugandan Non-Governmental Organisations. *The Journal of Development Studies*, 49(9), 1284-1298.
- Campa, J. M., & Kedia, S. (2002). Explaining the diversification discount. *The journal of finance*, 57(4), 1731-1762.
- Cameron, A. C., & Miller, D. L. (2015). A practitioner's guide to cluster-robust inference. *Journal of Human Resources*, 50(2), 317-372.
- Carroll, D. A., & Stater, K. J. (2009). Revenue diversification in nonprofit organizations: Does it lead to financial stability. *Journal of Public Administration Research and Theory*, 19(4), 947-966.
- DellaVigna, S., & Pope, D. (2017). What motivates effort? Evidence and expert forecasts. *The Review of Economic Studies*. (Corrected Proof) <https://doi.org/10.1093/restud/rdx033>.
- Dixit, A. (2002). Incentives and Organizations in the Public Sector: An Interpretative Review. *The Journal of Human Resources*, 37(4), 696. <http://doi.org/10.2307/3069614>
- Edwards, M., & Hulme, D. (1992). Scaling up NGO impact on development: learning from experience. *Development in Practice*, 2(2), 77-91.
- Erel, I., Jang, Y., & Weisbach, M. S. (2015). Do acquisitions relieve target firms' financial constraints?. *The Journal of Finance*, 70(1), 289-328.
- Fehr, E., & Schmidt, K. M. (2006). Chapter 8 The Economics of Fairness, Reciprocity and Altruism – Experimental Evidence and New Theories (pp. 615–691). [http://doi.org/10.1016/S1574-0714\(06\)01008-6](http://doi.org/10.1016/S1574-0714(06)01008-6)
- Fruttero, A., & Gauri, V. (2005). The Strategic Choices of NGOs: Location Decisions in Rural Bangladesh1. *Journal of Development Studies*, 41(5), 759–787. <http://doi.org/10.1080/00220380500145289>.
- Gibbons, R., & Murphy, K. J. (1992). Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence. *Journal of Political Economy*, 100(3), 468–505.

- <http://doi.org/10.1086/261826>
- Gneezy, U., Meier, S., & Rey-Biel, P. (2011). When and why incentives (don't) work to modify behavior. *The Journal of Economic Perspectives*, 25(4), 191-209.
- Hodge, M. M., & Piccolo, R. F. (2005). Funding source, board involvement techniques, and financial vulnerability in nonprofit organizations: A test of resource dependence. *Nonprofit Management and Leadership*, 16(2), 171–190. <http://doi.org/10.1002/nml.99>.
- Imas, A. (2014). Working for the “warm glow”: On the benefits and limits of prosocial incentives. *Journal of Public Economics*, 114, 14–18. <http://doi.org/10.1016/j.jpubeco.2013.11.006>
- Kistruck, G. M., Qureshi, I., & Beamish, P. W. (2013). Geographic and product diversification in charitable organizations. *Journal of Management*, 39(2), 496-530.
- Keating, E. K., Fischer, M., Gordon, T. P., & Greenlee, J. S. (2005). *Assessing financial vulnerability in the nonprofit sector*. Faculty Research Working Paper Series: Hauser Center for Nonprofit Organizations, Paper no. 27, Harvard University.
- Levine, D. K. (1998). Modeling Altruism and Spitefulness in Experiments. *Review of Economic Dynamics*, 1(3), 593–622. <http://doi.org/10.1006/redo.1998.0023>.
- Linardi, S., & McConnell, M. A. (2011). No excuses for good behavior: Volunteering and the social environment. *Journal of Public Economics*, 95(5), 445-454.
- Martens, B. (2005). Why do aid agencies exist?. *Development Policy Review*, 23(6), 643-663.
- Mendoza-Abarca, K. I., & Gras, D. (2017). The Performance Effects of Pursuing a Diversification Strategy by Newly Founded Nonprofit Organizations. *Journal of Management*, doi:10.1177/0149206316685854.
- Montgomery, C. A. (1994). Corporate Diversification. *Journal of Economic Perspectives*, 8(3), 163–178. <http://doi.org/10.1257/jep.8.3.163>.
- Moscarini, G. (2007). Competence implies credibility. *The American Economic Review*, 97(1), 37-63.
- Morfit, N. S. (2011). “AIDS is money”: how donor preferences reconfigure local realities. *World Development*, 39(1), 64-76.
- Murphy, K. J. (1999). Executive compensation. *Handbook of Labor Economics*, 3, 2485-2563.
- Olenick, A. J. (1988). Straight talk about a nagging problem: how to improve nonprofit management. *Nonprofit World*, 6, 31-33.
- Olson, M. (2009). *The Logic of Collective Action* (Vol. 124). Harvard University Press.
- Scott, K. (2003). *Funding matters: The impact of Canada's new funding regime on nonprofit and voluntary organisations*. Ottawa, Ontario: Canadian Council on Social Development.
- Shleifer, A., & Vishny, R. W. (1989). Management entrenchment: The case of manager-specific investments. *Journal of Financial Economics*, 25(1), 123-139.
- Smillie, I., Helmich, H., Randel, J., & German, T. (Eds.). (2013). *Stakeholders: Government-NGO partnerships for international development*. Routledge.
- Small, D. A., Loewenstein, G., & Slovic, P. (2007). Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behavior and Human Decision Processes*, 102(2), 143-153.
- Steinberg, R. (2010). Principal–agent theory and nonprofit accountability. In K. Hopt & T. Von Hippel (Eds.), *Comparative Corporate Governance of Non-Profit Organizations* (International Corporate Law and Financial Market Regulation, pp. 73-126). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511712128.006
- Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economics*, 26(1), 3-27.
- Trussel, J. M., & Greenlee, J. S. (2004). A financial rating system for charitable nonprofit organisations. *Research in Governmental and Nonprofit Accounting*, 11, 93–96.
- Tuckman, H. P. (1998). Competition, commercialization, and the evolution of nonprofit organizational structures. *Journal of Policy Analysis and Management*, 17, 175-194.
- Weisbrod, B. A. (1998). The nonprofit mission and its financing. *Journal of Policy Analysis and Management*, 17, 165-174.
- Young, D. R. (2009). How nonprofit organizations manage risk. In: Destefanis, S. and Musella, M., eds. *Paid and Unpaid Labour in the Social Economy*. AIEL Series in Labour Economics, Physica-Verlag Heidelberg, pp. 33-46.

Appendix for Online Publication

A. Derivation of the Certainty Equivalent (Equation 4)

Given $\varpi = w_0 + \alpha[e + \varepsilon(n)] + \lambda \ln n - \beta n - \frac{ke^2}{2}$ and $\varepsilon(n) \sim N(0, \frac{\sigma^2}{2})$ the induced wealth is also normal distributed with mean of $\mu = w_0 + \alpha e + \lambda \ln n - \beta n - \frac{ke^2}{2}$ and variance of $s = \frac{\alpha^2 \sigma^2}{n}$. The corresponding density function is:

$$f(\varpi) = \frac{1}{s\sqrt{2\pi}} \exp\left(-\frac{(\varpi - \mu)^2}{2s^2}\right)$$

Since $u(\varpi) = -\exp(-r\varpi)$, the corresponding expected exponential utility function is:

$$\begin{aligned} E(u(\varpi)) &= -\int_{-\infty}^{+\infty} \exp(-r\varpi) f(\varpi) d\varpi = -\int_{-\infty}^{+\infty} \exp(-r\varpi) \frac{1}{s\sqrt{2\pi}} \exp\left(-\frac{(\varpi - \mu)^2}{2s^2}\right) d\varpi \\ &= -\frac{1}{s\sqrt{2\pi}} \int_{-\infty}^{+\infty} \exp\left(-r\varpi - \frac{(\varpi - \mu)^2}{2s^2}\right) d\varpi \end{aligned}$$

The inside function is:

$$-r\varpi - \frac{(\varpi - \mu)^2}{2s^2} = -\frac{1}{2s^2} [(\varpi - \mu) + rs^2]^2 - r\mu + \frac{rs^2}{2}$$

Substitute that to $E(u(\varpi))$ we have:

$$\begin{aligned} E(u(\varpi)) &= -\frac{1}{s\sqrt{2\pi}} \int_{-\infty}^{+\infty} \exp\left(-\frac{1}{2s^2} [(\varpi - \mu) + rs^2]^2 - r\mu + \frac{rs^2}{2}\right) d\varpi \\ &= -\exp(-r\mu + \frac{rs^2}{2}) \frac{1}{s\sqrt{2\pi}} \int_{-\infty}^{+\infty} \exp\left(-\frac{1}{2s^2} [(\varpi - \mu) + rs^2]^2\right) d\varpi \end{aligned}$$

Let

$$\begin{aligned} g(\varpi) &= \frac{1}{s\sqrt{2\pi}} \int_{-\infty}^{+\infty} \exp\left(-\frac{1}{2s^2} [(\varpi - \mu) + rs^2]^2\right) d\varpi \\ &= \frac{1}{s\sqrt{2\pi}} \int_{-\infty}^{+\infty} \exp\left(-\frac{1}{2s^2} [\varpi - (\mu - rs^2)]^2\right) d\varpi \end{aligned}$$

be the density function of a random variable that follows a normal distribution with mean of $\mu - rs^2$ and variance of s^2 . Therefore:

$$\frac{1}{s\sqrt{2\pi}} \int_{-\infty}^{+\infty} \exp\left(-\frac{1}{2s^2} [\varpi - (\mu - rs^2)]^2\right) d\varpi = 1$$

and

$$E(u(\varpi)) = -\exp\left(-r\mu + \frac{rs^2}{2}\right) = -\exp\left[-r\left(\mu - \frac{rs^2}{2}\right)\right] = -\exp(rCE)$$

Hence the certainty equivalent is

$$CE = w_0 + \alpha + \lambda \ln n - \beta n - \frac{ke^2}{2} - \frac{r}{2} \alpha^2 \frac{\sigma^2}{n}$$