Short-term impacts of a pay-it-forward livestock transfer and training program in Nepal

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This study evaluates the short-term (1.5 year) impacts of a multifaceted livestock transfer and training program in rural Nepal using a randomized control trial (RCT). The program seeks to reduce poverty through group formation, livestock transfers (two doe goats), technical trainings, and values-based training. Values-based training encourages beneficiaries to "pay it forward" (PIF) by providing technical training and the first-born female offspring of their received goats to another individual in their community. We ask three questions: (i) what are the short-term impacts of the program? (ii) are all program components necessary to achieve impact? (iii) is the PIF mechanism effective at spreading impacts?

Despite the popularity of livestock transfer and training programs as anti-poverty interventions, until recently there was little empirical evidence of their effectiveness. Banerjee et al. (2015) evaluate the impact of the BRAC Graduation program, an intensive asset transfer and training program, in six countries. After three years the BRAC program has positive impacts on expenditure, food security, assets, finance, time use, income and mental health. Women's empowerment initially increases, but the effect dissipates over time. Spillover effects are not detected. The BRAC program is distinct from the program evaluated here in several important ways. First, the size of the transfer is 2-4 times larger. Second, beneficiaries received regular food or cash transfers for up to a year. Third, beneficiaries were not expected to transfer program benefits on to others.

I. Program

Heifer International's (HI) Smallholders in Livestock Value Chain (SLVC) program is a livestock transfer and training program seeking to transition women, households and communities out of poverty. It consists of four main components:

i) *Self-help group formation*: HI facilitates formation of women's self-help groups (SHGs) that meet regularly and are encouraged to create group savings accounts.

ii) *Technical trainings*: HI trains beneficiaries on technical topics including nutrition, home gardening, fodder development, and improved animal management. Beneficiaries are provided cash support for planting home gardens ($5) and fodder production ($10).

iii) *Values-based trainings*: HI trains beneficiaries on their "cornerstone" principles.[1] The values-based training encourages beneficiaries to PIF.

iv) *Livestock transfer*: Beneficiaries each receive two doe goats and cash support ($40) to help build a goat shelter. Each SHG receives one breeding buck.

Nepal's 75 districts are subdivided into village development committees (VDCs), each of which has nine wards. The SLVC operates at the ward level, targeting a pre-identified group of women to organize into a SHG. This group includes a member of all households (usually 20-25) in a neighborhood (*tole*).

Members of the directly recruited SHGs recruit a second generation of beneficiaries by forming up to five additional SHGs of other women in their ward. In most cases this covers nearly all remaining households in a ward. They then "pay forward" benefits by giving new SHG members technical trainings and their two first-born female goat offspring (while keeping and raising male kids for future sale). HI staff directly provide values-based trainings for second generation SHGs.

II. Research Design

HI first identified target VDCs where the organization had never worked. Prior to being aware of treatment assignment, HI identified the most central ward in each VDC, then a target *tole* within this ward. If assigned to treatment, one individual in each household in the *tole* was targeted as a direct beneficiary. Individuals in the ward residing outside the targeted *tole* are potential PIF beneficiaries. Through this process we have comparable groups of both potential direct beneficiaries and potential PIF beneficiaries across treatments. VDCs were stratified by geography and caste/ethnic composition. Within each stratification bin, VDCs were assigned to one of three treatment arms or to control:

i) *Full Treatment* (FT): SHG formation, technical training, values-based training, and goat transfer.

ii) *No Goats* (NG): Identical to FT, excluding the goat transfer.

iii) *No Values-based Training* (NVT): Identical to FT, excluding the values-based training (and therefore PIF encouragement).

Household survey data was collected prior to any intervention in mid-2014 and again in mid-2016, approximately 1.5 years after the program began for direct beneficiaries. The sample consists of 1,031 targeted direct beneficiaries and 797 potential PIF beneficiaries in 50 VDCs.

III. Analysis

We consider nine outcomes of interest, which we categorize as either short-term or long-term. Short-term outcomes are those we expect to change within the

[1]These principles include accountability; sharing and caring; sustainability and self-reliance; gender and focus on the family; genuine need and justice; improving the environment; full participation; training, education, and communication; and spirituality.

first 1.5 years of the program: women's empowerment, financial inclusion, aspirations, and mental health. Long-term outcomes are those less likely to change immediately given the reproductive and marketing cycle for goats: assets, income, expenditures, physical health and food security. Multiple subindicators for each outcome dimension are aggregated into summary indices. For empowerment we employ the women's empowerment in agriculture index (Alkire et al., 2013). For other non-monetary measures we use a standardized weighted average as described by Anderson (2008). For income and expenditures we use logged Nepali rupee totals. Details on summary indices are reported in a registered pre-analysis plan (http://www.socialscienceregistry.org/trials/1504).[2]

We estimate ITT effects separately for the subsamples of directly targeted beneficiaries and potential PIF beneficiaries using estimation model (1):

$$(1) \quad y_{hv}^{t=1} = \beta_0 + \beta_1 FT_{hv} + \beta_2 NG_{hv} + \beta_3 NVT_{hv} + \delta y_{hv}^{t=0} + \mathbf{X}_{hv}'\gamma + \mathbf{S_v}\rho + \varepsilon_{hv}$$

In (1), $y_{hv}^{t=1}$ is the outcome of interest for household h in village v, measured approximately one and a half years after the intervention. FT, NG, and NVT are treatment assignment dummies, given a value of one regardless of whether the individual actually joined a SHG. Controls include the outcome of interest measured at baseline ($y_{hv}^{t=0}$) and a vector of any covariates imbalanced at baseline ($\mathbf{X}_{ht}'$). Errors are clustered at the village level.

Panel (a) of Figure 1 shows the estimated impact of each treatment for each subsample on the four short-term outcomes, measured in standard deviations of the control group mean. For direct beneficiaries, the observed short-term impacts are similar across the different program variations. Financial inclusion increases by between 0.32 and 0.36 standard deviations, and empowerment increases by between 0.21 and 0.25 standard deviations. Accounting for the false discovery rate (FDR) across short-term outcomes, five of six estimates with p-values less than 0.1 also have q-values less than 0.1.

Unlike for direct beneficiaries, PIF effects on empowerment and financial inclusion differ across treatments in some cases. Among PIF beneficiaries in treatments with values-based training (FT and NG), we observe effects on women's empowerment at least as large as for direct beneficiaries. Without values-based training (NVT), the effects are less than half as large and not statistically significant. Treatments with the values-based training also have a positive impact on financial inclusion; with goats (FT) this effect is considerably smaller than for direct beneficiaries, and without goats (NG) it is the same size. As with empowerment, in the absence of values-based training (NVT) the financial inclusion effect is smaller and not significant. Accounting for the FDR, three of four estimates with p-values less than 0.1 have q-values less than 0.1.

We find no significant changes in mental health or aspirations 1.5 years after

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[2]In a minor deviation from the pre-analysis plan we use Anderson (2008) to calculate the aspirations index (rather than the pre-specified index) due to concerns about data quality. The reported results are not sensitive to this change.

Figure 1. : Program impacts
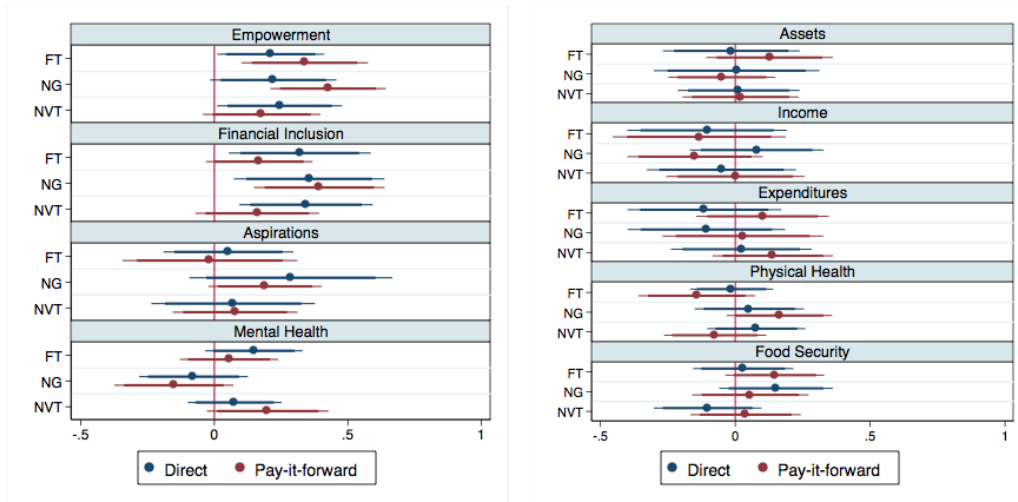
(a) Short-term welfare impacts.   (b) Long-term welfare impacts.

Note: ITT effects with 95/90% confidence intervals depicted by thin/thick bands. FT: full treatment, NG: "no goats" treatment, NVT: "no value-based training" treatment. Direct $N = 1031$, PIF $N = 797$.

the start of the program. Panel (b) of Figure 1 shows no significant changes for long-term outcomes at this time.

IV. Discussion and concluding remarks

We find that a goat transfer and training program in Nepal significantly increases financial inclusion and women's empowerment after 1.5 years. The impact on financial inclusion is the equivalent of moving a median beneficiary to the 60th percentile. The impact on empowerment is the equivalent of moving her to the 65th percentile. These effects are similar for direct beneficiaries and those brought into the program via its PIF component.

While we observe impacts on two short-term outcomes, we do not find statistically significant changes in assets, incomes, expenditures, physical health, or food security after 1.5 years. However, the timing of livestock growth and development implies no beneficiaries had additional marketable goats at the time of data collection. In this way, our results compliment those of Karlan et al. (2017), who observe improvements in financial inclusion and women's empowerment from participation in a group-savings program, but no effects on income, assets, consumption, or food security. Because livestock production is a slow process, it is unsurprising these short-term results mirror those from a group-savings intervention.

The reported ITT effects depend on both the magnitude of the impact for

those who take up the program and the recruitment rate. We observe substantial differences in program uptake across treatment arms, as well as between directly targeted and potential PIF beneficiaries. Among those directly targeted 90.1% (FT), 80.9% (NG), and 77.2% (NVT) reported participation. These rates reflect effective recruitment and retention, and suggest goats contribute to the program's appeal. Among potential PIFs 80.1% (FT), 62.6% (NG), and 23.1% (NVT) report program participation.[3] The relatively low recruitment rate among potential PIFs in the NVT treatment without the PIF component demonstrate the importance of this aspect of the intervention for its self-propagating nature.

Finally, a common criticism leveled against asset transfer and training programs is that they are not likely cost-effective when compared with alternatives like unconditional cash transfers. Successfully implemented, the PIF model may mitigate such concerns. With no discernible monetary benefits we cannot make meaningful cost-benefit calculations, but we do note that cost per beneficiary for this program is low: direct beneficiary costs were approximately $470 USD per household in the full treatment, whereas PIF costs were $64 USD per household. The average across all fully-treated beneficiaries was $120. These per-beneficiary costs are considerably lower than those in recently evaluated productive asset (Banerjee et al., 2015) and cash (Haushofer and Shapiro, 2016) transfer programs.

REFERENCES

Alkire, Sabina, Ruth Meinzen-Dick, Amber Peterman, Agnes Quisumbing, Greg Seymour, and Ana Vaz. 2013. "The womens empowerment in agriculture index." *World Development*, 52: 71–91.

Anderson, Michael L. 2008. "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association*, 103(484): 1481–1495.

Banerjee, Abhijit, Esther Duflo, Nathanael Goldberg, Dean Karlan, Robert Osei, William Parienté, Jeremy Shapiro, Bram Thuysbaert, and Christopher Udry. 2015. "A multifaceted program causes lasting progress for the very poor: Evidence from six countries." *Science*, 348(6236): 1260799.

Haushofer, Johannes, and Jeremy Shapiro. 2016. "The Short-term Impact of Unconditional Cash Transfers to the Poor: Experimental Evidence from Kenya." *The Quarterly Journal of Economics*, 131(4): 1973–2042.

Karlan, Dean, Beniamino Savonitto, Bram Thuysbaert, and Christopher Udry. 2017. "Impact of savings groups on the lives of the poor." *Proceedings of the National Academy of Sciences*, 114(12): 3079–3084.

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[3]All of these differences are statistically significant at p <0.01 with the exception of NG=NVT for direct beneficiaries.