

# Paying it forward: Short-term impacts of a livelihoods program with built-in spillovers

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**RUWAIDA ABDUL AND SALEHE ABDUL  
MUUNGONI VILLAGE, ZANZIBAR**

## GIVE THE GIFT OF A GOAT

Ruwaida and Salehe Abdul's family received a goat from Heifer. The gift of a goat has changed their lives forever.

For \$120, you can make a difference to another family just like the Abduls.

**How much can you provide?**

\$120 \$10

1 Goat

**GIVE \$120 NOW**

# Introduction

We evaluate the short-term (1.5 year) impacts of a livestock transfer and training program in rural Nepal.

The program seeks to reduce poverty through:

1. Self-help group formation with encouragement to save
2. Technical trainings on improved animal management
3. Livestock transfers = two doe goats + shared breeding buck
4. Values-based training with encouragement to “pay-it-forward”

# Introduction

“Pay-it-forward” mechanism is a big part of Heifer’s ethos

- Original self-help groups form additional self-help groups
- Provide PIF groups with technical training
- Eventually PIF groups receive livestock gift of equal size (two doe goats)
- Continues until entire village is in program

In Nepal Heifer is trying “exponential” pay-it-forward

- Each original self-help group forms *five* PIF groups
- For most villages, this is the entire village
- Group formation and training happens rapidly, pay-it-forward goat transfers happen later

# Research questions

1. What are the short-term (1.5 year) impacts of the program?
2. Are all program components necessary to achieve impact?
3. Is the pay-it-forward (PIF) mechanism effective at spreading impacts?



# Research design

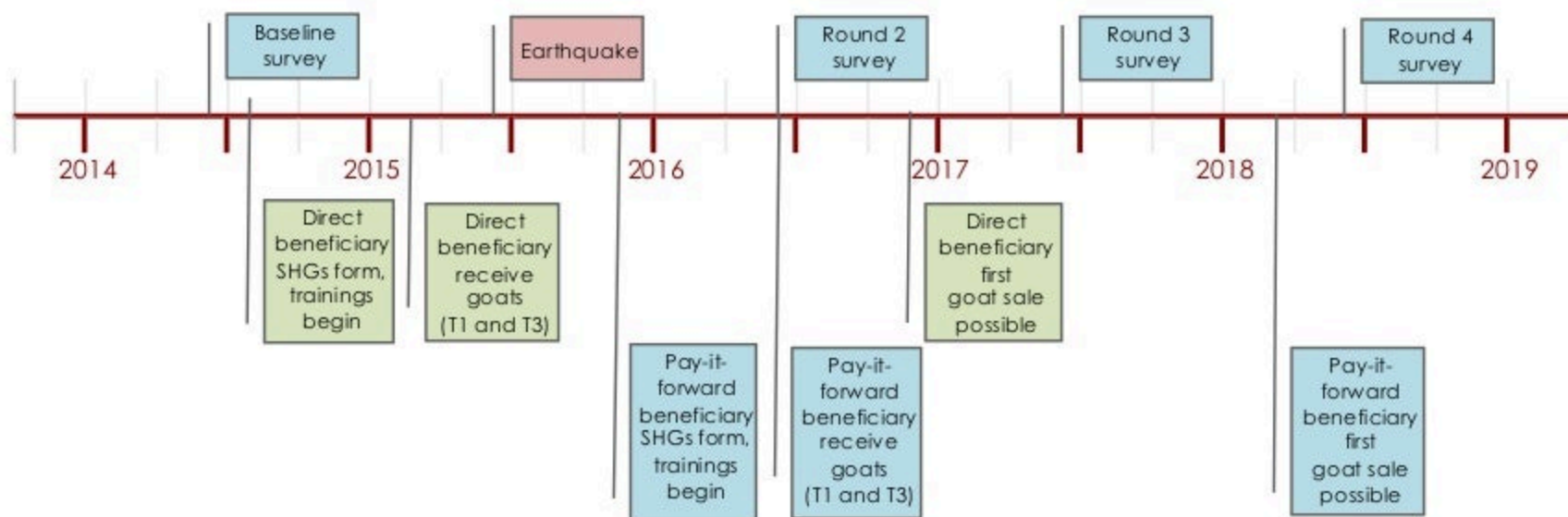
- Cluster RCT with three variations of the program (plus control) to capture effects of program components
  1. Full Heifer program
  2. Heifer program without goats
  3. Heifer program without values based training and PIF
- Sample includes two types of respondents to evaluate the impact of the PIF program component:
  1. Targeted direct beneficiaries
  2. Prospective PIF beneficiaries

→ Both groups are >99% women

components

diagram

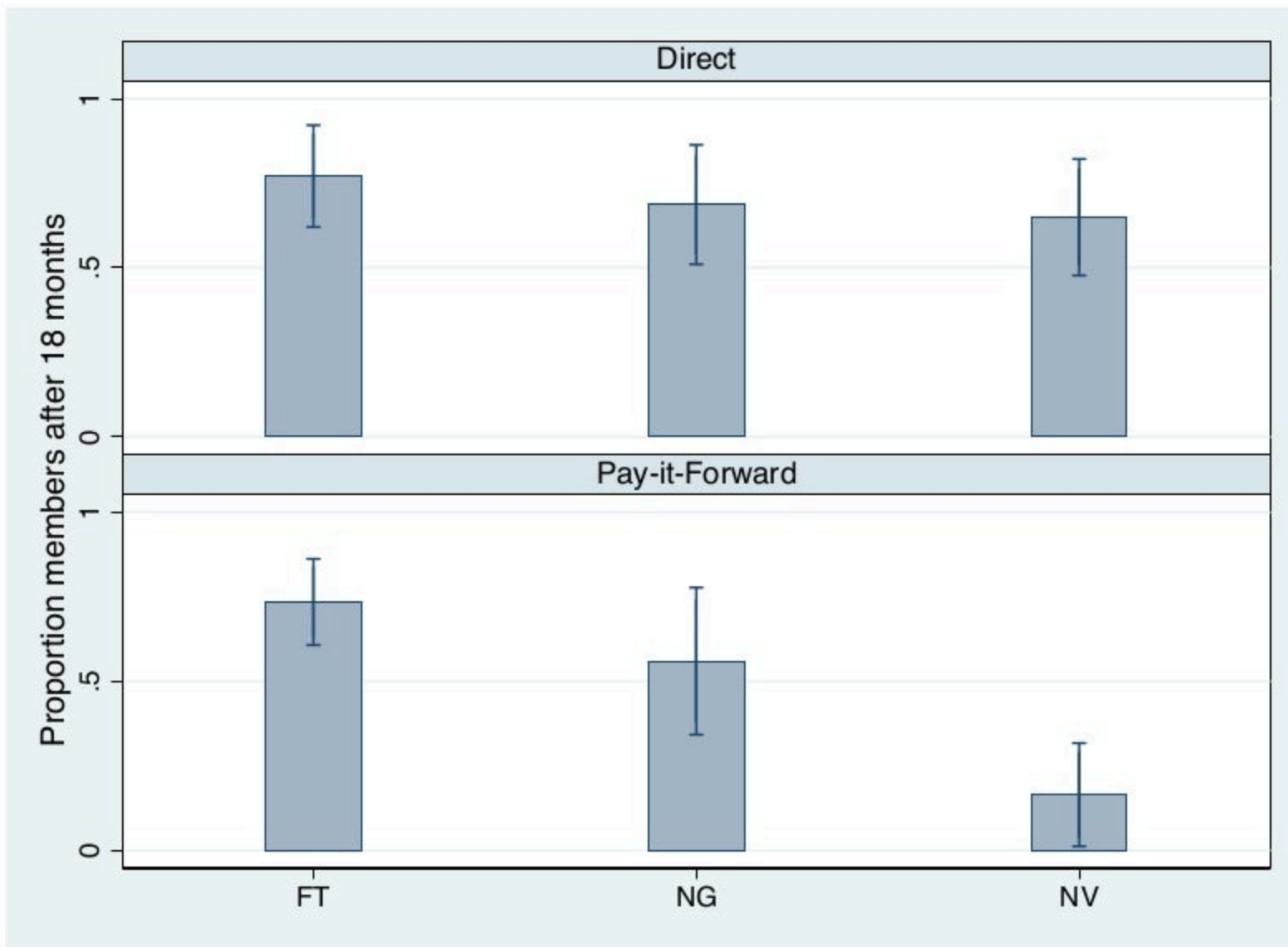
# Timeline



- 2014 (baseline) sample: 2,376 households
- 2015 Earthquake: dropped severely affected areas (10/60 VDCs)
- 2016 sample: 1,828 households: 1,033 direct beneficiaries and 798 PIF

# Recruitment rates

▸ estimation





# Defining welfare outcomes

Summary indices (pre-specified) for 9 dimensions of well-being:

1. Women's empowerment
2. Financial inclusion
3. Aspirations
4. Mental health
5. Assets
6. Income
7. Non-food expenditures
8. Physical health
9. Food security

▶ balance

# Women's empowerment sub-indicators

Women's Empowerment in Agriculture Index (Alkire et al. 2013):

1. Decision-making power over productive resources
2. Asset ownership
3. Access to and control over credit
4. Control over income
5. Group membership
6. Work less than 10.5 hours/day

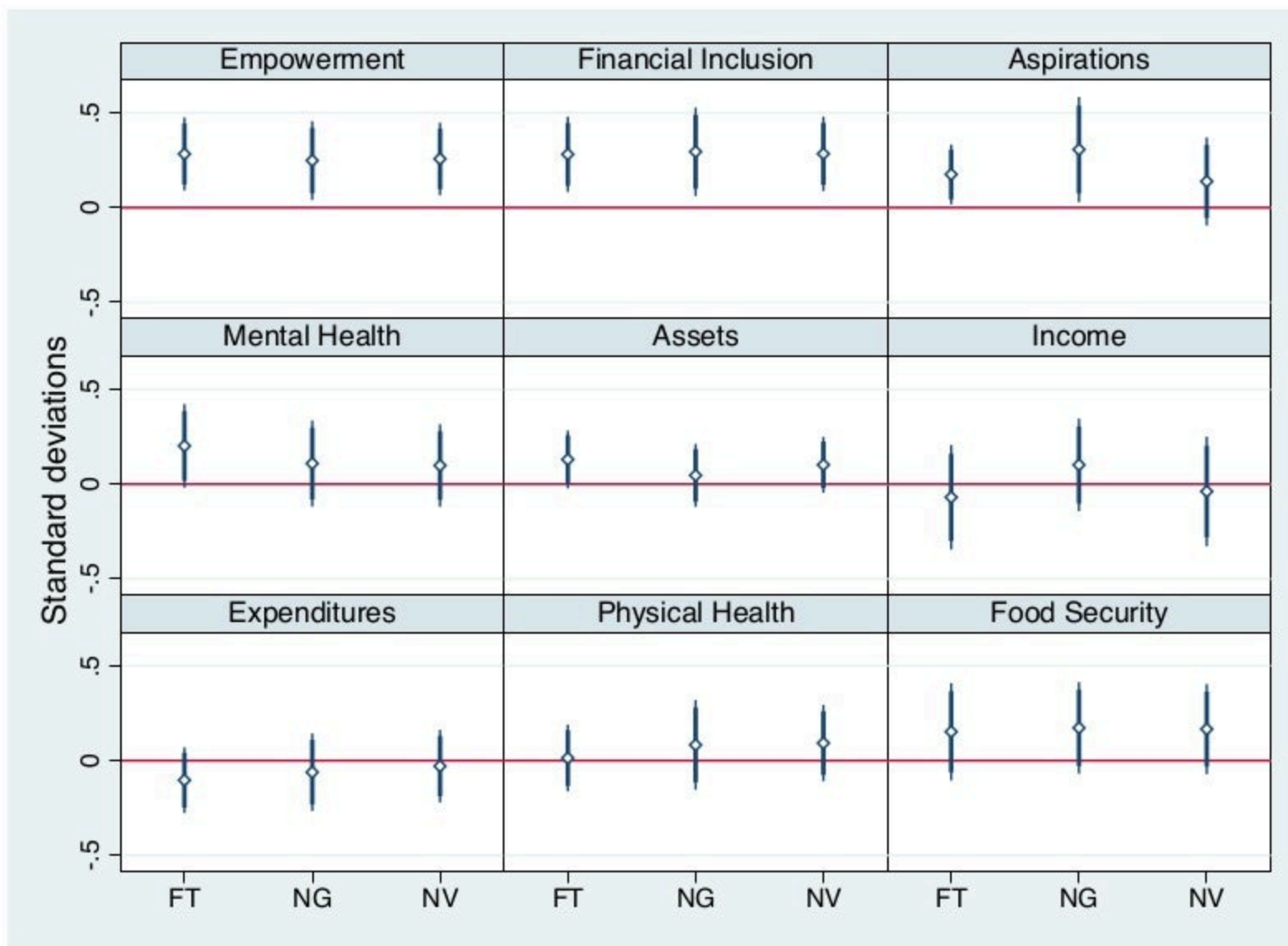
▶ indices

# Outcomes (Direct)

▶ table

▶ estimation

▶ zoom

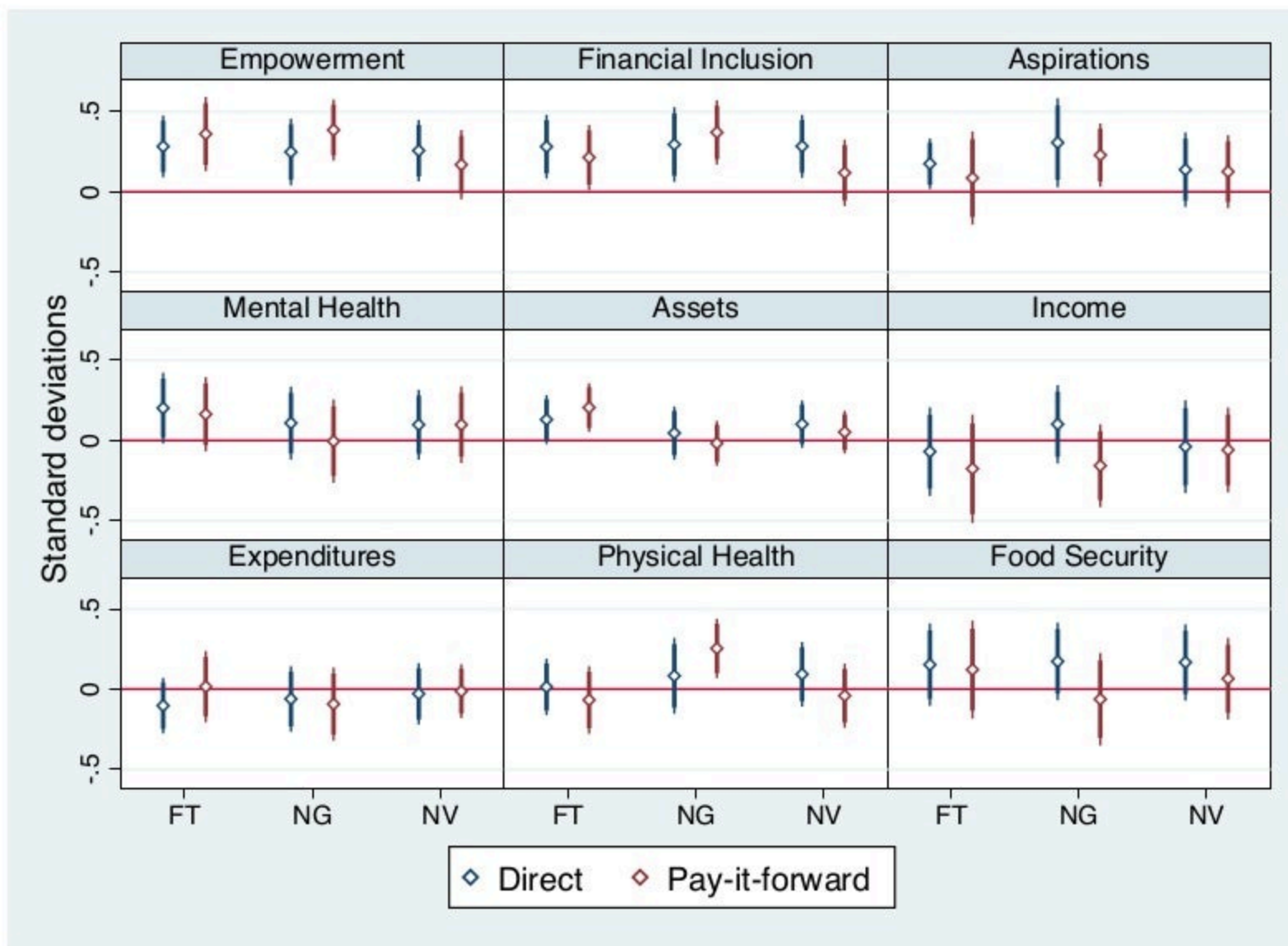


# Outcomes (Direct and Pay-it-Forward)

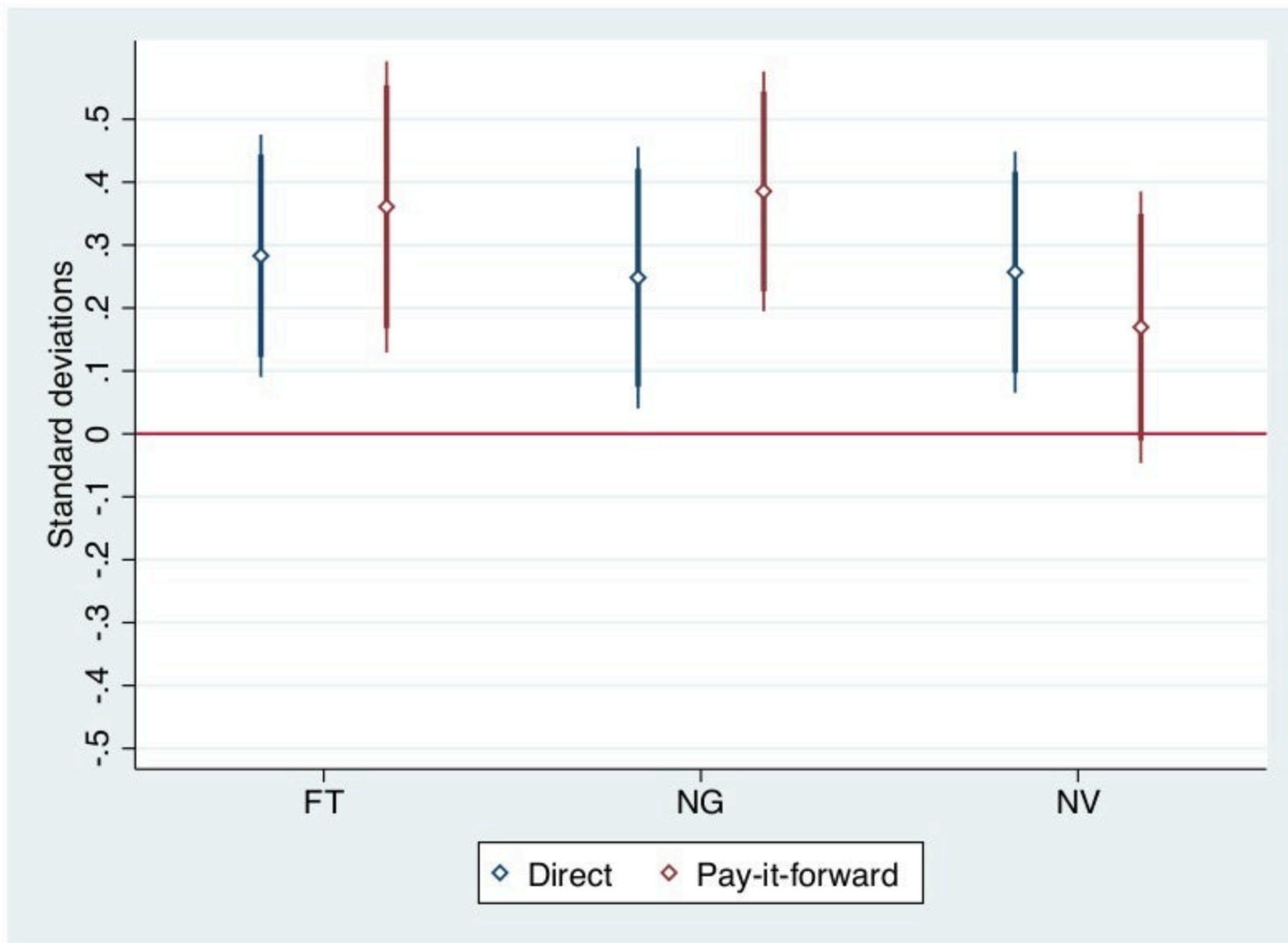
▶ table

▶ estimation

▶ zoom



# Empowerment

[▶ all results](#)

# Empowerment (Direct)

▶ see PIF

▶ indices

|                                   | Control mean      | FT                  | NG                  | NVT                 | N     |
|-----------------------------------|-------------------|---------------------|---------------------|---------------------|-------|
| Empowerment index                 | -0.000<br>(1.000) | 0.283***<br>(0.096) | 0.248**<br>(0.103)  | 0.257***<br>(0.095) | 1,027 |
| Production decisions              | 0.918<br>(0.275)  | 0.042**<br>(0.018)  | 0.032<br>(0.023)    | 0.029<br>(0.019)    | 1,030 |
| Asset ownership                   | 0.922<br>(0.268)  | 0.053***<br>(0.017) | 0.054***<br>(0.018) | 0.051**<br>(0.020)  | 1,031 |
| Access to and control over credit | 0.415<br>(0.494)  | -0.036<br>(0.050)   | -0.027<br>(0.062)   | -0.018<br>(0.054)   | 1,029 |
| Control over income               | 0.922<br>(0.269)  | 0.012<br>(0.022)    | 0.061**<br>(0.024)  | 0.026<br>(0.026)    | 1,029 |
| Group membership                  | 0.651<br>(0.478)  | 0.144***<br>(0.051) | 0.165***<br>(0.042) | 0.159***<br>(0.038) | 1,030 |
| Works $\leq$ 10.5 hours per day   | 0.492<br>(0.471)  | 0.039<br>(0.040)    | -0.043<br>(0.038)   | -0.001<br>(0.031)   | 1,031 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



# Empowerment (pay-it-forward)

[▶ see direct](#)
[▶ indices](#)

|                                   | Control mean     | FT                  | NG                  | NVT                | N   |
|-----------------------------------|------------------|---------------------|---------------------|--------------------|-----|
| Empowerment index                 | 0.000<br>(1.000) | 0.361***<br>(0.115) | 0.385***<br>(0.095) | 0.169<br>(0.107)   | 790 |
| Production decisions              | 0.863<br>(0.345) | 0.088***<br>(0.029) | 0.087***<br>(0.026) | 0.080**<br>(0.033) | 795 |
| Asset ownership                   | 0.918<br>(0.275) | 0.055***<br>(0.020) | 0.058**<br>(0.022)  | 0.041**<br>(0.019) | 794 |
| Access to and control over credit | 0.325<br>(0.470) | 0.025<br>(0.042)    | 0.094*<br>(0.051)   | 0.065<br>(0.049)   | 794 |
| Control over income               | 0.914<br>(0.282) | 0.026<br>(0.028)    | 0.070**<br>(0.027)  | 0.035<br>(0.026)   | 795 |
| Group membership                  | 0.579<br>(0.495) | 0.137**<br>(0.056)  | 0.199***<br>(0.064) | 0.029<br>(0.059)   | 796 |
| Works $\leq$ 10.5 hours per day   | 0.475<br>(0.464) | 0.078**<br>(0.037)  | -0.025<br>(0.041)   | 0.012<br>(0.046)   | 796 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Program costs

- The average across all FT direct beneficiaries was \$392 (i.e. \$1/day)
- The average across all NG direct beneficiaries was \$269
- Successfully implemented, PIF model reduces cost/beneficiary:
  - Average across all (direct and PIF) FT beneficiaries was \$135, average across all NG beneficiaries was \$105

# Costs of other programs

Compare to recently evaluated programs:

- Productive asset (Banerjee et al., 2015): \$1107 - \$4680
- Other Heifer transfers (cows in Zambia and Rwanda, Jodlowski et al., 2016, Rawlins et al., 2014): \$2000 and \$3000 respectively
- Cash (Haushoffer and Shapiro, 2016) transfer programs: \$369 - \$1113

other programs' impacts

# Conclusions

What are the short-term (1.5 year) impacts of the program?

- Strong evidence of significant improvements to women's empowerment and financial inclusion across direct and PIF beneficiaries
- Some evidence of higher aspirations and assets across direct and PIF beneficiaries
- Weak evidence of improved mental health for direct beneficiaries

# Conclusions

Are all program components necessary to achieve impact?

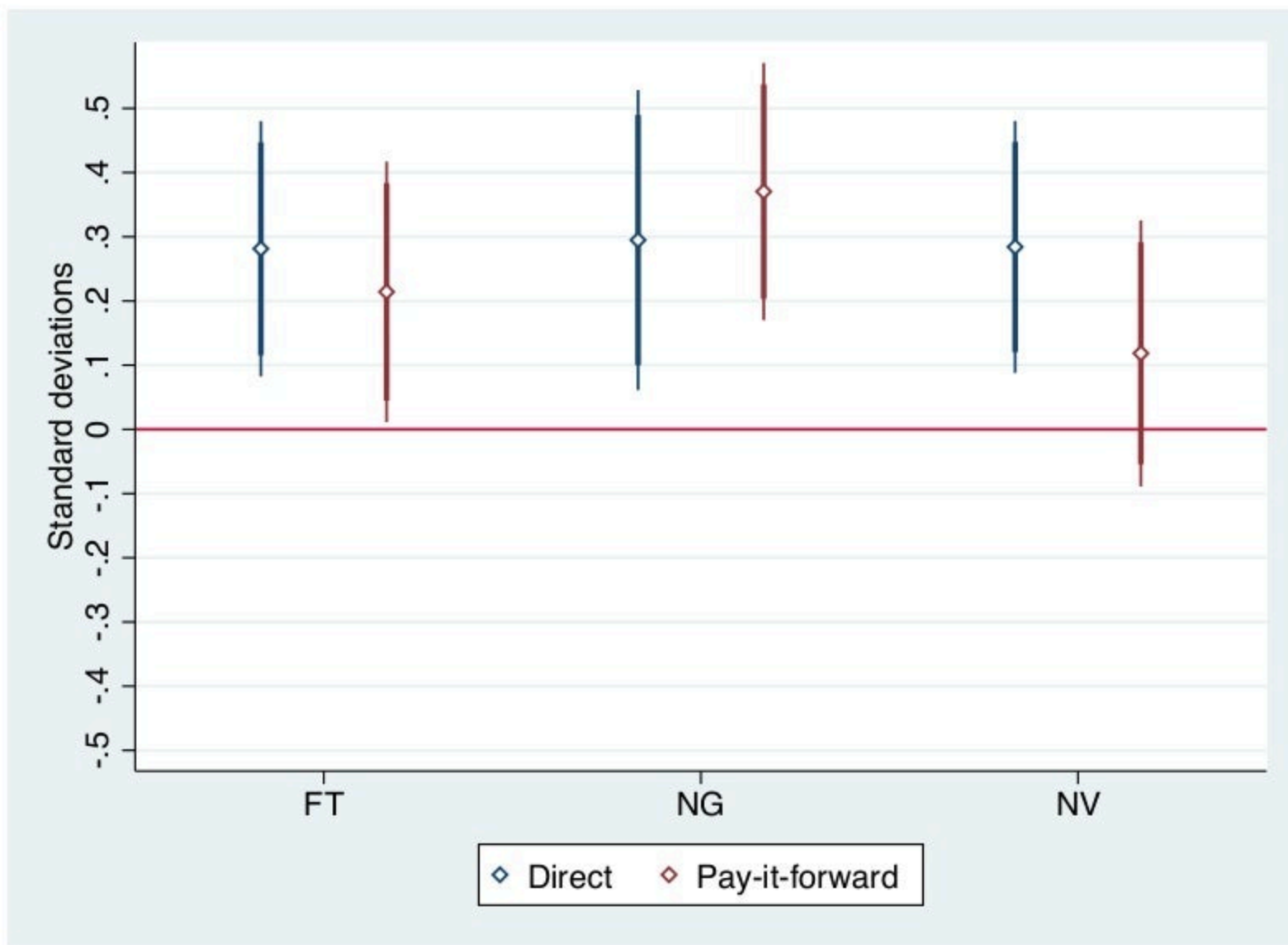
- Goats and especially values-based training matter little for direct impact
- However, goats and especially values-based training (which includes pay-it-forward) help recruitment, scaling impact
- With PIF goats aren't that much more costly, help recruitment a little and may help fundraising a lot

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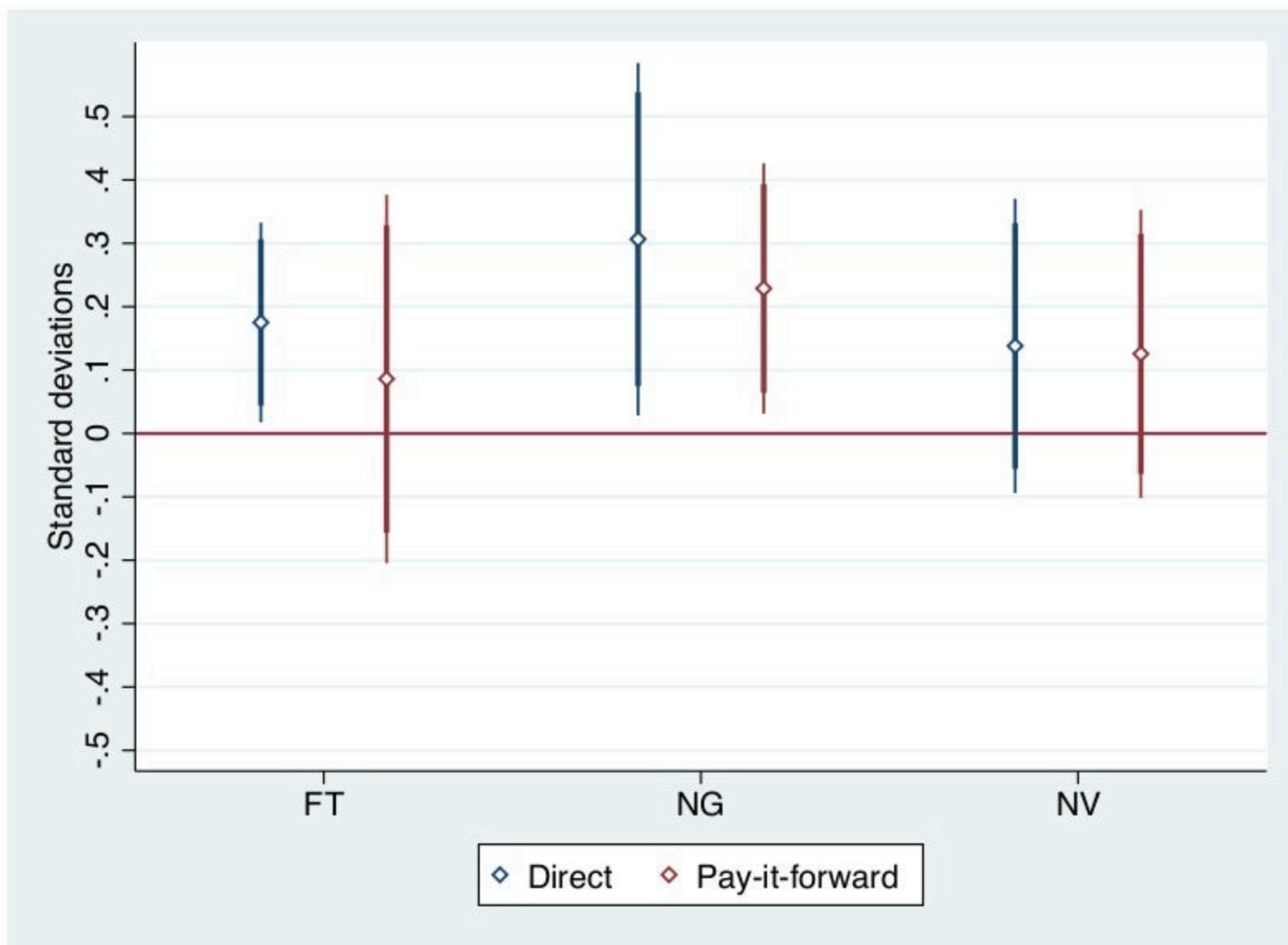




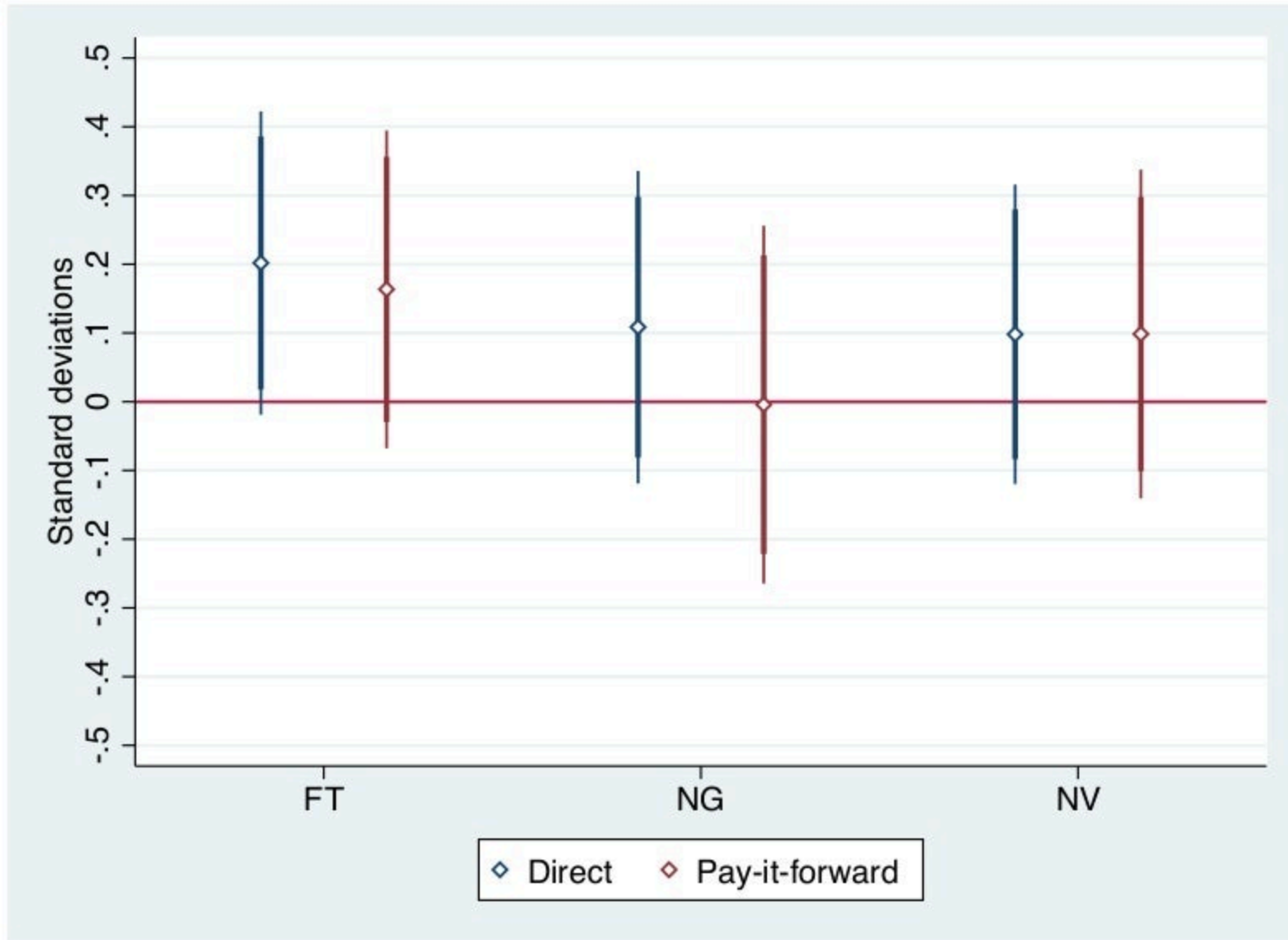
# Financial inclusion

[▶ all results](#)

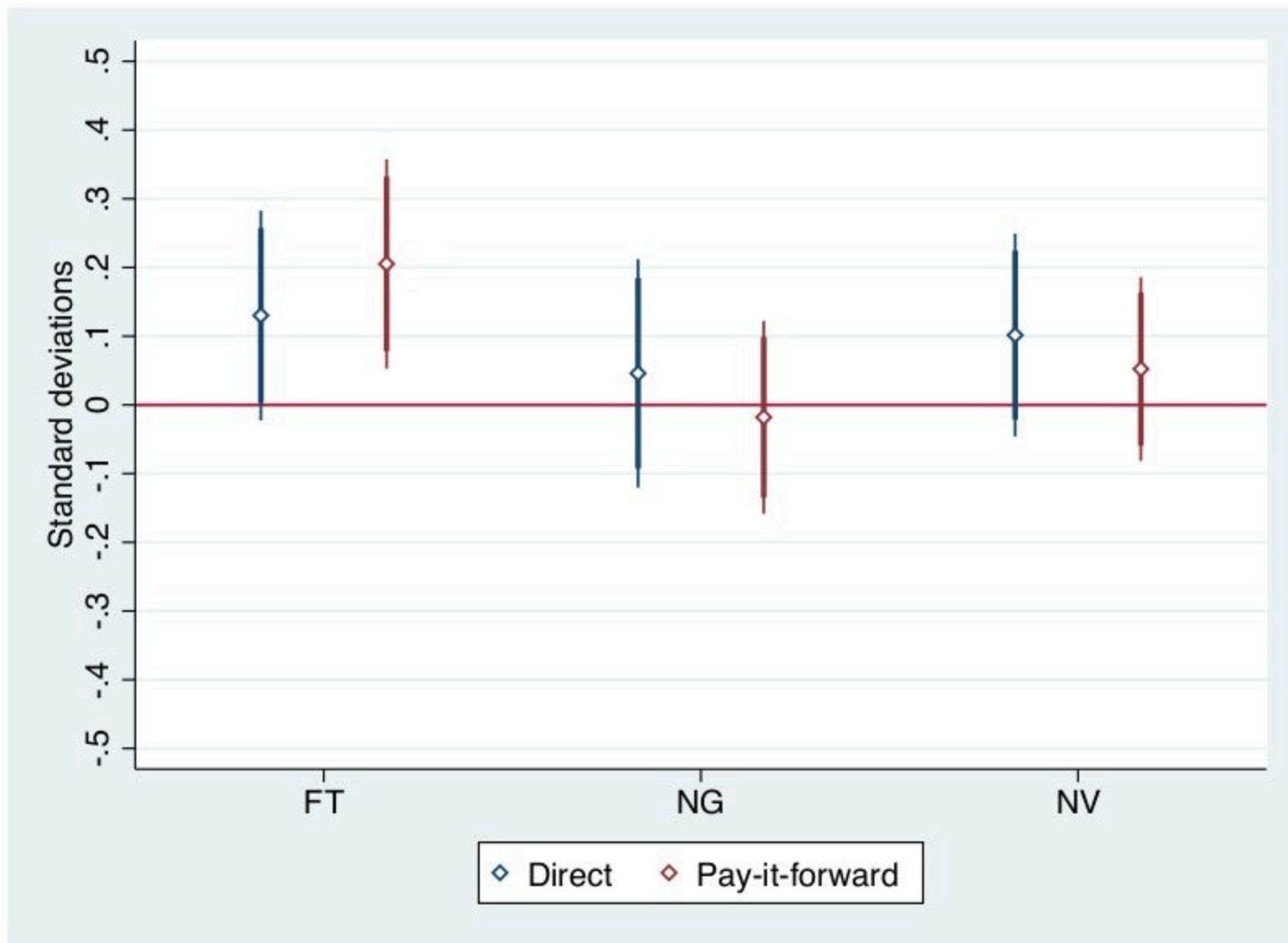
# Aspirations

[▶ all results](#)

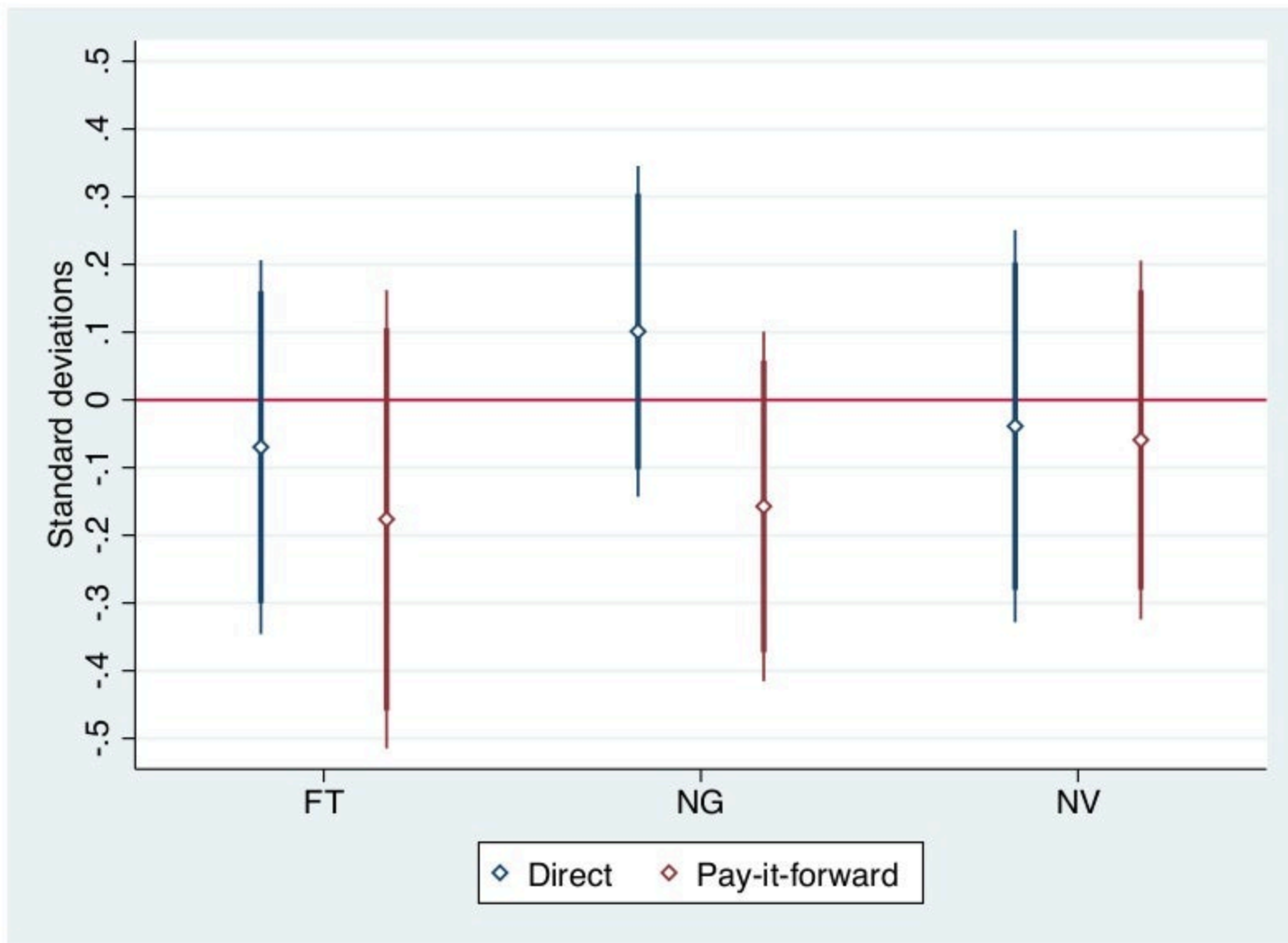
# Mental health

[▶ all results](#)

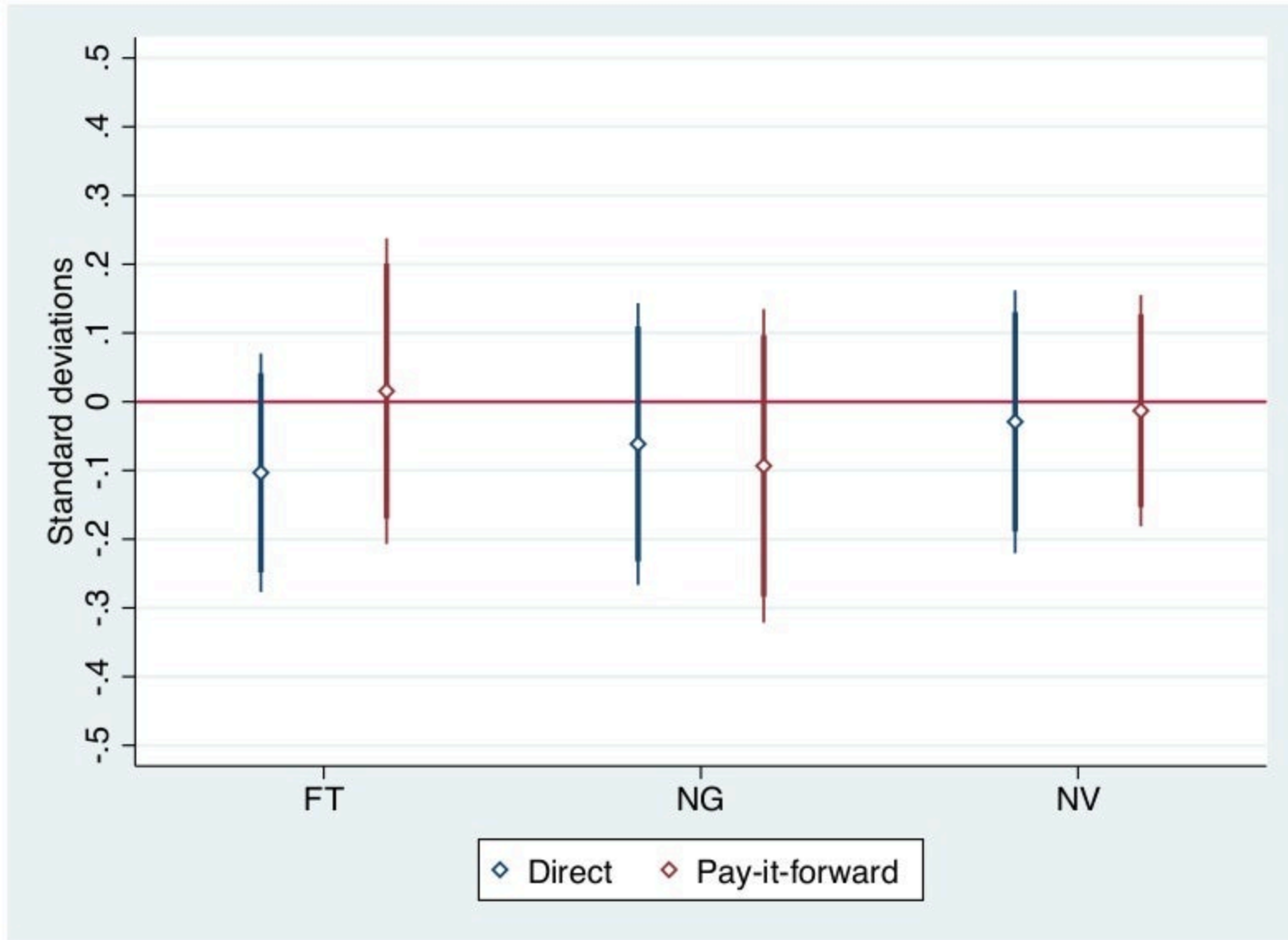
# Assets

[▶ all results](#)

## Income

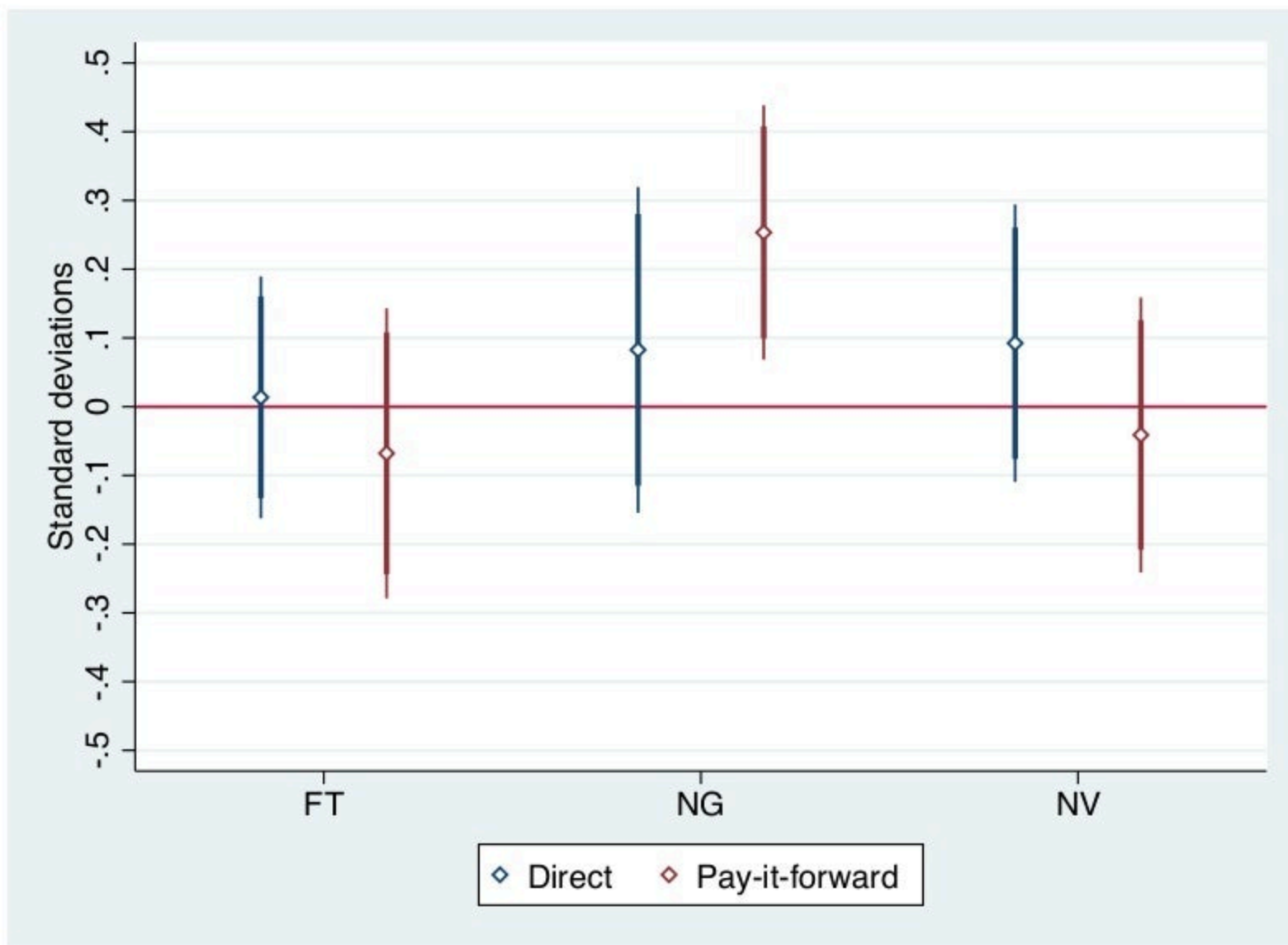
[▶ all results](#)

# Expenditure

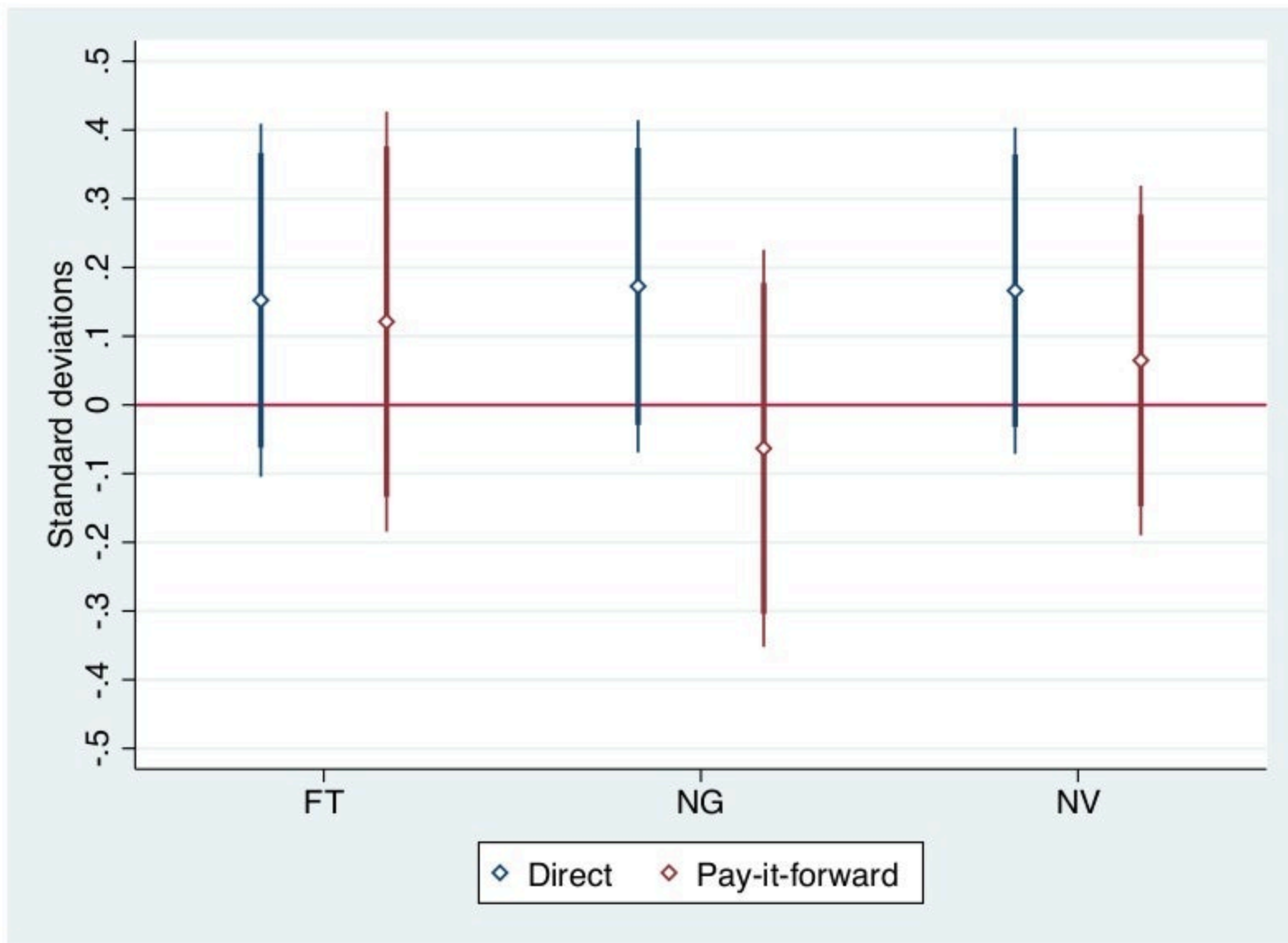
[▶ all results](#)



# Physical health

[▶ all results](#)

# Food security

[▶ all results](#)

# Financial inclusion

Standardized weighted average (Anderson 2008) of:

1. Amount saved last month (NPR)
2. Membership in a savings group
3. Amount owed for formal lenders
4. Amount owed for informal lenders (enters negatively)
5. Discount rate (enters negatively)
6. Planning horizon (log weeks)

▶ indices

# Aspirations

Standardized weighted average (Anderson 2008) of aspired:

1. Income (log NPR/year)
2. Asset ownership (value of home and land in log NPR)
3. Children's education (years)
4. Social status (number of people who trust your advice)

▶ indices

# Mental health

Standardized weighted average (Anderson 2008) of:

1. Depression score (CES-D scale (Radloff, 1977))
2. Locus of control (abbreviated Rotter (1966) scale)
3. Optimism (questions from World Values Survey, 2009)
4. Happiness (idem)
5. Self-esteem (idem)
6. Life satisfaction (idem)
7. Worry score (Meyer et al. 1990)

▶ indices

# Assets

Standardized weighted average (Anderson 2008) of:

1. Large productive assets, excluding land and livestock (number)
2. Non-productive asset index (principal components)
3. Livestock (tropical livestock units)
4. Land (hectares)
5. Housing quality index (principal components)

▶ indices



# Income

Log total of annual income (NPR):

1. Livestock income
2. Crop income
3. Salary and government income
4. Business income
5. Day labor income
6. Other income

▶ indices

# Non-food expenditure

Log total (NPR) spent on:

1. Medical expenses
2. Clothing
3. Education
4. Home improvement and goods
5. Temptation goods (alcohol and tobacco)
6. Celebrations
7. Ceremonies
8. Gifts and donations
9. Livestock feed, shelter, vet services

▶ indices

# Physical health

Standardized weighted average (Anderson 2008) of:

1. Subjective own health (1-10 scale)
2. Days of work missed last month
3. Subjective child health (1-10 scale)
4. Days of school missed to illness last month

▶ indices

# Food security

Standardized weighted average (Anderson 2008) of:

1. Meals per day
2. Household has enough to eat
3. Household Dietary Diversity Score (unique foods consumed over 1 week)
4. Child Dietary Diversity Score

▶ indices

# Recruitment rates

ITT regression of stated SHG membership on assigned treatment status:

$$R_{hv}^{t=1} = \beta_0 + \beta_1 T_{hv}^{FT} + \beta_2 T_{hv}^{NG} + \beta_3 T_{hv}^{NVT} + \varepsilon_{hv}$$

|        | Control mean     | FT                  | NG                  | NVT                 | N     |
|--------|------------------|---------------------|---------------------|---------------------|-------|
| Direct | 0.122<br>(0.328) | 0.771***<br>(0.076) | 0.687***<br>(0.088) | 0.650***<br>(0.086) | 1,033 |
| PIF    | 0.066<br>(0.249) | 0.735***<br>(0.064) | 0.560***<br>(0.108) | 0.165<br>(0.076)    | 798   |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

results

# Empirical approach

ITT effects separately for the subsamples of direct and PIF beneficiaries:

$$y_{hv}^{t=1} = \beta_0 + \beta_1 T_{hv}^{FT} + \beta_2 T_{hv}^{NG} + \beta_3 T_{hv}^{NVT} + \delta y_{hv}^{t=0} + \mathbf{X}'_{hv} \gamma + \mathbf{S}'_b \rho + \varepsilon_{hv}$$

- $y_{hv}^t$  is outcome for household  $h$  in village  $v$  at time  $t$
- $\mathbf{X}'_{ht}$  is vector of controls (baseline values)
  - Own and husband's age and education, maximum education in household, unmarried dummy, household size, asset index at baseline
- $\mathbf{S}'_b$  are strata bins

results

# Summary indices (Direct)

[▶ atl. indices](#)
[▶ sub-indices](#)
[▶ graph](#)

|                       | Control mean      | FT                   | NG                  | NVT                  | N     |
|-----------------------|-------------------|----------------------|---------------------|----------------------|-------|
| Empowerment           | -0.000<br>(1.000) | 0.283***<br>(0.096)‡ | 0.248**<br>(0.103)† | 0.257***<br>(0.095)‡ | 1,027 |
| Financial inclusion   | -0.000<br>(1.000) | 0.281***<br>(0.099)‡ | 0.295**<br>(0.116)† | 0.284***<br>(0.098)‡ | 1,033 |
| Aspirations           | -0.000<br>(1.000) | 0.175**<br>(0.078)†  | 0.306**<br>(0.138)† | 0.138<br>(0.116)     | 1,033 |
| Mental health         | 0.000<br>(1.000)  | 0.202*<br>(0.110)    | 0.108<br>(0.113)    | 0.098<br>(0.108)     | 1,033 |
| Assets                | 0.000<br>(1.000)  | 0.130*<br>(0.076)    | 0.046<br>(0.083)    | 0.102<br>(0.073)     | 1,033 |
| Income                | 12.162<br>(1.205) | -0.081<br>(0.160)    | 0.118<br>(0.141)    | -0.045<br>(0.168)    | 970   |
| Non-food expenditures | 12.131<br>(1.058) | -0.110<br>(0.092)    | -0.065<br>(0.108)   | -0.031<br>(0.101)    | 1,029 |
| Physical health       | -0.000<br>(1.000) | 0.014<br>(0.088)     | 0.083<br>(0.118)    | 0.092<br>(0.100)     | 1,033 |
| Food security         | 0.000<br>(1.000)  | 0.152<br>(0.128)     | 0.173<br>(0.120)    | 0.166<br>(0.118)     | 1,033 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

With FDR control: ‡  $q < 0.05$ , †  $q < 0.1$ .

# Summary indices (pay-it-forward)

[▶ atl. indices](#)
[▶ sub-indices](#)
[▶ graph](#)

|                       | Control mean      | FT                               | NG                               | NVT               | N   |
|-----------------------|-------------------|----------------------------------|----------------------------------|-------------------|-----|
| Empowerment           | 0.000<br>(1.000)  | 0.361***<br>(0.115) <sup>‡</sup> | 0.385***<br>(0.095) <sup>‡</sup> | 0.169<br>(0.107)  | 790 |
| Financial inclusion   | -0.000<br>(1.000) | 0.214**<br>(0.101) <sup>§</sup>  | 0.370***<br>(0.100) <sup>‡</sup> | 0.118<br>(0.103)  | 798 |
| Aspirations           | 0.000<br>(1.000)  | 0.086<br>(0.145)                 | 0.229**<br>(0.098) <sup>†</sup>  | 0.126<br>(0.113)  | 798 |
| Mental health         | -0.000<br>(1.000) | 0.163<br>(0.115)                 | -0.004<br>(0.130)                | 0.098<br>(0.119)  | 798 |
| Assets                | 0.000<br>(1.000)  | 0.205***<br>(0.076) <sup>‡</sup> | -0.018<br>(0.070)                | 0.052<br>(0.067)  | 798 |
| Income                | 12.183<br>(1.111) | -0.205<br>(0.196)                | -0.183<br>(0.150)                | -0.069<br>(0.153) | 754 |
| Non-food expenditures | 12.028<br>(1.070) | 0.016<br>(0.118)                 | -0.099<br>(0.121)                | -0.014<br>(0.089) | 794 |
| Physical health       | 0.000<br>(1.000)  | -0.068<br>(0.105)                | 0.253***<br>(0.092) <sup>‡</sup> | -0.041<br>(0.100) | 798 |
| Food security         | -0.000<br>(1.000) | 0.121<br>(0.152)                 | -0.063<br>(0.144)                | 0.065<br>(0.127)  | 798 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . With FDR control: <sup>‡</sup>  $q < 0.05$ , <sup>†</sup>  $q < 0.1$ , <sup>§</sup>  $q < 0.12$ .



# Financial inclusion (Direct)

[▶ see PIF](#)
[▶ indices](#)

|                     | Control mean      | FT                   | NG                  | NVT                 | N     |
|---------------------|-------------------|----------------------|---------------------|---------------------|-------|
| Financial index     | -0.000<br>(1.000) | 0.281***<br>(0.099)  | 0.295**<br>(0.116)  | 0.284***<br>(0.098) | 1,033 |
| Amount saved        | 4.268<br>(3.214)  | 0.856**<br>(0.358)   | 1.196***<br>(0.329) | 0.441<br>(0.363)    | 1,031 |
| Savings group       | 0.537<br>(0.500)  | 0.213***<br>(0.060)  | 0.186***<br>(0.059) | 0.142**<br>(0.060)  | 1,031 |
| Owe formal lender   | 3.123<br>(5.321)  | -0.253<br>(0.556)    | -0.030<br>(0.705)   | 0.037<br>(0.575)    | 1,032 |
| Owe informal lender | 3.648<br>(5.481)  | -0.404<br>(0.484)    | -0.872<br>(0.557)   | -0.302<br>(0.511)   | 1,032 |
| Discount rate       | 0.055<br>(0.083)  | -0.028***<br>(0.010) | -0.011<br>(0.013)   | -0.013<br>(0.012)   | 1,031 |
| Planning horizon    | 1.444<br>(1.616)  | 0.079<br>(0.240)     | -0.129<br>(0.263)   | 0.296<br>(0.242)    | 1,031 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Aspirations (Direct)

▶ see PIF

▶ indices

|                                  | Control mean       | FT                 | NG                 | NVT              | N     |
|----------------------------------|--------------------|--------------------|--------------------|------------------|-------|
| Aspirations index                | -0.000<br>(1.000)  | 0.175**<br>(0.078) | 0.306**<br>(0.138) | 0.138<br>(0.116) | 1,033 |
| Income aspirations               | 11.695<br>(3.189)  | 0.480*<br>(0.246)  | 0.807**<br>(0.324) | 0.396<br>(0.277) | 1,032 |
| Asset aspirations                | 14.469<br>(2.846)  | 0.162<br>(0.248)   | 0.555<br>(0.331)   | 0.121<br>(0.303) | 1,032 |
| Children's education aspirations | 14.801<br>(3.074)  | -0.404<br>(0.388)  | -0.110<br>(0.399)  | 0.112<br>(0.398) | 724   |
| Status aspirations               | 15.744<br>(20.048) | 6.661**<br>(2.845) | 4.638<br>(2.819)   | 1.443<br>(2.466) | 1,032 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Mental health (Direct)

[▶ see PIF](#)[▶ indices](#)

|                     | Control mean     | FT                  | NG                 | NVT               | N     |
|---------------------|------------------|---------------------|--------------------|-------------------|-------|
| Mental health index | 0.000<br>(1.000) | 0.202*<br>(0.110)   | 0.108<br>(0.113)   | 0.098<br>(0.108)  | 1,033 |
| Depression score    | 6.565<br>(1.867) | 0.297<br>(0.221)    | -0.120<br>(0.221)  | 0.113<br>(0.214)  | 1,031 |
| Locus of control    | 2.915<br>(1.482) | -0.176<br>(0.145)   | 0.016<br>(0.157)   | -0.077<br>(0.161) | 1,032 |
| Optimism            | 6.405<br>(1.186) | 0.123<br>(0.158)    | -0.043<br>(0.156)  | -0.060<br>(0.132) | 1,031 |
| Happiness           | 2.930<br>(0.530) | 0.045<br>(0.059)    | 0.101**<br>(0.049) | 0.054<br>(0.055)  | 1,032 |
| Self-esteem         | 9.602<br>(1.660) | 0.339**<br>(0.160)  | 0.192<br>(0.129)   | 0.198<br>(0.140)  | 1,031 |
| Life Satisfaction   | 6.361<br>(1.904) | 0.333<br>(0.209)    | 0.523**<br>(0.196) | 0.218<br>(0.187)  | 1,031 |
| Worry score         | 9.078<br>(2.083) | 0.529***<br>(0.195) | -0.063<br>(0.234)  | 0.236<br>(0.213)  | 1,031 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Assets (Direct)

▶ see PIF

▶ indices

|                            | Control mean      | FT                  | NG                  | NVT                 | N     |
|----------------------------|-------------------|---------------------|---------------------|---------------------|-------|
| Asset index                | 0.000<br>(1.000)  | 0.130*<br>(0.076)   | 0.046<br>(0.083)    | 0.102<br>(0.073)    | 1,033 |
| Productive asset index     | -0.000<br>(1.000) | 0.502***<br>(0.125) | 0.397***<br>(0.118) | 0.255**<br>(0.111)  | 1,033 |
| Non-productive asset index | -0.000<br>(1.000) | -0.117<br>(0.114)   | -0.027<br>(0.121)   | -0.034<br>(0.108)   | 1,033 |
| Livestock (TLU)            | 2.578<br>(2.360)  | 0.303*<br>(0.163)   | 0.038<br>(0.229)    | 0.302<br>(0.222)    | 1,032 |
| Land (hectares)            | 0.473<br>(0.563)  | 0.104***<br>(0.033) | 0.036<br>(0.039)    | 0.126***<br>(0.041) | 1,033 |
| Housing index              | -0.000<br>(1.000) | -0.042<br>(0.086)   | -0.078<br>(0.081)   | -0.125*<br>(0.073)  | 1,030 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Income (Direct)

▶ see PIF

▶ indices

|                  | Control mean                | FT                        | NG                          | NVT                        | N   |
|------------------|-----------------------------|---------------------------|-----------------------------|----------------------------|-----|
| Total income     | 12.162<br>(1.205)           | -0.081<br>(0.160)         | 0.118<br>(0.141)            | -0.045<br>(0.168)          | 970 |
| Livestock income | 20,831.873<br>(39,818.832)  | -1,407.156<br>(3,488.160) | 2,908.816<br>(3,292.913)    | 808.103<br>(2,725.474)     | 970 |
| Crop income      | 20,767.729<br>(49,735.478)  | -6,050.965<br>(3,741.016) | -7,170.005**<br>(3,504.175) | -2,125.251<br>(4,895.820)  | 970 |
| Permanent income | 36,758.964<br>(95,619.426)  | -4,992.824<br>(9,407.327) | 14,154.571<br>(12,884.585)  | -2,820.980<br>(10,595.601) | 970 |
| Business income  | 11,677.291<br>(39,824.659)  | -2,777.150<br>(2,786.123) | 3,534.564<br>(4,932.615)    | 2,485.272<br>(3,781.132)   | 970 |
| Day labor income | 18,645.418<br>(56,714.158)  | 5,396.710<br>(8,766.161)  | 921.510<br>(5,629.181)      | -7,395.837<br>(5,959.327)  | 970 |
| Other income     | 58,619.124<br>(138,991.166) | 3,925.564<br>(14,983.632) | 6,045.912<br>(16,823.699)   | 2,038.920<br>(15,337.872)  | 970 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Non-food expenditure (Direct)

[▶ see PIF](#)
[▶ indices](#)

|                                  | Control mean               | FT                          | NG                        | NVT                         | N     |
|----------------------------------|----------------------------|-----------------------------|---------------------------|-----------------------------|-------|
| Total expenditure                | 12.131<br>(1.058)          | -0.110<br>(0.092)           | -0.065<br>(0.108)         | -0.031<br>(0.101)           | 1,029 |
| Medical expenditures             | 43,640.000<br>(80,165.993) | 7,031.402<br>(8,377.286)    | 9,552.658<br>(9,304.525)  | 7,493.807<br>(6,980.047)    | 1,029 |
| Clothing expenditures            | 13,064.552<br>(12,320.573) | -634.931<br>(999.476)       | 427.017<br>(908.488)      | -199.841<br>(982.822)       | 1,029 |
| Education expenditures           | 21,207.889<br>(35,122.786) | -4,416.436**<br>(2,022.853) | -2,547.626<br>(2,266.774) | -2,640.085<br>(2,296.836)   | 1,104 |
| Home expenditures                | 21,376.493<br>(79,551.629) | -9,200.001<br>(6,532.645)   | -8,104.846<br>(8,096.441) | -11,155.591*<br>(6,316.441) | 1,029 |
| Temptation good expenditures     | 636.362<br>(1,401.104)     | 60.751<br>(112.828)         | -148.237<br>(113.371)     | -94.931<br>(107.231)        | 1,029 |
| Celebration expenditures         | 34,189.201<br>(58,131.756) | -4,064.075<br>(4,355.725)   | -2,467.162<br>(5,044.560) | 7,145.725<br>(5,881.541)    | 1,029 |
| Ceremonial expenditures          | 4,301.119<br>(8,097.780)   | -1,080.311<br>(957.414)     | -1,421.390<br>(957.753)   | 320.907<br>(1,211.721)      | 1,029 |
| Gifts and donations expenditures | 6,856.306<br>(13,983.740)  | 6,600.118**<br>(2,515.416)  | 2,741.001<br>(2,178.585)  | 3,912.112**<br>(1,630.609)  | 1,029 |
| Livestock expenditures           |                            |                             |                           |                             |       |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Physical health (Direct)

[▶ see PIF](#)[▶ indices](#)

|                         | Control mean      | FT                | NG                | NVT                | N     |
|-------------------------|-------------------|-------------------|-------------------|--------------------|-------|
| Physical health index   | -0.000<br>(1.000) | 0.014<br>(0.088)  | 0.083<br>(0.118)  | 0.092<br>(0.100)   | 1,033 |
| Subjective own health   | 6.468<br>(1.886)  | -0.075<br>(0.156) | 0.211<br>(0.184)  | 0.016<br>(0.151)   | 1,030 |
| Days work missed        | 1.554<br>(2.985)  | -0.013<br>(0.340) | 0.384<br>(0.403)  | 0.112<br>(0.324)   | 1,031 |
| Subjective child health | 7.074<br>(1.587)  | 0.204<br>(0.179)  | 0.410*<br>(0.219) | 0.422**<br>(0.205) | 721   |
| Days school missed      | 0.808<br>(2.010)  | 0.161<br>(0.244)  | 0.032<br>(0.198)  | -0.052<br>(0.170)  | 681   |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Food security (Direct)

[▶ see PIF](#)
[▶ indices](#)

|                             | Control mean     | FT                | NG               | NVT               | N     |
|-----------------------------|------------------|-------------------|------------------|-------------------|-------|
| Food security index         | 0.000<br>(1.000) | 0.152<br>(0.128)  | 0.173<br>(0.120) | 0.166<br>(0.118)  | 1,033 |
| Meals per day               | 3.315<br>(0.539) | 0.038<br>(0.091)  | 0.067<br>(0.096) | -0.065<br>(0.071) | 1,032 |
| Household has enough to eat | 0.759<br>(0.428) | 0.083<br>(0.061)  | 0.066<br>(0.054) | 0.072<br>(0.057)  | 1,032 |
| HDDS (household)            | 4.793<br>(1.157) | -0.063<br>(0.112) | 0.105<br>(0.124) | 0.043<br>(0.150)  | 1,032 |
| CDDS (child)                | 4.532<br>(1.341) | -0.038<br>(0.176) | 0.182<br>(0.174) | 0.049<br>(0.178)  | 697   |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



# Financial inclusion (pay-it-forward)

[▶ see direct](#)
[▶ indices](#)

|                     | Control mean      | FT                 | NG                  | NVT               | N   |
|---------------------|-------------------|--------------------|---------------------|-------------------|-----|
| Financial index     | -0.000<br>(1.000) | 0.214**<br>(0.101) | 0.370***<br>(0.100) | 0.118<br>(0.103)  | 798 |
| Amount saved        | 3.970<br>(3.287)  | 0.196<br>(0.341)   | 0.836**<br>(0.341)  | -0.205<br>(0.381) | 797 |
| Savings group       | 0.492<br>(0.501)  | 0.140**<br>(0.062) | 0.200***<br>(0.060) | 0.005<br>(0.060)  | 795 |
| Owe formal lender   | 2.162<br>(4.621)  | 0.028<br>(0.580)   | 0.813<br>(0.530)    | 0.196<br>(0.583)  | 797 |
| Owe informal lender | 3.606<br>(5.532)  | -0.202<br>(0.477)  | -0.623<br>(0.491)   | 0.116<br>(0.429)  | 797 |
| Discount rate       | 0.041<br>(0.064)  | -0.011<br>(0.008)  | 0.006<br>(0.010)    | 0.001<br>(0.011)  | 796 |
| Planning horizon    | 1.326<br>(1.654)  | 0.306<br>(0.190)   | 0.143<br>(0.214)    | 0.406<br>(0.244)  | 796 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Aspirations (pay-it-forward)

[▶ see direct](#)
[▶ indices](#)

|                                  | Control mean       | FT                | NG                 | NVT               | N   |
|----------------------------------|--------------------|-------------------|--------------------|-------------------|-----|
| Aspirations index                | 0.000<br>(1.000)   | 0.086<br>(0.145)  | 0.229**<br>(0.098) | 0.126<br>(0.113)  | 798 |
| Income aspirations               | 11.642<br>(3.372)  | 0.197<br>(0.409)  | 0.743*<br>(0.389)  | 0.188<br>(0.368)  | 797 |
| Asset aspirations                | 14.413<br>(2.748)  | -0.381<br>(0.372) | 0.184<br>(0.245)   | -0.072<br>(0.296) | 797 |
| Children's education aspirations | 14.312<br>(3.169)  | 0.635<br>(0.442)  | -0.211<br>(0.389)  | 0.424<br>(0.373)  | 565 |
| Status aspirations               | 15.533<br>(20.558) | 1.201<br>(2.798)  | 7.393*<br>(4.174)  | 1.943<br>(2.513)  | 796 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Mental health (pay-it-forward)

[▶ see direct](#)
[▶ indices](#)

|                     | Control mean      | FT                 | NG                | NVT               | N   |
|---------------------|-------------------|--------------------|-------------------|-------------------|-----|
| Mental health index | -0.000<br>(1.000) | 0.163<br>(0.115)   | -0.004<br>(0.130) | 0.098<br>(0.119)  | 798 |
| Depression score    | 6.594<br>(1.897)  | 0.311<br>(0.190)   | -0.194<br>(0.265) | 0.011<br>(0.215)  | 796 |
| Locus of control    | 2.985<br>(1.390)  | -0.055<br>(0.120)  | -0.196<br>(0.146) | -0.047<br>(0.159) | 797 |
| Optimism            | 6.345<br>(1.234)  | 0.067<br>(0.146)   | -0.038<br>(0.158) | 0.159<br>(0.177)  | 796 |
| Happiness           | 2.939<br>(0.541)  | 0.077<br>(0.057)   | 0.065<br>(0.066)  | -0.029<br>(0.056) | 797 |
| Self-esteem         | 9.812<br>(1.876)  | 0.005<br>(0.193)   | -0.001<br>(0.200) | 0.025<br>(0.228)  | 796 |
| Life Satisfaction   | 6.416<br>(1.959)  | -0.011<br>(0.209)  | 0.304<br>(0.196)  | 0.097<br>(0.178)  | 796 |
| Worry score         | 8.909<br>(1.949)  | 0.613**<br>(0.232) | 0.108<br>(0.371)  | 0.416*<br>(0.245) | 796 |

## Assets (pay-it-forward)

[▶ see direct](#)[▶ indices](#)

|                            | Control mean      | FT                  | NG                 | NVT               | N   |
|----------------------------|-------------------|---------------------|--------------------|-------------------|-----|
| Asset index                | 0.000<br>(1.000)  | 0.205***<br>(0.076) | -0.018<br>(0.070)  | 0.052<br>(0.067)  | 798 |
| Productive asset index     | -0.000<br>(1.000) | 0.401***<br>(0.113) | 0.315**<br>(0.129) | 0.089<br>(0.114)  | 798 |
| Non-productive asset index | -0.000<br>(1.000) | -0.158<br>(0.117)   | -0.199<br>(0.125)  | -0.009<br>(0.132) | 798 |
| Livestock (TLU)            | 2.362<br>(2.064)  | 0.437**<br>(0.181)  | -0.022<br>(0.158)  | 0.192<br>(0.157)  | 797 |
| Land (hectares)            | 0.393<br>(0.483)  | 0.054<br>(0.044)    | 0.040<br>(0.045)   | 0.040<br>(0.043)  | 798 |
| Housing index              | -0.000<br>(1.000) | 0.090<br>(0.075)    | -0.117*<br>(0.070) | -0.040<br>(0.059) | 795 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Income (pay-it-forward)

[▶ see direct](#)[▶ indices](#)

|                  | Control mean                | FT                           | NG                           | NVT                         | N   |
|------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-----|
| Total income     | 12.183<br>(1.111)           | -0.205<br>(0.196)            | -0.183<br>(0.150)            | -0.069<br>(0.153)           | 754 |
| Livestock income | 15,108.242<br>(31,113.693)  | 19,293.949***<br>(5,961.446) | 4,543.267<br>(5,368.579)     | 8,708.532**<br>(3,985.108)  | 754 |
| Crop income      | 15,071.978<br>(40,680.351)  | 832.869<br>(4,877.172)       | -2,093.657<br>(2,923.830)    | 2,023.732<br>(5,213.261)    | 754 |
| Permanent income | 50,021.978<br>(130,008.158) | -19,077.109<br>(13,231.242)  | -13,507.453<br>(15,179.789)  | -17,629.981<br>(15,551.593) | 754 |
| Business income  | 13,741.758<br>(43,609.953)  | -5,879.913<br>(4,883.170)    | 2,872.887<br>(5,124.329)     | -4,476.482<br>(4,576.263)   | 754 |
| Day labor income | 19,243.956<br>(62,113.002)  | 3,086.009<br>(6,801.808)     | -358.080<br>(6,138.208)      | -1,689.370<br>(6,331.307)   | 754 |
| Other income     | 52,693.407<br>(116,931.111) | -8,393.446<br>(11,774.336)   | -21,889.629**<br>(9,808.631) | 11,464.333<br>(10,349.597)  | 754 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Non-food expenditure (pay-it-forward)

[▶ see direct](#)
[▶ indices](#)

|                                  | Control mean                | FT                          | NG                           | NVT                         | N   |
|----------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----|
| Total expenditure                | 12.028<br>(1.070)           | 0.016<br>(0.118)            | -0.099<br>(0.121)            | -0.014<br>(0.089)           | 794 |
| Medical expenditures             | 57,071.635<br>(116,487.254) | -7,781.690<br>(9,415.112)   | -20,641.500**<br>(8,199.442) | -13,460.938<br>(9,410.331)  | 794 |
| Clothing expenditures            | 13,690.355<br>(12,465.395)  | -1,953.962*<br>(1,020.229)  | -1,975.003*<br>(1,014.018)   | -1,341.520<br>(1,029.550)   | 794 |
| Education expenditures           | 17,618.050<br>(32,912.397)  | -2,276.329<br>(2,959.122)   | -1,459.214<br>(3,381.620)    | -5,516.753**<br>(2,498.740) | 869 |
| Home expenditures                | 12,242.081<br>(43,070.028)  | 10,957.829**<br>(5,202.826) | -695.668<br>(5,545.050)      | 758.416<br>(4,354.087)      | 794 |
| Tempation good expenditures      | 663.249<br>(1,415.022)      | 163.540<br>(110.915)        | 102.361<br>(116.336)         | -27.050<br>(121.608)        | 794 |
| Celebration expenditures         | 26,987.817<br>(48,477.371)  | 2,713.915<br>(4,676.136)    | 5,345.627<br>(5,279.414)     | 9,830.294**<br>(4,197.035)  | 794 |
| Ceremonial expenditures          | 4,392.386<br>(9,032.441)    | -2,621.597***<br>(953.127)  | -2,167.429**<br>(946.077)    | -842.731<br>(931.690)       | 794 |
| Gifts and donations expenditures | 5,210.980<br>(12,644.375)   | 2,884.712*<br>(1,688.888)   | 2,130.641<br>(2,060.226)     | 1,281.279<br>(1,509.468)    | 794 |
| Livestock expenditures           |                             |                             |                              |                             |     |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Physical health (pay-it-forward)

[▶ see direct](#)[▶ indices](#)

|                         | Control mean     | FT                | NG                  | NVT               | N   |
|-------------------------|------------------|-------------------|---------------------|-------------------|-----|
| Physical health index   | 0.000<br>(1.000) | -0.068<br>(0.105) | 0.253***<br>(0.092) | -0.041<br>(0.100) | 798 |
| Subjective own health   | 6.508<br>(1.856) | -0.097<br>(0.227) | 0.569**<br>(0.214)  | -0.251<br>(0.179) | 796 |
| Days work missed        | 1.599<br>(3.532) | 0.498<br>(0.423)  | 0.238<br>(0.495)    | 0.361<br>(0.330)  | 796 |
| Subjective child health | 7.099<br>(1.790) | 0.042<br>(0.317)  | 0.531*<br>(0.286)   | 0.160<br>(0.270)  | 562 |
| Days school missed      | 0.847<br>(2.573) | 0.056<br>(0.286)  | -0.361<br>(0.245)   | 0.063<br>(0.266)  | 521 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

# Food security (pay-it-forward)

▶ see direct

▶ indices

|                             | Control mean      | FT                 | NG                | NVT               | N   |
|-----------------------------|-------------------|--------------------|-------------------|-------------------|-----|
| Food security index         | -0.000<br>(1.000) | 0.121<br>(0.152)   | -0.063<br>(0.144) | 0.065<br>(0.127)  | 798 |
| Meals per day               | 3.249<br>(0.509)  | 0.163**<br>(0.061) | 0.110<br>(0.071)  | 0.036<br>(0.064)  | 796 |
| Household has enough to eat | 0.741<br>(0.439)  | 0.069<br>(0.059)   | -0.013<br>(0.057) | 0.054<br>(0.052)  | 796 |
| HDDS (household)            | 4.766<br>(1.109)  | -0.023<br>(0.151)  | -0.076<br>(0.165) | -0.036<br>(0.144) | 796 |
| CDDS (child)                | 4.526<br>(1.231)  | -0.017<br>(0.196)  | -0.078<br>(0.212) | -0.110<br>(0.176) | 534 |

OLS regressions, clustered (VDC) standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



# Balance: demographics (Direct)

|                      | Sample mean        | FT                 | NG                | NVT                | FT=NG              | FT=NVT              | NG=NVT             | N     |
|----------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|--------------------|-------|
| Respondent age       | 40.616<br>(13.786) | -0.661<br>(1.440)  | -1.196<br>(1.971) | -2.683<br>(1.729)  | 0.535<br>(0.783)   | 2.022<br>(0.235)    | 1.486<br>(0.493)   | 1,108 |
| Respondent education | 2.898<br>(4.080)   | -0.406<br>(0.603)  | 0.550<br>(0.689)  | -0.128<br>(0.653)  | -0.957*<br>(0.067) | -0.278<br>(0.549)   | 0.678<br>(0.239)   | 1,108 |
| Spouse age           | 44.519<br>(13.816) | -0.899<br>(1.654)  | -1.125<br>(2.227) | -2.560<br>(1.804)  | 0.226<br>(0.918)   | 1.661<br>(0.347)    | 1.434<br>(0.535)   | 980   |
| Spouse education     | 5.563<br>(4.300)   | -0.174<br>(0.886)  | 0.927<br>(0.999)  | 0.501<br>(0.920)   | -1.101<br>(0.140)  | -0.675<br>(0.283)   | 0.426<br>(0.585)   | 980   |
| No spouse            | 0.116<br>(0.321)   | -0.029<br>(0.026)  | 0.028<br>(0.036)  | -0.044*<br>(0.024) | -0.057<br>(0.124)  | 0.015<br>(0.559)    | 0.072**<br>(0.047) | 1,109 |
| Maximum education    | 9.163<br>(3.853)   | -0.752<br>(0.723)  | 0.066<br>(0.836)  | -0.228<br>(0.793)  | -0.818<br>(0.201)  | -0.524<br>(0.365)   | 0.294<br>(0.681)   | 1,108 |
| household size       | 5.793<br>(2.559)   | -0.414*<br>(0.237) | -0.198<br>(0.319) | -0.029<br>(0.222)  | -0.216<br>(0.469)  | -0.385**<br>(0.045) | -0.169<br>(0.555)  | 1,108 |
| TLU                  | 2.466<br>(2.149)   | -0.108<br>(0.408)  | -0.247<br>(0.361) | 0.297<br>(0.394)   | 0.139<br>(0.717)   | -0.405<br>(0.332)   | -0.544<br>(0.144)  | 1,109 |
| Land (ha)            | 0.464<br>(0.609)   | -0.055<br>(0.087)  | -0.048<br>(0.082) | -0.086<br>(0.090)  | -0.007<br>(0.922)  | 0.031<br>(0.712)    | 0.039<br>(0.627)   | 1,109 |

▶ back

# Balance: indices (Direct)

|                       | Control mean      | FT                 | NG                | NVT               | FT=NG                | FT=NVT              | NG=NVT             | N     |
|-----------------------|-------------------|--------------------|-------------------|-------------------|----------------------|---------------------|--------------------|-------|
| Empowerment           | -0.075<br>(1.041) | -0.200<br>(0.152)  | 0.043<br>(0.101)  | -0.156<br>(0.146) | -0.243<br>(0.102)    | -0.044<br>(0.808)   | 0.199<br>(0.160)   | 1,101 |
| Financial inclusion   | -0.029<br>(0.905) | -0.158<br>(0.117)  | 0.131<br>(0.137)  | -0.099<br>(0.106) | -0.289*<br>(0.062)   | -0.059<br>(0.636)   | 0.230<br>(0.113)   | 1,109 |
| Aspirations           | -0.114<br>(1.004) | -0.214<br>(0.195)  | 0.068<br>(0.211)  | -0.317<br>(0.196) | -0.282<br>(0.128)    | 0.103<br>(0.534)    | 0.385**<br>(0.041) | 1,109 |
| Mental health         | -0.053<br>(1.003) | -0.210<br>(0.141)  | 0.068<br>(0.136)  | -0.087<br>(0.165) | -0.278**<br>(0.023)  | -0.123<br>(0.418)   | 0.155<br>(0.291)   | 1,109 |
| Assets                | -0.143<br>(0.931) | -0.275<br>(0.183)  | -0.161<br>(0.154) | -0.154<br>(0.182) | -0.115<br>(0.501)    | -0.122<br>(0.536)   | -0.007<br>(0.966)  | 1,109 |
| Income                | 11.802<br>(1.370) | -0.022<br>(0.228)  | 0.306<br>(0.237)  | 0.030<br>(0.206)  | -0.328<br>(0.174)    | -0.051<br>(0.805)   | 0.276<br>(0.208)   | 978   |
| Non-food expenditures | 11.969<br>(1.051) | -0.308*<br>(0.169) | 0.001<br>(0.176)  | -0.170<br>(0.179) | -0.309**<br>(0.020)  | -0.138<br>(0.305)   | 0.172<br>(0.230)   | 1,105 |
| Physical health       | 0.004<br>(0.985)  | -0.217*<br>(0.119) | 0.143<br>(0.094)  | 0.070<br>(0.106)  | -0.361***<br>(0.002) | -0.287**<br>(0.021) | 0.074<br>(0.446)   | 1,109 |
| Food security         | 0.003<br>(1.019)  | -0.073<br>(0.124)  | 0.052<br>(0.143)  | 0.026<br>(0.124)  | -0.125<br>(0.436)    | -0.099<br>(0.491)   | 0.026<br>(0.872)   | 1,109 |

# Balance: demographics (PIF)

|                      | Sample mean        | FT                | NG                | NVT               | FT=NG              | FT=NVT              | NG=NVT            | N   |
|----------------------|--------------------|-------------------|-------------------|-------------------|--------------------|---------------------|-------------------|-----|
| Respondent age       | 41.121<br>(14.180) | 2.671<br>(1.851)  | 0.250<br>(1.561)  | 0.803<br>(1.685)  | 2.421<br>(0.237)   | 1.868<br>(0.382)    | -0.553<br>(0.769) | 873 |
| Respondent education | 2.503<br>(3.790)   | -0.548<br>(0.539) | -0.265<br>(0.513) | -0.351<br>(0.542) | -0.284<br>(0.554)  | -0.197<br>(0.699)   | 0.086<br>(0.858)  | 873 |
| Spouse age           | 44.723<br>(13.974) | 1.724<br>(1.826)  | 1.714<br>(1.959)  | 0.325<br>(1.698)  | 0.010<br>(0.996)   | 1.399<br>(0.482)    | 1.389<br>(0.511)  | 775 |
| Spouse education     | 4.899<br>(4.192)   | -0.279<br>(0.614) | -0.153<br>(0.641) | -0.010<br>(0.699) | -0.126<br>(0.814)  | -0.269<br>(0.655)   | -0.144<br>(0.820) | 775 |
| No spouse            | 0.112<br>(0.316)   | 0.035<br>(0.034)  | 0.038<br>(0.030)  | 0.028<br>(0.032)  | -0.002<br>(0.948)  | 0.008<br>(0.838)    | 0.010<br>(0.768)  | 873 |
| Maximum education    | 8.759<br>(3.983)   | -0.585<br>(0.574) | -0.082<br>(0.653) | -0.311<br>(0.659) | -0.503<br>(0.355)  | -0.274<br>(0.619)   | 0.229<br>(0.717)  | 873 |
| household size       | 5.920<br>(2.809)   | -0.529<br>(0.320) | 0.119<br>(0.368)  | 0.194<br>(0.339)  | -0.648*<br>(0.054) | -0.723**<br>(0.018) | -0.075<br>(0.829) | 873 |
| TLU                  | 2.339<br>(2.082)   | 0.310<br>(0.316)  | 0.360<br>(0.427)  | 0.283<br>(0.379)  | -0.050<br>(0.903)  | 0.027<br>(0.939)    | 0.077<br>(0.866)  | 873 |
| Land (ha)            | 0.468<br>(0.669)   | 0.054<br>(0.075)  | 0.105<br>(0.081)  | 0.149*<br>(0.081) | -0.050<br>(0.563)  | -0.095<br>(0.272)   | -0.045<br>(0.623) | 873 |

▶ back

# Balance: indices (PIF)

|                       | Control mean      | FT                  | NG                | NVT                  | FT=NG                | FT=NVT              | NG=NVT            | N   |
|-----------------------|-------------------|---------------------|-------------------|----------------------|----------------------|---------------------|-------------------|-----|
| Empowerment           | 0.121<br>(0.958)  | 0.145<br>(0.133)    | 0.175<br>(0.156)  | 0.163<br>(0.155)     | -0.030<br>(0.820)    | -0.019<br>(0.888)   | 0.012<br>(0.940)  | 867 |
| Financial inclusion   | 0.097<br>(0.976)  | 0.167<br>(0.118)    | 0.184<br>(0.188)  | 0.047<br>(0.122)     | -0.016<br>(0.930)    | 0.120<br>(0.308)    | 0.137<br>(0.468)  | 873 |
| Aspirations           | -0.224<br>(1.033) | -0.205<br>(0.170)   | -0.226<br>(0.212) | -0.449***<br>(0.160) | 0.020<br>(0.921)     | 0.244<br>(0.118)    | 0.224<br>(0.265)  | 873 |
| Mental health         | -0.105<br>(0.962) | -0.141<br>(0.155)   | -0.074<br>(0.162) | -0.199<br>(0.166)    | -0.066<br>(0.640)    | 0.058<br>(0.693)    | 0.124<br>(0.419)  | 873 |
| Assets                | -0.015<br>(0.921) | -0.096<br>(0.154)   | 0.084<br>(0.132)  | -0.044<br>(0.146)    | -0.179<br>(0.232)    | -0.051<br>(0.750)   | 0.128<br>(0.362)  | 873 |
| Income                | 11.795<br>(1.312) | -0.233<br>(0.201)   | 0.138<br>(0.189)  | -0.111<br>(0.191)    | -0.370**<br>(0.024)  | -0.121<br>(0.456)   | 0.249*<br>(0.096) | 754 |
| Non-food expenditures | 12.008<br>(1.003) | -0.405**<br>(0.163) | -0.172<br>(0.179) | -0.183<br>(0.163)    | -0.233*<br>(0.073)   | -0.222**<br>(0.037) | 0.011<br>(0.932)  | 869 |
| Physical health       | 0.054<br>(0.939)  | -0.027<br>(0.116)   | 0.209*<br>(0.111) | 0.040<br>(0.134)     | -0.236***<br>(0.004) | -0.067<br>(0.538)   | 0.169<br>(0.104)  | 873 |
| Food security         | -0.096<br>(1.022) | -0.261**<br>(0.112) | 0.016<br>(0.117)  | -0.134<br>(0.115)    | -0.277**<br>(0.024)  | -0.127<br>(0.284)   | 0.150<br>(0.226)  | 873 |

# Alternative indices (Direct)

▶ PIF

▶ main indices

|                                     | Control mean      | FT                               | NG                              | NVT                             | N     |
|-------------------------------------|-------------------|----------------------------------|---------------------------------|---------------------------------|-------|
| Empowerment (Anderson)              | -0.000<br>(1.000) | 0.253***<br>(0.084) <sup>‡</sup> | 0.235**<br>(0.104) <sup>†</sup> | 0.227**<br>(0.092) <sup>†</sup> | 1,033 |
| Empowerment (Anderson, no groups)   | 0.000<br>(1.000)  | 0.175**<br>(0.072) <sup>†</sup>  | 0.145<br>(0.105)                | 0.144<br>(0.086)                | 1,033 |
| Finance (no groups)                 | -0.000<br>(1.000) | 0.223**<br>(0.095) <sup>†</sup>  | 0.266**<br>(0.111) <sup>†</sup> | 0.251**<br>(0.094) <sup>‡</sup> | 1,033 |
| Aspirations (Bernard & Taffesse)    | -0.000<br>(1.000) | 0.139<br>(0.092)                 | 0.235<br>(0.145)                | 0.104<br>(0.124)                | 1,106 |
| Assets (no pen)                     | -0.000<br>(1.000) | 0.036<br>(0.074)                 | -0.006<br>(0.077)               | -0.030<br>(0.073)               | 1,033 |
| Productive assets (no pen)          | -0.000<br>(1.000) | 0.137<br>(0.104)                 | 0.088<br>(0.097)                | -0.051<br>(0.090)               | 1,033 |
| Non-food expenditure (no livestock) | 12.067<br>(1.076) | -0.214**<br>(0.094)              | -0.073<br>(0.107)               | -0.071<br>(0.104)               | 1,029 |

Estimates with clustered (VDC) standard errors in parentheses. Columns 4-6: Wald tests of equal treatment effects with p-values in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Controlling for FDR (Benjamani and Hochberg, 1995): <sup>‡</sup>  $q < 0.05$ , <sup>†</sup>  $q < 0.1$ , <sup>§</sup>  $q < 0.12$ .

# Alternative indices (PIF)

▶ direct

▶ main indices

|                                     | Control mean      | FT                               | NG                               | NVT                              | N   |
|-------------------------------------|-------------------|----------------------------------|----------------------------------|----------------------------------|-----|
| Empowerment (Anderson)              | -0.000<br>(1.000) | 0.364***<br>(0.099) <sup>‡</sup> | 0.405***<br>(0.080) <sup>‡</sup> | 0.229**<br>(0.089) <sup>§</sup>  | 798 |
| Empowerment (Anderson, no groups)   | 0.000<br>(1.000)  | 0.311***<br>(0.092) <sup>‡</sup> | 0.314***<br>(0.079) <sup>‡</sup> | 0.260***<br>(0.090) <sup>†</sup> | 798 |
| Finance (no groups)                 | -0.000<br>(1.000) | 0.158<br>(0.098)                 | 0.323***<br>(0.094) <sup>‡</sup> | 0.133<br>(0.101)                 | 798 |
| Aspirations (Bernard & Taffesse)    | 0.000<br>(1.000)  | 0.018<br>(0.134)                 | 0.212*<br>(0.106) <sup>§</sup>   | 0.124<br>(0.086)                 | 867 |
| Assets (no pen)                     | -0.000<br>(1.000) | 0.080<br>(0.073)                 | -0.064<br>(0.060)                | 0.005<br>(0.067)                 | 798 |
| Productive assets (no pen)          | -0.000<br>(1.000) | 0.165*<br>(0.093)                | 0.034<br>(0.100)                 | -0.004<br>(0.098)                | 798 |
| Non-food expenditure (no livestock) | 11.977<br>(1.085) | -0.025<br>(0.118)                | -0.144<br>(0.125)                | -0.023<br>(0.091)                | 794 |

Estimates with clustered (VDC) standard errors in parentheses. Columns 4-6: Wald tests of equal treatment effects with p-values in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Controlling for FDR (Benjamani and Hochberg, 1995): <sup>‡</sup>  $q < 0.05$ , <sup>†</sup>  $q < 0.1$ , <sup>§</sup>  $q < 0.12$ .

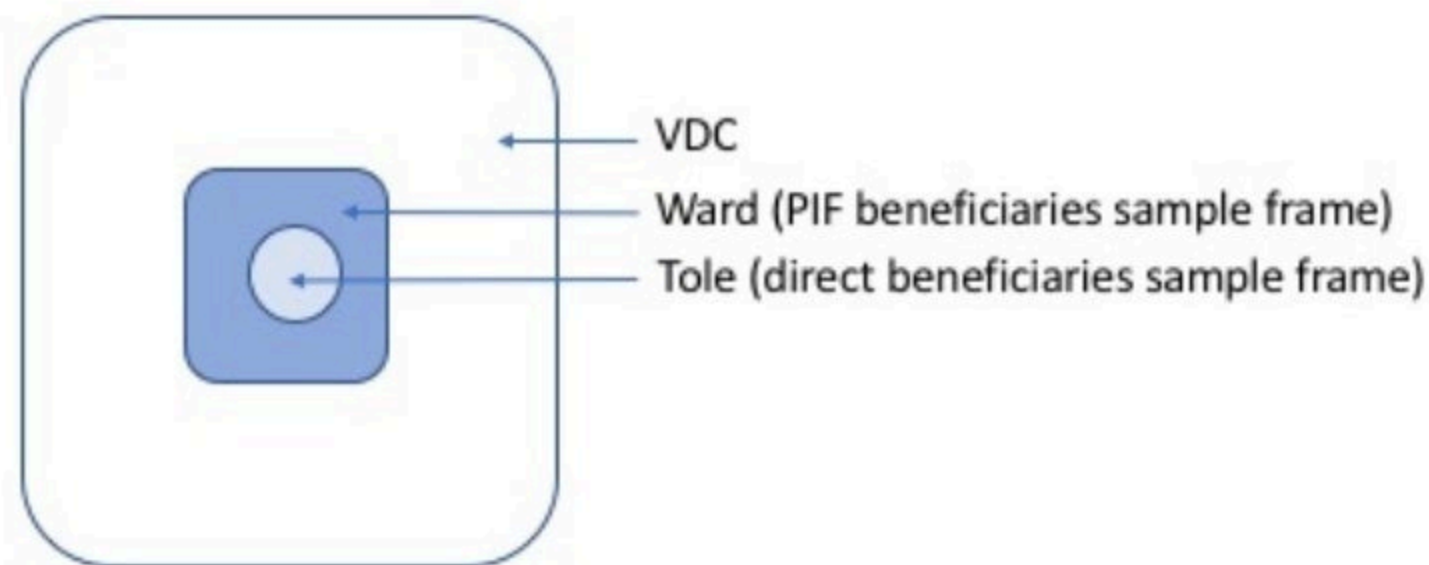
# Sample frame and randomization

map

design

Within project areas, Nepal-based HI staff identified:

- 60 VDCs
- A central ward within each VDC
- A targeted tole within each central ward



# Description of program components by treatment design

| Description of Program Components  | T1<br>(FT) | T2<br>(NG) | T3<br>(NVT) |
|--|------------|------------|-------------|
| <b>Basic intervention</b>  | x          | x          | x           |
| <i>SHG formation</i>   |            |            |             |
| <i>SHG savings encouragement</i>   |            |            |             |
| <i>training on nutrition</i>   |            |            |             |
| <i>training on improved animal management</i>                              |            |            |             |
| <i>training and cash support (\$5) for home gardening</i>                  |            |            |             |
| <i>training and cash support (\$10) for fodder &amp; forage production</i> |            |            |             |
| <i>cash support (\$40) for goat shed improvement</i>                       |            |            |             |
| <i>access to community animal health worker</i>                            |            |            |             |
| <b>Productive asset transfer</b>   | x          |            | x           |
| <i>2 doe goats</i>   |            |            |             |
| <i>1 shared buck of improved breeding stock (per SHG)</i>                  |            |            |             |
| <b>Values-based trainings</b>  | x          | x          |             |
| <i>encouragement to "pay-it-forward"</i>                                   |            |            |             |
| <i>training on SHG management</i>  |            |            |             |
| <i>training on gender and justice</i>                                      |            |            |             |
| <i>training on remaining HI Cornerstones*</i>                              |            |            |             |



# Study area



back



# Sample frame and randomization

- Stratified by geography and caste/ethnicity
- Contamination of control unlikely:
  - low population density
  - rugged terrain
  - poor roads
  - poor connectivity
  - central wards



# Existing empirical evidence

Recent evidence show similar programs increase/improve:

- Income/expenditures (Bandiera et al. 2017; Banerjee et al. 2015; Jodlowski et al. 2016)
- Savings (Bandiera et al. 2017; Banerjee et al. 2015)
- Food consumption/diet quality/food security (Bandiera et al. 2017; Banerjee et al. 2015; Darrouzet-Nardi et al. 2016; Kafle et al. 2016)
- Anthropometrics (Miller et al. 2014; Rawlins et al. 2014)

Evidence of impacts on emotional well-being and women's empowerment have been mixed (Bandiera et al. 2017; Banerjee et al. 2015) **costs**

# Existing evidence

Banerjee et al. (2015) evaluation of the Graduation Program in six countries:

- After 3 years, positive impacts on expenditure, food security, assets, finance, time use, income and mental health
- Women's empowerment initially increases, but effect dissipates over time
- No evidence of spillover or indirect effects

Heifer program distinct from Graduation program in several important ways

- Does not target poorest households within a community
- Asset transfer is one-quarter to one-half the size
- Beneficiaries do not receive regular food or cash transfers for a year
- Beneficiaries expected to transfer program benefits

costs

# Program costs

| <b>Panel A: Costs for direct beneficiaries</b> | <b>FT</b>    | <b>NG</b>    | <b>NVT</b>   |
|--|--------------|--------------|--------------|
| <i>Basic intervention</i>                      | 231          | 231          | 231          |
| <i>Productive asset transfer</i>               | 130          |              | 130          |
| <i>Values-based trainings</i>                  | 31           | 38           |              |
| <b>Per-beneficiary total</b>                   | <b>\$392</b> | <b>\$269</b> | <b>\$361</b> |

| <b>Panel B: Costs for PIF beneficiaries</b> |             |             |            |
|---|-------------|-------------|------------|
| <i>Basic intervention</i>                   | 62          | 62          |            |
| <i>Productive asset transfer</i>            | 10          |             |            |
| <i>Values-based trainings</i>               | 10          | 10          |            |
| <b>Per-beneficiary total</b>                | <b>\$82</b> | <b>\$72</b> | <b>\$0</b> |