# R Notebook

Hide

```
library(ggplot2)
library(tidyr)
library(knitr)
library(xtable)
```

```
Attaching package: 'xtable'

The following object is masked from 'package:arm':

    display
```

Hide

```
library(dplyr)
library(AER)
```

```
Loading required package: car
Loading required package: carData
Registered S3 methods overwritten by 'car':
  method                          from
  influence.merMod                lme4
  cooks.distance.influence.merMod lme4
  dfbeta.influence.merMod         lme4
  dfbetas.influence.merMod        lme4

Attaching package: 'car'

The following object is masked from 'package:purrr':

    some

The following object is masked from 'package:dplyr':

    recode

The following object is masked from 'package:arm':

    logit

Loading required package: lmtest
Loading required package: zoo

Attaching package: 'zoo'

The following objects are masked from 'package:base':

    as.Date, as.Date.numeric

Loading required package: sandwich
Loading required package: survival
```

Hide

```
library(plm)
```

```
Attaching package: 'plm'

The following objects are masked from 'package:dplyr':

    between, lag, lead
```

Hide

```
library(multiwayvcov)
library(magrittr)
```

```
Attaching package: 'magrittr'

The following object is masked from 'package:purrr':

    set_names

The following object is masked from 'package:tidyr':

    extract
```

Hide

```
library(miceadds)
```

```
Loading required package: mice

Attaching package: 'mice'

The following object is masked from 'package:stats':

    filter

The following objects are masked from 'package:base':

    cbind, rbind

* miceadds 3.10-28 (2020-07-29 21:56:24)
```

Hide

```
library(car)
library(lmtest)
library(sandwich)
library(psych)
```

```
Attaching package: 'psych'

The following object is masked from 'package:car':

    logit

The following objects are masked from 'package:ggplot2':

    %+%, alpha

The following objects are masked from 'package:arm':

    logit, rescale, sim
```

```
library(stargazer)
```

```
Please cite as:

 Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Table
s.
 R package version 5.2.2. https://CRAN.R-project.org/package=stargazer
```

```
library(haven)
library(Amelia)
```

```
Loading required package: Rcpp
##
## Amelia II: Multiple Imputation
## (Version 1.7.6, built: 2019-11-24)
## Copyright (C) 2005-2020 James Honaker, Gary King and Matthew Blackwell
## Refer to http://gking.harvard.edu/amelia/ for more information
##
```

```
library(mice)
library(lattice)
library(VIM)
```

```
Loading required package: colorspace
VIM is ready to use.

Suggestions and bug-reports can be submitted at: https://github.com/statistikat/VIM/issu
es

Attaching package: 'VIM'

The following object is masked from 'package:datasets':

    sleep
```

```
library(mitools)
library(miceadds)
library(ggplot2)
library(cobalt)
library(gridExtra)
library(tidyverse)
library(gtable)
library(grid)
```

Hide

```
#!diagnostics suppress=<comma-separated list of variables>
```

Hide

```
dat <- read_dta("/Users/swimmingcircle/Documents/CS112_Decision/social_network/0422analy
sis.dta")
```

Hide

```
dat
```

| id<br><dbl> | address<br><chr> | region<br><dbl> | village<br><chr> | takeup_survey<br><dbl> | ...<br><dbl> | ag...<br><dbl> | e...<br><dbl> | rice_inc<br><dbl> | ricearea_2010<br><dbl> | ▶ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1111030 | fusheng21 | 1 | fusheng | 1 | 76 | 5 | 1 | 40 | 5.00 | |
| 1111031 | fusheng21 | 1 | fusheng | 0 | 54 | 4 | 0 | 100 | 10.00 | |
| 1111032 | fusheng21 | 1 | fusheng | 1 | 67 | 2 | 2 | 60 | 10.00 | |
| 1111034 | fusheng21 | 1 | fusheng | 1 | 74 | 2 | 1 | 30 | 0.74 | |
| 1111035 | fusheng21 | 1 | fusheng | 1 | 60 | 6 | 1 | 50 | 11.00 | |
| 1111036 | fusheng21 | 1 | fusheng | 0 | 56 | 6 | 1 | 90 | 13.00 | |
| 1111038 | fusheng21 | 1 | fusheng | 1 | 61 | 13 | 1 | 30 | 4.00 | |
| 1111040 | fusheng21 | 1 | fusheng | 1 | 40 | 4 | 2 | 100 | 30.00 | |
| 1111041 | fusheng21 | 1 | fusheng | 0 | 63 | 3 | 1 | 70 | 2.00 | |
| 1111042 | fusheng21 | 1 | fusheng | 1 | 57 | 9 | 2 | NA | 1.00 | |

1-10 of 4,902 rows | 1-10 of 59 columns          Previous **1** 2 3 4 5 6 ... 100 Next

# Descriptive statistics

Hide

```
panelA <- dat %>%
```

```
Warning messages:
1: Unknown or uninitialised column: `session`.
2: Unknown or uninitialised column: `session`.
3: Unknown or uninitialised column: `session`.
4: Unknown or uninitialised column: `session`.
```

```
  select(male, age, agpop, educ, ricearea_2010, rice_inc, disaster_yes, disaster_loss, r
isk_averse, disaster_prob, understanding) %>%
  summarise_all(funs(n = sum(!is.na(.)), mean = mean(., na.rm = TRUE), sd = sd(., na.rm
 = TRUE))) %>%
  matrix(nrow = 11, ncol = 3) %>%
  set_rownames(c("male", "age", "agpop", "educ", "ricearea_2010", "rice_inc", "disaster_
yes", "disaster_loss", "risk_averse", "disaster_prob", "understanding")) %>%
  set_colnames(c('n', 'mean', 'sd'))
```

```
`funs()` is deprecated as of dplyr 0.8.0.
Please use a list of either functions or lambdas:

  # Simple named list:
  list(mean = mean, median = median)

  # Auto named with `tibble::lst()`:
  tibble::lst(mean, median)

  # Using lambdas
  list(~ mean(., trim = .2), ~ median(., na.rm = TRUE))
This warning is displayed once every 8 hours.
Call `lifecycle::last_warnings()` to see where this warning was generated.
```

```
panelB <- dat %>%
  select(network_obs, network_rate_preintensive, network_twoside, network_second) %>%
  summarise_all(funs(n = sum(!is.na(.)), mean = mean(., na.rm = TRUE), sd = sd(., na.rm
 = TRUE))) %>%
  matrix(nrow = 4, ncol = 3) %>%
  set_rownames(c("network_obs", "network_rate_preintensive", "network_twoside", "network
_second"))%>%
  set_colnames(c('n', 'mean', 'sd'))

panelC <- dat %>%
  select(indegree, path_out_ind, eigenvector) %>%
  summarise_all(funs(n = sum(!is.na(.)), mean = mean(., na.rm = TRUE), sd = sd(., na.rm
 = TRUE))) %>%
  matrix(nrow = 3, ncol = 3) %>%
  set_colnames(c('n', 'mean', 'sd')) %>%
  set_rownames(c("indegree", "path_out_ind", "eigenvector"))
```

```
panelA
```

```
               n      mean        sd
male           4894 0.9139763 0.2804277
age            4893 51.49438   12.03191
agpop          4893 4.915185   2.133418
educ           4841 1.191902   0.8533748
ricearea_2010  4883 13.62975   19.50735
rice_inc       4789 74.11861   27.67502
disaster_yes   4453 0.6328318  0.482087
disaster_loss  2518 27.50675   18.19906
risk_averse    4902 0.1888209  0.3133002
disaster_prob  4902 33.63282   16.61935
understanding  4723 0.4572518  0.3030129
```

```
print('')
```

```
[1] ""
```

```
panelB
```

```
                            n     mean       sd
network_obs                 4588 4.918265  0.433588
network_rate_preintensive   4588 0.1649738 0.1896223
network_twoside             4588 0.0416921 0.098993
network_second              4521 0.1677539 0.1172213
```

```
print('')
```

```
[1] ""
```

```
panelC
```

```
              n     mean       sd
indegree      4588 3.244182  1.912167
path_out_ind  4588 2.672834  0.8662739
eigenvector   4588 0.1437882 0.08318533
```

```
takeup_summary <- dat %>%
  select(takeup_survey) %>%
  summarise_all(funs(n = sum(!is.na(.)), mean = mean(., na.rm = TRUE), sd = sd(., na.rm
 = TRUE))) %>%
  as.data.frame(row.names = c('n', 'mean','sd')) %>%
  mutate(session = "total")

takeup_summary
```

| n | mean | sd | session |
| :---: | :---: | ---: | --- |
| <int> | <dbl> | <dbl> | <chr> |
| 4902 | 0.4455324 | 0.4970751 | total |

1 row

<div align="right">Hide</div>

```
# matrix(takeup_summary[1,], nrow = 1, ncol = 3)
```

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```
dat$session <- 0
dat$session[dat$delay == 0 & dat$intensive == 0] <- 11
dat$session[dat$delay == 0 & dat$intensive == 1] <- 12
dat$session[dat$delay == 1 & dat$intensive == 0] <- 21
dat$session[dat$delay == 1 & dat$intensive == 1] <- 22
dat$session <- as.factor(dat$session)
as.data.frame(table(dat$session))
```

| Var1 | Freq |
| --- | ---: |
| <fctr> | <int> |
| 11 | 1079 |
| 12 | 1096 |
| 21 | 1374 |
| 22 | 1353 |

4 rows

<div align="right">Hide</div>

```
dat
```

| id | address | region | village | takeup_survey | ... | ag... | e... | rice_inc | ricearea_2010 | ▶ |
| ---: | --- | ---: | --- | ---: | ---: | ---: | ---: | ---: | ---: | --- |
| <dbl> | <chr> | <dbl> | <chr> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | |
| 1111030 | fusheng21 | 1 | fusheng | 1 | 76 | 5 | 1 | 40 | 5.00 | |
| 1111031 | fusheng21 | 1 | fusheng | 0 | 54 | 4 | 0 | 100 | 10.00 | |

| id | address | region | village | takeup_survey | ... | ag... | e... | rice_inc | ricearea_2010 |
|---|---|---|---|---|---|---|---|---|---|
| <dbl> | <chr> | <dbl> | <chr> | <dbl> | | <dbl> <dbl> | <dbl> | <dbl> | <dbl> |
| 1111032 | fusheng21 | 1 | fusheng | 1 | | 67 2 | 2 | 60 | 10.00 |
| 1111034 | fusheng21 | 1 | fusheng | 1 | | 74 2 | 1 | 30 | 0.74 |
| 1111035 | fusheng21 | 1 | fusheng | 1 | | 60 6 | 1 | 50 | 11.00 |
| 1111036 | fusheng21 | 1 | fusheng | 0 | | 56 6 | 1 | 90 | 13.00 |
| 1111038 | fusheng21 | 1 | fusheng | 1 | | 61 13 | 1 | 30 | 4.00 |
| 1111040 | fusheng21 | 1 | fusheng | 1 | | 40 4 | 2 | 100 | 30.00 |
| 1111041 | fusheng21 | 1 | fusheng | 0 | | 63 3 | 1 | 70 | 2.00 |
| 1111042 | fusheng21 | 1 | fusheng | 1 | | 57 9 | 2 | NA | 1.00 |

1-10 of 4,902 rows | 1-10 of 60 columns        Previous  **1**  2  3  4  5  6  …  100  Next

Hide

```
takeup_by_session <- dat %>%
  select(takeup_survey, info_none, session) %>%
  filter(info_none == 1) %>%
  group_by(session) %>%
  summarise(n = sum(!is.na(takeup_survey)), mean = mean(takeup_survey, na.rm = TRUE), sd
= sd(takeup_survey, na.rm = TRUE)) %>%
  data.frame()
```

`summarise()` ungrouping output (override with `.groups` argument)

Hide

```
panelD <- rbind(takeup_by_session, takeup_summary)
panelD
```

| session | n | mean | sd |
|---|---|---|---|
| <fctr> | <int> | <dbl> | <dbl> |
| 11 | 1079 | 0.3521779 | 0.4778706 |
| 12 | 1096 | 0.5036496 | 0.5002149 |
| 21 | 657 | 0.4429224 | 0.4971099 |
| 22 | 660 | 0.4651515 | 0.4991624 |
| total | 4902 | 0.4455324 | 0.4970751 |

5 rows

# Intensive Session Effect

# Table 2 replication column 1

```
# Section 2: Intensive Session Effect ---------------------------------------------------
-
# With extension on bootstrap cluster standard errors
#The dataset is now called dat - SORRY!
################Table 2 in the paper ##################
###Table2, col 1 - intensive session effect
round1dat <- dat[dat$delay == 0, ]

lm_t2c1 <- lm(takeup_survey ~ intensive + male + age + agpop + ricearea_2010 + literacy
 +
              village, data = round1dat)
lm_t2c1
```

```
Call:
lm(formula = takeup_survey ~ intensive + male + age + agpop +
    ricearea_2010 + literacy + village, data = round1dat)

Coefficients:
    (Intercept)         intensive             male              age            agpop
      0.3634212         0.1408242        0.0407053        0.0017669       -0.0029449
   ricearea_2010          literacy    villagebeilian    villagebeixing    villagecaijia
      0.0007886         0.0832050       -0.4123784       -0.1940895       -0.2424232
    villagechaxi     villagedaqiao      villagedaxi       villagedayu     villagedazhou
     -0.1673066         0.2331480       -0.2599335       -0.2345645       -0.2557939
    villagedongan     villagedukou   villagefusheng     villagefuzhou    villagegangtou
     -0.2849145        -0.1285052        0.0229908        0.0009335       -0.1539832
    villagegangxia    villageguojia    villagehefeng      villagehelin   villagehongxing
      0.1156739        -0.5002053       -0.4074481       -0.0584232       -0.2921655
  villagehuangshan    villagejingang   villagejinggang    villagelianhe   villagelianqian
     -0.1324631        -0.2456389       -0.2850252       -0.2555737       -0.1181014

   villagelianxing   villagelongqing   villagelusikou    villagemazhou    villageminzhu
      0.0228554         0.0943500       -0.1907178        0.0683045       -0.3818980
   villageshigang    villagewanshang    villagexiabao   villagexianghu   villagexiaofang
     -0.2715477         0.0914096        0.2450654        0.0920943       -0.2613101
 villagexiashatou   villagexiecheng      villagexihe      villagexihu     villagexilian
     -0.1738035        -0.1826537       -0.2841952        0.0587897       -0.4263741
   villagexinguang   villagexingzeng   villagexinlian   villageyanjiang    villageyazhou
     -0.1489744        -0.0932542       -0.3919875       -0.1611961       -0.4803191
   villageyongfeng    villagezhangxi      villagezixi
     -0.0252228        -0.3062709       -0.2889457
```

#Extension 1: Use matching to check the intensive session effect

```
#import matching library
library(Matching)
```

```
## 
##   Matching (Version 4.9-7, Build Date: 2020-02-05)
##   See http://sekhon.berkeley.edu/matching for additional documentation.
##   Please cite software as:
##    Jasjeet S. Sekhon. 2011. ``Multivariate and Propensity Score Matching
##    Software with Automated Balance Optimization: The Matching package for R.''
##    Journal of Statistical Software, 42(7): 1-52.
## 
```

```
library(MatchIt)
```

```
Attaching package: 'MatchIt'

The following object is masked _by_ '.GlobalEnv':

    lalonde
```

```
#Subset the variable we will be match on
round1dat_NA <- round1dat %>% select(intensive, male,age, agpop, ricearea_2010, literac
y, village, takeup_survey)

#Find the columns that has NA
colnames(round1dat_NA)[colSums(is.na(round1dat_NA)) > 0]
```

```
character(0)
```

```
#Drop NA
round1dat<- round1dat_NA %>% drop_na()
```

```
#set the non-numerical variables as factors
round1dat$village <- as.factor(round1dat$village)

X <- cbind(round1dat$male, round1dat$age, round1dat$agpop, round1dat$ricearea_2010, roun
d1dat$literacy,round1dat$village)

X<- as.data.frame(X) %>% rename(make=V1, age=V2, agpop = V3, ricearea_2010=V4, literacy=
V5, village=V6)
```

```
#Genetic Matching
invisible(capture.output(genout1 <- GenMatch(Tr = round1dat$intensive, X=X , M=1, estima
nd = 'ATT', max.generations = 10)))
```

```
Loading required namespace: rgenoud
```

Hide

```
mout1 <- Match(Y = round1dat$takeup_survey, Tr= round1dat$intensive, X = X, M =1, estima
nd = 'ATT', Weight.matrix = genout1, exact = c(1,0,0,0,1,1), caliper = c(1e16, 1e16, 0.5
, 0.3,1e16, 1e16 ))



mbgen1 <- MatchBalance(intensive~ male + age + agpop + ricearea_2010 + literacy + villag
e, data = round1dat, match.out=mout1, nboots=500)
```

```
***** (V1) male *****
                    Before Matching        After Matching
mean treatment........    0.92208            0.96327
mean control..........    0.90746            0.96327
std mean diff.........      5.451               0

mean raw eQQ diff.....   0.014164              0
med  raw eQQ diff.....        0                0
max  raw eQQ diff.....        1                0

mean eCDF diff........   0.007309              0
med  eCDF diff........   0.007309              0
max  eCDF diff........   0.014618              0

var ratio (Tr/Co).....    0.85559              1
T-test p-value........    0.22663              1


***** (V2) age *****
                    Before Matching        After Matching
mean treatment........    50.974             50.443
mean control..........    51.478             50.284
std mean diff.........    -4.147             1.3604

mean raw eQQ diff.....    0.60434            0.91589
med  raw eQQ diff.....        1                1
max  raw eQQ diff.....        6               14

mean eCDF diff........   0.0087386          0.015088
med  eCDF diff........   0.0054993          0.01285
max  eCDF diff........   0.037233           0.03972

var ratio (Tr/Co).....    1.0444             1.195
T-test p-value........    0.33269            0.62004
KS Bootstrap p-value..    0.314              0.396
KS Naive p-value......    0.44942            0.50923
KS Statistic..........    0.037233           0.03972


***** (V3) agpop *****
                    Before Matching        After Matching
mean treatment........    4.8451             4.6043
mean control..........    4.9046             4.5924
std mean diff.........    -2.8457            0.74298

mean raw eQQ diff.....    0.090652           0.074766
med  raw eQQ diff.....        0                0
max  raw eQQ diff.....        1                1

mean eCDF diff........   0.0050011          0.0067969
med  eCDF diff........   0.0022692          0.0035047
max  eCDF diff........   0.035327           0.023364
```

```
var ratio (Tr/Co).....     0.96673              1.0308
T-test p-value........     0.51441              0.51515
KS Bootstrap p-value..      0.172                0.62
KS Naive p-value......     0.51754              0.9736
KS Statistic..........     0.035327             0.023364


***** (V4) ricearea_2010 *****
                        Before Matching      After Matching
mean treatment........     14.853               11.391
mean control..........     13.719               11.32
std mean diff.........     4.395                0.8151

mean raw eQQ diff.....     1.1145               0.4128
med  raw eQQ diff.....       0                    0
max  raw eQQ diff.....      445                   6

mean eCDF diff........   0.0053186            0.012663
med  eCDF diff........   0.0042309            0.010514
max  eCDF diff........    0.017511            0.036215

var ratio (Tr/Co).....     2.9867               1.0749
T-test p-value........     0.21287              0.4743
KS Bootstrap p-value..      0.97                 0.474
KS Naive p-value......     0.99668              0.62848
KS Statistic..........     0.017511             0.036215


***** (V5) literacy *****
                        Before Matching      After Matching
mean treatment........     0.78479             0.85545
mean control..........     0.78093             0.85545
std mean diff.........     0.93911                0

mean raw eQQ diff.....   0.0037771                0
med  raw eQQ diff.....       0                    0
max  raw eQQ diff.....       1                    0

mean eCDF diff........   0.0019306                0
med  eCDF diff........   0.0019306                0
max  eCDF diff........   0.0038612                0

var ratio (Tr/Co).....     0.98722                1
T-test p-value........     0.82874                1


***** (V6) villagebeilian *****
                        Before Matching      After Matching
mean treatment........   0.0083488            0.0082938
mean control..........    0.01322             0.0082938
std mean diff.........    -5.3511                 0

mean raw eQQ diff.....   0.0056657                0
```

```
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0024356                 0
med   eCDF diff........  0.0024356                 0
max   eCDF diff........  0.0048712                 0

var ratio (Tr/Co).....    0.63463                 1
T-test p-value........    0.27639                 1


***** (V7) villagebeixing *****
                     Before Matching     After Matching
mean treatment........   0.018553        0.014218
mean control..........   0.016997        0.014218
std mean diff.........     1.1524                 0

mean raw eQQ diff..... 0.00094429                 0
med   raw eQQ diff.....          0                 0
max   raw eQQ diff.....          1                 0

mean eCDF diff........ 0.00077785                 0
med   eCDF diff........ 0.00077785                 0
max   eCDF diff........  0.0015557                 0

var ratio (Tr/Co).....     1.0898                 1
T-test p-value........     0.7856                 1


***** (V8) villagecaijia *****
                     Before Matching     After Matching
mean treatment........   0.012987        0.010664
mean control..........   0.014164        0.010664
std mean diff.........    -1.0394                 0

mean raw eQQ diff.....  0.0018886                 0
med   raw eQQ diff.....          0                 0
max   raw eQQ diff.....          1                 0

mean eCDF diff........ 0.00058865                 0
med   eCDF diff........ 0.00058865                 0
max   eCDF diff........  0.0011773                 0

var ratio (Tr/Co).....    0.91796                 1
T-test p-value........    0.81424                 1


***** (V9) villagechaxi *****
                     Before Matching     After Matching
mean treatment........  0.0064935       0.0035545
mean control..........  0.0084986       0.0035545
std mean diff.........    -2.4952                 0

mean raw eQQ diff.....  0.0028329                 0
```

```
med   raw eQQ diff.....        0                    0
max   raw eQQ diff.....        1                    0

mean eCDF diff........  0.0010025                   0
med   eCDF diff........  0.0010025                   0
max   eCDF diff........  0.0020051                   0

var ratio (Tr/Co).....     0.7656                   1
T-test p-value........     0.5915                   1


***** (V10) villagedaqiao *****
                      Before Matching      After Matching
mean treatment........  0.0055659          0.0035545
mean control..........   0.00661           0.0035545
std mean diff.........   -1.4028                    0

mean raw eQQ diff.....  0.0018886                   0
med   raw eQQ diff.....        0                    0
max   raw eQQ diff.....        1                    0

mean eCDF diff........ 0.00052207                   0
med   eCDF diff........ 0.00052207                   0
max   eCDF diff........  0.0010441                   0

var ratio (Tr/Co).....    0.84291                   1
T-test p-value........     0.7566                   1


***** (V11) villagedaxi *****
                      Before Matching      After Matching
mean treatment........   0.032468           0.030806
mean control..........   0.032106           0.030806
std mean diff.........    0.20402                   0

mean raw eQQ diff.....        0                    0
med   raw eQQ diff.....        0                    0
max   raw eQQ diff.....        0                    0

mean eCDF diff........ 0.00018089                   0
med   eCDF diff........ 0.00018089                   0
max   eCDF diff........ 0.00036177                   0

var ratio (Tr/Co).....     1.0109                   1
T-test p-value........    0.96229                   1


***** (V12) villagedayu *****
                      Before Matching      After Matching
mean treatment........    0.03525           0.035545
mean control..........   0.037771           0.035545
std mean diff.........    -1.3664                   0

mean raw eQQ diff.....  0.0028329                   0
```

```
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0012605                    0
med   eCDF diff........  0.0012605                    0
max   eCDF diff........   0.002521                    0

var ratio (Tr/Co).....    0.93569                    1
T-test p-value........    0.75622                    1


***** (V13) villagedazhou *****
                      Before Matching      After Matching
mean treatment........   0.026902         0.029621
mean control..........   0.023607         0.029621
std mean diff.........     2.0353                    0

mean raw eQQ diff..... 0.0028329                    0
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0016472                    0
med   eCDF diff........  0.0016472                    0
max   eCDF diff........  0.0032945                    0

var ratio (Tr/Co).....     1.1357                    1
T-test p-value........    0.62754                    1


***** (V14) villagedongan *****
                      Before Matching      After Matching
mean treatment........   0.014842         0.007109
mean control..........   0.012276         0.007109
std mean diff.........     2.1215                    0

mean raw eQQ diff..... 0.0018886                    0
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0012833                    0
med   eCDF diff........  0.0012833                    0
max   eCDF diff........  0.0025666                    0

var ratio (Tr/Co).....     1.2059                    1
T-test p-value........    0.60805                    1


***** (V15) villagedukou *****
                      Before Matching      After Matching
mean treatment........   0.050093         0.054502
mean control..........   0.049103         0.054502
std mean diff.........    0.45356                    0

mean raw eQQ diff..... 0.00094429                    0
```

```
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........ 0.00049492                    0
med   eCDF diff........ 0.00049492                    0
max   eCDF diff........ 0.00098984                    0

var ratio (Tr/Co).....     1.0191                   1
T-test p-value........     0.91612                  1


***** (V16) villagefusheng *****
                     Before Matching    After Matching
mean treatment........    0.038033         0.040284
mean control..........    0.035883         0.040284
std mean diff.........      1.1238                0

mean raw eQQ diff..... 0.0018886                    0
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........ 0.0010752                    0
med   eCDF diff........ 0.0010752                    0
max   eCDF diff........ 0.0021505                    0

var ratio (Tr/Co).....     1.0575                   1
T-test p-value........     0.79229                  1


***** (V17) villagefuzhou *****
                     Before Matching    After Matching
mean treatment........    0.033395         0.033175
mean control..........     0.03305         0.033175
std mean diff.........     0.19201                0

mean raw eQQ diff.....          0                   0
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          0                   0

mean eCDF diff........ 0.00017256                    0
med   eCDF diff........ 0.00017256                    0
max   eCDF diff........ 0.00034513                    0

var ratio (Tr/Co).....     1.0101                   1
T-test p-value........     0.96452                  1


***** (V18) villagegangtou *****
                     Before Matching    After Matching
mean treatment........    0.030612         0.030806
mean control..........    0.032106         0.030806
std mean diff.........    -0.86659                0

mean raw eQQ diff..... 0.0018886                    0
```

```
med   raw eQQ diff.....          0                0
max   raw eQQ diff.....          1                0

mean eCDF diff........ 0.00074676                 0
med   eCDF diff........ 0.00074676                0
max   eCDF diff........  0.0014935                0

var ratio (Tr/Co).....    0.95494                 1
T-test p-value........     0.8431                 1



***** (V19) villagegangxia *****
                     Before Matching    After Matching
mean treatment........  0.0092764        0.010664
mean control..........   0.011331        0.010664
std mean diff.........    -2.1426                 0

mean raw eQQ diff.....  0.0028329                 0
med   raw eQQ diff.....          0                0
max   raw eQQ diff.....          1                0

mean eCDF diff........  0.0010275                 0
med   eCDF diff........  0.0010275                0
max   eCDF diff........   0.002055                0

var ratio (Tr/Co).....    0.82033                 1
T-test p-value........    0.63845                 1



***** (V20) villageguojia *****
                     Before Matching    After Matching
mean treatment........   0.010204        0.0082938
mean control..........   0.012276        0.0082938
std mean diff.........    -2.0604                 0

mean raw eQQ diff.....  0.0028329                 0
med   raw eQQ diff.....          0                0
max   raw eQQ diff.....          1                0

mean eCDF diff........  0.0010358                 0
med   eCDF diff........  0.0010358                0
max   eCDF diff........  0.0020717                0

var ratio (Tr/Co).....    0.83297                 1
T-test p-value........       0.65                 1



***** (V21) villagehefeng *****
                     Before Matching    After Matching
mean treatment........   0.040816        0.043839
mean control..........   0.043437        0.043839
std mean diff.........     -1.324                 0

mean raw eQQ diff.....  0.0028329                 0
```

```
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........  0.0013104                   0
med   eCDF diff........  0.0013104                   0
max   eCDF diff........  0.0026209                   0

var ratio (Tr/Co).....    0.94222                   1
T-test p-value........    0.76315                   1


***** (V22) villagehelin *****
                    Before Matching    After Matching
mean treatment........    0.018553         0.015403
mean control..........    0.014164         0.015403
std mean diff.........     3.2507                 0

mean raw eQQ diff..... 0.0037771                  0
med   raw eQQ diff.....          0                 0
max   raw eQQ diff.....          1                 0

mean eCDF diff........ 0.0021943                  0
med   eCDF diff........ 0.0021943                  0
max   eCDF diff........ 0.0043886                  0

var ratio (Tr/Co).....     1.304                  1
T-test p-value........    0.42389                 1


***** (V23) villagehongxing *****
                    Before Matching    After Matching
mean treatment........    0.037106         0.040284
mean control..........    0.037771         0.040284
std mean diff.........    -0.35204                0

mean raw eQQ diff..... 0.00094429                 0
med   raw eQQ diff.....          0                 0
max   raw eQQ diff.....          1                 0

mean eCDF diff........ 0.00033287                 0
med   eCDF diff........ 0.00033287                 0
max   eCDF diff........ 0.00066573                 0

var ratio (Tr/Co).....    0.98304                 1
T-test p-value........    0.93544                 1


***** (V24) villagehuangshan *****
                    Before Matching    After Matching
mean treatment........    0.038033         0.046209
mean control..........    0.036827         0.046209
std mean diff.........    0.63031                 0

mean raw eQQ diff..... 0.00094429                 0
```

```
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0006031                      0
med   eCDF diff........  0.0006031                      0
max   eCDF diff........  0.0012062                      0

var ratio (Tr/Co).....     1.0314                     1
T-test p-value........     0.88329                    1



***** (V25) villagejingang *****
                     Before Matching    After Matching
mean treatment........   0.030612        0.035545
mean control..........   0.028329        0.035545
std mean diff.........      1.325               0

mean raw eQQ diff.....  0.0018886              0
med   raw eQQ diff.....          0               0
max   raw eQQ diff.....          1               0

mean eCDF diff........  0.0011418              0
med   eCDF diff........  0.0011418              0
max   eCDF diff........  0.0022836              0

var ratio (Tr/Co).....     1.0781              1
T-test p-value........     0.75507             1



***** (V26) villagejinggang *****
                     Before Matching    After Matching
mean treatment........   0.014842        0.011848
mean control..........   0.016997        0.011848
std mean diff.........     -1.7812              0

mean raw eQQ diff.....  0.0028329              0
med   raw eQQ diff.....          0               0
max   raw eQQ diff.....          1               0

mean eCDF diff........  0.0010774              0
med   eCDF diff........  0.0010774              0
max   eCDF diff........  0.0021549              0

var ratio (Tr/Co).....     0.87512             1
T-test p-value........     0.69094             1



***** (V27) villagelianhe *****
                     Before Matching    After Matching
mean treatment........   0.012987        0.010664
mean control..........   0.014164        0.010664
std mean diff.........     -1.0394              0

mean raw eQQ diff.....  0.0018886              0
```

```
med   raw eQQ diff.....         0                    0
max   raw eQQ diff.....         1                    0


mean eCDF diff........ 0.00058865                    0
med   eCDF diff........ 0.00058865                   0
max   eCDF diff........   0.0011773                  0


var ratio (Tr/Co).....    0.91796                    1
T-test p-value........    0.81424                    1



***** (V28) villagelianqian *****
                     Before Matching     After Matching
mean treatment........   0.019481          0.016588
mean control..........   0.022663          0.016588
std mean diff.........    -2.3016                 0

mean raw eQQ diff..... 0.0037771                  0
med   raw eQQ diff.....         0                 0
max   raw eQQ diff.....         1                 0


mean eCDF diff........ 0.0015912                  0
med   eCDF diff........ 0.0015912                 0
max   eCDF diff........ 0.0031824                 0


var ratio (Tr/Co).....    0.86236                 1
T-test p-value........    0.60888                 1



***** (V29) villagelianxing *****
                     Before Matching     After Matching
mean treatment........    0.01577          0.016588
mean control..........   0.017941          0.016588
std mean diff.........    -1.7422                 0

mean raw eQQ diff..... 0.0028329                  0
med   raw eQQ diff.....         0                 0
max   raw eQQ diff.....         1                 0


mean eCDF diff........ 0.0010858                  0
med   eCDF diff........ 0.0010858                 0
max   eCDF diff........ 0.0021715                 0


var ratio (Tr/Co).....     0.8809                 1
T-test p-value........    0.69687                 1



***** (V30) villagelongqing *****
                     Before Matching     After Matching
mean treatment........   0.012987          0.011848
mean control..........   0.016053          0.011848
std mean diff.........    -2.7067                 0


mean raw eQQ diff..... 0.0037771                  0
```

```
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0015329                     0
med   eCDF diff........  0.0015329                     0
max   eCDF diff........  0.0030659                     0

var ratio (Tr/Co).....    0.81152                     1
T-test p-value........    0.55399                     1


***** (V31) villagelusikou *****
                     Before Matching    After Matching
mean treatment........    0.01577      0.018957
mean control..........    0.012276     0.018957
std mean diff.........    2.8034                       0

mean raw eQQ diff.....  0.0028329                     0
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.0017471                     0
med   eCDF diff........  0.0017471                     0
max   eCDF diff........  0.0034942                     0

var ratio (Tr/Co).....    1.2801                      1
T-test p-value........    0.49218                     1


***** (V32) villagemazhou *****
                     Before Matching    After Matching
mean treatment........    0.016698     0.0094787
mean control..........    0.016997     0.0094787
std mean diff.........   -0.23369                     0

mean raw eQQ diff..... 0.00094429                     0
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........ 0.00014979                     0
med   eCDF diff........ 0.00014979                     0
max   eCDF diff........ 0.00029958                     0

var ratio (Tr/Co).....    0.98266                     1
T-test p-value........    0.95712                     1


***** (V33) villageminzhu *****
                     Before Matching    After Matching
mean treatment........    0.03525      0.0391
mean control..........    0.03305      0.0391
std mean diff.........    1.1927                      0

mean raw eQQ diff.....  0.0018886                     0
```

```
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........  0.0011002                    0
med   eCDF diff........  0.0011002                    0
max   eCDF diff........  0.0022004                    0

var ratio (Tr/Co).....     1.0641                    1
T-test p-value........    0.77955                    1



***** (V34) villageshigang *****
                      Before Matching    After Matching
mean treatment........   0.022263         0.024882
mean control..........   0.024551         0.024882
std mean diff.........    -1.5501                0

mean raw eQQ diff..... 0.0028329                    0
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........   0.001144                    0
med   eCDF diff........   0.001144                    0
max   eCDF diff........   0.002288                    0

var ratio (Tr/Co).....    0.90892                    1
T-test p-value........    0.72672                    1



***** (V35) villagewanshang *****
                      Before Matching    After Matching
mean treatment........  0.0083488         0.007109
mean control..........  0.0056657         0.007109
std mean diff.........     2.9474                0

mean raw eQQ diff..... 0.0018886                    0
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........  0.0013415                    0
med   eCDF diff........  0.0013415                    0
max   eCDF diff........  0.0026831                    0

var ratio (Tr/Co).....     1.4696                    1
T-test p-value........    0.45708                    1



***** (V36) villagexiabao *****
                      Before Matching    After Matching
mean treatment........   0.010204        0.0059242
mean control..........    0.00661        0.0059242
std mean diff.........     3.5746                0

mean raw eQQ diff..... 0.0028329                    0
```

```
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........   0.001797                     0
med   eCDF diff........   0.001797                     0
max   eCDF diff........   0.0035941                    0

var ratio (Tr/Co).....      1.5381                    1
T-test p-value........      0.3627                    1



***** (V37) villagexianghu *****
                     Before Matching     After Matching
mean treatment........   0.010204         0.010664
mean control..........   0.011331         0.010664
std mean diff.........     -1.1213               0

mean raw eQQ diff.....   0.0018886               0
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........  0.00056368               0
med   eCDF diff........  0.00056368               0
max   eCDF diff........   0.0011274               0

var ratio (Tr/Co).....     0.90152                1
T-test p-value........     0.80084                1



***** (V38) villagexiaofang *****
                     Before Matching     After Matching
mean treatment........   0.010204        0.0059242
mean control..........   0.0075543       0.0059242
std mean diff.........      2.6354               0

mean raw eQQ diff.....   0.0018886               0
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....          1                    0

mean eCDF diff........   0.0013249               0
med   eCDF diff........   0.0013249               0
max   eCDF diff........   0.0026498               0

var ratio (Tr/Co).....      1.3471                1
T-test p-value........      0.5138                1



***** (V39) villagexiashatou *****
                     Before Matching     After Matching
mean treatment........   0.011132        0.0011848
mean control..........   0.00661         0.0011848
std mean diff.........      4.3078               0

mean raw eQQ diff.....   0.0037771               0
```

```
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........  0.0022609                   0
med   eCDF diff........  0.0022609                   0
max   eCDF diff........  0.0045217                   0

var ratio (Tr/Co).....     1.6764                   1
T-test p-value........     0.26471                  1


***** (V40) villagexiecheng *****
                    Before Matching      After Matching
mean treatment........     0.03154          0.03436
mean control..........     0.024551         0.03436
std mean diff.........     3.9967                   0

mean raw eQQ diff.....     0.00661                  0
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........  0.0034942                   0
med   eCDF diff........  0.0034942                   0
max   eCDF diff........  0.0069884                   0

var ratio (Tr/Co).....     1.2754                   1
T-test p-value........     0.32789                  1


***** (V41) villagexihe *****
                    Before Matching      After Matching
mean treatment........     0.017625         0.020142
mean control..........     0.020774         0.020142
std mean diff.........    -2.3921                   0

mean raw eQQ diff.....  0.0037771                   0
med   raw eQQ diff.....          0                   0
max   raw eQQ diff.....          1                   0

mean eCDF diff........  0.0015745                   0
med   eCDF diff........  0.0015745                   0
max   eCDF diff........  0.0031491                   0

var ratio (Tr/Co).....     0.85113                  1
T-test p-value........     0.59617                  1


***** (V42) villagexihu *****
                    Before Matching      After Matching
mean treatment........     0.012059         0.013033
mean control..........     0.014164         0.013033
std mean diff.........    -1.9276                   0

mean raw eQQ diff.....  0.0028329                   0
```

```
med  raw eQQ diff.....          0                  0
max  raw eQQ diff.....          1                  0

mean eCDF diff........  0.0010525                  0
med  eCDF diff........  0.0010525                  0
max  eCDF diff........  0.0021049                  0

var ratio (Tr/Co).....     0.8532                  1
T-test p-value........    0.66916                  1


***** (V43) villagexilian *****
                       Before Matching    After Matching
mean treatment........  0.0092764        0.0082938
mean control..........   0.011331        0.0082938
std mean diff.........    -2.1426                  0

mean raw eQQ diff.....  0.0028329                  0
med  raw eQQ diff.....          0                  0
max  raw eQQ diff.....          1                  0

mean eCDF diff........  0.0010275                  0
med  eCDF diff........  0.0010275                  0
max  eCDF diff........   0.002055                  0

var ratio (Tr/Co).....    0.82033                  1
T-test p-value........    0.63845                  1


***** (V44) villagexinguang *****
                       Before Matching    After Matching
mean treatment........   0.025046         0.031991
mean control..........   0.033994         0.031991
std mean diff.........    -5.7234                  0

mean raw eQQ diff.....  0.0094429                  0
med  raw eQQ diff.....          0                  0
max  raw eQQ diff.....          1                  0

mean eCDF diff........   0.004474                  0
med  eCDF diff........   0.004474                  0
max  eCDF diff........   0.008948                  0

var ratio (Tr/Co).....    0.74359                  1
T-test p-value........    0.22225                  1


***** (V45) villagexingzeng *****
                       Before Matching    After Matching
mean treatment........   0.016698         0.016588
mean control..........   0.017941         0.016588
std mean diff.........   -0.97029                  0

mean raw eQQ diff.....  0.0018886                  0
```

```
med   raw eQQ diff.....           0                    0
max   raw eQQ diff.....           1                    0

mean eCDF diff........ 0.00062193                     0
med   eCDF diff........ 0.00062193                     0
max   eCDF diff........    0.0012439                   0

var ratio (Tr/Co).....     0.93183                    1
T-test p-value........     0.82571                    1


***** (V46) villagexinlian *****
                        Before Matching      After Matching
mean treatment........    0.038033           0.043839
mean control..........    0.034939           0.043839
std mean diff.........     1.6172                     0

mean raw eQQ diff..... 0.0028329                      0
med   raw eQQ diff.....           0                   0
max   raw eQQ diff.....           1                   0

mean eCDF diff........  0.0015474                      0
med   eCDF diff........  0.0015474                      0
max   eCDF diff........  0.0030948                      0

var ratio (Tr/Co).....     1.0851                     1
T-test p-value........     0.70294                    1


***** (V47) villageyanjiang *****
                        Before Matching      After Matching
mean treatment........   0.0064935          0.0047393
mean control..........   0.0056657          0.0047393
std mean diff.........     1.0301                     0

mean raw eQQ diff.....           0                    0
med   raw eQQ diff.....           0                   0
max   raw eQQ diff.....           0                   0

mean eCDF diff........ 0.00041389                     0
med   eCDF diff........ 0.00041389                     0
max   eCDF diff........ 0.00082778                     0

var ratio (Tr/Co).....     1.1451                     1
T-test p-value........     0.80564                    1


***** (V48) villageyazhou *****
                        Before Matching      After Matching
mean treatment........    0.019481           0.020142
mean control..........    0.021719           0.020142
std mean diff.........    -1.6186                     0

mean raw eQQ diff..... 0.0028329                      0
```

```
med  raw eQQ diff.....          0                    0
max  raw eQQ diff.....          1                    0

mean eCDF diff........   0.001119                    0
med  eCDF diff........   0.001119                    0
max  eCDF diff........   0.0022381                   0

var ratio (Tr/Co).....     0.89899                   1
T-test p-value........     0.71594                   1


***** (V49) villageyongfeng *****
                     Before Matching      After Matching
mean treatment........   0.027829        0.026066
mean control..........   0.020774        0.026066
std mean diff.........     4.2872               0

mean raw eQQ diff.....    0.00661               0
med  raw eQQ diff.....          0               0
max  raw eQQ diff.....          1               0

mean eCDF diff........   0.0035275              0
med  eCDF diff........   0.0035275              0
max  eCDF diff........   0.007055               0

var ratio (Tr/Co).....     1.3299               1
T-test p-value........     0.28954               1


***** (V50) villagezhangxi *****
                     Before Matching      After Matching
mean treatment........   0.058442        0.07109
mean control..........   0.053824        0.07109
std mean diff.........     1.9674               0

mean raw eQQ diff.....   0.0037771              0
med  raw eQQ diff.....          0               0
max  raw eQQ diff.....          1               0

mean eCDF diff........   0.0023086              0
med  eCDF diff........   0.0023086              0
max  eCDF diff........   0.0046172              0

var ratio (Tr/Co).....     1.0805               1
T-test p-value........     0.64304               1


***** (V51) villagezixi *****
                     Before Matching      After Matching
mean treatment........   0.018553        0.014218
mean control..........   0.022663        0.014218
std mean diff.........    -3.0444               0

mean raw eQQ diff.....   0.0047214              0
```

```
med  raw eQQ diff.....           0                    0
max  raw eQQ diff.....           1                    0

mean eCDF diff........    0.002055                    0
med  eCDF diff........    0.002055                    0
max  eCDF diff........     0.00411                    0

var ratio (Tr/Co).....     0.82207                    1
T-test p-value........     0.50413                    1


Before Matching Minimum p.value: 0.172
Variable Name(s): agpop  Number(s): 3

After Matching Minimum p.value: 0.396
Variable Name(s): age  Number(s): 2
```

Hide

```
#mbgen2 <- MatchBalance(intensive~ male + age + agpop + ricearea_2010 + literacy + villa
ge, data = round1dat, match.out=mout1, nboots=500)
```

Hide

```
summary(mout1)
```

```
Estimate...   0.12204
AI SE......   0.022709
T-stat.....   5.3739
p.val......   7.7051e-08

Original number of observations..............  2137
Original number of treated obs...............  1078
Matched number of observations...............   844
Matched number of observations  (unweighted).   856

Number of obs dropped by 'exact' or 'caliper'   234
```

#Social network effect ## Table 2 replication column 2-6

Hide

```
#Round 1 participants with information
dat_delay_noinfo <- dat[dat$delay == 1 & dat$info_none == 1, ]
lm_t2c2 <- lm(takeup_survey ~ network_rate_preintensive + male + age + agpop + ricearea_
2010 + literacy +
              intensive + risk_averse + disaster_prob + friend1 + friend2 + friend3 +
 friend4 + friend5 + village,data = dat_delay_noinfo)

lm_t2c2
```

```
Call:
lm(formula = takeup_survey ~ network_rate_preintensive + male +
    age + agpop + ricearea_2010 + literacy + intensive + risk_averse +
    disaster_prob + friend1 + friend2 + friend3 + friend4 + friend5 +
    village, data = dat_delay_noinfo)

Coefficients:
             (Intercept)  network_rate_preintensive                       male
               -0.309686                   0.291185                   0.015673
                     age                      agpop              ricearea_2010
                0.004502                  -0.010157                   0.004314
                 literacy                   intensive                risk_averse
                0.087433                   0.029836                   0.109170
            disaster_prob                     friend1                    friend2
                0.001940                         NA                  -0.320185
                  friend3                     friend4                    friend5
               -0.199158                  -0.138805                         NA
            villagebeixing              villagecaijia             villagedaqiao
                0.163130                   0.304711                   0.518810
                villagedaxi                villagedayu             villagedazhou
                0.332533                   0.366318                   0.249093
              villagedongan              villagedukou            villagefusheng
                0.332227                   0.254961                   0.447132
              villagefuzhou            villagegangtou            villagegangxia
                0.410264                   0.162942                   0.587894
              villageguojia             villagehefeng              villagehelin
                0.439132                   0.156094                   0.402205
            villagehongxing          villagehuangshan           villagejingang
                0.122871                   0.426051                   0.207088
            villagejinggang           villagelianqian           villagelianxing
                0.271775                   0.361079                   0.575290
            villagelongqing            villagelusikou             villagemazhou
                0.331263                   0.462447                   0.422276
             villageminzhu             villageshigang          villagewanshang
                0.135621                   0.233987                   0.262976
              villagexiabao            villagexianghu           villagexiaofang
                0.532218                   0.429912                   0.417308
           villagexiashatou           villagexiecheng               villagexihe
                0.088401                   0.102240                   0.285431
               villagexihu              villagexilian           villagexinguang
                0.334351                   0.324259                   0.177317
            villagexingzeng            villagexinlian           villageyanjiang
                0.287571                   0.177150                   0.884911
              villageyazhou            villageyongfeng            villagezhangxi
                0.351340                   0.539276                   0.168329
               villagezixi
                0.198938
```

Hide

```
###check the effects of household covariates and exclude other covariates except intensi
ve session
lm_t2c3 <- lm(takeup_survey ~ network_rate_preintensive + network_rate_presimple + inten
sive
              + friend1 + friend2 + friend3 + friend4 + friend5 + village,
              data = dat_delay_noinfo)

lm_t2c3
```

```
Call:
lm(formula = takeup_survey ~ network_rate_preintensive + network_rate_presimple +
    intensive + friend1 + friend2 + friend3 + friend4 + friend5 +
    village, data = dat_delay_noinfo)

Coefficients:
              (Intercept)  network_rate_preintensive    network_rate_presimple
                  0.13193                    0.27809                  -0.10795
                 intensive                    friend1                   friend2
                  0.02562                         NA                  -0.45760
                   friend3                    friend4                   friend5
                 -0.19241                   -0.12522                        NA
             villagebeixing             villagecaijia             villagedaqiao
                  0.18229                    0.22555                   0.44728
               villagedaxi               villagedayu             villagedazhou
                  0.27910                    0.37532                   0.18164
             villagedongan             villagedukou           villagefusheng
                  0.43820                    0.20799                   0.40045
             villagefuzhou            villagegangtou            villagegangxia
                  0.39530                    0.16291                   0.55931
             villageguojia             villagehefeng             villagehelin
                  0.45743                    0.14484                   0.40749
           villagehongxing          villagehuangshan           villagejingang
                  0.14528                    0.39272                   0.19683
           villagejinggang           villagelianqian          villagelianxing
                  0.24562                    0.33922                   0.57993
           villagelongqing           villagelusikou            villagemazhou
                  0.27162                    0.47283                   0.36705
           villageminzhu            villageshigang         villagewanshang
                  0.14525                    0.16044                   0.20277
           villagexiabao            villagexianghu          villagexiaofang
                  0.51706                    0.42758                   0.36684
         villagexiashatou          villagexiecheng              villagexihe
                  0.11203                    0.07079                   0.25564
              villagexihu             villagexilian          villagexinguang
                  0.34227                    0.29979                   0.16259
           villagexingzeng           villagexinlian          villageyanjiang
                  0.28246                    0.15698                   0.86202
            villageyazhou           villageyongfeng          villagezhangxi
                  0.31007                    0.51916                   0.14673
              villagezixi
                  0.18147
```

###Table 2, col 4

```
Warning messages:
1: Unknown or uninitialised column: `pre_takeup_maj`.
2: Unknown or uninitialised column: `pre_takeup_maj`.
3: Unknown or uninitialised column: `pre_takeup_maj`.
4: Unknown or uninitialised column: `pre_takeup_maj`.
```

```
lm_t2c4 <- lm(takeup_survey ~ network_rate_preintensive + intensive + network_rate_prein
tensive:intensive + male + age + agpop + ricearea_2010
            + literacy + risk_averse + disaster_prob + friend1 + friend2 + friend3 + f
riend4 + friend5 + village
            , data = dat_delay_noinfo)
```

```
#Column 5
lm_t2c5 <- lm(takeup_survey ~ network_onlyone + network_onlytwo + network_twomore + inte
nsive
            + network_onlyone:intensive + network_onlytwo:intensive + network_twomore:
intensive +
              + male + age + agpop + ricearea_2010 + literacy + risk_averse + disaster
_prob
            + friend1 + friend2 + friend3 + friend4 + friend5 + village
            , data = dat_delay_noinfo)
```

```
#For people who is in the first round or people who is in second round samples who have
 friends and receive info

dat$nofriend = 1
dat$nofriend[dat$delay == 1 & dat$info_none == 1 & dat$network_yes == 1] = 0 #set no fri
end = 0 (which means they have friends) if they are in the second round, receive informa
tion, and have social network


 dat_t2c6 = dat[ (dat$delay == 0 | (dat$delay == 1 & dat$info_none == 1 & dat$nofriend =
= 1)), ]
# dat_t2c6$inter = dat_t2c6$intensive * dat_t2c6$delay
lm_t2c6 <- lm(takeup_survey ~ intensive + delay + intensive*delay
            + male + age + agpop + ricearea_2010 + literacy + risk_averse + disaster_p
rob
            + village
            , data = dat_t2c6)
```

```
stargazer(lm_t2c1, lm_t2c2, lm_t2c3, lm_t2c4, lm_t2c5, lm_t2c6,
          omit = c("village", "friend1", "friend2", "friend3", "friend4", "friend5"), st
yle = "aer", no.space = T, df = FALSE)
```

length of NULL cannot be changedlength of NULL cannot be changedlength of NULL cannot be changedlength of NULL cannot be changedlength of NULL cannot be changednumber of rows of result is not a multiple of vector length (arg 2)number of rows of result is not a multiple of vector length (arg 2)number of rows of result is not a multiple of vector length (arg 2)number of rows of result is not a multiple of vector length (arg 2)number of rows of result is not a multiple of vector length (arg 2)

```latex
% Table created by stargazer v.5.2.2 by Marek Hlavac, Harvard University. E-mail: hlavac
at fas.harvard.edu
% Date and time: Fri, Dec 18, 2020 - 18:50:29
\begin{table}[!htbp] \centering
  \caption{}
  \label{}
\begin{tabular}{@{\extracolsep{5pt}}lcccccc}
\\[-1.8ex]\hline
\hline \\[-1.8ex]
\\[-1.8ex] & \multicolumn{6}{c}{takeup\_survey} \\
\\[-1.8ex] & (1) & (2) & (3) & (4) & (5) & (6)\\
\hline \\[-1.8ex]
 network\_rate\_preintensive &  & 0.291$^{***}$ & 0.278$^{***}$ & 0.444$^{***}$ &  &  \\
  &  & (0.078) & (0.080) & (0.106) &  &  \\
  network\_rate\_presimple &  &  & $-$0.108 &  &  &  \\
  &  &  & (0.090) &  &  &  \\
  network\_onlyone &  &  &  &  & 0.097$^{**}$ &  \\
  &  &  &  &  & (0.043) &  \\
  network\_onlytwo &  &  &  &  & 0.177$^{*}$ &  \\
  &  &  &  &  & (0.104) &  \\
  network\_twomore &  &  &  &  & 0.137 &  \\
  &  &  &  &  & (0.090) &  \\
  intensive & 0.141$^{***}$ & 0.030 & 0.026 & 0.081$^{**}$ & 0.094$^{**}$ & 0.140$^{***}$ \\
  & (0.020) & (0.027) & (0.027) & (0.036) & (0.040) & (0.021) \\
  delay &  &  &  &  &  & 0.032 \\
  &  &  &  &  &  & (0.031) \\
  risk\_averse &  & 0.109$^{**}$ &  & 0.105$^{**}$ & 0.104$^{**}$ & 0.072$^{**}$ \\
  &  & (0.048) &  & (0.048) & (0.048) & (0.028) \\
  disaster\_prob &  & 0.002$^{**}$ &  & 0.002$^{**}$ & 0.002$^{**}$ & 0.000 \\
  &  & (0.001) &  & (0.001) & (0.001) & (0.001) \\
  male & 0.041 & 0.016 &  & 0.019 & 0.029 & 0.048 \\
  & (0.041) & (0.057) &  & (0.057) & (0.057) & (0.036) \\
  age & 0.002$^{*}$ & 0.005$^{***}$ &  & 0.005$^{***}$ & 0.005$^{***}$ & 0.002$^{***}$ \\
  & (0.001) & (0.001) &  & (0.001) & (0.001) & (0.001) \\
  agpop & $-$0.003 & $-$0.010 &  & $-$0.010 & $-$0.008 & $-$0.004 \\
  & (0.005) & (0.006) &  & (0.006) & (0.006) & (0.004) \\
  ricearea\_2010 & 0.001 & 0.004$^{***}$ &  & 0.004$^{***}$ & 0.004$^{***}$ & 0.001$^{**}$ \\
  & (0.001) & (0.001) &  & (0.001) & (0.001) & (0.000) \\
  literacy & 0.083$^{***}$ & 0.087$^{**}$ &  & 0.087$^{**}$ & 0.090$^{**}$ & 0.063$^{**}$ \\
  & (0.028) & (0.036) &  & (0.036) & (0.036) & (0.025) \\
  network\_rate\_preintensive:intensive &  &  &  & $-$0.329$^{**}$ &  &  \\
  &  &  &  & (0.155) &  &  \\
  network\_onlyone:intensive &  &  &  &  & $-$0.087 &  \\
  &  &  &  &  & (0.061) &  \\
  network\_onlytwo:intensive &  &  &  &  & $-$0.091 &  \\
  &  &  &  &  & (0.154) &  \\
  network\_twomore:intensive &  &  &  &  & $-$0.141 &  \\
  &  &  &  &  & (0.140) &  \\
```

```
   intensive:delay &   &   &   &   &   & $-$0.053 \\
   &   &   &   &   &   & (0.043) \\
   Constant & 0.363$^{**}$ & $-$0.310$^{*}$ & 0.132 & $-$0.342$^{**}$ & $-$0.380$^{**}$ &
0.333$^{**}$ \\
   & (0.158) & (0.169) & (0.142) & (0.169) & (0.170) & (0.157) \\
 Observations & 2,137 & 1,255 & 1,274 & 1,255 & 1,255 & 2,756 \\
R$^{2}$ & 0.125 & 0.119 & 0.091 & 0.123 & 0.129 & 0.107 \\
Adjusted R$^{2}$ & 0.103 & 0.079 & 0.055 & 0.082 & 0.085 & 0.089 \\
Residual Std. Error & 0.469 & 0.476 & 0.482 & 0.475 & 0.474 & 0.473 \\
F Statistic & 5.732$^{***}$ & 2.952$^{***}$ & 2.508$^{***}$ & 2.989$^{***}$ & 2.941$^{**
*}$ & 5.786$^{***}$ \\
\hline \\[-1.8ex]
\textit{Notes:} & \multicolumn{6}{l}{$^{***}$Significant at the 1 percent level.} \\
 & \multicolumn{6}{l}{$^{**}$Significant at the 5 percent level.} \\
 & \multicolumn{6}{l}{$^{*}$Significant at the 10 percent level.} \\
\end{tabular}
\end{table}
```

```
length of NULL cannot be changedlength of NULL cannot be changedlength of NULL cannot be
changedlength of NULL cannot be changedlength of NULL cannot be changednumber of rows of
result is not a multiple of vector length (arg 2)number of rows of result is not a multi
ple of vector length (arg 2)number of rows of result is not a multiple of vector length
(arg 2)number of rows of result is not a multiple of vector length (arg 2)number of rows
of result is not a multiple of vector length (arg 2)
```

#Extension 2: Use Genetic Matching to measure Social network effect – Compare with Table 2 column 2

# Distribution Balance: check the distribution balance plot before matching

Hide

```
male <- bal.plot(dat_gen3$dense_network ~ dat_gen3$male, treat = dat_gen3$dense_network)
+ ggtitle("Distributional Balance for Male") + xlab('Male')
```

```
No 'var.name' was provided. Dispalying balance for dat_gen3$male.
```

Hide

```
age <- bal.plot(dat_gen3$dense_network ~ dat_gen3$age, treat = dat_gen3$dense_network) +
ggtitle("Distributional Balance for Age") + xlab('Age')
```

```
No 'var.name' was provided. Dispalying balance for dat_gen3$age.
```

Hide

```
agpop <- bal.plot(dat_gen3$dense_network ~ dat_gen3$agpop, treat = dat_gen3$dense_networ
k) + ggtitle("Distributional Balance for Age Population") + xlab('Age Population')
```

No 'var.name' was provided. Dispalying balance for dat_gen3$agpop.

Hide

```
ricearea_2010 <- bal.plot(dat_gen3$dense_network ~ dat_gen3$ricearea_2010, treat = dat_g
en3$dense_network) + ggtitle("Distributional Balance for Rice Area") + xlab('Rice Area')
```

No 'var.name' was provided. Dispalying balance for dat_gen3$ricearea_2010.

Hide

```
literacy <- bal.plot(dat_gen3$dense_network ~ dat_gen3$literacy, treat = dat_gen3$dense_
network) + ggtitle("Distributional Balance for Literacy") + xlab('Literacy')
```

No 'var.name' was provided. Dispalying balance for dat_gen3$literacy.

Hide

```
village <- bal.plot(dat_gen3$dense_network ~ dat_gen3$village, treat = dat_gen3$dense_ne
twork) + ggtitle("Distributional Balance for Village") + xlab('Village')
```

No 'var.name' was provided. Dispalying balance for dat_gen3$village.

Hide

```
intensive <- bal.plot(dat_gen3$dense_network ~ dat_gen3$intensive, treat = dat_gen3$dens
e_network) + ggtitle("Distributional Balance for Intensive") + xlab('Intensive')
```

No 'var.name' was provided. Dispalying balance for dat_gen3$intensive.

Hide

```
risk_averse <- bal.plot(dat_gen3$dense_network ~ dat_gen3$risk_averse, treat = dat_gen3
$risk_averse) + ggtitle("Distributional Balance for Risk Averse") + xlab('Risk Averse')
```

No 'var.name' was provided. Dispalying balance for dat_gen3$risk_averse.

Hide

```
disaster_prob <- bal.plot(dat_gen3$dense_network ~ dat_gen3$disaster_prob, treat = dat_g
en3$dense_network) + ggtitle("Distributional Balance for Disaster Probability") + xlab(
'Disaster Probability')
```
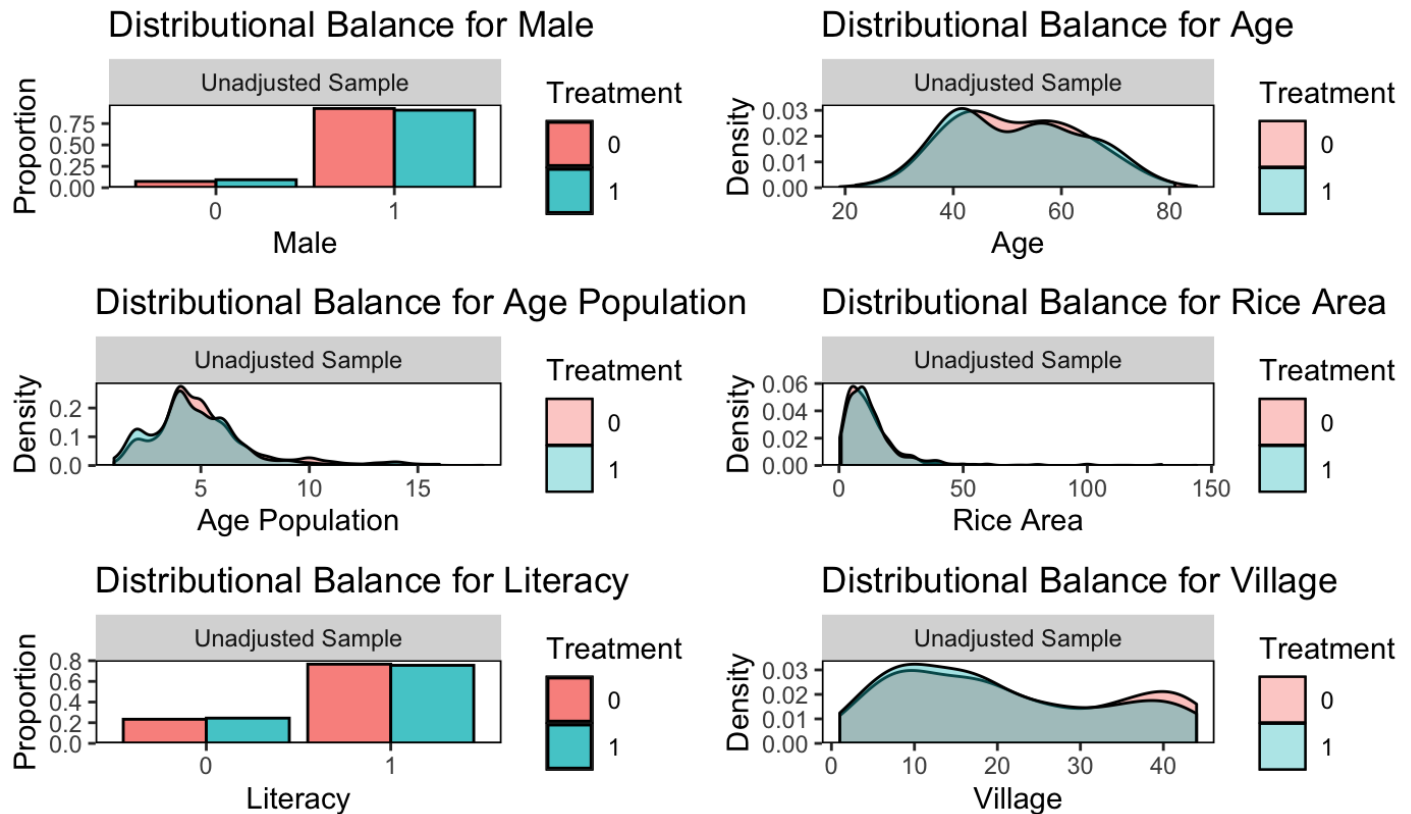
No 'var.name' was provided. Dispalying balance for dat_gen3$disaster_prob.

Hide

```
#Distribution Balance for household characteristics
grid.arrange(male, age, agpop, ricearea_2010, literacy, village, nrow =3, top=textGrob(
"Distribution balance for household characteristics", gp=gpar(fontsize=15,font=15)))
```
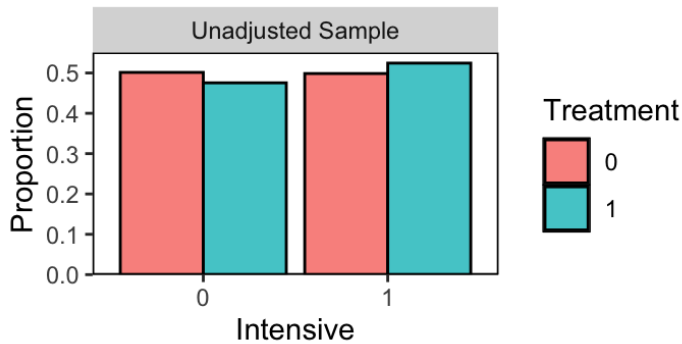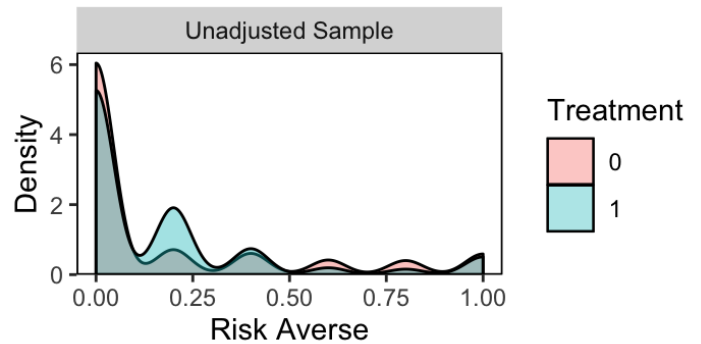
# Distribution balance for household characteristics



```
grid.arrange(intensive, risk_averse, disaster_prob, nrow =2, top=textGrob("Distribution
 balance plot of non-househole variables", gp=gpar(fontsize=15,font=15)))
```

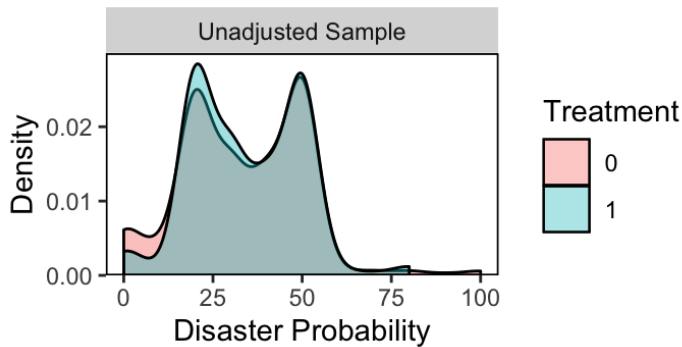# Distribution balance plot of non-househole variables

## Distributional Balance for Intensive



## Distributional Balance for Risk Averse



## Distributional Balance for Disaster Probability



# Network effect 1-1

- treatment: people have dense network
- sample: 2nd round with no take-up information given
- matching variables: household charateristics

Hide

```
#Define treatment: create a binary variable dense_network as our treatment, if network_rate_preintensive > 0.4
dat$dense_network <- 0
dat$dense_network[dat$network_rate_preintensive >=0.4] <-1
```

Hide

```
#Data preparation for genetic matching

#create dataframe for included variables
dat_gen <- cbind(dat_delay_noinfo$male, dat_delay_noinfo$age, dat_delay_noinfo$agpop, da
t_delay_noinfo$ricearea_2010, dat_delay_noinfo$literacy,factor(dat_delay_noinfo$villag
e), dat_delay_noinfo$intensive, dat_delay_noinfo$dense_network, dat_delay_noinfo$takeup_
survey)


dat_gen<- as.data.frame(dat_gen) %>% rename(male=V1, age=V2, agpop = V3, , ricearea_2010
=V4, literacy=V5, village=V6, intensive = V7, dense_network = V8, takeup_survey = V9)

#drop NAs so we can do genetic matching
dat_gen<- dat_gen %>% drop_na()

#Dataframe for matched variable
X2 <- subset(dat_gen, select = -c(dense_network,takeup_survey))
```

Hide

```
#Genetic Matching
invisible(capture.output(genout2 <- GenMatch(Tr = dat_gen$dense_network, X=X2 , M=1, est
imand = 'ATT', max.generations = 10)))
```

Hide

```
mout2 <- Match(Y = dat_gen$takeup_survey, Tr= dat_gen$dense_network, X=X2, M =1, estiman
d = 'ATT', Weight.matrix = genout2)

# mout2 <- Match(Y = round1dat$takeup_survey, Tr= round1dat$intensive, X = X, M =2, esti
mand = 'ATT', Weight.matrix = genout1, exact = c(1,0,0,0,1,1), caliper = c(1e16, 1e16, 1
e16, 0.3,1e16, 1e16 )))

mbgen2 <- MatchBalance(dense_network~ male + age + agpop + ricearea_2010 + literacy + vi
llage, data = dat_gen, match.out=mout2, nboots=500)
```

```
***** (V1) male *****
                  Before Matching        After Matching
mean treatment........    0.90667           0.90667
mean control..........    0.92624           0.90667
std mean diff.........    -6.7126               0

mean raw eQQ diff.....   0.017778               0
med  raw eQQ diff.....          0               0
max  raw eQQ diff.....          1               0

mean eCDF diff........  0.0097852               0
med  eCDF diff........  0.0097852               0
max  eCDF diff........    0.01957               0

var ratio (Tr/Co).....     1.2429               1
T-test p-value........    0.35246               1


***** (V2) age *****
                  Before Matching        After Matching
mean treatment........     51.591            51.591
mean control..........     51.794            51.689
std mean diff.........    -1.6387           -0.79111

mean raw eQQ diff.....    0.72444           0.80531
med  raw eQQ diff.....          1                 1
max  raw eQQ diff.....          4                 3

mean eCDF diff........   0.011375           0.01432
med  eCDF diff........  0.0053035          0.013274
max  eCDF diff........   0.054865          0.044248

var ratio (Tr/Co).....     1.1009            1.1513
T-test p-value........    0.82193           0.68637
KS Bootstrap p-value..      0.472             0.956
KS Naive p-value......    0.63032           0.97982
KS Statistic..........   0.054865          0.044248


***** (V3) agpop *****
                  Before Matching        After Matching
mean treatment........     4.8489            4.8489
mean control..........     5.0233            4.8578
std mean diff.........    -7.1092           -0.36223

mean raw eQQ diff.....    0.30667           0.11504
med  raw eQQ diff.....          0                 0
max  raw eQQ diff.....          3                 2

mean eCDF diff........   0.018446         0.0071903
med  eCDF diff........   0.012512         0.0044248
max  eCDF diff........   0.061438          0.022124
```

```
var ratio (Tr/Co).....     1.2471              1.1378
T-test p-value........     0.32466             0.7997
KS Bootstrap p-value..      0.182              0.984
KS Naive p-value......      0.4841               1
KS Statistic..........     0.061438            0.022124


***** (V4) ricearea_2010 *****
                     Before Matching      After Matching
mean treatment........      13.09               13.09
mean control..........      12.863              12.924
std mean diff.........      1.752               1.2827

mean raw eQQ diff.....      0.90249             1.0027
med  raw eQQ diff.....       0.4                0.35
max  raw eQQ diff.....       20                  20

mean eCDF diff........      0.016307            0.017257
med  eCDF diff........      0.01014             0.013274
max  eCDF diff........      0.058898            0.061947

var ratio (Tr/Co).....      0.94481             1.0256
T-test p-value........      0.81226             0.53624
KS Bootstrap p-value..      0.378               0.604
KS Naive p-value......      0.53906             0.77872
KS Statistic..........      0.058898            0.061947


***** (V5) literacy *****
                     Before Matching      After Matching
mean treatment........      0.75556             0.75556
mean control..........      0.76657             0.75556
std mean diff.........      -2.558                0

mean raw eQQ diff.....     0.0088889              0
med  raw eQQ diff.....        0                   0
max  raw eQQ diff.....        1                   0

mean eCDF diff........     0.0055089              0
med  eCDF diff........     0.0055089              0
max  eCDF diff........      0.011018              0

var ratio (Tr/Co).....      1.0358                1
T-test p-value........      0.72667               1


***** (V6) village *****
                     Before Matching      After Matching
mean treatment........      20.28               20.28
mean control..........      21.72               20.022
std mean diff.........      -11.386             2.0383

mean raw eQQ diff.....      1.4444              0.61504
```

```
med  raw eQQ diff.....          1                    0
max  raw eQQ diff.....          5                    3


mean eCDF diff........    0.032979             0.014328
med  eCDF diff........    0.037628             0.011062
max  eCDF diff........    0.061998             0.044248


var ratio (Tr/Co).....      0.9221               1.0325
T-test p-value........      0.1242              0.48299
KS Bootstrap p-value..       0.276                0.936
KS Naive p-value......     0.47233              0.97982
KS Statistic..........    0.061998             0.044248



Before Matching Minimum p.value: 0.1242
Variable Name(s): village  Number(s): 6


After Matching Minimum p.value: 0.48299
Variable Name(s): village  Number(s): 6
```

Hide

```
#mbgen2 <- MatchBalance(intensive~ male + age + agpop + ricearea_2010 + literacy + villa
ge, data = round1dat, match.out=mout1, nboots=500)
```

Hide

```
summary(mout2)
```

```
Estimate...  0.11111
AI SE......  0.049772
T-stat.....  2.2324
p.val......  0.025587

Original number of observations..............  1296
Original number of treated obs...............  225
Matched number of observations...............  225
Matched number of observations  (unweighted).  226
```

# Network effect 1-2

- treatment: people have dense network
- sample: 2nd round with no take-up information given
- matching variables: household charateristics + risk_averse + disaster_prob(exact the same as column 2)

Hide

```
#Data preperation for genetic matching

#create a dataframe for
dat_gen3 <- cbind(dat_delay_noinfo$male, dat_delay_noinfo$age, dat_delay_noinfo$agpop, d
at_delay_noinfo$ricearea_2010, dat_delay_noinfo$literacy,factor(dat_delay_noinfo$villag
e), dat_delay_noinfo$intensive, dat_delay_noinfo$risk_averse, dat_delay_noinfo$disaster_
prob ,dat_delay_noinfo$dense_network, dat_delay_noinfo$takeup_survey)


dat_gen3<- as.data.frame(dat_gen3) %>% rename(male=V1, age=V2, agpop = V3, , ricearea_20
10=V4, literacy=V5, village=V6, intensive = V7, risk_averse= V8,disaster_prob = V9 ,dens
e_network = V10, takeup_survey = V11)

#drop NAs so we can do genetic matching
dat_gen3<- dat_gen3 %>% drop_na()

#Dataframe for matched variable
X4 <- subset(dat_gen3, select = -c(dense_network,takeup_survey))

X4
```

| | ... | ... | ag... | ricearea_2010 | literacy | village | intensive | risk_averse | disaster_prob |
|---|---|---|---|---|---|---|---|---|---|
| | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> | <dbl> |
| 1 | 1 | 54 | 4 | 10.00 | 0 | 10 | 0 | 0.0 | 20 |
| 2 | 1 | 67 | 2 | 10.00 | 1 | 10 | 1 | 0.0 | 30 |
| 3 | 1 | 61 | 13 | 4.00 | 1 | 10 | 1 | 0.0 | 50 |
| 4 | 1 | 45 | 4 | 15.00 | 1 | 10 | 0 | 0.2 | 50 |
| 5 | 1 | 70 | 7 | 3.80 | 1 | 10 | 0 | 0.0 | 20 |
| 6 | 1 | 76 | 4 | 5.00 | 1 | 10 | 1 | 0.2 | 50 |
| 7 | 1 | 59 | 7 | 4.00 | 0 | 10 | 1 | 0.0 | 20 |
| 8 | 1 | 48 | 6 | 8.00 | 1 | 10 | 0 | 0.4 | 50 |
| 9 | 1 | 72 | 12 | 4.55 | 0 | 10 | 1 | 0.0 | 50 |
| 10 | 1 | 48 | 7 | 4.50 | 1 | 10 | 0 | 0.0 | 20 |

1-10 of 1,296 rows          Previous **1** 2 3 4 5 6 … 100 Next

Hide

```
table(dat_gen3$dense_network)
```

```
   0    1
1071  225
```

```
#Genetic Matching
invisible(capture.output(genout4 <- GenMatch(Tr = dat_gen3$dense_network, X=X4 , M=1, es
timand = 'ATT', max.generations = 10)))
```

```
mout4 <- Match(Y = dat_gen3$takeup_survey, Tr= dat_gen3$dense_network, X=X4, M =1, estim
and = 'ATT', Weight.matrix = genout4)

mbgen4 <- MatchBalance(dense_network~ male + age + agpop + ricearea_2010 + literacy + vi
llage+risk_averse+disaster_prob, data = dat_gen3, match.out=mout4, nboots=500)
```

```
***** (V1) male *****
                    Before Matching         After Matching
mean treatment........     0.90667              0.90667
mean control..........     0.92624              0.91111
std mean diff.........     -6.7126              -1.5244

mean raw eQQ diff.....     0.017778             0.0044444
med  raw eQQ diff.....        0                    0
max  raw eQQ diff.....        1                    1

mean eCDF diff........     0.0097852            0.0022222
med  eCDF diff........     0.0097852            0.0022222
max  eCDF diff........      0.01957             0.0044444

var ratio (Tr/Co).....      1.2429               1.0449
T-test p-value........      0.35246              0.31731


***** (V2) age *****
                    Before Matching         After Matching
mean treatment........     51.591               51.591
mean control..........     51.794               51.702
std mean diff.........     -1.6387              -0.89898

mean raw eQQ diff.....     0.72444              1.6133
med  raw eQQ diff.....        1                    2
max  raw eQQ diff.....        4                    7

mean eCDF diff........     0.011375             0.030675
med  eCDF diff........     0.0053035            0.026667
max  eCDF diff........     0.054865             0.071111

var ratio (Tr/Co).....      1.1009               1.3425
T-test p-value........      0.82193              0.89129
KS Bootstrap p-value..      0.486                0.518
KS Naive p-value......      0.63032              0.62002
KS Statistic..........     0.054865             0.071111


***** (V3) agpop *****
                    Before Matching         After Matching
mean treatment........     4.8489               4.8489
mean control..........     5.0233               4.8267
std mean diff.........     -7.1092              0.90558

mean raw eQQ diff.....     0.30667              0.13778
med  raw eQQ diff.....        0                    0
max  raw eQQ diff.....        3                    1

mean eCDF diff........     0.018446             0.0086111
med  eCDF diff........     0.012512             0.0066667
max  eCDF diff........     0.061438             0.022222
```

```
var ratio (Tr/Co).....      1.2471              1.1686
T-test p-value........      0.32466             0.64973
KS Bootstrap p-value..      0.192               0.99
KS Naive p-value......      0.4841              1
KS Statistic..........      0.061438            0.022222


***** (V4) ricearea_2010 *****
                      Before Matching      After Matching
mean treatment........      13.09               13.09
mean control..........      12.863              12.729
std mean diff.........      1.752               2.7849

mean raw eQQ diff.....      0.90249             0.87684
med  raw eQQ diff.....      0.4                 0.6
max  raw eQQ diff.....      20                  20

mean eCDF diff........      0.016307            0.018272
med  eCDF diff........      0.01014             0.017778
max  eCDF diff........      0.058898            0.053333

var ratio (Tr/Co).....      0.94481             1.2006
T-test p-value........      0.81226             0.2068
KS Bootstrap p-value..      0.392               0.77
KS Naive p-value......      0.53906             0.90621
KS Statistic..........      0.058898            0.053333


***** (V5) literacy *****
                      Before Matching      After Matching
mean treatment........      0.75556             0.75556
mean control..........      0.76657             0.76
std mean diff.........      -2.558              -1.0319

mean raw eQQ diff.....      0.0088889           0.0044444
med  raw eQQ diff.....      0                   0
max  raw eQQ diff.....      1                   1

mean eCDF diff........      0.0055089           0.0022222
med  eCDF diff........      0.0055089           0.0022222
max  eCDF diff........      0.011018            0.0044444

var ratio (Tr/Co).....      1.0358              1.0126
T-test p-value........      0.72667             0.31731


***** (V6) village *****
                      Before Matching      After Matching
mean treatment........      20.28               20.28
mean control..........      21.72               20.084
std mean diff.........      -11.386             1.5463

mean raw eQQ diff.....      1.4444              0.52444
```

```
med   raw eQQ diff.....          1                    0
max   raw eQQ diff.....          5                    3

mean eCDF diff........    0.032979             0.011919
med   eCDF diff........    0.037628            0.0088889
max   eCDF diff........    0.061998                0.04

var ratio (Tr/Co).....      0.9221              1.0237
T-test p-value........      0.1242             0.56366
KS Bootstrap p-value..       0.328                0.95
KS Naive p-value......     0.47233             0.99376
KS Statistic..........    0.061998                0.04


***** (V7) risk_averse *****
                     Before Matching      After Matching
mean treatment........    0.16267             0.16267
mean control..........    0.17628             0.15911
std mean diff.........    -5.0316              1.3138

mean raw eQQ diff.....    0.049778           0.0088889
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....        0.4                  0.2

mean eCDF diff........    0.050052            0.022222
med   eCDF diff........     0.04747           0.0044444
max   eCDF diff........     0.10413             0.11111

var ratio (Tr/Co).....     0.75532              1.0038
T-test p-value........     0.50483             0.44991
KS Bootstrap p-value..       0.002               0.036
KS Naive p-value......    0.035476             0.12432
KS Statistic..........     0.10413             0.11111


***** (V8) disaster_prob *****
                     Before Matching      After Matching
mean treatment........     34.147              34.147
mean control..........     33.243              34.342
std mean diff.........     5.9119             -1.2797

mean raw eQQ diff.....     1.5911             0.77333
med   raw eQQ diff.....          0                    0
max   raw eQQ diff.....         20                  10

mean eCDF diff........    0.018797            0.010159
med   eCDF diff........   0.0079365           0.0066667
max   eCDF diff........    0.062932            0.026667

var ratio (Tr/Co).....     0.77756               1.016
T-test p-value........      0.4319             0.45969
KS Bootstrap p-value..        0.17               0.906
KS Naive p-value......     0.45305                   1
KS Statistic..........    0.062932            0.026667
```

```
Before Matching Minimum p.value: 0.002
Variable Name(s): risk_averse   Number(s): 7

After Matching Minimum p.value: 0.036
Variable Name(s): risk_averse   Number(s): 7
```

```
summary(mout4)
```

```
Estimate...   0.044444
AI SE......   0.051029
T-stat.....   0.87096
p.val......   0.38378

Original number of observations..............  1296
Original number of treated obs...............   225
Matched number of observations...............   225
Matched number of observations  (unweighted).   225
```

#Social network effect 2: we only examine if they have their network coming or not

# Network effect 1-2

- treatment: as long as people have network(network_yes)
- sample: 2nd round with no take-up information given
- matching variables: household charateristics + risk_averse + disaster_prob(exact the same as column 2)

```
#Data preperation for genetic matching


dat_gen2 <- cbind(dat_delay_noinfo$male, dat_delay_noinfo$age, dat_delay_noinfo$agpop, d
at_delay_noinfo$ricearea_2010, dat_delay_noinfo$literacy,factor(dat_delay_noinfo$villag
e), dat_delay_noinfo$intensive, dat_delay_noinfo$risk_averse, dat_delay_noinfo$disaster_
prob, dat_delay_noinfo$network_yes, dat_delay_noinfo$takeup_survey)


dat_gen2<- as.data.frame(dat_gen2) %>% rename(male=V1, age=V2, agpop = V3, , ricearea_20
10=V4, literacy=V5, village=V6, intensive = V7, risk_averse = V8, disaster_prob= V9, net
work_yes = V10, takeup_survey = V11)

#drop NAs so we can do genetic matching
dat_gen2<- dat_gen2 %>% drop_na()

#Dataframe for matched variable
X3 <- subset(dat_gen2, select = -c(network_yes,takeup_survey))


X3
```

| | ... <dbl> | ... <dbl> | ag... <dbl> | ricearea_2010 <dbl> | literacy <dbl> | village <dbl> | intensive <dbl> | risk_averse <dbl> | disaster_prob <dbl> |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 54 | 4 | 10.00 | 0 | 10 | 0 | 0.0 | 20 |
| 2 | 1 | 67 | 2 | 10.00 | 1 | 10 | 1 | 0.0 | 30 |
| 3 | 1 | 61 | 13 | 4.00 | 1 | 10 | 1 | 0.0 | 50 |
| 4 | 1 | 45 | 4 | 15.00 | 1 | 10 | 0 | 0.2 | 50 |
| 5 | 1 | 70 | 7 | 3.80 | 1 | 10 | 0 | 0.0 | 20 |
| 6 | 1 | 76 | 4 | 5.00 | 1 | 10 | 1 | 0.2 | 50 |
| 7 | 1 | 59 | 7 | 4.00 | 0 | 10 | 1 | 0.0 | 20 |
| 8 | 1 | 48 | 6 | 8.00 | 1 | 10 | 0 | 0.4 | 50 |
| 9 | 1 | 72 | 12 | 4.55 | 0 | 10 | 1 | 0.0 | 50 |
| 10 | 1 | 48 | 7 | 4.50 | 1 | 10 | 0 | 0.0 | 20 |

1-10 of 1,255 rows          Previous **1** 2 3 4 5 6 ... 100 Next

Hide

```
NA
NA
```

Hide

```
#Genetic Matching
invisible(capture.output(genout3 <- GenMatch(Tr = dat_gen2$network_yes, X=X3 , M=1, esti
mand = 'ATT', max.generations = 10)))
```

```
mout3 <- Match(Y = dat_gen2$takeup_survey, Tr= dat_gen2$network_yes, X=X3, M =2, estiman
d = 'ATT', Weight.matrix = genout3, caliper = c(1e16, 1e16, 1e16, 0.3,1e16, 1e16, 1e16,
1e16, 1e16), exact = c(0,0,0,0,1,1,0,1,0))

# mout2 <- Match(Y = round1dat$takeup_survey, Tr= round1dat$intensive, X = X, M =2, esti
mand = 'ATT', Weight.matrix = genout1, exact = c(1,0,0,0,1,1), ))#

mbgen3 <- MatchBalance(network_yes~ male + age + agpop + ricearea_2010 + literacy + vill
age + risk_averse + disaster_prob, data = dat_gen2, match.out=mout3, nboots=500)
```

```
***** (V1) male *****
                      Before Matching        After Matching
mean treatment........     0.92614               0.93929
mean control..........     0.91696               0.95536
std mean diff.........      3.5112               -6.7179

mean raw eQQ diff.....    0.0086505              0.016071
med  raw eQQ diff.....         0                     0
max  raw eQQ diff.....         1                     1

mean eCDF diff........    0.0045949             0.0080357
med  eCDF diff........    0.0045949             0.0080357
max  eCDF diff........    0.0091897             0.016071

var ratio (Tr/Co).....     0.89803               1.3371
T-test p-value........      0.5474               0.29542


***** (V2) age *****
                      Before Matching        After Matching
mean treatment........     51.198                52.079
mean control..........     52.107                52.198
std mean diff.........     -7.8043               -1.0466

mean raw eQQ diff.....     0.97751               0.87321
med  raw eQQ diff.....         1                     1
max  raw eQQ diff.....         4                     6

mean eCDF diff........    0.015231              0.015831
med  eCDF diff........    0.011074              0.013393
max  eCDF diff........    0.041338              0.055357

var ratio (Tr/Co).....     0.98607               1.1487
T-test p-value........     0.17005               0.84813
KS Bootstrap p-value..      0.476                 0.252
KS Naive p-value......     0.66098               0.35746
KS Statistic..........     0.041338              0.055357


***** (V3) agpop *****
                      Before Matching        After Matching
mean treatment........     5.0502                 5.05
mean control..........     4.9204                4.9482
std mean diff.........     5.5303                4.3419

mean raw eQQ diff.....     0.15052               0.15893
med  raw eQQ diff.....         0                     0
max  raw eQQ diff.....         3                     3

mean eCDF diff........    0.0089757             0.009933
med  eCDF diff........    0.0076564             0.011607
max  eCDF diff........    0.022246               0.025
```

```
var ratio (Tr/Co).....        1.321              1.3465
T-test p-value........      0.29502             0.51504
KS Bootstrap p-value..       0.828               0.792
KS Naive p-value......      0.99785             0.9948
KS Statistic..........      0.022246            0.025


***** (V4) ricearea_2010 *****
                        Before Matching      After Matching
mean treatment........      13.371             9.3604
mean control..........      12.435             9.2888
std mean diff.........      6.7298             1.3227

mean raw eQQ diff.....      1.1971             0.43704
med  raw eQQ diff.....         1               0.2
max  raw eQQ diff.....        44                3

mean eCDF diff........      0.026637           0.021942
med  eCDF diff........      0.023367           0.024107
max  eCDF diff........      0.079408           0.055357

var ratio (Tr/Co).....      1.1642             1.0961
T-test p-value........      0.21658            0.63694
KS Bootstrap p-value..       0.018              0.248
KS Naive p-value......      0.039201           0.35746
KS Statistic..........      0.079408           0.055357


***** (V5) literacy *****
                        Before Matching      After Matching
mean treatment........      0.7548             0.86071
mean control..........      0.77855            0.86071
std mean diff.........      -5.5156               0

mean raw eQQ diff.....      0.024221              0
med  raw eQQ diff.....         0                  0
max  raw eQQ diff.....         1                  0

mean eCDF diff........      0.011873              0
med  eCDF diff........      0.011873              0
max  eCDF diff........      0.023746              0

var ratio (Tr/Co).....      1.0732                1
T-test p-value........      0.32121               1


***** (V6) village *****
                        Before Matching      After Matching
mean treatment........      20.954             19.864
mean control..........      21.59              19.864
std mean diff.........      -4.8467               0

mean raw eQQ diff.....      0.69377               0
```

```
med  raw eQQ diff.....          1                0
max  raw eQQ diff.....          3                0

mean eCDF diff........     0.015278              0
med  eCDF diff........     0.010222              0
max  eCDF diff........     0.049613              0

var ratio (Tr/Co).....        1.03               1
T-test p-value........     0.38851               1
KS Bootstrap p-value..         0.3               1
KS Naive p-value......     0.42662               1
KS Statistic..........     0.049613              0


***** (V7) risk_averse *****
                     Before Matching       After Matching
mean treatment........     0.15185         0.022143
mean control..........     0.16055         0.022143
std mean diff.........     -3.1041                0

mean raw eQQ diff.....     0.02526                0
med  raw eQQ diff.....          0                 0
max  raw eQQ diff.....         0.2                0

mean eCDF diff........     0.023296               0
med  eCDF diff........     0.026435               0
max  eCDF diff........     0.040035               0

var ratio (Tr/Co).....     0.85628                1
T-test p-value........     0.59977                1
KS Bootstrap p-value..       0.198                1
KS Naive p-value......     0.69967                1
KS Statistic..........     0.040035               0


***** (V8) disaster_prob *****
                     Before Matching       After Matching
mean treatment........      33.996           32.011
mean control..........      33.202           33.018
std mean diff.........      4.6204          -5.9797

mean raw eQQ diff.....      1.0061           1.5786
med  raw eQQ diff.....          0                 0
max  raw eQQ diff.....         20                20

mean eCDF diff........     0.008897         0.019643
med  eCDF diff........    0.0034359         0.017857
max  eCDF diff........     0.034942         0.041071

var ratio (Tr/Co).....      1.0116           1.1987
T-test p-value........     0.41329          0.44923
KS Bootstrap p-value..       0.386            0.334
KS Naive p-value......     0.84101          0.73233
KS Statistic..........     0.034942         0.041071
```

```
Before Matching Minimum p.value: 0.018
Variable Name(s): ricearea_2010  Number(s): 4

After Matching Minimum p.value: 0.248
Variable Name(s): ricearea_2010  Number(s): 4
```

Hide

```
summary(mout3)
```

```
Estimate...  0.057143
AI SE......  0.019358
T-stat.....  2.9519
p.val......  0.0031583

Original number of observations..............  1255
Original number of treated obs...............  677
Matched number of observations...............  280
Matched number of observations  (unweighted).  560

Number of obs dropped by 'exact' or 'caliper'  397
```