Permutation tests

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Contents

Use the 'trimmed' sample (has all 800 members) rather than the 'initial' sample (has only 776 members after dropping members who received loans only twice). To set to the trimmed sample, set the parameter UseTrimmedSample to T.

```
UseTrimmedSample ← T
TestMedian ← F
```

We use the 'initial' sample (has only 776 members after dropping members who received loans only twice), not the 'trimmed' sample (has all 800 members). To set to the trimmed sample, set the parameter UseTrimmedSample to T. Here, we set to F.

```
UseTrimmedSample ← F
TestMedian ← F
```

```
source(paste0(pathprogram, "MergeAllNarrowNetAssetsANCOVA.R"))
```

```
             AttritIn
Arm             2   3   4   9 Sum
  traditional   7   4  20 144 175
  large         5   2   1 192 200
  large grace  23   3   3 171 200
  cow           5   5  13 177 200
  Sum          40  14  37 684 775
                    AttritIn
BStatus                2   3   4   9 Sum
  borrower             8   6   8 578 600
  pure saver           0   0   0   0   0
  individual rejection 9   4   1  75  89
  group rejection     11   4   0  55  70
  rejection by flood  12   0  28   0  40
  Sum                 40  14  37 708 799
         AttritIn
TradGroup   2   3   4   9 Sum
  planned   0   0   1  83  84
  twice     0   0   0  24  24
  double    0   0   0   0   0
  <NA>     40  14  36 601 691
  Sum      40  14  37 708 799
             AttritIn
Arm             2   3   4   9 Sum
  traditional   7   4  20 168 199
  large         5   2   1 192 200
  large grace  23   3   3 171 200
  cow           5   5  13 177 200
  Sum          40  14  37 708 799
```

```
             AttritIn
Arm             2   3   4   9 Sum
  traditional   7   4  20 144 175
  large         5   2   1 192 200
  large grace  23   3   3 171 200
  cow           5   5  13 177 200
  Sum          40  14  37 684 775


Number of obs based on narrow assets
             tee
Arm              1    2    3    4  Sum
  traditional  175  168  163  143  649
  large        200  195  192  188  775
  large grace  200  177  174  164  715
  cow          200  195  190  171  756
  Sum          775  735  719  666 2895
             AttritIn
Arm             2   3   4   9 Sum
  traditional   7   4  20 144 175
  large         5   2   1 192 200
  large grace  23   3   3 171 200
  cow           5   5  13 177 200
  Sum          40  14  37 684 775


Number of obs based on roster
             AttritIn
Arm             2   3   4   9 Sum
  traditional   7   4  20 144 175
  large         5   2   1 192 200
  large grace  23   3   3 171 200
  cow           5   5  13 177 200
  Sum          40  14  37 684 775


Number of nonattriting obs but with lacking 4 entries in assets
             ObPattern
Arm           0111 1111 <NA> Sum
  traditional    1    0    0   1
  large          3    0    1   4
  large grace    5    1    1   7
  cow            5    0    1   6
  Sum           14    1    3  18
```

```
ar ← readRDS(paste0(pathsaveHere, DataFileNames[3], "Trimmed.rds"))
arA ← readRDS(paste0(pathsaveHere, DataFileNames[2], "Trimmed.rds"))
ass ← readRDS(paste0(pathsaveHere, DataFileNames[4], "Trimmed.rds"))
lvo ← readRDS(paste0(pathsaveHere, DataFileNames[5], "Trimmed.rds"))
#NeA ← readRDS(paste0(pathsaveHere, "NetAssetsANCOVATrimmed.rds"))
NeA1R ← readRDS(paste0(pathsaveHere, "NarrowNetAssetsANCOVATrimmed.rds"))
# NeA1R2 drops 24 members in trad who were disbursed loans only twice or once
NeA1R2 ← readRDS(paste0(pathsaveHere, "NarrowNetAssetsANCOVA.rds"))
setnames(NeA1R, c("NetValue", "NarrowNetValue"),
  c("BroadNetValue", "NetValue"))
rsk ← readRDS(paste0(pathsaveHere, "RiskPreferences.rds"))
rsk2 ← rsk[, .(hhid, RiskPrefVal, TimePref1Val, TimePref2Val, PresentBias)]
if (Only800) ar ← ar[o800 == 1L, ]
```

There are 92 members who attrited.

```
addmargins(table0(ar[tee==1 & o800==1 & AttritIn<9 , .(BStatus,AttritIn)]))
```

```
                     AttritIn
BStatus                2  3  4 Sum
  borrower             8  6  8  22
  pure saver           0  0  0   0
  individual rejection 10  4  1  15
  group rejection      11  4  0  15
  rejection by flood   12  0 28  40
  Sum                  41 14 37  92
```

```
#addmargins(table(ar[mid == 1 & Time == 1, .(BStatus, Arm)]), 1:2, sum, T)
#addmargins(table(ar[mid == 1 & Time == 4, .(BStatus, Arm)]), 1:2, sum, T)
# "ar" is roster
# AttritIn is created as below in read_cleaned_data.rnw
# (465): xid[, AttritIn := 9L]
# (466): xid[grepl("^En|^2nd and 4", missing_followup), AttritIn := 4L]
# (467): xid[grepl("^3rd and 4", missing_followup), AttritIn := 3L]
# (468): xid[grepl("^2.*3.*4", missing_followup), AttritIn := 2L]
```

```
ar[, Tee := max(survey), by = hhid]
arA[, Tee := max(survey), by = hhid]
ass[, Tee := max(survey), by = hhid]
lvo[, Tee := max(survey), by = hhid]
```

Correct AttritIn for these 24 members. Keep only the 1st obs for all members.

```
addmargins(table(ar[tee == 1 & grepl("tw|dou", TradGroup), AttritIn]))
```

```
  9 Sum
 24  24
```

```
#ar[Tee == 1 & AttritIn == 9 & grepl("tw|dou", TradGroup), AttritIn := 2L]
```

There are 24 members with TradGroup = twice, double. They were dropped from estimation sample. If UseTrimmedSample==T, attrition is based on all 800 members, if F, attrition is analysed using 776 members.

```
if (!UseTrimmedSample) ar ← ar[!grepl("tw|dou", TradGroup), ]
addmargins(table0(ar[o800 == 1L & tee == 1, .(Tee, AttritIn)]))
```

```
     AttritIn
Tee     2   3   4   9 Sum
  1    41   0   0   0  41
  2     0  14   0   0  14
  3     0   0  37   0  37
  4     0   0   0 684 684
  Sum  41  14  37 684 776
```

```
psas ← ass[o800 == 1 & tee == 1,
  .(hhid, tee, HAssetAmount, PAssetAmount)]
pslv ← lvo[o800 == 1 & tee == 1,
  .(hhid, tee, TotalImputedValue, NumCows)]
nne ← NeA1R[o800 == 1 & tee == 1,
  .(hhid, tee, NetValue, BroadNetValue)]
```

```
source(paste0(pathprogram, "AttritionPermutationTableHeaders5.R"))
armerge ← ar[, c("groupid", "hhid", "mid", "o800", "TradGroup",
  "BStatus", "AttritIn", "survey", "tee", "Time", vartobetested[1:5]), with = F]
armerge[, En := 1:.N, by = .(hhid, Time)]
armerge[, Tee := .N, by = .(hhid, mid, Time)]
armerge ← armerge[En == 1 & Time == 1 & o800 == 1, ]
as ← merge(armerge, psas, by = c("hhid", "tee"), all.x = T)
asl ← merge(as, pslv, by = c("hhid", "tee"), all.x = T)
asln ← merge(asl, nne, by = c("hhid", "tee"), all.x = T)
asv ← merge(asln, rsk2, by = "hhid", all.x = T)
addmargins(table0(asv[!grepl("tw|dou", TradGroup), .(Arm, AttritIn)]))
```

```
             AttritIn
Arm             2   3   4   9 Sum
  traditional   8   4  20 144 176
  large         5   2   1 192 200
  large grace  23   3   3 171 200
  cow           5   5  13 177 200
  Sum          41  14  37 684 776
```

```
# keep only rational respondents of risk preferences

# use tee==4 to define attrition, where tee is survey round in asset and livestock
# while tee in roster is meeting number (must rename survey to tee)
asv[, Attrited := 0L]
asv[hhid %in% hhid[AttritIn < 9], Attrited := 1L]
addmargins(table0(asv[!grepl("tw|dou", TradGroup), .(Arm, Attrited)]))
```

```
             Attrited
Arm             0   1 Sum
  traditional 144  32 176
  large       192   8 200
  large grace 171  29 200
  cow         177  23 200
  Sum         684  92 776
```

```
asv[, c("Rejected", "GRejected", "IRejected") := 0L]
asv[grepl("^i.*rej", BStatus), IRejected := 1L]
asv[grepl("^g.*rej", BStatus), GRejected := 1L]
asv[IRejected == 1L | GRejected == 1L, Rejected := 1L]
asv[, Active := 1L]
asv[Attrited == 1 | Rejected == 1, Active := 0L]
saveRDS(asv, paste0(pathsaveHere, "DestatData.rds"))
```

Attrition of members who were not affected by floods.

```
asv ← readRDS(paste0(pathsaveHere, "DestatData.rds"))
addmargins(table0(asv[!grepl("flo", BStatus) & Rejected == 0, .(Attrited, Arm)]))
```

```
        Arm
Attrited traditional large large grace cow Sum
     0           83   164         160 147 554
     1            2     7           7   6  22
     Sum         85   171         167 153 576
```

```
# these are HHs with two disbursements under traditional; read_admin_data.rnw(472)
# adw[(loanamount1st == 5600 & loanamount2nd == 5600 & loanamount3rd == 5600) |
#   (!is.na(DisDate1) & !is.na(DisDate2) & !is.na(DisDate3)),
```

```
#   TradGroup := "planned"]
# adw[loanamount1st == 5600 & loanamount2nd == 11200,
#   TradGroup := "double"]
# adw[(loanamount1st == 7840 & loanamount2nd == 8960) |
#   (!is.na(DisDate1) & !is.na(DisDate2) & is.na(DisDate3)),
#   TradGroup := "twice"]
# adw[, TradGroup := factor(TradGroup, levels = c("planned", "twice", "double"))]

# data to use in each tests: TradNonTradAttrited, AttritedInTrad, TradNonTradRejected, IRe
# drop 2 loan receivers
asv1 ← asv[!grepl("tw|dou", TradGroup), ]
# drop group rejecters
asv2 ← asv[!grepl("gr", BStatus), ]
# drop 2 loan receivers and group rejecters
asv3 ← asv[!grepl("gr", BStatus) & !grepl("tw|dou", TradGroup), ]
asvT ← asv[grepl("tra", Arm), ]
asvNT ← asv[!grepl("tra", Arm), ]
# data to be used for each tested variable
datalist ← rep("asv", length(vartobetested))
datalist1 ← paste0(datalist, 1) # drop 2 loan receivers
datalist2 ← paste0(datalist, 2) # drop group rejecters
datalist3 ← paste0(datalist, 3) # drop 2 loan receivers and group rejecters
datasets ← "asv"
datasets1 ← paste0(datasets, 1)
datasets2 ← paste0(datasets, 2)
datasets3 ← paste0(datasets, 3)
for (k in 1:3) {
  addchar ← c("f", "t", "j")[k]
  Datasets ← get(paste0("datasets", c("", 1, 2)[k]))
  for (dd in Datasets) {
    xdd ← get(dd)
    # all members all arms: attrited vs. nonattrited
    xa ← xdd
    assign(paste0(dd, "a", addchar), xa)
    # all in trad: attrition vs. nonattrition
    xTa ← xdd[grepl("trad", Arm), ]
    assign(paste0(dd, "Ta", addchar), xTa)
    # all in nontrad: attrition vs. nonattrition
    xNTa ← xdd[!grepl("trad", Arm), ]
    assign(paste0(dd, "NTa", addchar), xNTa)
    # attrited members in all arms: trad vs. nontrad
    xTNTa ← xdd[Attrited == 1L, ]
    xTNTa[, TradArm := 1L]; xTNTa[!grepl("trad", Arm), TradArm := 0L]
    assign(paste0(dd, "TNTa", addchar), xTNTa)
    # all members except flood victims: attrited vs. nonattrited
    xNFa ← xdd[!grepl("floo", BStatus), ]
    assign(paste0(dd, "NFa", addchar), xNFa)
    # all except flood victims in trad: attrition vs. nonattrition
    xNFTa ← xdd[!grepl("floo", BStatus) & grepl("trad", Arm), ]
    assign(paste0(dd, "NFTa", addchar), xNFTa)
    # all except flood victims in nontrad: attrition vs. nonattrition
    xNFNTa ← xdd[!grepl("floo", BStatus) & !grepl("trad", Arm), ]
    assign(paste0(dd, "NFNTa", addchar), xNFNTa)
    # attrited members except flood victims in all arms: trad vs. nontrad
    xNFTNTa ← xdd[!grepl("floo", BStatus) & Attrited == 1L, ]
    xNFTNTa[, TradArm := 1L]; xNFTNTa[!grepl("trad", Arm), TradArm := 0L]
```

```
assign(paste0(dd, "NFTNTa", addchar), xNFTNTa)
# attrited members except flood victims in all arms: cow vs. noncow
xNFCNCa ← xdd[!grepl("floo", BStatus) & Attrited == 1L, ]
xNFCNCa[, CowArm := 1L]; xNFCNCa[!grepl("cow", Arm), CowArm := 0L]
assign(paste0(dd, "NFCNCa", addchar), xNFCNCa)
# attrited members except flood victims: cow vs. large grace
xNFCGa ← xdd[!grepl("floo", BStatus) & grepl("cow|gr", Arm) & Attrited == 1L, ]
xNFCGa[, CowArm := 1L]; xNFCGa[!grepl("cow", Arm), CowArm := 0L]
assign(paste0(dd, "NFCGa", addchar), xNFCGa)
# active/surviving (neither attrited nor rejected) members except flood victims
# (these people are considered not fit for the offered program)
# active/survival in all arms
xs ← xdd
assign(paste0(dd, "s", addchar), xs)
# active in trad: attrition vs. nonattrition
xTs ← xdd[grepl("trad", Arm), ]
assign(paste0(dd, "Ts", addchar), xTs)
# active in nontrad: attrition vs. nonattrition
xNTs ← xdd[!grepl("trad", Arm), ]
assign(paste0(dd, "NTs", addchar), xNTs)
# active members in all arms: trad vs. nontrad
xTNTs ← xdd[Active == 1L, ]
xTNTs[, TradArm := 1L]; xTNTs[!grepl("trad", Arm), TradArm := 0L]
assign(paste0(dd, "TNTs", addchar), xTNTs)
# active members: cow vs. noncow
xCNCs ← xdd[!grepl("floo", BStatus) & Active == 1L, ]
xCNCs[, CowArm := 1L]; xCNCs[!grepl("cow", Arm), CowArm := 0L]
assign(paste0(dd, "CNCs", addchar), xCNCs)
# active members: cow vs. lsge grace
xCGs ← xdd[!grepl("floo", BStatus) & grepl("cow|gr", Arm) & Active == 1L, ]
xCGs[, CowArm := 1L]; xCGs[!grepl("cow", Arm), CowArm := 0L]
assign(paste0(dd, "CGs", addchar), xCGs)
# all rejection all arms: rejected vs. nonrejected
xr ← xdd
assign(paste0(dd, "r", addchar), xr)
# all rejection in trad: rejected vs. nonrejected
xTr ← xdd[grepl("trad", Arm), ]
assign(paste0(dd, "Tr", addchar), xTr)
# all rejection in nontrad: rejected vs. nonrejected
xNTr ← xdd[!grepl("trad", Arm), ]
assign(paste0(dd, "NTr", addchar), xNTr)
# all rejection: trad rejecetd vs. nontrad rejected
xTNTr ← xdd[Rejected == 1L, ]
xTNTr[, TradArm := 1L]; xTNTr[!grepl("trad", Arm), TradArm := 0L]
assign(paste0(dd, "TNTr", addchar), xTNTr)
# all rejection: cow rejecetd vs. noncow rejected
xCNCr ← xdd[Rejected == 1L, ]
xCNCr[, CowArm := 1L]; xCNCr[!grepl("cow", Arm), CowArm := 0L]
assign(paste0(dd, "CNCr", addchar), xCNCr)
# all rejection: cow rejecetd vs. large grace rejected
xCLGr ← xdd[grepl("cow|gr", Arm) & Rejected == 1L, ]
xCLGr[, CowArm := 1L]; xCLGr[!grepl("cow", Arm), CowArm := 0L]
assign(paste0(dd, "CLGr", addchar), xCLGr)
# all acceptance: cow accepted vs. noncow accepted
xCNCa ← xdd[Rejected == 0L, ]
xCNCa[, CowArm := 1L]; xCNCa[!grepl("cow", Arm), CowArm := 0L]
```

```
    assign(paste0(dd, "CNCa", addchar), xCNCa)
    # all acceptance: cow accepted vs. large grace accepted
    xCLGa ← xdd[grepl("cow|gr", Arm) & Rejected == 0L, ]
    xCLGa[, CowArm := 1L]; xCLGa[!grepl("cow", Arm), CowArm := 0L]
    assign(paste0(dd, "CLGa", addchar), xCLGa)
    # group rejection in all arms: rejected vs. nonrejected
    xgr ← xdd
    assign(paste0(dd, "gr", addchar), xgr)
    # group rejection in trad: rejecters vs. nonrejecters
    xTgr ← xdd[grepl("tra", Arm), ]
    assign(paste0(dd, "Tgr", addchar), xTgr)
    # group rejection in nontrad: rejecters vs. nonrejecters
    xNTgr ← xdd[!grepl("tra", Arm), ]
    assign(paste0(dd, "NTgr", addchar), xNTgr)
    # group rejection: trad rejecters vs. nontrad rejecters
    xTNTgr ← xdd[GRejected == 1L, ]
    xTNTgr[, TradArm := 1L]; xTNTgr[!grepl("trad", Arm), TradArm := 0L]
    assign(paste0(dd, "TNTgr", addchar), xTNTgr)
    # individual rejection in all arms: rejected vs. nonrejected
    # individual rejecters vs. all except group rejecters
    # group rejecters are excluded because they preceded indiv rejection
    xir ← xdd[!grepl("gr", BStatus), ]
    assign(paste0(dd, "ir", addchar), xir)
    # individual rejection in trad: rejecters vs. nonrejecters
    xTir ← xdd[grepl("tra", Arm) & !grepl("gr", BStatus), ]
    assign(paste0(dd, "Tir", addchar), xTir)
    # individual rejection in nontrad: rejecters vs. nonrejecters
    xNTir ← xdd[!grepl("tra", Arm) & !grepl("gr", BStatus), ]
    assign(paste0(dd, "NTir", addchar), xNTir)
    # individual rejection: trad rejecters vs. nontrad rejecters
    xTNTir ← xdd[!grepl("gr", BStatus) & Rejected == 1L, ]
    xTNTir[, TradArm := 1L]; xTNTir[!grepl("trad", Arm), TradArm := 0L]
    assign(paste0(dd, "TNTir", addchar), xTNTir)
    # trad group rejecters vs. nontrad participants
    xTNTgrp ← xdd[(grepl("gr", BStatus) & grepl("trad", Arm) & Rejected == 1L) |
      (grepl("bo", BStatus) & !grepl("trad", Arm)), ]
    xTNTgrp[, TradArm := 1L]; xTNTgrp[!grepl("trad", Arm), TradArm := 0L]
    assign(paste0(dd, "TNTgrp", addchar), xTNTgrp)
    # trad group vs. nontrad group
    xTNTrandom ← xdd
    xTNTrandom[, TradArm := 1L]; xTNTrandom[!grepl("trad", Arm), TradArm := 0L]
    assign(paste0(dd, "TNTrandom", addchar), xTNTrandom)
  }
}

# data names: ..af, ..rf  (full), ..at, ..rt (drop 2 loan receivers), ..aj, ..rj (drop gro
# data to use: datalist (full), datalist1 (drop 2 loan receivers), datalist2 (drop group r
library(coin)
```

```
要求されたパッケージ
 survival をロード中です
```

```
PM ← vector(mode = "list", length = 3)
for (k in 1:3) {
  addchar ← c("f", "t", "j")[k]
  dataList ← eval(parse(text=paste0("datalist", c("", 1:2))[k]))
```

```
if (addchar == "j") M ← 9 else M ← length(selection.criteria)
Pm ← vector(mode = "list", length = M)
for (m in 1:M) {
  set.seed(100+m)
  if (grepl("^Attrited$", addtofilename[m]))
    DataList ← gsub("$", paste0("a", addchar), dataList) else
  if (grepl("^AttritedInTrad", addtofilename[m]))
    DataList ← gsub("$", paste0("Ta", addchar), dataList) else
  if (grepl("^AttritedInNonTrad", addtofilename[m]))
    DataList ← gsub("$", paste0("NTa", addchar), dataList) else
  if (grepl("^TradNonTradAttrited$", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTa", addchar), dataList) else
  if (grepl("^NonFloodAttrited$", addtofilename[m]))
    DataList ← gsub("$", paste0("NFa", addchar), dataList) else
  if (grepl("^NonFloodAttritedInTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("NFTa", addchar), dataList) else
  if (grepl("^NonFloodAttritedInNonTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("NFNTa", addchar), dataList) else
  if (grepl("^NonFloodTradNonTradAttrited$", addtofilename[m]))
    DataList ← gsub("$", paste0("NFTNTa", addchar), dataList) else
  if (grepl("^NonFloodAttritedCowN", addtofilename[m]))
    DataList ← gsub("$", paste0("NFCNCa", addchar), dataList) else
  if (grepl("^NonFloodAttritedCowL", addtofilename[m]))
    DataList ← gsub("$", paste0("NFCGa", addchar), dataList) else
  if (grepl("^Active$", addtofilename[m]))
    DataList ← gsub("$", paste0("s", addchar), dataList) else
  if (grepl("^ActiveInTrad", addtofilename[m]))
    DataList ← gsub("$", paste0("Ts", addchar), dataList) else
  if (grepl("^ActiveInNonTrad", addtofilename[m]))
    DataList ← gsub("$", paste0("NTs", addchar), dataList) else
  if (grepl("^ActiveTradNonTrad", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTs", addchar), dataList) else
  if (grepl("^ActiveCowN", addtofilename[m]))
    DataList ← gsub("$", paste0("CNCs", addchar), dataList) else
  if (grepl("^ActiveCowL", addtofilename[m]))
    DataList ← gsub("$", paste0("CGs", addchar), dataList) else
  if (grepl("^Random", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTrandom", addchar), dataList) else
  if (grepl("^Rejected$", addtofilename[m]))
    DataList ← gsub("$", paste0("r", addchar), dataList) else
  if (grepl("^Rej.*InTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("Tr", addchar), dataList) else
  if (grepl("^Rej.*InNonTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("NTr", addchar), dataList) else
  if (grepl("^TradNonTradR", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTr", addchar), dataList) else
  if (grepl("^GRejected$", addtofilename[m]))
    DataList ← gsub("$", paste0("gr", addchar), dataList) else
  if (grepl("^GRej.*InTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("Tgr", addchar), dataList) else
  if (grepl("^GRej.*InNonTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("NTgr", addchar), dataList) else
  if (grepl("^TradNonTradGR", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTgr", addchar), dataList) else
  if (grepl("^IRejected$", addtofilename[m]))
    DataList ← gsub("$", paste0("ir", addchar), dataList) else
```

```
  if (grepl("^IRej.*InTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("Tir", addchar), dataList) else
  if (grepl("^IRej.*InNonTrad$", addtofilename[m]))
    DataList ← gsub("$", paste0("NTir", addchar), dataList) else
  if (grepl("^TradNonTradIR", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTir", addchar), dataList) else
  if (grepl("^GRejectedTradPar", addtofilename[m]))
    DataList ← gsub("$", paste0("TNTgrp", addchar), dataList) else
  if (grepl("^RejectedCowN", addtofilename[m]))
    DataList ← gsub("$", paste0("CNCr", addchar), dataList) else
  if (grepl("^RejectedCowLa", addtofilename[m]))
    DataList ← gsub("$", paste0("CLGr", addchar), dataList) else
  if (grepl("^AcceptedCowN", addtofilename[m]))
    DataList ← gsub("$", paste0("CNCa", addchar), dataList) else
  if (grepl("^AcceptedCowLa", addtofilename[m]))
    DataList ← gsub("$", paste0("CLGa", addchar), dataList) else
    DataList ← gsub("$", addchar, dataList)
  pmresults ← permmedian ← vector(mode = "list", length(vartobetested))
  for (i in 1:length(vartobetested)) {
    # if specific arm is selected, Arm is not compared in permutation
    if (grepl("Trad$|TradArm|Cow", addtofilename[m]) &
      vartobetested[i] == "Arm") next
    pmdata ← get(DataList[i])
    # drop NAs in vartobetested[i]
    pmdata ← pmdata[!is.na(eval(parse(text=vartobetested[i]))), ]
    # NULL if vartobetested[i] has uniform values (otherwise returns an error)
    if (length(unique(unlist(pmdata[, vartobetested[i], with = F]))) == 1)
      pmresults[[i]] ← NULL else
      pmresults[[i]] ← independence_test(eval(parse(text=
        paste(vartobetested[i], "~ as.factor(", selection.criteria[m], ")")
        )),
        data = pmdata,
        distribution = approximate(nresample=PermRepTimes))
    if (!TestMedian) next
    if (vartobetested[i] == "Arm" | length(unique(unlist(pmdata[, vartobetested[i], with
      permmedian[[i]] ← NULL else
      permmedian[[i]] ← median_test(eval(parse(text=
        paste(vartobetested[i], "~ as.factor(", selection.criteria[m], ")"))),
        data = pmdata,
        mid.score = "0.5",
        distribution = approximate(nresample=PermRepTimes))
  }
  #pmresults[[1]]@statistic@teststatistic
  Pmtresults ← NULL
  for (i in 1:length(vartobetested))
  {
    if (grepl("Trad$|TradArm|Cow", addtofilename[m]) &
      vartobetested[i] == "Arm") next
    z ← get(DataList[i])
    z ← z[!is.na(eval(parse(text=vartobetested[i]))), ]
    if (vartobetested[i] == "Arm") {
      Pmtresults ← rbind(Pmtresults,
        c(vartobetested[i],
          sum(!grepl("trad", unlist(z[eval(parse(text = selection.criteria[m])) == 0L,
            vartobetested[i], with = F])))/
            nrow(z[eval(parse(text = selection.criteria[m])) == 0L, ]),
```

```
          sum(!grepl("trad", unlist(z[eval(parse(text = selection.criteria[m])) == 1L,
            vartobetested[i], with = F]))/
            nrow(z[eval(parse(text = selection.criteria[m])) == 1L, ]),
          midpvalue(pmresults[[i]]),
          pvalue_interval(pmresults[[i]])))
    } else if (length(unique(unlist(z[, vartobetested[i], with = F]))) == 1)
    {
      # if both groups have no different values,
      # use 0 for all zero entries or 1 for unique nonzero entries
      if (allzerovalues ← unique(unlist(z[, vartobetested[i], with = F])) == 0)
        Pmtresults ← rbind(Pmtresults,
          c(vartobetested[i], 0, 0, rep(NA, 3))) else
        Pmtresults ← rbind(Pmtresults,
          c(vartobetested[i], 1, 1, rep(NA, 3)))
    } else {
      Pmtresults ← rbind(Pmtresults,
        c(vartobetested[i],
          mean(unlist(z[eval(parse(text = selection.criteria[m])) == 0L,
            vartobetested[i], with = F]), na.rm = T),
          mean(unlist(z[eval(parse(text = selection.criteria[m])) == 1L,
            vartobetested[i], with = F]), na.rm = T),
          midpvalue(pmresults[[i]]),
          pvalue_interval(pmresults[[i]])))
      if (TestMedian)
        Pmtresults ← rbind(Pmtresults,
          c("",
            median(unlist(z[eval(parse(text = selection.criteria[m])) == 0L,
              vartobetested[i], with = F]), na.rm = T),
            median(unlist(z[eval(parse(text = selection.criteria[m])) == 1L,
              vartobetested[i], with = F]), na.rm = T),
            midpvalue(permmedian[[i]]),
            pvalue_interval(permmedian[[i]])
          ))
    }
  }
  Pmtresults ← data.table(Pmtresults)
  setnames(Pmtresults, c("variables", paste0(c("Non", ""), selection.criteria[m]),
    "p-value.mid", "p-value.lower", "p-value.upper"))
  Pmtresults[grepl("Impute", variables),
    variables := gsub("To.*", "LivestockValue", variables)]
  cols ← grepout("er|ttr|eje|TradArm|CowA|Activ", colnames(Pmtresults))
  Pmtresults[, (cols) := lapply(.SD, as.numeric), .SDcols = cols]
  Pmtresults[, (cols) := lapply(.SD, formatC, digits = 3, format = "f"), .SDcols = cols
  cols ← grepout("^p", colnames(Pmtresults))
  Pmtresults[, (cols) := lapply(.SD, as.numeric), .SDcols = cols]
  Pmtresults[, (cols) := lapply(.SD,
    function(x) paste0("(", formatC(x*100, digits = 1, format = "f"), ")")), .SDcols = c
  cols ← grepout("ed$|TradArm|CowA|Activ", colnames(Pmtresults))
  Pmtresults[grepl("Ass|Liv|NetV|Val", variables),
    (cols) := lapply(.SD, function(x) formatC(as.numeric(x), digits = 0, format = "f")),
    .SDcols = cols]
  setcolorder(Pmtresults, c("variables", paste0(c("Non", ""), selection.criteria[m]),
    "p-value.lower", "p-value.mid", "p-value.upper"))
  obs0L ← nrow(get(DataList[1])[eval(parse(text = selection.criteria[m])) == 0L, ])
  obs1L ← nrow(get(DataList[1])[eval(parse(text = selection.criteria[m])) == 1L, ])
  nobs ← t(c(NA, obs0L, obs1L, NA, obs1L/(obs0L+obs1L), NA))
```

```
    Pmtresults[, variables := paste0("\\makebox[2.5cm]{\\hfill ", variables, "}")]
    Pmtresults0 ← rbind(Pmtresults, nobs, use.names = F)
    Pmtresults0[nrow(Pmtresults0), variables := "\\makebox[2.5cm]{\\hfill n}"]
    Pm[[m]] ← Pmtresults0
    if (grepl("InNon|InTra|^TradNon|Cow", addtofilename[m]))
      Pmtresults ← Pmtresults[!grepl("Arm", variables), ]
    pmt ← latextab(as.matrix(Pmtresults),
      hleft = "\\scriptsize\\hfil$",
      hcenter = c(3, rep(1.5, ncol(Pmtresults)-1)),
      hright = "$",
      headercolor = "gray80", adjustlineskip = "-.2ex", delimiterline= NULL,
      alternatecolor = "gray90")
    pmt ← rbind(pmt[1:(nrow(pmt)-1), , drop = F],
        paste(c("\\makebox[2.5cm]{\\hfill n}",
         obs0L, obs1L, paste0("\\multicolumn{3}{l}{\\makebox[4.5cm]{\\scriptsize (rate: "
         formatC(obs1L/(obs0L+obs1L), digits = 3, format = "f"), ")\\hfill}}")),
         collapse = " & "),
        pmt[nrow(pmt), , drop = F]
      )
    write.tablev(pmt,
      paste0(pathsavePerm, addtofilename[m],
        c("Full", "", "DropGroupRejecters")[k], "PermutationTestResultso800.tex")
    , colnamestrue = F)
  }
  names(Pm) ← addtofilename[1:M]
  PM[[k]] ← Pm
}
names(PM) ← c("Full", "Drop2LoanReceivers", "DropGroupRejecters")
saveRDS(PM, paste0(pathsavePerm, "AllPermutationTestResults.rds"))

PM ← readRDS(paste0(pathsavePerm, "AllPermutationTestResults.rds"))
# indiv rejecters
Irej ← c("IRejectedInTrad", "IRejectedInNonTrad", "^IRejected$")
ir12 ←  cbind(
    PM[[2]][[grep(Irej[1], addtofilename)]][, c(1:3, 5)],
    PM[[2]][[grep(Irej[2], addtofilename)]][, c(2:3, 5)])
setnames(ir12, c("variables", 1:(ncol(ir12)-1)))
ir3 ← PM[[2]][[grep(Irej[3], addtofilename)]][, c(1:3, 5)]
setnames(ir3, c("variables", 10+1:(ncol(ir3)-1)))
ir3rows ← data.table(variables = ir3[, variables])
setkey(ir12, variables)
setkey(ir3, variables)
ir123 ← ir12[ir3]
ir123 ← ir123[ir3rows]
setnames(ir123, c("variables", paste0("v", 1:(ncol(ir123)-1))))
for (i in paste0("v", c(3, 6, 9)))
  ir123[nrow(ir123), (i) :=
    paste0("(\\mbox{rate }", formatC(as.numeric(eval(parse(text=i))), digits = 3, format =
#cnm ← t(c("\\makebox[3cm]{\\hfil variables}",
#  paste0("\\makebox[1.5cm]{\\hfil ", rep(c("Yes", "No", "$p$ value"), 3), "}")))
cnm ← t(c("\\makebox[2.5cm]{\\hfil }",
  paste0("\\makebox[1.2cm]{(", 1:(ncol(ir123)-1), ")}")))
irj ← as.matrix(rbind(cnm, ir123, use.names = F))
irj[is.na(irj)] ← ""
colnames(irj) ← c("variables", rep(c("Not rejected", "Rejected", "$p$ value"), 3))
irj ← latextab(irj,
```

```
  hleft = "\\scriptsize\\hfil$",
  hcenter = c(2.5, rep(1.2, ncol(irj)-1)),
  hright = "$",
  headercolor = "gray80", adjustlineskip = "-.2ex", delimiterline= NULL,
  alternatecolor = "gray90",
  addseparatingcols = c(3, 6),
  separatingcolwidth = rep(.1, 2),
  separatingcoltitle = c("\\textsf{Traditional} arm", "non-\\textsf{Traditional} arms", "A
  addsubcoltitlehere = T
  )
write.tablev(irj,
  paste0(pathsavePerm, "IndividualRejectionTestResults.tex")
, colnamestrue = F)
# active members
Suv ← c("Acc.*NonCow", "Act.*NonCow")
sv12 ←  cbind(
    PM[[2]][[grep(Suv[1], addtofilename)]][, c(1, 3, 2, 5)],
    PM[[2]][[grep(Suv[2], addtofilename)]][, c(3, 2, 5)])
setnames(sv12, c("variables", paste0("v", 1:(ncol(sv12)-1))))
for (i in paste0("v", c(3, 6)))
  sv12[nrow(sv12), (i) :=
    paste0("(\\mbox{rate }", formatC(as.numeric(eval(parse(text=i))), digits = 3, format =
cnm ← t(c("\\makebox[2.5cm]{\\hfil }",
  paste0("\\makebox[1.2cm]{(", 1:(ncol(sv12)-1), ")}")))
suv ← as.matrix(rbind(cnm, sv12, use.names = F))
colnames(suv) ← c("variables", rep(c("Cattle arm", "Other arms", "$p$ value"), 2))
suv ← latextab(suv,
  hleft = "\\scriptsize\\hfil$",
  hcenter = c(2.5, rep(1.2, ncol(suv)-1)),
  hright = "$",
  headercolor = "gray80", adjustlineskip = "-.2ex", delimiterline= NULL,
  alternatecolor = "gray90",
  addseparatingcols = 3,
  separatingcolwidth = .1,
  separatingcoltitle = c("Borrowers", "Non-attriting borrowers"),
  addsubcoltitlehere = T
  )
write.tablev(suv,
  paste0(pathsavePerm, "CowVsNonCowTestResults.tex")
, colnamestrue = F)
```

```
ar ← readRDS(paste0(pathsaveHere, DataFileNames[3], "Trimmed.rds"))
if (!UseTrimmedSample) ar ← ar[!grepl("tw|dou", TradGroup), ]
if (Only800) ar ← ar[o800 == 1L, ]
# "ar" is roster
# below is what was processed in AttritionTestsContents2.rnw
ar[, Attrited := 1L]
ar[hhid %in% hhid[Time == 4], Attrited := 0L]
ar[, c("Rejected", "GRejected", "IRejected") := 0L]
ar[grepl("^[ig].*rej", BStatus), Rejected := 1L]
ar[grepl("^i.*rej", BStatus), IRejected := 1L]
ar[grepl("^g.*rej", BStatus), GRejected := 1L]
ar[, En := 1:.N, by = .(hhid, Time)]
ar[, Tee := .N, by = .(hhid, mid, Time)]
ar ← ar[En == 1 & Time == 1, ]
```

Among 776 observations, there are 40 whose villages are washed away and 70 who by group rejected the assigned arms (traditional, large, large grace with 40, 20, 10 individuals, respectively). There are 31, 9, 13, 37 individuals who individually rejected traditional, large, large grace, cow, respectively.

```
table(ar[Attrited == 1L, Tee])
```

```
table0(ar[Attrited == 1L, .(FloodInRd1, BStatus)])
table0(ar[Attrited == 1L, .(AssignOriginal, BStatus)])
```

```
TabLabelStrings ←
c(
  "Per.* of rejection$", "of rej.*ng traditional arm$", "of rej.*ng non-traditional arm$",
  "of rej.*l vs", "p rejection$", "p rej.* traditional arm$",
  "p rej.*g non-traditional arm$", "p rejecters.*vs", "l rejection$",
  "l rej.*g tra", "l rej.*g non-", "l rej.*vs",
  "bo.*non-ca",
  "of attrition$", "of attri.* traditional arm$",
  "of attri.* non-traditional arm$", "of attri.* of",
  "active status$", "active.*race$", "active.*other"
  )
```

Use coin package's independence_test: Approximate permutation tests by randomly resampling 100000 times.

```
tb1 ← "\\hfil\\begin{minipage}[t]{14cm}\\hfil\\textsc{\\normalsize Table \\refstepcounter
tb2 ← "}\\\\\\setlength{\\tabcolsep}{.5pt}\\setlength{\\baselineskip}{8pt}\\renewcommand{
tb3 ← "}};\\end{tikzpicture}\\\\\\begin{tabular}{>{\\hfill\\scriptsize}p{1cm}<{}>{\\hfill
#tb4 ← ". Step-down method is used to adjust for multiple testing of a multi-factor group
\\\\& 3. & See the footnote of \\textsc{Table \\ref{tab MainTextIRjecters}} for descriptio
tb42 ← ". Step-down method is used to adjust for multiple testing of a multi-factor group
tb41 ← paste(tb42, "See the footnote of \\textsc{Table \\ref{tab MainTextIRjecters}} for
tb43 ← ".\\\\& 2. & See footnotes of \\textsc{Table \\ref{tab1 Permutation test results
tb44 ← ".\\\\& 2. & See footnotes of \\textsc{Table \\ref{tab1 Permutation test results
for (k in 1:3)
  for (i in 1:length(HeaderDescription))
    assign(paste0("Tb", k, i),
      paste0(
        tb1
        ,
        HeaderDescription[i]
        ,
        paste0("\\label{", get(paste0("TabLabel", k))[i], "}")
        ,
        tb2
        ,
        paste0(pathsavePerm, addtofilename[i], c("", "Full", "DropGroupRejecters")[k],
          "PermutationTestResultso800.tex")
        ,
        tb3
        ,
        PermRepTimes
        ,
        #if (i %in% c(1, 5, 11, 17, 21, 25)) tb42 else tb41
        if (i==17)
        paste0(tb42, TabVariableDescription, PrefTestsDefinitions1, "\\end{tabular}\\end{
        #if (i==18) tb41 else
        if (i %in% c(1, 5, 11, 18, 21, 25)) tb43 else
```

```
        tb44
        )
    )
```

The variables usded: HeadLiteracy is an indicator variable of household head literacy. HeadAge is age of household head. HHsize is total number of household members. FloodInRd1 is an indicator variable of flood exposure. HAssetAmount and PAssetAmount are amount of household and productive assets, respectively, in BDT, NumCows is cattle holding per household. NetValue is net asset values in BDT per housheold using asset items observed in all 4 rounds. BroadNetValue is net asset values in BDT per housheold for all asset items. Attrited indicates attrition rates in the household survey, and GRejected and IRejected show group rejection rates and individual rejection rates to the lending program. Non-attriting borrowers indicates the ratio of non-attriting borrowers to all borrowers. Because attrition and rejection are separate events, a household can reject and attrit, so non-attrited borrowers $\geqslant$ total - (rejected members + attrited members). USD 1 is about BDT 80. RiskPrefVal is the respondent's choice of the acceptable minimum excess monetary value of the risky option over a certainty option. Lower values indicate a greater risk tolerance. TimePref1val is the respondent's choice of the acceptable minimum excess monetary value in 3 months that is no smaller than present monetary benefit, and TimePref2Val is the the minimum excess value in 1 year and 3 months that is no smaller than monetary benefits of 1 year from now. Lower values indicate a greater patience. If a respondent's TimePref1val is greater than TimePref2val, the respondent is considered to be present-biased. PresentBias is an indicator function that takes the value of 1 if the respondent is considered to be present-biased, 0 otherwise. RiskPrefIndex is an index where a larger number is associated with more risk tolerance. TimePref1Index is an index where a larger number is associated with greater future discounting in a 3 month time frame, and TimePref2Index is in a 1 year and 3 month time frame.

I Rejection

```
for (i in 1:13) {
  ii ← grep(TabLabelStrings[i], TabLabel1)
  cat(eval(parse(text=paste0("Tb1", ii))))
}
```

TABLE 1: PERMUTATION TEST RESULTS OF REJECTION

variables	NonRejected	Rejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.127	0.081	(9.6)	(11.2)	(12.8)
HeadAge	38.145	37.763	(66.9)	(67.1)	(67.3)
HHsize	4.255	3.938	(1.4)	(1.5)	(1.5)
Arm	0.830	0.556	(0.0)	(0.0)	(0.0)
FloodInRd1	0.475	0.585	(1.3)	(1.5)	(1.7)
HAssetAmount	136	31	(5.2)	(5.2)	(5.2)
PAssetAmount	1324	889	(29.5)	(29.5)	(29.5)
LivestockValue	5700	2685	(0.7)	(0.8)	(0.8)
NumCows	0.285	0.134	(0.7)	(0.8)	(0.8)
NetValue	6853	3277	(0.4)	(0.4)	(0.4)
BroadNetValue	6853	3277	(0.4)	(0.4)	(0.4)
RiskPrefVal	110	117	(2.0)	(2.3)	(2.7)
TimePref1Val	383	383	(94.5)	(95.9)	(97.3)
TimePref2Val	493	474	(13.5)	(14.5)	(15.4)
PresentBias	0.451	0.519	(14.6)	(16.1)	(17.5)
n	616	160	(rate: 0.206)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000. Step-down method is used to adjust for multiple testing of a multi-factor grouping variable. The second and third columns show means of each group. For Arm, proportions of non-traditional arm between two groups are tested.

2. p-value.lower, p-value.mid, p-value.upper indicate lower-bound, mid point value, and upper-bound of the p values for observed test statistic and the null distribution, expressed in per centage units.

3. HeadLiteracy is an indicator variable of household head literacy. HeadAge is age of household head. HHsize is total number of household members. FloodInRd1 is an indicator variable of flood exposure. HAssetAmount and PAssetAmount are amount of household and productive assets, respectively, in BDT, NumCows is cattle holding per household. NetValue is net asset values in BDT per housheold using asset items observed in all 4 rounds. BroadNetValue is net asset values in BDT per housheold for all asset items. Attrited indicates attrition rates in the household survey, and GRejected and IRejected show group rejection rates and individual rejection rates to the lending program. Non-attriting borrowers indicates the ratio of non-attriting borrowers to all borrowers. Because attrition and rejection are separate events, a household can reject and attrit, so non-attrited borrowers $\geqslant$ total - (rejected members + attrited members). USD 1 is about BDT 80.RiskPrefVal is the respondent's choice of the acceptable minimum excess monetary value of the risky option over a certainty option. Lower values indicate a greater risk tolerance. TimePref1val is the respondent's choice of the acceptable minimum excess monetary value in 3 months that is no smaller than present monetary benefit, and TimePref2Val is the the minimum excess value in 1 year and 3 months that is no smaller than monetary benefits of 1 year from now. Lower values indicate a greater patience. If a respondent's TimePref1val is greater than TimePref2val, the respondent is considered to be present-biased. PresentBias is an indicator function that takes the value of 1 if the respondent is considered to be present-biased, 0 otherwise.

TABLE 2: PERMUTATION TEST RESULTS OF REJECTION AMONG TRADITIONAL ARM

variables	NonRejected	Rejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.095	0.099	(79.5)	(89.7)	(100.0)
HeadAge	38.848	37.800	(49.8)	(50.3)	(50.8)
HHsize	4.181	3.958	(31.8)	(33.1)	(34.4)
FloodInRd1	0.514	0.386	(9.0)	(10.6)	(12.2)
HAssetAmount	185	30	(12.8)	(13.1)	(13.5)
PAssetAmount	996	967	(95.9)	(95.9)	(95.9)
LivestockValue	6095	1714	(0.7)	(0.9)	(1.1)
NumCows	0.305	0.086	(0.7)	(0.9)	(1.1)
NetValue	7156	2447	(0.9)	(0.9)	(0.9)
BroadNetValue	7156	2447	(0.9)	(0.9)	(0.9)
RiskPrefVal	115	116	(74.5)	(80.8)	(87.1)
TimePref1Val	376	370	(77.3)	(79.1)	(81.0)
TimePref2Val	485	480	(70.8)	(75.6)	(80.4)
PresentBias	0.465	0.477	(87.4)	(93.7)	(100.0)
n	105	71	(rate: 0.403)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 1.

TABLE 3: PERMUTATION TEST RESULTS OF REJECTION AMONG NON-TRADITIONAL ARM

variables	NonRejected	Rejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.133	0.067	(8.3)	(9.9)	(11.5)
HeadAge	38.000	37.733	(81.9)	(82.1)	(82.3)
HHsize	4.270	3.921	(3.6)	(3.8)	(3.9)
FloodInRd1	0.467	0.742	(0.0)	(0.0)	(0.0)
HAssetAmount	126	32	(16.9)	(16.9)	(17.0)
PAssetAmount	1392	828	(21.5)	(21.5)	(21.5)
LivestockValue	5619	3544	(15.6)	(17.3)	(19.0)
NumCows	0.281	0.177	(15.6)	(17.3)	(19.0)
NetValue	6790	3929	(8.1)	(8.1)	(8.1)
BroadNetValue	6791	3929	(8.0)	(8.0)	(8.0)
RiskPrefVal	109	118	(2.6)	(3.2)	(3.7)
TimePref1Val	385	395	(58.8)	(60.3)	(61.9)
TimePref2Val	495	468	(12.7)	(14.0)	(15.3)
PresentBias	0.449	0.561	(6.4)	(7.6)	(8.8)
n	511	89	(rate: 0.148)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 4: PERMUTATION TEST RESULTS OF REJECTERS, TRADITIONAL VS. NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.067	0.099	(38.6)	(47.4)	(56.2)
HeadAge	37.733	37.800	(96.7)	(96.9)	(97.2)
HHsize	3.921	3.958	(88.1)	(90.1)	(92.0)
FloodInRd1	0.742	0.386	(0.0)	(0.0)	(0.0)
HAssetAmount	32	30	(95.6)	(96.2)	(96.9)
PAssetAmount	828	967	(32.9)	(32.9)	(32.9)
LivestockValue	3544	1714	(17.0)	(20.3)	(23.6)
NumCows	0.177	0.086	(17.0)	(20.4)	(23.8)
NetValue	3929	2447	(27.1)	(27.1)	(27.1)
BroadNetValue	3929	2447	(27.2)	(27.2)	(27.2)
RiskPrefVal	118	116	(56.0)	(62.9)	(69.8)
TimePref1Val	395	370	(25.0)	(26.5)	(28.0)
TimePref2Val	468	480	(51.5)	(60.6)	(69.6)
PresentBias	0.561	0.477	(29.5)	(33.9)	(38.3)
n	89	71	(rate: 0.444)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 5: PERMUTATION TEST RESULTS OF GROUP REJECTION

variables	NonGRejected	GRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.123	0.057	(7.7)	(9.8)	(11.9)
HeadAge	38.188	36.841	(28.7)	(28.8)	(29.0)
HHsize	4.201	4.071	(46.4)	(47.8)	(49.2)
Arm	0.807	0.429	(0.0)	(0.0)	(0.0)
FloodInRd1	0.490	0.571	(16.8)	(19.0)	(21.2)
HAssetAmount	125	9	(12.1)	(12.2)	(12.2)
PAssetAmount	1259	994	(62.7)	(62.7)	(62.7)
LivestockValue	5377	2000	(4.0)	(4.4)	(4.9)
NumCows	0.269	0.100	(4.0)	(4.5)	(5.0)
NetValue	6483	2453	(2.0)	(2.0)	(2.0)
BroadNetValue	6483	2453	(2.1)	(2.1)	(2.1)
RiskPrefVal	111	114	(51.3)	(55.7)	(60.1)
TimePref1Val	382	393	(59.2)	(60.9)	(62.7)
TimePref2Val	493	454	(3.7)	(4.2)	(4.6)
PresentBias	0.451	0.610	(1.4)	(1.7)	(2.1)
n	706	70	(rate: 0.090)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 1.

TABLE 6: PERMUTATION TEST RESULTS OF GROUP REJECTION AMONG TRADITIONAL ARM

variables	NonGRejected	GRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.110	0.050	(22.2)	(29.3)	(36.5)
HeadAge	38.257	39.026	(67.4)	(67.7)	(68.0)
HHsize	4.059	4.200	(57.7)	(59.9)	(62.0)
FloodInRd1	0.519	0.275	(0.3)	(0.5)	(0.7)
HAssetAmount	159	0	(11.8)	(15.2)	(18.7)
PAssetAmount	964	1054	(77.9)	(77.9)	(77.9)
LivestockValue	5481	500	(1.0)	(1.1)	(1.2)
NumCows	0.274	0.025	(0.9)	(1.1)	(1.2)
NetValue	6511	1092	(1.0)	(1.0)	(1.0)
BroadNetValue	6511	1092	(1.1)	(1.1)	(1.1)
RiskPrefVal	116	111	(34.6)	(39.9)	(45.2)
TimePref1Val	369	389	(40.1)	(43.2)	(46.4)
TimePref2Val	487	472	(47.1)	(52.0)	(56.9)
PresentBias	0.449	0.538	(27.3)	(31.8)	(36.2)
n	136	40	(rate: 0.227)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 7: PERMUTATION TEST RESULTS OF GROUP REJECTION AMONG NON-TRADITIONAL ARM

variables	NonGRejected	GRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.126	0.067	(24.7)	(33.0)	(41.3)
HeadAge	38.171	34.000	(2.8)	(2.8)	(2.8)
HHsize	4.235	3.900	(19.6)	(20.8)	(22.1)
FloodInRd1	0.483	0.967	(0.0)	(0.0)	(0.0)
HAssetAmount	117	22	(45.7)	(45.7)	(45.8)
PAssetAmount	1329	914	(54.1)	(54.1)	(54.2)
LivestockValue	5352	5000	(85.9)	(92.9)	(100.0)
NumCows	0.268	0.250	(85.7)	(92.9)	(100.0)
NetValue	6476	4269	(40.8)	(40.8)	(40.8)
BroadNetValue	6477	4269	(40.9)	(40.9)	(40.9)
RiskPrefVal	110	119	(19.8)	(24.3)	(28.7)
TimePref1Val	386	400	(66.3)	(70.3)	(74.2)
TimePref2Val	494	420	(1.4)	(1.7)	(2.1)
PresentBias	0.451	0.750	(0.5)	(0.8)	(1.0)
n	570	30	(rate: 0.050)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 8: PERMUTATION TEST RESULTS OF GROUP REJECTERS, TRADITIONAL VS. NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.067	0.050	(62.7)	(81.4)	(100.0)
HeadAge	34.000	39.026	(2.7)	(2.7)	(2.8)
HHsize	3.900	4.200	(34.2)	(36.6)	(39.0)
FloodInRd1	0.967	0.275	(0.0)	(0.0)	(0.0)
HAssetAmount	22	0	(0.0)	(1.5)	(3.0)
PAssetAmount	914	1054	(59.6)	(59.6)	(59.6)
LivestockValue	5000	500	(0.1)	(0.7)	(1.3)
NumCows	0.250	0.025	(0.1)	(0.7)	(1.3)
NetValue	4269	1092	(3.1)	(3.1)	(3.1)
BroadNetValue	4269	1092	(3.1)	(3.1)	(3.1)
RiskPrefVal	119	111	(23.2)	(31.3)	(39.5)
TimePref1Val	400	389	(56.7)	(67.3)	(77.9)
TimePref2Val	420	472	(12.1)	(15.0)	(18.0)
PresentBias	0.750	0.538	(9.3)	(12.6)	(15.9)
n	30	40	(rate: 0.571)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 9: PERMUTATION TEST RESULTS OF INDIVIDUAL REJECTION

variables	NonIRejected	IRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.127	0.100	(38.7)	(44.3)	(49.9)
HeadAge	38.145	38.494	(76.2)	(76.4)	(76.7)
HHsize	4.255	3.833	(0.9)	(1.0)	(1.1)
Arm	0.830	0.656	(0.0)	(0.0)	(0.0)
FloodInRd1	0.475	0.596	(3.0)	(3.5)	(4.0)
HAssetAmount	136	48	(23.2)	(23.3)	(23.4)
PAssetAmount	1324	807	(19.4)	(19.4)	(19.4)
LivestockValue	5700	3146	(7.7)	(8.5)	(9.2)
NumCows	0.285	0.157	(7.6)	(8.3)	(9.1)
NetValue	6853	3925	(6.9)	(6.9)	(6.9)
BroadNetValue	6853	3925	(7.0)	(7.0)	(7.0)
RiskPrefVal	110	120	(1.9)	(2.2)	(2.5)
TimePref1Val	383	375	(63.8)	(65.4)	(66.9)
TimePref2Val	493	490	(85.3)	(89.0)	(92.6)
PresentBias	0.451	0.444	(90.2)	(95.1)	(100.0)
n	616	90	(rate: 0.127)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 1.

TABLE 10: PERMUTATION TEST RESULTS OF INDIVIDUAL REJECTION AMONG TRADITIONAL ARM

variables	NonIRejected	IRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.095	0.161	(19.0)	(26.1)	(33.1)
HeadAge	38.848	36.258	(21.2)	(21.3)	(21.5)
HHsize	4.181	3.645	(6.1)	(6.6)	(7.2)
FloodInRd1	0.514	0.533	(83.9)	(91.9)	(100.0)
HAssetAmount	185	70	(46.9)	(48.5)	(50.2)
PAssetAmount	996	851	(71.9)	(72.0)	(72.0)
LivestockValue	6095	3333	(23.9)	(28.2)	(32.4)
NumCows	0.305	0.167	(23.9)	(28.1)	(32.4)
NetValue	7156	4254	(30.6)	(30.6)	(30.6)
BroadNetValue	7156	4254	(30.8)	(30.8)	(30.8)
RiskPrefVal	115	123	(16.8)	(21.5)	(26.2)
TimePref1Val	376	342	(23.9)	(24.9)	(25.9)
TimePref2Val	485	492	(72.6)	(79.3)	(85.9)
PresentBias	0.465	0.385	(37.6)	(44.4)	(51.2)
n	105	31	(rate: 0.228)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 2.

TABLE 11: PERMUTATION TEST RESULTS OF INDIVIDUAL REJECTION AMONG NON-TRADITIONAL ARM

variables	NonIRejected	IRejected	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.133	0.068	(14.9)	(18.1)	(21.2)
HeadAge	38.000	39.732	(22.3)	(22.4)	(22.5)
HHsize	4.270	3.932	(9.2)	(9.6)	(10.1)
FloodInRd1	0.467	0.627	(2.1)	(2.4)	(2.8)
HAssetAmount	126	37	(30.8)	(31.0)	(31.2)
PAssetAmount	1392	784	(18.1)	(18.1)	(18.1)
LivestockValue	5619	3051	(13.5)	(15.1)	(16.8)
NumCows	0.281	0.153	(13.4)	(15.1)	(16.7)
NetValue	6790	3757	(12.6)	(12.6)	(12.6)
BroadNetValue	6791	3757	(12.4)	(12.4)	(12.4)
RiskPrefVal	109	118	(6.3)	(7.6)	(8.9)
TimePref1Val	385	393	(68.1)	(70.0)	(71.9)
TimePref2Val	495	489	(74.0)	(78.3)	(82.6)
PresentBias	0.449	0.478	(64.3)	(70.0)	(75.7)
n	511	59	(rate: 0.104)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 2.

TABLE 12: PERMUTATION TEST RESULTS OF INDIVIDUAL REJECTERS, TRADITIONAL VS. NON-TRADITIONAL ARM

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.068	0.161	(15.7)	(21.1)	(26.5)
HeadAge	39.732	36.258	(21.9)	(22.0)	(22.2)
HHsize	3.932	3.645	(44.5)	(46.5)	(48.4)
FloodInRd1	0.627	0.533	(36.9)	(43.2)	(49.5)
HAssetAmount	37	70	(54.8)	(62.3)	(69.9)
PAssetAmount	784	851	(67.9)	(68.0)	(68.0)
LivestockValue	3051	3333	(82.0)	(91.0)	(100.0)
NumCows	0.153	0.167	(82.3)	(91.2)	(100.0)
NetValue	3757	4254	(82.7)	(82.7)	(82.7)
BroadNetValue	3757	4254	(82.7)	(82.7)	(82.7)
RiskPrefVal	118	123	(40.0)	(49.1)	(58.2)
TimePref1Val	393	342	(10.4)	(13.3)	(16.1)
TimePref2Val	489	492	(86.3)	(93.2)	(100.0)
PresentBias	0.478	0.385	(32.4)	(39.8)	(47.1)
n	59	31	(rate: 0.344)		

Source: Estimated with GUK administrative and survey data.
Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 13: PERMUTATION TEST RESULTS OF BORROWERS, CATTLE VS. NON-CATTLE ARMS

variables	NonCowArm	CowArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.110	0.172	(3.9)	(4.7)	(5.4)
HeadAge	38.325	37.642	(44.4)	(44.6)	(44.7)
HHsize	4.287	4.166	(33.3)	(34.1)	(35.0)
FloodInRd1	0.479	0.463	(71.7)	(75.1)	(78.5)
HAssetAmount	115	194	(21.3)	(21.3)	(21.3)
PAssetAmount	1526	765	(11.9)	(11.9)	(11.9)
LivestockValue	6150	4444	(14.8)	(15.9)	(17.0)
NumCows	0.308	0.222	(14.5)	(15.6)	(16.7)
NetValue	7519	4999	(6.2)	(6.2)	(6.2)
BroadNetValue	7520	5000	(6.3)	(6.3)	(6.3)
RiskPrefVal	110	109	(66.1)	(69.4)	(72.8)
TimePref1Val	373	411	(0.6)	(0.6)	(0.6)
TimePref2Val	486	512	(4.1)	(4.4)	(4.8)
PresentBias	0.444	0.472	(51.7)	(54.9)	(58.0)
n	453	163	(rate: 0.265)		

Source: Estimated with GUK administrative and survey data.
Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 1 shows test results of independence between loan receivers and nonreceivers (group, individual rejecters) on the analysis sample of 776 members. It shows that lower head literacy, smaller household size, being affected by flood at the baseline, smaller livestock holding, and smaller net assets are correlated with opting out the offered type of lending. RiskPrefVal indicates that the minimum expected payoff to choose the risky option is greater, albeit to a small degree, for the rejecters. Time preference variables show statistically indistinguishable differences. Ratio of PresentBias is high but there is no statistically large difference between the two groups. TABLE 2 indicates that lower asset and livestock holding is more pronounced among traditional rejecters relative to loan receivers. It also shows that flood exposure is less frequent, contrary to TABLE 1, among the rejecters. TABLE 3 indicates that lower head literacy, smaller household size, higher flood exposure, are more pronounced among non-traditional rejecters relative to loan receivers. It also shows that asset and livestock holding is no different relative to the receivers. Comparing rejecters of traditional arm, lower flood exposure may be the only stark difference against non-traditional arm members, and smaller asset and livestock holding is merely suggestive (TABLE 4). We observe smaller risk tolerance among the rejecters which we did not observe in the traditional arm, indicating that the greater risk tolerance for participants is mainly attributable to non-traditional participants.

Group rejecters and non-group rejecters are compared in TABLE 5. Marked differences are found in arm (traditional vs. non-traditional) and net asset values and head literacy are noted. We see more PresentBias in the group-rejecters. This is difficult to understand but is consistent with the situation that the rejection decision was made because procrastination of some members can lead to loan

defaults which causes a problem to the group as a whole. As we will see later, the comparison of individual rejecters and non-rejecters do not show such a difference in PresentBias. This is also consistent with such a 'group wariness' interpretation. Table 6 compares group rejecters in traditional arm and finds smaller flood exposure and lower livestock and net asset holding are associated with group rejection. Group rejecters in non-traditional arm are examined in Table 7 and younger head age, flood at baseline, and smaller household asset holding are correlated with rejection. Comparing group rejecters between traditional and non-traditional arms in Table 8, younger head age, higher flood exposure, larger net asset values and livestock holding are noted among the non-traditional group rejecters. These hint that for non-traditional arm group rejecters, it is the smaller household size and the baseline flood that may have constrained them from participation, and for traditional group rejecters, it is the low asset levels.

Acknowledging the reasons for rejection can be different, we tested the independence of each characteristics for individual rejecters (vs. participants) in Table 9. Smaller HHsize, being affected with FloodInRd1, and smaller LivestockValue, NumCows, and NetValue are associated with individual rejecters. Individual decisions not to participate may be more straightforward: Smaller household size may indicate difficulty in securing the cattle production labour in a household, being hit with a flood may have resulted in lower livestock levels that would prompt them to reconsider partaking in another livestock project. Individual rejecters exhibit smaller risk tolerance, which was not observed among the group rejecters. This also fortifies the disadvantages of having less favourable conditions in terms of household size, asset positions, and shocks.

Table 10 and Table 11 compare individual rejecters and nonrejecters in traditional arm and non-traditional arms, respectively. For traditional rejecters, livestock and other asset values are not correlated with rejection, but the values are similar to non-traditional and higher p values may be due to smaller sample size. For non-traditional arm rejecters, household size and flood exposure are correlated. Comparison of individual rejecters between traditional and non-traditional arms show no detectable difference (Table 12). This suggests that indvidual rejecters in all arms were constrained with small household size and small asset holding. In Table 13, we compare if the cattle arm participants (borrowers) differ from participants in other arms at the baseline. It is worth noting that partcipants of cattle arm differ from other arms in having less cattle rearing experience as observed in smaller initial cattle holding (p value = .156) and in having lower net asset values (p value = .058), weakly hinting that the cattle arm's managerial support programs may have encouraged participation of inexperienced or lower asset holders.

II Attrition

```
HeaderDescription[11:16] ← c(
   "Permutation test results of attrition among borrowers",
     "Permutation test results of attrition among traditional arm borrowers",
     "Permutation test results of attrition among non-traditional arm borrowers",
     "Permutation test results of non-attriting members of traditional and non-traditional
     "Permutation test results of non-attriting members of cattle and all other arm borrow
     "Permutation test results of non-attriting members of cattle and large grace arm borr
    )
TabLabel1 ← paste("tab1", HeaderDescription)

TabLabelStrings[19:20] ← c("active.*race arms$", "acti.*other arms$")

for (i in 14:length(TabLabelStrings)) {
  ii ← grep(TabLabelStrings[i], TabLabel1)
  if (grepl("active status", TabLabelStrings[i])){
   tblatt ← eval(parse(text=paste0("Tb1", ii)))
   cat(gsub("active\\\\", "attrited or rejected (NonActive) and other (Active) borrowers\\
     tblatt))
```

```
    rm(tblatt)
  } else
  if (grepl("active ra|acti.*o", TabLabelStrings[i])) {
    tblatt ← eval(parse(text=paste0("Tb1", ii)))
    cat(#gsub("active members", "non-active borrowers",
      tblatt
      #)
      )
    rm(tblatt)
  } else
    cat(eval(parse(text=paste0("Tb1", ii))))
}
```

TABLE 14: PERMUTATION TEST RESULTS OF ATTRITION

variables	NonAttrited	Attrited	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.115	0.130	(60.9)	(67.0)	(73.1)
HeadAge	37.996	38.598	(59.1)	(59.3)	(59.5)
HHsize	4.178	4.272	(54.2)	(55.5)	(56.8)
Arm	0.789	0.652	(0.0)	(0.0)	(0.0)
FloodInRd1	0.493	0.527	(50.2)	(54.0)	(57.7)
HAssetAmount	123	48	(27.4)	(27.5)	(27.7)
PAssetAmount	1109	2181	(10.5)	(10.5)	(10.5)
LivestockValue	5124	5000	(92.4)	(96.2)	(100.0)
NumCows	0.256	0.250	(92.3)	(96.2)	(100.0)
NetValue	6140	5960	(90.7)	(90.7)	(90.7)
BroadNetValue	6141	5960	(90.8)	(90.8)	(90.8)
RiskPrefVal	110	128	(0.0)	(0.0)	(0.0)
TimePref1Val	382	404	(28.2)	(29.4)	(30.6)
TimePref2Val	490	486	(82.5)	(86.8)	(91.2)
PresentBias	0.459	0.531	(30.0)	(33.7)	(37.4)
n	684	92	(rate: 0.119)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 1.

TABLE 15: PERMUTATION TEST RESULTS OF ATTRITION AMONG TRADITIONAL ARM

variables	NonAttrited	Attrited	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.118	0.000	(1.8)	(3.2)	(4.6)
HeadAge	38.497	38.125	(84.8)	(85.2)	(85.6)
HHsize	4.167	3.750	(13.7)	(14.7)	(15.6)
FloodInRd1	0.479	0.387	(32.6)	(37.7)	(42.8)
HAssetAmount	121	132	(95.2)	(96.0)	(96.8)
PAssetAmount	997	926	(81.3)	(81.3)	(81.4)
LivestockValue	4722	2581	(28.3)	(33.6)	(38.8)
NumCows	0.236	0.129	(28.5)	(33.6)	(38.8)
NetValue	5625	3633	(41.0)	(41.0)	(41.0)
BroadNetValue	5625	3633	(40.8)	(40.8)	(40.8)
RiskPrefVal	113	131	(1.2)	(1.5)	(1.8)
TimePref1Val	371	391	(49.8)	(54.5)	(59.3)
TimePref2Val	485	470	(47.8)	(54.1)	(60.5)
PresentBias	0.462	0.522	(50.3)	(57.9)	(65.6)
n	144	32	(rate: 0.182)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 16: PERMUTATION TEST RESULTS OF ATTRITION AMONG NON-TRADITIONAL ARM

variables	NonAttrited	Attrited	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.115	0.200	(3.6)	(5.1)	(6.5)
HeadAge	37.862	38.850	(47.0)	(47.2)	(47.4)
HHsize	4.181	4.550	(6.1)	(6.4)	(6.7)
FloodInRd1	0.497	0.600	(10.2)	(12.0)	(13.8)
HAssetAmount	124	5	(13.5)	(13.7)	(13.9)
PAssetAmount	1139	2829	(9.3)	(9.3)	(9.3)
LivestockValue	5232	6531	(49.8)	(53.0)	(56.3)
NumCows	0.262	0.327	(49.9)	(53.1)	(56.4)
NetValue	6277	7162	(65.2)	(65.2)	(65.2)
BroadNetValue	6278	7162	(65.4)	(65.4)	(65.4)
RiskPrefVal	110	125	(2.2)	(2.8)	(3.3)
TimePref1Val	385	415	(27.4)	(29.3)	(31.2)
TimePref2Val	491	500	(66.1)	(71.5)	(77.0)
PresentBias	0.458	0.538	(43.0)	(48.8)	(54.7)
n	540	60	(rate: 0.100)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 2.

TABLE 17: PERMUTATION TEST RESULTS OF ATTRITERS OF TRADITIONAL AND NON-TRADITIONAL ARMS

variables	NonTradArm	TradArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.200	0.000	(0.3)	(0.5)	(0.7)
HeadAge	38.850	38.125	(76.8)	(77.2)	(77.6)
HHsize	4.550	3.750	(2.1)	(2.3)	(2.6)
FloodInRd1	0.600	0.387	(4.8)	(6.2)	(7.5)
HAssetAmount	5	132	(3.8)	(7.5)	(11.2)
PAssetAmount	2829	926	(83.4)	(83.4)	(83.4)
LivestockValue	6531	2581	(17.0)	(20.3)	(23.7)
NumCows	0.327	0.129	(17.1)	(20.4)	(23.7)
NetValue	7162	3633	(45.5)	(45.5)	(45.5)
BroadNetValue	7162	3633	(45.4)	(45.4)	(45.4)
RiskPrefVal	125	131	(39.1)	(48.5)	(57.9)
TimePref1Val	415	391	(50.7)	(58.0)	(65.3)
TimePref2Val	500	470	(29.7)	(36.1)	(42.5)
PresentBias	0.538	0.522	(77.8)	(88.9)	(100.0)
n	60	32	(rate: 0.348)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 2.

TABLE 18: PERMUTATION TEST RESULTS OF ACTIVE STATUS

variables	NonActive	Active	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.104	0.123	(38.9)	(42.7)	(46.5)
HeadAge	37.835	38.159	(68.8)	(69.0)	(69.1)
HHsize	4.072	4.236	(14.9)	(15.3)	(15.7)
Arm	0.581	0.850	(0.0)	(0.0)	(0.0)
FloodInRd1	0.548	0.477	(6.6)	(7.2)	(7.9)
HAssetAmount	33	147	(1.8)	(1.8)	(1.8)
PAssetAmount	1440	1154	(55.0)	(55.0)	(55.0)
LivestockValue	3714	5642	(5.2)	(5.6)	(6.0)
NumCows	0.186	0.282	(5.0)	(5.4)	(5.8)
NetValue	4616	6718	(5.6)	(5.6)	(5.6)
BroadNetValue	4616	6719	(5.6)	(5.6)	(5.6)
RiskPrefVal	120	109	(0.0)	(0.0)	(0.0)
TimePref1Val	388	382	(60.3)	(61.4)	(62.5)
TimePref2Val	476	494	(13.7)	(14.6)	(15.5)
PresentBias	0.520	0.446	(7.9)	(8.7)	(9.6)
n	222	554	(rate: 0.714)		

Source: Estimated with GUK administrative and survey data.

Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.

2. See footnotes of TABLE 1.

TABLE 19: PERMUTATION TEST RESULTS OF ACTIVE MEMBERS OF CATTLE AND LARGE GRACE ARMS

variables	NonCowArm	CowArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.106	0.150	(23.6)	(27.1)	(30.6)
HeadAge	38.481	37.973	(64.4)	(64.7)	(64.9)
HHsize	4.181	4.102	(57.3)	(58.9)	(60.4)
FloodInRd1	0.352	0.459	(4.6)	(5.5)	(6.3)
HAssetAmount	90	215	(13.1)	(13.2)	(13.3)
PAssetAmount	1480	753	(0.3)	(0.3)	(0.3)
LivestockValue	5375	3425	(12.6)	(13.9)	(15.2)
NumCows	0.269	0.171	(12.4)	(13.7)	(15.0)
NetValue	6740	4117	(5.4)	(5.4)	(5.4)
BroadNetValue	6740	4118	(5.3)	(5.3)	(5.3)
RiskPrefVal	112	108	(24.4)	(26.6)	(28.8)
TimePref1Val	373	412	(2.1)	(2.2)	(2.3)
TimePref2Val	479	515	(2.1)	(2.4)	(2.7)
PresentBias	0.462	0.466	(90.9)	(95.5)	(100.0)
n	160	147	(rate: 0.479)		

Source: Estimated with GUK administrative and survey data.
Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 20: PERMUTATION TEST RESULTS OF ACTIVE MEMBERS OF CATTLE AND ALL OTHER ARMS

variables	NonCowArm	CowArm	p-value.lower	p-value.mid	p-value.upper
HeadLiteracy	0.113	0.150	(24.6)	(27.5)	(30.4)
HeadAge	38.226	37.973	(78.6)	(78.8)	(79.0)
HHsize	4.285	4.102	(16.6)	(17.1)	(17.7)
FloodInRd1	0.484	0.459	(56.1)	(59.5)	(62.9)
HAssetAmount	123	215	(18.2)	(18.2)	(18.3)
PAssetAmount	1298	753	(2.8)	(2.8)	(2.8)
LivestockValue	6437	3425	(1.5)	(1.6)	(1.8)
NumCows	0.322	0.171	(1.5)	(1.6)	(1.8)
NetValue	7658	4117	(0.7)	(0.7)	(0.7)
BroadNetValue	7658	4118	(0.8)	(0.8)	(0.8)
RiskPrefVal	109	108	(64.9)	(68.3)	(71.6)
TimePref1Val	371	412	(0.5)	(0.5)	(0.5)
TimePref2Val	486	515	(2.7)	(3.0)	(3.3)
PresentBias	0.439	0.466	(55.8)	(59.1)	(62.4)
n	407	147	(rate: 0.265)		

Source: Estimated with GUK administrative and survey data.
Notes: 1. R's package coin is used for baseline mean covariates to conduct approximate permutation tests. Number of repetition is set to 100000.
2. See footnotes of TABLE 2.

TABLE 14 shows results from tests of independence between attriters and nonattriters. Attrition is defined as attrition from household surveys, not from the lending program. We see the moderate rate of attrition is not correlated with household level characteristicsat the conventional p value level. Productive asset amounts seem to differ between attriters and nonattriters at $p = .105$, with the former being larger than the latter. This positive attrition selection can cause underestimation of impacts, if the asset values are positively correlated with entrepreneurial capacity. We also see that the attriters are less risk tolerant in terms of minimum expected payoff to choose a risky option in RiskPrefVal. TABLE 15 shows attrition in the traditional arm. Household heads of attriters are relatively less literate than nonattriters. We observe the traditional arm attriters are less risk tolerant the nonattriters. TABLE 16 compares attriters and nonattriters in the non-traditional arm. Unlike traditional arm attriters, non-traditional arm attriters have more literate household heads, have a larger household size, are more exposed to floods, and have larger productive assets. The traditional arm attriters may be less entrepreneurial, if anything, so their attrition may upwardly bias the positive gains of the arm, hence understate the impacts of non-traditional arm. These are explicitly shown in TABLE 17 where we compare attriters of traditional and non-traditional arms. Overall, attrition may have attenuated the impacts but is not likely to have inflated them.[†] We observe the non-traditional arm attriters are also less risk tolerant than the nonattriters.

[†] So one can employ the Lee bounds for stronger results, but doing so will give us less precision and require more assumptions. We will not use the Lee bounds [we can show them if necessary].

For the microfinance institutions (MFIs), attrition of the loan receiving members poses a threat to their business continuation. Financial institutions often use observable characteristics, such as collateralisable assets, and easily surveyed chracteristics, such as job experiences and schooling of borrowers, and are likely to lend if the assets levels are greater and the borrowers have relevant job experiences and more schooling. We first examine if such screening variables have any predictive power in terms of loan rejection or borrower attrition under our lending. Table 18 compares potential MFI targets (nonattriting borrowers, noted as Active) vs. non-targets (attriting borrowers or loan rejecters, noted as NonActive) in all arms. It shows potential targets at the baseline have larger values in livestock and greater number of cattle, and are less affected by the flood, which conforms the conventional wisdom of lenders in using these aspects in their loan decisions. We also see that more risk torelant members are likely to be borrowers and do not attrit. Next, we examine if the relationship of having "less favourable" values in these characteristics and attrition is mitigated under various loan characteristics. In Table 19, we restrict our attention to the potential MFI targets, or the nonattriting borrowers, and compare between cattle and large grace arms, whose difference is efffectively the presence of managerial supports that the former provides. Comparing against the large grace arm, nonattriting borrowers of the cattle arm are more exposed to the flood (p = .055), have less productive assets (p = .003), have lower net asset values (p = .046), and have fewer livestock (p = .139). This shows that the smaller livestock holders or individuals with less experienced in livestock are encouraged to participate and continue to operate in the cattle arm that has a managerial support program, with all other features being equal. This is consistent with our analysis of participation in Table 13 which weakly hints that the cattle arm's managerial support programs may have encouraged participation of inexperienced or lower asset holders. This also underscores our interpretation that the current impact estimates may be downwardly biased, if any, as people who would otherwise attrit or reject in the cattle arm stayed on. This result is confirmed with lower p values due to a larger sample size when we compare the nonattriting borrowers between cattle arm with all other arms in Table 20. At the baseline, cattle arm nonattriting borrowers have smaller baseline livestock holding (p value = .016) and smaller baseline net asset holding (p value = .007) than other arms' nonattriting borrowers.