

Permutation tests

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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
```

The majority of descriptive statistics are related to assets. We base our descriptive statistics on the asset data.

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

Number of obs by Arm and attrition

| Arm | AttritIn | | | | Sum |
|-------------|----------|----|----|-----|-----|
| | 2 | 3 | 4 | 9 | |
| traditional | 6 | 4 | 20 | 144 | 174 |
| large | 5 | 2 | 1 | 191 | 199 |
| large grace | 22 | 3 | 3 | 170 | 198 |
| cattle | 5 | 5 | 13 | 176 | 199 |
| Sum | 38 | 14 | 37 | 681 | 770 |

Number of obs by membership status and attrition

| BStatus | AttritIn | | | | Sum |
|----------------------|----------|----|----|-----|-----|
| | 2 | 3 | 4 | 9 | |
| borrower | 8 | 6 | 8 | 575 | 597 |
| pure saver | 0 | 0 | 0 | 0 | 0 |
| individual rejection | 9 | 4 | 1 | 75 | 89 |
| group rejection | 9 | 4 | 0 | 55 | 68 |
| rejection by flood | 12 | 0 | 28 | 0 | 40 |
| Sum | 38 | 14 | 37 | 705 | 794 |

```
# trimmed sample are data before dropping 26 traditional HHs.
```

```
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"))
```

```
NeAIR ← readRDS(paste0(pathsaveHere, "NarrowNetAssetsANCOVATrimmed.rds"))
```

```
# NeAIR2 drops (from NeAIR) 24 members in trad who were disbursed loans only twice or once
```

```
NeAIR2 ← readRDS(paste0(pathsaveHere, "NarrowNetAssetsANCOVA.rds"))
```

```
rsk ← readRDS(paste0(pathsaveHere, "RiskPreferences.rds"))
```

```
rsk2 <- rsk[, .(hhid, RiskPrefVal, TimePref1Val, TimePref2Val, PresentBias)]
if (Only800) ar <- ar[o800 == 1L, ]
```

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. 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 \textsf{UseTrimmedSample} to T. Here, we
UseTrimmedSample <- F
TestMedian <- F
```

```
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 | 40 | 0 | 0 | 0 | 40 |
| 2 | 0 | 14 | 0 | 0 | 14 |
| 3 | 0 | 0 | 37 | 0 | 37 |
| 4 | 0 | 0 | 0 | 681 | 681 |
| Sum | 40 | 14 | 37 | 681 | 772 |

Out of 772 members, there are 91 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 | 9 | 4 | 1 | 14 |
| group rejection | 11 | 4 | 0 | 15 |
| rejection by flood | 12 | 0 | 28 | 40 |
| Sum | 40 | 14 | 37 | 91 |

```
#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]
```

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

```
psas <- ass[o800 == 1 & tee == 1,
  .(hhid, tee, NLHAssetAmount, PAssetAmount)]
pslv <- lvo[o800 == 1 & tee == 1,
  .(hhid, tee, TotalImputedValue, NumCows)]
nne <- NeAIR[o800 == 1 & tee == 1,
```

```
# BroadNetValue is similar to NetValue, so drop it.
.(hhid, tee, NetValue, #NarrowNetValue,
BroadNetValue
#, RNetValue, RNarrowNetValue, RBroadNetValue
)]
```

```
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)
asl ← merge(asl, nne, by = c("hhid", "tee"), all.x = T)
asv ← merge(asl, rsk2, by = "hhid", all.x = T)
addmargins(table0(asv[!grepl("tw|dou", TradGroup), .(Arm, AttritIn)]))
```

| | AttritIn | | | | |
|-------------|----------|----|----|-----|-----|
| Arm | 2 | 3 | 4 | 9 | Sum |
| traditional | 7 | 4 | 20 | 144 | 175 |
| large | 5 | 2 | 1 | 191 | 199 |
| large grace | 23 | 3 | 3 | 170 | 199 |
| cattle | 5 | 5 | 13 | 176 | 199 |
| Sum | 40 | 14 | 37 | 681 | 772 |

```
# 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 | 31 | 175 |
| large | 191 | 8 | 199 |
| large grace | 170 | 29 | 199 |
| cattle | 176 | 23 | 199 |
| Sum | 681 | 91 | 772 |

```
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]
asv[, CompletePanel := F]
asv[hhid %in% intersect(hhid[tee == 1 & !is.na(NetValue)], hhid[tee == 4 & !is.na(NetValue)
CompletePanel := T]
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 | cattle |
| Sum | | | | | |
| 0 | 83 | 163 | | 159 | 146 |
| 1 | 2 | 7 | | 7 | 6 |
| Sum | 85 | 170 | | 166 | 152 |

```
# 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
# vartobetested is defined in AttritionPermutationTableHeaders5.R in FormSample.rnw
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("cattle", Arm), CowArm := 0L]
assign(paste0(dd, "CNCs", addchar), xCNCs)
# active members: cow vs. lsg grace
xCGs ← xdd[!grepl("floo", BStatus) & grepl("cattle|gr", Arm) & Active == 1L, ]
xCGs[, CowArm := 1L]; xCGs[!grepl("cattle", 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 rejected vs. nontrad rejected
xTNTr ← xdd[Rejected == 1L, ]
xTNTr[, TradArm := 1L]; xTNTr[!grepl("trad", Arm), TradArm := 0L]
assign(paste0(dd, "TNTr", addchar), xTNTr)

```

```

# all rejection: cattle rejected vs. noncattle rejected
xCNCr ← xdd[Rejected == 1L, ]
xCNCr[, CowArm := 1L]; xCNCr[!grepl("cattle", Arm), CowArm := 0L]
assign(paste0(dd, "CNCr", addchar), xCNCr)
# all rejection: cattle rejected vs. large grace rejected
xCLGr ← xdd[grepl("cattle|gr", Arm) & Rejected == 1L, ]
xCLGr[, CowArm := 1L]; xCLGr[!grepl("cattle", Arm), CowArm := 0L]
assign(paste0(dd, "CLGr", addchar), xCLGr)
# all acceptance: cattle accepted vs. noncattle accepted
xCNCa ← xdd[Rejected == 0L, ]
xCNCa[, CowArm := 1L]; xCNCa[!grepl("cattle", Arm), CowArm := 0L]
assign(paste0(dd, "CNCa", addchar), xCNCa)
# all acceptance: cattle accepted vs. large grace accepted
xCLGa ← xdd[grepl("cattle|gr", Arm) & Rejected == 0L, ]
xCLGa[, CowArm := 1L]; xCLGa[!grepl("cattle", 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 group)
# data to use: datalist (full), datalist1 (drop 2 loan receivers), datalist2 (drop group)
library(coin)
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("NFCGCa", 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 or
  # selection.criteria[m] has uniform values (otherwise returns an error)
  if (length(unique(unlist(pmdata[, vartobetested[i], with = F]))) == 1 |
    length(unique(unlist(pmdata[, selection.criteria[m], 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 = F]))) == 1 |
    length(unique(unlist(pmdata[, selection.criteria[m], with = F]))) == 1)
    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 if (length(unique(unlist(pmdata[, selection.criteria[m], with = F]))) == 1)
    {
      # if there is only 1 group for selection criteria, use -1
      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(permmmedian[[i]]),
            pvalue_interval(permmmedian[[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 = cols]
cols ← grepout("ed$|TradArm|CowA|Activ", colnames(Pmtresults))
Pmtresults[grepl("Ass|Liv|NetV|Val", variables),
  (cols) := lapply(.SD, function(x) formatC(as.numeric(x), digits = 0, format = "f")),
  .SDcols = cols]
setcolorder(Pmtresults, c("variables", paste0(c("Non", ""), selection.criteria[m]),
  "p-value.lower", "p-value.mid", "p-value.upper"))
obs0L ← nrow(get(DataList[1])[eval(parse(text = selection.criteria[m])) == 0L, ])
obs1L ← nrow(get(DataList[1])[eval(parse(text = selection.criteria[m])) == 1L, ])
nobs ← t(c(NA, obs0L, obs1L, NA, obs1L/(obs0L+obs1L), NA))
# rename variables to understandable description subst.tablePerm is in SubstTablePerm.
rn ← unlist(Pmtresults[, variables])
for (i in 1:nrow(subst.tablePerm))
  rn ← gsub(subst.tablePerm[i, 1], subst.tablePerm[i, 2], rn)
Pmtresults[, variables := rn]
Pmtresults[, variables := paste0("\\makebox[3.75cm]{\\hfill ", variables, "}")]
Pmtresults0 ← rbind(Pmtresults, nobs, use.names = F)
Pmtresults0[nrow(Pmtresults0), variables := "\\makebox[2.85cm]{\\hfill n}"]
Pm[[m]] ← Pmtresults0
if (grepl("InNon|InTra|^TradNon|Cow", addtofilename[m]))
  #Pmtresults ← Pmtresults[!grepl("Arm", variables), ]
  Pmtresults ← Pmtresults[!grepl("^Propo", variables), ]
# CowArm => Cattle arm
if (grepl("Cow", names(Pmtresults))) {
  setnames(Pmtresults,
    grepout("Cow", names(Pmtresults))
    , gsub("Cow", "Cattle", grepout("Cow", names(Pmtresults))))
}
pmt ← latextab(as.matrix(Pmtresults),
  hleft = "\\scriptsize\\hfil$",
  hcenter = c(3.75, rep(1.5, ncol(Pmtresults)-1)),
  hright = "$",
  headercolor = "gray80", adjustlineskip = "-.2ex", delimiterline= NULL,
  alternatcolor = "gray90")
pmt ← rbind(pmt[1:(nrow(pmt)-1), , drop = F],
  paste(c("\\makebox[3.75cm]{\\hfill n}",
    obs0L, obs1L, paste0("\\multicolumn{3}{1}{\\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$")
ir12 ← cbind(
  PM[[2]][[ grep(Irej[1], addtofilename) ]][, c(1:3, 5)],
  PM[[2]][[ grep(Irej[2], addtofilename) ]][, c(2:3, 5)])
setnames(ir12, c("variables", 1:(ncol(ir12)-1)))
ir3 ← PM[[2]][[ grep(Irej[3], addtofilename) ]][, c(1:3, 5)]
setnames(ir3, c("variables", 10+1:(ncol(ir3)-1)))
ir3rows ← data.table(variables = ir3[, variables])
setkey(ir12, variables)
setkey(ir3, variables)
ir123 ← ir12[ir3]
ir123 ← ir123[ir3rows]
setnames(ir123, c("variables", paste0("v", 1:(ncol(ir123)-1))))
for (i in paste0("v", c(3, 6, 9)))
  ir123[nrow(ir123), (i)] :=
    paste0("\\mbox{rate }", formatC(as.numeric(eval(parse(text=i))), digits = 3, format = "f"))
#cnm ← t(c("\\makebox[3cm]{\\hfil variables}",
# paste0("\\makebox[1.5cm]{\\hfil ", rep(c("Yes", "No", "$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,
  alternatcolor = "gray90",
  addseparatingcols = c(3, 6),
  separatingcolwidth = rep(.1, 2),
  separatingcoltitle = c("\\textsf{Traditional} arm", "non-\\textsf{Traditional} arms", "non-\\textsf{Traditional} arms"),
  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 = "f"))
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-attributing 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("^i.*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 30, 9, 13, 37 individuals who individually rejected traditional, large, large grace, cattle, respectively.

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

```
table0(ar[Attrited == 1L, .(FloodInRd1, BStatus)])
table0(ar[Attrited == 1L, .(Arm, 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
tb45 ← paste(tb42, "Contrasts between \\textsf{cattle} arm and other arms. See the footnote
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 %in% grep("non-catt", HeaderDescription)) # 30, 32
          tb45 else
        if (i %in% c(1, 5, 11, 18, 21, 25))
          tb43 else
          tb44
        )
      )
    )
  )
)

```

The variables used: Head literate is an indicator variable of household head literacy. Head age is age of household head. Household size is total number of household members. Flood at baseline is an indicator variable of flood exposure. Household asset amount and Productive asset amount are amount of non-livestock household and productive assets, respectively, in BDT. Livestock value is BDT value of all livestock holding beyond cattle. Number of cattle holding is number of cattle holding. Net asset value is net asset values in BDT using asset items observed in all 4 rounds. Broad net asset value is net asset values in BDT 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 \geq total - (rejected members + attrited members). USD 1 is about BDT 80. Risk preference 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. Time preference 1 is the respondent's choice of the acceptable minimum excess monetary value in 3 months that is no smaller than present monetary benefit, and Time preference 2 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 Time preference 1 is greater than Time preference 2, the respondent is considered to be present-biased. Present bias is an indicator function that takes the value of 1 if the respondent is considered to be present-biased, 0 otherwise. Risk preference

is an index where a larger number is associated with more risk tolerance. Time preference 1 is an index where a larger number is associated with greater future discounting in a 3 month time frame, and Time preference 2 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("Tbl", ii))))
}
```

TABLE 1: PERMUTATION TEST RESULTS OF REJECTION

| variables | NonRejected | Rejected | p-value.lower | p-value.mid | p-value.upper |
|-------------------------------------|-------------|----------|---------------|-------------|---------------|
| Head literate | 0.126 | 0.082 | (9.6) | (11.3) | (13.0) |
| Head age | 38.131 | 37.813 | (72.7) | (72.9) | (73.1) |
| Household size | 4.258 | 3.943 | (1.5) | (1.5) | (1.6) |
| Prop. of non-textsfTraditional arms | 0.829 | 0.560 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.475 | 0.585 | (1.2) | (1.4) | (1.6) |
| Household asset amount | 1413 | 1235 | (8.2) | (8.2) | (8.2) |
| Productive asset amount | 1438 | 932 | (24.5) | (24.5) | (24.5) |
| Livestock value | 5556 | 2685 | (0.9) | (1.0) | (1.0) |
| Number of cattle holding | 0.278 | 0.134 | (0.8) | (0.9) | (1.0) |
| Net asset value | 8993 | 5339 | (5.1) | (5.1) | (5.1) |
| Broad net asset value | 9945 | 5618 | (2.4) | (2.4) | (2.4) |
| Risk preference | 110 | 117 | (2.7) | (3.0) | (3.3) |
| Time preference 1 | 384 | 383 | (89.1) | (90.4) | (91.8) |
| Time preference 2 | 494 | 474 | (13.6) | (14.5) | (15.5) |
| Present bias | 0.452 | 0.519 | (14.4) | (15.9) | (17.4) |
| n | 613 | 159 | (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. Head literate is an indicator variable of household head literacy. Head age is age of household head. Household size is total number of household members. Flood at baseline is an indicator variable of flood exposure. Household asset amount and Productive asset amount are amount of non-livestock household and productive assets, respectively, in BDT. Livestock value is BDT value of all livestock holding beyond cattle. Number of cattle holding is number of cattle holding. Net asset value is net asset values in BDT using asset items observed in all 4 rounds. Broad net asset value is net asset values in BDT 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-attribing borrowers indicates the ratio of non-attribing borrowers to all borrowers. Because attrition and rejection are separate events, a household can reject and attrit, so non-attribed borrowers \geq total - (rejected members + attrited members). USD 1 is about BDT 80. Risk preference 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. Time preference 1 is the respondent's choice of the acceptable minimum excess monetary value in 3 months that is no smaller than present monetary benefit, and Time preference 2 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 Time preference 1 is greater than Time preference 2, the respondent is considered to be present-biased. Present bias 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 |
|--------------------------|-------------|----------|---------------|-------------|---------------|
| Head literate | 0.095 | 0.100 | (79.5) | (89.8) | (100.0) |
| Head age | 38.848 | 37.913 | (55.2) | (55.5) | (55.7) |
| Household size | 4.181 | 3.971 | (34.3) | (35.7) | (37.1) |
| Flood at baseline | 0.514 | 0.386 | (9.2) | (10.7) | (12.2) |
| Household asset amount | 1538 | 1291 | (18.5) | (18.6) | (18.6) |
| Productive asset amount | 1016 | 1024 | (99.0) | (99.1) | (99.1) |
| Livestock value | 6095 | 1714 | (0.7) | (0.9) | (1.1) |
| Number of cattle holding | 0.305 | 0.086 | (0.7) | (0.9) | (1.1) |
| Net asset value | 11103 | 4076 | (1.6) | (1.6) | (1.6) |
| Broad net asset value | 12547 | 4513 | (0.6) | (0.6) | (0.6) |
| Risk preference | 115 | 116 | (74.6) | (80.9) | (87.1) |
| Time preference 1 | 376 | 370 | (77.3) | (79.2) | (81.1) |
| Time preference 2 | 485 | 480 | (70.9) | (75.8) | (80.6) |
| Present bias | 0.465 | 0.477 | (87.5) | (93.8) | (100.0) |
| n | 105 | 70 | (rate: 0.400) | | |

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 |
|--------------------------|-------------|----------|---------------|-------------|---------------|
| Head literate | 0.132 | 0.067 | (8.0) | (9.6) | (11.2) |
| Head age | 37.982 | 37.733 | (83.0) | (83.2) | (83.4) |
| Household size | 4.274 | 3.921 | (3.3) | (3.5) | (3.7) |
| Flood at baseline | 0.467 | 0.742 | (0.0) | (0.0) | (0.0) |
| Household asset amount | 1392 | 1185 | (12.5) | (12.5) | (12.5) |
| Productive asset amount | 1526 | 859 | (19.1) | (19.1) | (19.1) |
| Livestock value | 5444 | 3544 | (20.6) | (22.6) | (24.6) |
| Number of cattle holding | 0.272 | 0.177 | (20.4) | (22.3) | (24.3) |
| Net asset value | 8627 | 6473 | (39.9) | (39.9) | (39.9) |
| Broad net asset value | 9494 | 6612 | (26.4) | (26.4) | (26.4) |
| Risk preference | 109 | 118 | (2.6) | (3.7) | (4.8) |
| Time preference 1 | 386 | 395 | (61.8) | (63.4) | (65.0) |
| Time preference 2 | 495 | 468 | (12.9) | (14.1) | (15.3) |
| Present bias | 0.449 | 0.561 | (8.9) | (10.1) | (11.3) |
| n | 508 | 89 | (rate: 0.149) | | |

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 |
|-------------------------------------|------------|---------|---------------|-------------|---------------|
| Head literate | 0.067 | 0.100 | (39.2) | (47.9) | (56.7) |
| Head age | 37.733 | 37.913 | (92.1) | (92.4) | (92.7) |
| Household size | 3.921 | 3.971 | (84.1) | (86.1) | (88.1) |
| Prop. of non-textsfTraditional arms | 1.000 | 0.000 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.742 | 0.386 | (0.0) | (0.0) | (0.0) |
| Household asset amount | 1185 | 1291 | (47.1) | (47.3) | (47.6) |
| Productive asset amount | 859 | 1024 | (24.6) | (24.6) | (24.6) |
| Livestock value | 3544 | 1714 | (16.9) | (20.3) | (23.6) |
| Number of cattle holding | 0.177 | 0.086 | (17.0) | (20.3) | (23.7) |
| Net asset value | 6473 | 4076 | (25.4) | (25.4) | (25.4) |
| Broad net asset value | 6612 | 4513 | (32.0) | (32.0) | (32.0) |
| Risk preference | 118 | 116 | (55.9) | (62.8) | (69.8) |
| Time preference 1 | 395 | 370 | (25.5) | (27.0) | (28.5) |
| Time preference 2 | 468 | 480 | (51.6) | (60.6) | (69.5) |
| Present bias | 0.561 | 0.477 | (29.5) | (33.9) | (38.4) |
| n | 89 | 70 | (rate: 0.440) | | |

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 |
|-------------------------------------|--------------|-----------|---------------|-------------|---------------|
| Head literate | 0.123 | 0.057 | (7.5) | (9.7) | (11.8) |
| Head age | 38.187 | 36.841 | (28.4) | (28.5) | (28.7) |
| Household size | 4.205 | 4.071 | (43.6) | (44.9) | (46.2) |
| Prop. of non-textsfTraditional arms | 0.808 | 0.429 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.490 | 0.571 | (16.9) | (19.1) | (21.2) |
| Household asset amount | 1390 | 1246 | (31.8) | (31.8) | (31.9) |
| Productive asset amount | 1360 | 1070 | (62.5) | (62.5) | (62.5) |
| Livestock value | 5250 | 2000 | (4.7) | (5.2) | (5.7) |
| Number of cattle holding | 0.262 | 0.100 | (4.7) | (5.2) | (5.7) |
| Net asset value | 8743 | 3333 | (4.2) | (4.2) | (4.2) |
| Broad net asset value | 9628 | 3464 | (2.3) | (2.3) | (2.3) |
| Risk preference | 111 | 114 | (51.2) | (55.5) | (59.9) |
| Time preference 1 | 383 | 393 | (62.5) | (64.3) | (66.1) |
| Time preference 2 | 493 | 454 | (2.7) | (3.1) | (3.5) |
| Present bias | 0.451 | 0.610 | (1.3) | (1.7) | (2.0) |
| n | 702 | 70 | (rate: 0.091) | | |

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 |
|--------------------------|--------------|-----------|---------------|-------------|---------------|
| Head literate | 0.111 | 0.050 | (22.4) | (29.5) | (36.6) |
| Head age | 38.319 | 39.026 | (69.9) | (70.2) | (70.5) |
| Household size | 4.067 | 4.200 | (57.6) | (59.8) | (62.0) |
| Flood at baseline | 0.519 | 0.275 | (0.4) | (0.5) | (0.7) |
| Household asset amount | 1500 | 1257 | (23.0) | (23.1) | (23.3) |
| Productive asset amount | 984 | 1147 | (60.2) | (60.2) | (60.2) |
| Livestock value | 5481 | 500 | (0.9) | (1.0) | (1.2) |
| Number of cattle holding | 0.274 | 0.025 | (0.9) | (1.0) | (1.2) |
| Net asset value | 10397 | 2171 | (1.0) | (1.0) | (1.0) |
| Broad net asset value | 11798 | 2191 | (0.3) | (0.3) | (0.3) |
| Risk preference | 116 | 111 | (34.7) | (40.0) | (45.2) |
| Time preference 1 | 369 | 389 | (40.1) | (43.2) | (46.4) |
| Time preference 2 | 487 | 472 | (47.1) | (52.0) | (56.8) |
| Present bias | 0.449 | 0.538 | (27.1) | (31.7) | (36.3) |
| n | 135 | 40 | (rate: 0.229) | | |

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 |
|--------------------------|--------------|-----------|---------------|-------------|---------------|
| Head literate | 0.125 | 0.067 | (24.5) | (32.8) | (41.1) |
| Head age | 38.156 | 34.000 | (2.8) | (2.8) | (2.9) |
| Household size | 4.238 | 3.900 | (19.6) | (20.8) | (22.0) |
| Flood at baseline | 0.483 | 0.967 | (0.0) | (0.0) | (0.0) |
| Household asset amount | 1369 | 1221 | (55.0) | (55.1) | (55.1) |
| Productive asset amount | 1451 | 970 | (55.4) | (55.4) | (55.4) |
| Livestock value | 5194 | 5000 | (85.5) | (92.8) | (100.0) |
| Number of cattle holding | 0.260 | 0.250 | (85.5) | (92.8) | (100.0) |
| Net asset value | 8417 | 6141 | (62.0) | (62.0) | (62.0) |
| Broad net asset value | 9200 | 6541 | (56.7) | (56.7) | (56.7) |
| Risk preference | 110 | 119 | (19.7) | (24.2) | (28.8) |
| Time preference 1 | 387 | 400 | (66.6) | (70.5) | (74.4) |
| Time preference 2 | 495 | 420 | (1.5) | (1.8) | (2.1) |
| Present bias | 0.452 | 0.750 | (0.5) | (0.8) | (1.1) |
| n | 567 | 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 |
|-------------------------------------|------------|---------|---------------|-------------|---------------|
| Head literate | 0.067 | 0.050 | (62.7) | (81.4) | (100.0) |
| Head age | 34.000 | 39.026 | (2.7) | (2.7) | (2.8) |
| Household size | 3.900 | 4.200 | (34.2) | (36.6) | (39.0) |
| Prop. of non-textsfTraditional arms | 1.000 | 0.000 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.967 | 0.275 | (0.0) | (0.0) | (0.0) |
| Household asset amount | 1221 | 1257 | (88.1) | (88.4) | (88.6) |
| Productive asset amount | 970 | 1147 | (50.4) | (50.4) | (50.5) |
| Livestock value | 5000 | 500 | (0.1) | (0.7) | (1.3) |
| Number of cattle holding | 0.250 | 0.025 | (0.1) | (0.7) | (1.3) |
| Net asset value | 6141 | 2171 | (9.7) | (9.7) | (9.7) |
| Broad net asset value | 6541 | 2191 | (5.7) | (5.7) | (5.7) |
| Risk preference | 119 | 111 | (23.3) | (31.3) | (39.3) |
| Time preference 1 | 400 | 389 | (56.7) | (67.4) | (78.0) |
| Time preference 2 | 420 | 472 | (12.0) | (14.9) | (17.9) |
| Present bias | 0.750 | 0.538 | (9.3) | (12.7) | (16.0) |
| 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 |
|-------------------------------------|--------------|-----------|---------------|-------------|---------------|
| Head literate | 0.126 | 0.101 | (49.0) | (54.9) | (60.7) |
| Head age | 38.131 | 38.593 | (69.2) | (69.3) | (69.5) |
| Household size | 4.258 | 3.843 | (1.2) | (1.3) | (1.3) |
| Prop. of non-textsfTraditional arms | 0.829 | 0.663 | (0.1) | (0.1) | (0.1) |
| Flood at baseline | 0.475 | 0.596 | (3.1) | (3.6) | (4.1) |
| Household asset amount | 1413 | 1226 | (16.0) | (16.1) | (16.2) |
| Productive asset amount | 1438 | 826 | (16.7) | (16.7) | (16.7) |
| Livestock value | 5556 | 3146 | (8.4) | (9.3) | (10.2) |
| Number of cattle holding | 0.278 | 0.157 | (8.4) | (9.3) | (10.2) |
| Net asset value | 8993 | 6921 | (40.8) | (40.8) | (40.8) |
| Broad net asset value | 9945 | 7317 | (29.3) | (29.3) | (29.3) |
| Risk preference | 110 | 120 | (1.9) | (2.2) | (2.5) |
| Time preference 1 | 384 | 375 | (61.0) | (62.6) | (64.1) |
| Time preference 2 | 494 | 490 | (78.2) | (81.8) | (85.4) |
| Present bias | 0.452 | 0.444 | (90.0) | (95.0) | (100.0) |
| n | 613 | 89 | (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 |
|--------------------------|--------------|-----------|---------------|-------------|---------------|
| Head literate | 0.095 | 0.167 | (18.8) | (25.3) | (31.9) |
| Head age | 38.848 | 36.467 | (25.6) | (25.8) | (26.0) |
| Household size | 4.181 | 3.667 | (7.0) | (8.2) | (9.5) |
| Flood at baseline | 0.514 | 0.533 | (84.1) | (92.1) | (100.0) |
| Household asset amount | 1538 | 1360 | (56.2) | (56.6) | (56.9) |
| Productive asset amount | 1016 | 869 | (71.7) | (71.7) | (71.7) |
| Livestock value | 6095 | 3333 | (23.9) | (28.1) | (32.4) |
| Number of cattle holding | 0.305 | 0.167 | (23.9) | (28.1) | (32.3) |
| Net asset value | 11103 | 7761 | (50.7) | (50.7) | (50.7) |
| Broad net asset value | 12547 | 9001 | (47.4) | (47.4) | (47.4) |
| Risk preference | 115 | 123 | (16.9) | (21.6) | (26.3) |
| Time preference 1 | 376 | 342 | (24.0) | (25.1) | (26.1) |
| Time preference 2 | 485 | 492 | (72.0) | (78.8) | (85.6) |
| Present bias | 0.465 | 0.385 | (37.8) | (44.4) | (51.1) |
| n | 105 | 30 | (rate: 0.222) | | |

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 | NonRejected | IRejected | p-value.lower | p-value.mid | p-value.upper |
|--------------------------|-------------|-----------|---------------|-------------|---------------|
| Head literate | 0.132 | 0.068 | (14.5) | (17.8) | (21.1) |
| Head age | 37.982 | 39.732 | (21.9) | (22.0) | (22.2) |
| Household size | 4.274 | 3.932 | (8.4) | (8.9) | (9.3) |
| Flood at baseline | 0.467 | 0.627 | (1.9) | (2.3) | (2.6) |
| Household asset amount | 1392 | 1174 | (14.6) | (14.7) | (14.8) |
| Productive asset amount | 1526 | 804 | (15.9) | (15.9) | (15.9) |
| Livestock value | 5444 | 3051 | (15.1) | (17.0) | (18.9) |
| Number of cattle holding | 0.272 | 0.153 | (15.1) | (17.0) | (18.9) |
| Net asset value | 8627 | 6580 | (47.9) | (47.9) | (47.9) |
| Broad net asset value | 9494 | 6634 | (32.8) | (32.8) | (32.8) |
| Risk preference | 109 | 118 | (6.2) | (7.5) | (8.8) |
| Time preference 1 | 386 | 393 | (72.0) | (73.9) | (75.8) |
| Time preference 2 | 495 | 489 | (73.7) | (78.1) | (82.5) |
| Present bias | 0.449 | 0.478 | (64.3) | (70.0) | (75.7) |
| n | 508 | 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 |
|-------------------------------------|------------|---------|---------------|-------------|---------------|
| Head literate | 0.068 | 0.167 | (16.1) | (21.1) | (26.2) |
| Head age | 39.732 | 36.467 | (25.8) | (26.0) | (26.2) |
| Household size | 3.932 | 3.667 | (48.1) | (50.1) | (52.1) |
| Prop. of non-textsfTraditional arms | 1.000 | 0.000 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.627 | 0.533 | (36.7) | (42.9) | (49.2) |
| Household asset amount | 1174 | 1360 | (39.9) | (40.3) | (40.8) |
| Productive asset amount | 804 | 869 | (68.0) | (68.1) | (68.1) |
| Livestock value | 3051 | 3333 | (82.2) | (91.1) | (100.0) |
| Number of cattle holding | 0.153 | 0.167 | (82.2) | (91.1) | (100.0) |
| Net asset value | 6580 | 7761 | (70.0) | (70.0) | (70.0) |
| Broad net asset value | 6634 | 9001 | (53.6) | (53.6) | (53.6) |
| Risk preference | 118 | 123 | (39.9) | (49.1) | (58.2) |
| Time preference 1 | 393 | 342 | (10.3) | (13.2) | (16.0) |
| Time preference 2 | 489 | 492 | (86.5) | (93.3) | (100.0) |
| Present bias | 0.478 | 0.385 | (32.4) | (39.8) | (47.2) |
| n | 59 | 30 | (rate: 0.337) | | |

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 |
|--------------------------|-----------|--------|---------------|-------------|---------------|
| Head literate | 0.111 | 0.167 | (5.2) | (6.3) | (7.3) |
| Head age | 38.306 | 37.642 | (45.7) | (45.8) | (45.9) |
| Household size | 4.288 | 4.173 | (36.3) | (37.2) | (38.0) |
| Flood at baseline | 0.479 | 0.463 | (71.4) | (74.8) | (78.3) |
| Household asset amount | 1334 | 1639 | (0.5) | (0.5) | (0.5) |
| Productive asset amount | 1563 | 1089 | (40.5) | (40.5) | (40.5) |
| Livestock value | 5956 | 4444 | (17.6) | (20.0) | (22.5) |
| Number of cattle holding | 0.298 | 0.222 | (17.6) | (20.1) | (22.6) |
| Net asset value | 10048 | 5968 | (4.4) | (4.4) | (4.4) |
| Broad net asset value | 10764 | 7597 | (12.7) | (12.7) | (12.7) |
| Risk preference | 110 | 109 | (66.1) | (69.3) | (72.4) |
| Time preference 1 | 374 | 412 | (0.5) | (0.6) | (0.6) |
| Time preference 2 | 487 | 512 | (3.8) | (4.2) | (4.6) |
| Present bias | 0.446 | 0.469 | (57.9) | (61.2) | (64.5) |
| n | 451 | 162 | (rate: 0.264) | | |

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. Contrasts between cattle arm and other arms. See the footnote of TABLE ?? for description of variables.

TABLE 1 shows test results of independence between loan receivers and nonreceivers (group, individual rejecters) on the analysis sample of 772 members. It shows that lower head literacy, smaller

household size, being affected by flood at the baseline, smaller cattle/livestock holding, and smaller net assets are correlated with opting out the offered type of lending. Smaller net assets based on broader items also show a tendency to reject a participation offer. Risk preference indicates that the minimum expected payoff to choose a 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 contrasts of smaller net asset holding and cattle/livestock holding are more pronounced among traditional rejecters than in the case of all rejecters of TABLE 1. It also shows that flood exposure among the rejecters is less frequent than in TABLE 1. TABLE 3 indicates that lower head literacy, smaller household size, higher flood exposure, are more pronounced among non-traditional rejecters than in the case of all rejecters of TABLE 1. Risk preference shows greater risk tolerance among non-rejecters than rejecters of the non-traditional arms. It also shows that asset and livestock holding is not statistically different between rejecters and non-rejecters. The only difference between rejecters of traditional and non-traditional arms we observe in TABLE 4 is lower flood exposure of the former. Due possibly to a small sample size, smaller asset and livestock holding of the traditional arm rejecters is merely suggestive.

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 individual 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 participants 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-attributing members of traditional and non-traditional",
  "Permutation test results of non-attributing members of cattle and all other arm borrow",
  "Permutation test results of non-attributing members of cattle and large grace arm born
)
TabLabel1 ← paste("tbl", 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("Tbl", 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("Tbl", ii)))
    cat(#gsub("active members", "non-active borrowers",
      tblatt
    #)
    )
    rm(tblatt)
  } else
    cat(eval(parse(text=paste0("Tbl", ii))))
}
```

TABLE 14: PERMUTATION TEST RESULTS OF ATTRITION

| variables | NonAttrited | Attrited | p-value.lower | p-value.mid | p-value.upper |
|-------------------------------------|-------------|----------|---------------|-------------|---------------|
| Head literate | 0.115 | 0.132 | (61.1) | (66.9) | (72.7) |
| Head age | 37.982 | 38.692 | (52.9) | (53.1) | (53.3) |
| Household size | 4.181 | 4.286 | (51.2) | (52.5) | (53.7) |
| Prop. of non-textsfTraditional arms | 0.789 | 0.659 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.493 | 0.527 | (50.3) | (54.1) | (57.8) |
| Household asset amount | 1363 | 1515 | (26.7) | (26.8) | (26.9) |
| Productive asset amount | 1216 | 2239 | (10.9) | (10.9) | (10.9) |
| Livestock value | 4993 | 5000 | (92.2) | (96.1) | (100.0) |
| Number of cattle holding | 0.250 | 0.250 | (92.1) | (96.1) | (100.0) |
| Net asset value | 8195 | 8974 | (75.4) | (75.4) | (75.4) |
| Broad net asset value | 8945 | 10432 | (55.4) | (55.4) | (55.4) |
| Risk preference | 110 | 128 | (0.0) | (0.0) | (0.1) |
| Time preference 1 | 382 | 404 | (30.3) | (31.6) | (32.9) |
| Time preference 2 | 490 | 486 | (74.5) | (78.7) | (82.9) |
| Present bias | 0.459 | 0.531 | (30.3) | (34.0) | (37.7) |
| n | 681 | 91 | (rate: 0.118) | | |

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 |
|--------------------------|-------------|----------|---------------|-------------|---------------|
| Head literate | 0.118 | 0.000 | (1.5) | (3.0) | (4.6) |
| Head age | 38.497 | 38.387 | (95.3) | (95.7) | (96.1) |
| Household size | 4.167 | 3.774 | (15.0) | (16.1) | (17.2) |
| Flood at baseline | 0.479 | 0.387 | (32.5) | (37.6) | (42.8) |
| Household asset amount | 1373 | 1700 | (17.4) | (17.6) | (17.8) |
| Productive asset amount | 1027 | 982 | (87.8) | (87.9) | (87.9) |
| Livestock value | 4722 | 2581 | (28.3) | (33.4) | (38.6) |
| Number of cattle holding | 0.236 | 0.129 | (28.4) | (33.5) | (38.5) |
| Net asset value | 8223 | 6979 | (76.2) | (76.2) | (76.2) |
| Broad net asset value | 9232 | 7938 | (75.1) | (75.1) | (75.1) |
| Risk preference | 113 | 131 | (1.3) | (1.6) | (1.9) |
| Time preference 1 | 371 | 391 | (49.8) | (54.5) | (59.2) |
| Time preference 2 | 485 | 470 | (47.8) | (54.1) | (60.5) |
| Present bias | 0.462 | 0.522 | (50.3) | (58.0) | (65.7) |
| n | 144 | 31 | (rate: 0.177) | | |

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 |
|--------------------------|-------------|----------|---------------|-------------|---------------|
| Head literate | 0.114 | 0.200 | (3.5) | (4.8) | (6.2) |
| Head age | 37.845 | 38.850 | (46.1) | (46.3) | (46.5) |
| Household size | 4.184 | 4.550 | (6.1) | (6.5) | (6.8) |
| Flood at baseline | 0.497 | 0.600 | (10.2) | (11.9) | (13.6) |
| Household asset amount | 1360 | 1410 | (76.4) | (76.8) | (77.1) |
| Productive asset amount | 1266 | 2879 | (9.6) | (9.6) | (9.6) |
| Livestock value | 5065 | 6531 | (41.1) | (44.1) | (47.1) |
| Number of cattle holding | 0.253 | 0.327 | (41.0) | (44.2) | (47.3) |
| Net asset value | 8189 | 10105 | (53.8) | (53.8) | (53.8) |
| Broad net asset value | 8875 | 11845 | (34.5) | (34.5) | (34.5) |
| Risk preference | 110 | 125 | (2.2) | (2.8) | (3.3) |
| Time preference 1 | 386 | 415 | (30.4) | (32.4) | (34.3) |
| Time preference 2 | 492 | 500 | (66.0) | (71.5) | (77.1) |
| Present bias | 0.459 | 0.538 | (42.9) | (48.7) | (54.5) |
| n | 537 | 60 | (rate: 0.101) | | |

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 |
|------------------------------------|------------|---------|---------------|-------------|---------------|
| Head literate | 0.200 | 0.000 | (0.2) | (0.4) | (0.7) |
| Head age | 38.850 | 38.387 | (85.5) | (85.9) | (86.3) |
| Household size | 4.550 | 3.774 | (2.9) | (3.2) | (3.5) |
| Prop. of non-textsTraditional arms | 1.000 | 0.000 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.600 | 0.387 | (4.8) | (6.2) | (7.6) |
| Household asset amount | 1410 | 1700 | (38.8) | (39.2) | (39.6) |
| Productive asset amount | 2879 | 982 | (87.4) | (87.4) | (87.4) |
| Livestock value | 6531 | 2581 | (17.2) | (20.5) | (23.8) |
| Number of cattle holding | 0.327 | 0.129 | (17.0) | (20.3) | (23.7) |
| Net asset value | 10105 | 6979 | (78.0) | (78.0) | (78.0) |
| Broad net asset value | 11845 | 7938 | (69.7) | (69.7) | (69.7) |
| Risk preference | 125 | 131 | (39.3) | (48.8) | (58.3) |
| Time preference 1 | 415 | 391 | (50.3) | (57.7) | (65.1) |
| Time preference 2 | 500 | 470 | (29.6) | (36.1) | (42.6) |
| Present bias | 0.538 | 0.522 | (77.5) | (88.7) | (100.0) |
| n | 60 | 31 | (rate: 0.341) | | |

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 |
|-------------------------------------|-----------|--------|---------------|-------------|---------------|
| Head literate | 0.104 | 0.122 | (45.7) | (49.8) | (53.8) |
| Head age | 37.871 | 38.143 | (73.9) | (74.0) | (74.2) |
| Household size | 4.077 | 4.240 | (15.4) | (15.8) | (16.2) |
| Prop. of non-textsfTraditional arms | 0.584 | 0.849 | (0.0) | (0.0) | (0.0) |
| Flood at baseline | 0.548 | 0.477 | (6.8) | (7.5) | (8.1) |
| Household asset amount | 1300 | 1407 | (24.9) | (24.9) | (24.9) |
| Productive asset amount | 1482 | 1277 | (69.3) | (69.3) | (69.3) |
| Livestock value | 3714 | 5481 | (7.3) | (7.8) | (8.4) |
| Number of cattle holding | 0.186 | 0.274 | (7.2) | (7.7) | (8.2) |
| Net asset value | 7015 | 8741 | (30.7) | (30.7) | (30.7) |
| Broad net asset value | 7751 | 9592 | (28.3) | (28.3) | (28.3) |
| Risk preference | 120 | 109 | (0.0) | (0.0) | (0.0) |
| Time preference 1 | 388 | 383 | (66.6) | (67.7) | (68.8) |
| Time preference 2 | 476 | 494 | (13.8) | (14.6) | (15.5) |
| Present bias | 0.520 | 0.447 | (7.8) | (8.7) | (9.5) |
| n | 221 | 551 | (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 |
|--------------------------|-----------|--------|---------------|-------------|---------------|
| Head literate | 0.107 | 0.144 | (30.3) | (34.5) | (38.7) |
| Head age | 38.440 | 37.973 | (66.7) | (66.9) | (67.1) |
| Household size | 4.176 | 4.110 | (63.2) | (64.7) | (66.3) |
| Flood at baseline | 0.352 | 0.459 | (4.7) | (5.5) | (6.3) |
| Household asset amount | 1311 | 1676 | (0.9) | (0.9) | (0.9) |
| Productive asset amount | 1544 | 1112 | (29.9) | (29.9) | (29.9) |
| Livestock value | 5283 | 3425 | (12.4) | (13.9) | (15.4) |
| Number of cattle holding | 0.264 | 0.171 | (12.5) | (14.0) | (15.5) |
| Net asset value | 8662 | 5457 | (15.5) | (15.5) | (15.5) |
| Broad net asset value | 8918 | 7251 | (47.6) | (47.6) | (47.6) |
| Risk preference | 113 | 108 | (20.1) | (22.0) | (23.9) |
| Time preference 1 | 374 | 413 | (1.9) | (2.0) | (2.1) |
| Time preference 2 | 479 | 515 | (2.7) | (3.0) | (3.3) |
| Present bias | 0.465 | 0.462 | (90.8) | (95.4) | (100.0) |
| n | 159 | 146 | (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 |
|--------------------------|-----------|--------|---------------|-------------|---------------|
| Head literate | 0.114 | 0.144 | (30.1) | (33.7) | (37.4) |
| Head age | 38.205 | 37.973 | (80.3) | (80.5) | (80.7) |
| Household size | 4.286 | 4.110 | (18.9) | (19.4) | (20.0) |
| Flood at baseline | 0.484 | 0.459 | (56.4) | (59.8) | (63.1) |
| Household asset amount | 1313 | 1676 | (0.1) | (0.1) | (0.1) |
| Productive asset amount | 1336 | 1112 | (47.1) | (47.2) | (47.2) |
| Livestock value | 6222 | 3425 | (1.8) | (2.0) | (2.2) |
| Number of cattle holding | 0.311 | 0.171 | (1.8) | (2.0) | (2.2) |
| Net asset value | 9888 | 5457 | (2.4) | (2.4) | (2.4) |
| Broad net asset value | 10410 | 7251 | (11.5) | (11.5) | (11.5) |
| Risk preference | 109 | 108 | (64.6) | (67.9) | (71.3) |
| Time preference 1 | 372 | 413 | (0.4) | (0.5) | (0.5) |
| Time preference 2 | 487 | 515 | (2.7) | (3.0) | (3.3) |
| Present bias | 0.441 | 0.462 | (62.5) | (66.1) | (69.6) |
| n | 405 | 146 | (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 characteristics at 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 than 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.

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 characteristics, 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 tolerant 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 effectively 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.

[†] 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].