Framing an Unconditional Cash Transfer: Pre-Analysis Plan

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Abstract

This document describes the pre-analysis plan for a randomized experiment examining the effects of framing of welfare payments on self-concept and economic behavior. In this study, we will provide small, unconditional cash transfers to residents of an informal settlement in Nairobi and vary the way in which the transfers are framed to participants. Participants will be randomly assigned to one of three treatment groups: the transfer framed as a means toward poverty alleviation, individual empowerment, or collective support. We will then collect self-reported measures of self-efficacy, judgement, and affect and observed measures of temporal discounting and investment. This pre-analysis plan outlines our hypotheses, the schedule of experimental tasks, and our empirical strategy. In order to guarantee transparency and bind ourselves from fishing for results, we will pre-register the source files to be used for data analysis.

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1. Introduction

2. Research Design

2.1 Sampling

This study will be conducted in conjunction with the Busara Center for Behavioral Economics in Nairobi with 525 participants residing in Kibera and Kawangware, two of Kenya's largest urban slums (Haushofer et al. 2014). Treatment and data collection will take place with household surveys in the Kibera settlement with Busara Center enumerators. This section outlines the sampling procedure to be used in the experiment.

The study area will be partitioned into seven, non-overlapping catchment regions to be used for sample selection. Research staff will visit one catchment region per day and will not visit the same region more than once. Table 1 summarizes these areas. Beginning at a designated intersection in the catchment region, a team of nine enumerators and a guide[1] will select every eighth household in each direction for survey. From that visit on, enumerators will select the eighth house down from the subsequent structure, away from the intersection and on the opposite side of the road. If participants are not available at the selected households enumerators will move to the next door away from the origin.

Table 1: Survey location

Area	Origin
Kibera	AIC Church
Kibera	Kibera Immanuel Technical Institute
Kibera	Kibera Labour Hall
Kibera	Kibera Chonesus Hall
Kibera	Busara Center
Kawangware	Kawangware Pastor Ken's Hall
Kawangware	Kawangware CDF Hall

Sampled individuals will be enrolled in the survey if they meet the following eligibility criteria:

1. Between 18 and 50 years old
2. Member of the Busara Center's participant pool
3. Resident of Kibera or Kawangware
4. Not surveyed by the Busara Center for any other study in the past 10 days
5. Owns a working phone and an M-Pesa account registered under the participant's name

If an eligible person is available at the selected household, they will be enrolled as a participant. If there are multiple members, enumerators will prioritize the youngest eligible person of the opposite gender than in the previous survey. We will sample from the study area for a total of 525 surveys.

[1] Guides will accompany enumerators but will not be involved in sampling or data collection.

2.2 Statistical power

2.3 Experimental procedure

The survey questionnaire will be delivered in English with Kiswahili translations. The following summarizes the schedule of tasks in the questionnaire.[2]

1. Consent agreement
2. Cash transfer framing
3. Self-efficacy questionnaire (5 items)
4. Judgement questionnaire (5 items)
5. Affect questionnaire (4 items)
6. Video selection task
7. Savings task
8. Frame evaluation
9. Message of support
10. Subjective social status ladder scale (2 items)
11. Sociodemographic questionnaire (9 items)

2.4 Treatment

At the outset of the survey, eligible and consenting participants will be told they are receiving an unconditional cash transfer of KES 400 (USD PPP 10.5) from an organization unaffiliated with the Busara Center.[3] Participants will be randomly assigned by the survey software[4] to receive one of three messages introducing the purpose of the cash transfer. All frames are identical in content and structure save for the described purpose of the cash transfer. In the poverty allevation framing, the payment is described as a means to meet basic needs. The individual empowerment framing describes the payment as a means toward individual goals and the collective support framing as a means toward goals regarding family and the community. Participants will listen to the message in their preferred language (English or Kiswahili) with pre-recorded audio clips or as read by the enumerator.

After framing, enumerators will send USD PPP 10.5 to the participant via the mobile money system M-Pesa.[5] Enumerators will be instructed to confirm receipt of the payment. In the individual empowerment and collective support treatments, enumerators will also elicit participants to list either individual or collective goals and beliefs about the purpose of the payment. Enumerators play the message once again after the transfer

[2]We will use a single survey instrument, programmed with Qualtrics, for treatment delivery and subsequent data collection. The programmed and paper versions of the survey are included as supplementary materials.

[3]This study will be conducted with Kenyan shillings (KES). We report USD values calculated at purchasing power parity using a conversion factor for private consumption of 38.15 in 2013. The price level ratio of PPP conversion factor (GDP) to KES market exchange rate for 2011 was 0.444.

[4]We evenly assign treatment groups to achive balance in group size.

[5]For more information on M-Pesa, we refer the reader to Jack and Suri (2011) and Mbiti and Weil (2011).

2.4.1 Poverty alleviation framing

The goal of this Poverty Alleviation Organization is to alleviate poverty and reduce financial hardship among the poor. This organization believes that people living in poverty should be given income support to help them meet their basic needs. This organization aims to help promote a decent standard of living among the poor and help them deal with emergencies. Thus, the Poverty Alleviation Organization gives financial assistance to people like you, to help them make ends meet. For example, with the financial assistance, people might be able to struggle less to afford basic needs, like paying off debts, paying rent, and buying clothes and food. Now we are going to send you 400 KSh. Please note that this is a one-time transfer of financial assistance.

2.4.2 Individual empowerment framing

The goal of this Individual Empowerment Organization is to promote individuals' potential to create a better future for themselves. The organization believes that individuals are wise and know best how to help themselves become self-reliant/independent if they have the financial resources to do so. This organization aims to empower individuals to pursue their personal interests and create their own path to independence. Thus, the Individual Empowerment Organization gives financial resources to individuals, like you, to enable them to invest in their personal goals. For example, people might use their unique talents to start a self-run business, invest in job training courses, or create art. Now we are going to send you 400 KSh. Please note that this is a one-time transfer of financial resources.

2.4.3 Collective support framing

The goal of this Community Empowerment Organization is to enable people to help promote better futures for those they care about and want to support most. The organization believes that people know best how to support each other and grow together if they have financial resources to do so. This organization aims to empower people to improve their own lives and those of the people and communities they care about most. Thus, the Community Empowerment Organization gives financial resources to community members, like you, to enable them to contribute positively to the lives of people important to them. For example, when people can invest in themselves, they are better able to expand employment opportunities for others, provide valuable services to their community, or teach others, including children, useful skills and knowledge. Now Community Empowerment Organization is going to send you 400 KSh. Please note that this is a one-time transfer of financial resources.

3. Data

3.1 Cash transfer framing

3.2 Self-efficacy questionnaire (5 items)

3.3 Judgement questionnaire (5 items)

3.4 Affect questionnaire (4 items)

3.5 Video selection task

3.6 Savings task

3.7 Frame evaluation

3.8 Message of support

3.9 Subjective social status ladder scale (2 items)

3.10 Sociodemographic questionnaire (9 items)

4. Empirical Analysis

4.1 Treatment effect of cash transfer frames

We will use the following reduced-form specification to estimate the treatment effect of different frames.[6]

$$Y_i = \beta_0 + \beta_1 \textsc{Ind}_i + \beta_2 \textsc{Com}_i + \varepsilon_i \tag{1}$$

Y_i refers to the outcome variables for individual i measured after the manipulation. The outcome variables described in Table 2 will be the focus of this analysis. $\textsc{Ind}_i$ indicates assignment to the individual empowerment frame while $\textsc{Com}_i$ indicates assignment to the collective support frame. The reference category in this model is the poverty alleviation frame. We will estimate cluster-robust standard errors at the individual level. Table 3 lists the hypotheses we will test using Equation 1.

Table 2: Primary outcome variables

Variable	Description
Video selection	Dummy variable for having chosen at least one business video
Savings choice	Dummy variable for sending non-zero amount
Message recording	Dummy variable for recording message of support
Effect forecast	

Table 3: Primary hypothesis tests

Null hypothesis	Description
$H_0 : \beta_1 = 0$	Effect of individual empowerment frame relative to poverty alleviation frame
$H_0 : \beta_2 = 0$	Effect of collective support frame relative to poverty alleviation frame
$H_0 : \beta_1 = \beta_2$	Effect of collective support frame relative to individual empowerment frame

[6] We will conduct the data analysis outlined in this section using the R programming language with the scripts included in Appendix C.

To improve precision, we will also apply covariate adjustment with a vector of baseline indicators $\mathbf{X}_i$. We obtain the covariate-adjusted treatment effect estimate by estimating Equation 1 including the demeaned covariate vector $\dot{\mathbf{X}}_i = \mathbf{X}_i - \bar{\mathbf{X}}_i$ as an additive term and as an interaction with the treatment indicator.

$$Y_i = \beta_0 + \beta_1 \textsc{Ind}_i + \beta_2 \textsc{Com}_i + \gamma_0 \dot{\mathbf{X}}_i' + \gamma_1 \textsc{Ind}_i \dot{\mathbf{X}}_i' + \gamma_2 \textsc{Com}_i \dot{\mathbf{X}}_i' + \varepsilon_i \tag{2}$$

The set of indicators partitions our sample so that our estimate for β_j remains unbiased for the average treatment effect (Lin 2013). We will estimate cluster-robust standard errors at the individual level. We use this model to test the hypotheses detailed in Table 3 including the control variables listed in Table 4.

Table 4: Control variables for covariate adjustment

Variable	Description
Age	Dummy variable indicating participant is over 25
Gender	Dummy variable indicating participant is female
Employment	Dummy variable indicating participant is employed
Education	Dummy variable indicating participant completed std. 8
Savings	Dummy variable having more than Ksh 1000 saved

4.2 Randomization inference

One potential concern is that inference might be invalidated by finite sample bias in estimates of the standard errors. To address this issue, we will conduct randomization inference to test the Fisherian sharp null hypothesis of no treatment effect for every participant (Fisher 1935).[7] We perform Monte Carlo approximations of the exact p-values using $M = 10,000$ permutations of the treatment assignment. We will then estimate our primary specification within each m^{th} permutation and calculate the standard Wald statistics for each of our hypothesis tests. We will compare the Wald statistics from the original sample with the distribution of permuted statistics to produce approximations of the exact p-values:

$$\hat{p}_\beta = \frac{1}{10,000} \sum_{m=1}^{10,000} \mathbf{1}\Big[\hat{\beta}'_m V(\hat{\beta}_m)^{-1} \hat{\beta}_m \geq \hat{\beta}'_{obs.} V(\hat{\beta}_{obs.})^{-1} \hat{\beta}_{obs.}\Big] \tag{3}$$

Following Young (2015), we will permute the data and calculate the regressions for all outcomes within each draw.

4.3 Multiple testing adjustment

Given that our survey instrument included several items related to a single behavior or dimension, we will calculate sharpened q-values over outcomes in Table 2 to control the false discovery rate (Benjamini, Krieger, and Yekutieli 2006). Rather than specifying a single q, we will report the minimum q-value at which each hypothesis is rejected (Anderson 2008). We will apply this correction separately for each hypothesis test and will report both standard p-values and minimum q-values in our analysis.

[7] Note that this is more restrictive than the null hypothesis of zero average treatment effect we will test in the previous section.

4.4 Heterogeneous treatment effects

We will analyze the extent to which the policy frames produced heterogeneous treatment effects with the following specification.

$$Y_i = \beta_0 + \beta_1 \textsc{Ind}_i + \beta_2 \textsc{Com}_i + \delta_0 x_i + \delta_1 \textsc{Ind}_i x_i + \delta_2 \textsc{Com}_i x_i + \varepsilon_i \tag{4}$$

x_i is the binary dimension of heterogeneity measured before treatment assignment. δ_1 and δ_2 identify the heterogeneous treatment effects of the individual empowerment and collective support frames relative to the poverty alleviation frame. Testing $\delta_1 = \delta_2$ identifies heterogeneous effects between the former two frames. Standard errors are clustered at the individual level. We estimate this model with the baseline variables summarized in Table 4.

4.5 Analysis of potential mechanisms

References

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A. Consent Form

DESCRIPTION: You are invited to participate in a research study on how people view social programs conducted by the Busara Center for Behavioral Economics. You have been asked to participate in this study because you live in Nairobi, Kenya. If you volunteer to participate in this study, you will be asked to complete a survey about your beliefs and opinions. You will also be asked to provide basic information about yourself, your family. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please ask questions about anything you do not understand before deciding whether or not to participate. Please ask me if there is anything that is not clear or if you need more information.

TIME INVOLVEMENT: Your participation will take approximately 40-60 minutes.

RISKS AND BENEFITS: There are no direct benefits to you from participating in this research and minimal foreseeable risks to you or your family if you choose to participate in this study. We cannot and do not guarantee or promise that you will receive any benefits from this study.

CONFIDENTIALITY AND DATA STORAGE: Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number, and the list connecting your name with this number will be kept in a locked room and will be destroyed once all the data have been collected and analyzed. Presenting results will never reveal your identity. Confidentiality of subjects' data will be maintained to the extent allowed by law. No information about you, or provided by you during the research will be disclosed to others without your written permission, except: if necessary to protect your rights or welfare, or if required by law.

PAYMENTS: If you do decide to participate, you will receive a token of appreciation for agreeing to take part in this survey. You may also receive more money from our partner organization. If you choose to participate but decide to withdraw part way through you will be compensated accordingly.

PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand your participation is VOLUNTARY and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. The alternative is not to participate. You have the right to refuse to answer particular questions. Since these questionnaires might include personal questions about your feelings and finances, it is important that you know you may skip any questions that make you feel uncomfortable or choose to withdraw from the study at any time. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. To be eligible to participate, you must be 18 years old and above. You may choose to participate but then revoke your permission for us to use the data we collected while still being compensated for your participation.

CONTACT INFORMATION:
Questions: If you have any questions, concerns or complaints about this research, its procedures, risks and benefits, contact the Protocol Director, Jane Atieno at 072896461 or Catherine Thomas, at +1 (601) 750-1960.

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact the Stanford Institutional Review Board (IRB) to speak to someone independent of the research team at (650)-723-2480 or toll free at 1-866-680-2906, or email at IRB2-Manager@lists.stanford.edu. You can also write to the Stanford IRB, Stanford University,

3000 El Camino Real, Five Palo Alto Square, 4th Floor, Palo Alto, CA 94306. If you have any questions or concerns about your rights and treatment as a research subject, you may contact The Secretary, KEMRI SERU, PO Box 54840-00200, Nairobi; Telephone numbers 020-2722541, 0717719477. Email address seru@kemri.org.

The extra copy of this signed and dated consent form is for you to keep.

I understand the information that was presented and that:

A.

My participation is voluntary, and I may withdraw my consent and discontinue participation in the project at any time. My refusal to participate will not result in any penalty.

B.

I do not waive any legal rights or release Busara Center for Behavioral Economics, its agents, or you from liability for negligence.

I hereby give my consent to be the subject of your research.

_____

_____

Subject's Signature **Date**

_____ _____

Person Obtaining Consent's Signature **Date**

_____

_____

Witness' Signature **Date**

_____

Subject's thumb print (for illiterate subjects) **Date**

A COPY OF THIS ENTIRE DOCUMENT MUST BE PROVIDED TO THE SUBJECT.

IRB Use Only
Approval Date: Monthname dd, 20yy Expiration Date: Monthname dd, 20yy

B. Survey Instrument

C. Data Analysis Scripts

C.1 Packages

```r
setwd("/Users/Justin/Google Drive/UBIF/UBIF_Deliverables/UBIF_PAP/K1_PAP") # make this
set.seed(47269801)

required.packages <- c("dplyr", "multiwayvcov", "multcomp", "knitr")
packages.missing <- required.packages[!required.packages %in% installed.packages()[,"Pa
if(length(packages.missing) > 0) {install.packages(required.packages, repo="https://cra
lapply(required.packages, library, character.only = TRUE)
```

C.2 User-defined functions

```r
## RegTest conducts asymptotic test from linear model ##

RegTest <- function(equation, clustvars, hypotheses, data) {

    model <- lm(equation, data = data, na.action = na.omit)

    if (missing(clustvars)) model$vcov <- vcov(model)
    else model$vcov <- cluster.vcov(model, cluster = clustvars)

    model$test <- summary(glht(model, linfct = hypotheses, vcov = model$vcov))$test

    numhyp <- length(hypotheses)

    EST <- matrix(nrow = numhyp, ncol = 4)

    for (i in 1:numhyp) {

        EST[i, 1] <- model$test$coefficients[i]
        EST[i, 2] <- model$test$tstat[i]
        EST[i, 3] <- model$test$sigma[i]
        EST[i, 4] <- model$test$pvalues[i]

    }

    colnames(EST) <- c("Estimate", "Tstat", "SE", "P")

    return(EST)

}

## PermTest returns MC approximations of the exact p-value ##

PermTest <- function(equation, treatvars, clustvars, hypotheses, iterations, data) {

    stopifnot(length(hypotheses) <= 1)

    obsEST <- RegTest(equation, clustvars, hypotheses, data)
    obsStat <- obsEST[1, 2]
```

```
    simEST <- matrix(ncol = 4)

    for (i in 1:iterations) {

        simTreat <- data[, treatvars, drop = FALSE]
        simTreat <- simTreat[sample(nrow(simTreat)),]

        simData <- cbind(simTreat, data[, !(names(data) %in% treatvars), drop = FALSE])
        colnames(simData)[1:2] <- treatvars

        simEST <- rbind(simEST, RegTest(equation, clustvars, hypotheses, data = simData)

    }

    simSTAT <- simEST[2:nrow(simEST), 2]
    countSTAT <- matrix(abs(simSTAT) >= abs(obsStat), ncol = 1)

    ExactP <- matrix(1, nrow = 1, ncol = nrow(countSTAT)) %*% countSTAT
    ExactP <- ExactP / iterations

    EST <- cbind(obsEST, ExactP)

    colnames(EST) <- c("Estimate", "Tstat", "SE", "P", "ExactP")

    return(EST)

}

## FDR returns minimum q-values ##

FDR <- function(pvals, step) {

    if (sum(is.na(pvals) == FALSE) <= 1) {return(pvals)}
    if (missing(step)) {step <- 0.001}

    allpvals <- cbind(as.matrix(pvals), matrix(1:nrow(as.matrix(pvals)), ncol = 1))

    pvals <- na.omit(allpvals)
    nump <- nrow(pvals)

    pvals <- pvals[order(pvals[, 1]), ]
    rank <- matrix(1:nump, ncol = 1)
    pvals <- cbind(pvals, rank, matrix(0, nrow = nump, ncol = 1))

    qval <- 1

    while (qval > 0) {

        qfirst <- qval / (1 + qval)
        fdrtemp <- (qfirst * rank) / nump
```

```
        subrank <- which(fdrtemp >= as.matrix(pvals[, 1]))

        if (length(subrank) < 1) {
            numreject <- 0
        } else numreject <- max(subrank)

        qsec <- qfirst * (nump / (nump - numreject))
        fdrtemp <- (qsec * rank) / nump

        subrank <- which(fdrtemp >= as.matrix(pvals[, 1]))

        if (length(subrank) < 1) {
            numreject <- 0
        } else numreject <- max(subrank)

        pvals[which(pvals[, 3] <= numreject), 4] <- qval

        qval <- qval - step

    }

    pvals <- pvals[order(pvals[, 2]), ]

    qvals <- matrix(nrow = nrow(allpvals), ncol = 1)
    qvals[match(pvals[, 2], allpvals[, 2]), 1] <- pvals[, 4]

    return(as.matrix(qvals))

}
```

C.3 Data cleaning

```
## Create locals for simulation ##

  OBS <- 510

## Generate treatment ##

  Treat <- sample(0:2,OBS, rep = TRUE, prob = c(.33, .33, 0.33)) %>%
  factor(levels = c(0, 1, 2), labels = c("Poverty", "Ind.", "Col."))

  Pov <- (Treat == "Poverty") * 1
  Ind <- (Treat == "Ind.") * 1
  Col <- (Treat == "Col.") * 1

## Generate gender ##

 Gen <- sample(0:1,OBS,rep = TRUE,prob = c(.5,.5))  %>%
  factor(levels = c(0,1), labels = c("Male","Female"))
```

```r
## Generate factor variable measuring highest level of education ##

 Edu <- sample(1:3,OBS,rep = TRUE,prob = c(.5,.3,.2)) %>%
  factor(levels = c(1,2,3), labels = c("Primary school","High school","University & abo

## Generate income ##

 LnInc <- rnorm(OBS, mean = 5, sd = 1)
 Inc <- exp(LnInc)

## Generate y with notreatment effect ##

  yNull <- rnorm(OBS, 0, 1)

## Generate outcome with effects
  yInd <- (0.8 * Ind) + rnorm(OBS, 0, 1)
  yCol <- (0.4 * Col) + rnorm(OBS, 0, 1)

## Generate id ##

  ID <- matrix(1:OBS, ncol = 1)

## Create, save dataframe ##

  TestData <- data.frame(ID, Treat, Pov, Ind, Col, Gen, Edu, Inc, yNull, yInd, yCol)
```

C.4 Treatment effect

```r
hypotheses <- c("Ind = 0", "Col = 1", "Ind - Col = 0")
equations <- c("yNull ~ Ind + Col", "yInd ~ Ind + Col", "yCol ~ Ind + Col")

for (h in hypotheses) {

    RES <- matrix(nrow = 1, ncol = 5)

    for (eqn in equations) {

        # RES <- rbind(RES, RegTest(eqn, clustvars = TestData$ID, hypotheses = c(h), da
        RES <- rbind(RES, PermTest(eqn, treatvars = c("Treat"), clustvars = TestData$ID

    }

    RES <- RES[2:nrow(RES), 1:ncol(RES)]
    RES <- cbind(RES, FDR(RES[, 4]))

    rownames(RES) <- equations
    colnames(RES)[6] <- "Min. Q"

    print("----------------------------------------------------------------------", quote
```

```
        print(paste("H_0:", h), quote = FALSE)
        print(RES, quote = FALSE)
        print("------------------------------------------------------------------------", quote

    }
```

```
## [1] ------------------------------------------------------------------------
## [1] H_0: Ind = 0
##                       Estimate       Tstat        SE            P ExactP
## yNull ~ Ind + Col -0.075319746 -0.68073437 0.1106448 4.963503e-01      1
## yInd ~ Ind + Col   0.724331855  6.78370880 0.1067752 3.274581e-11      1
## yCol ~ Ind + Col  -0.001033057 -0.01002653 0.1030323 9.920041e-01      1
##                   Min. Q
## yNull ~ Ind + Col  0.986
## yInd ~ Ind + Col   0.001
## yCol ~ Ind + Col   0.000
## [1] ------------------------------------------------------------------------
## [1] ------------------------------------------------------------------------
## [1] H_0: Col = 1
##                       Estimate      Tstat        SE            P ExactP
## yNull ~ Ind + Col -0.13145711 -10.111510 0.1118979 0.000000e+00      1
## yInd ~ Ind + Col   0.07232116  -8.251344 0.1124276 1.332268e-15      1
## yCol ~ Ind + Col   0.49240775  -4.701855 0.1079557 3.327556e-06      1
##                   Min. Q
## yNull ~ Ind + Col  0.001
## yInd ~ Ind + Col   0.001
## yCol ~ Ind + Col   0.001
## [1] ------------------------------------------------------------------------
## [1] ------------------------------------------------------------------------
## [1] H_0: Ind - Col = 0
##                       Estimate      Tstat        SE            P ExactP
## yNull ~ Ind + Col  0.05613736  0.4763352 0.1178526 6.340408e-01      1
## yInd ~ Ind + Col   0.65201069  5.6691093 0.1150111 2.412258e-08      1
## yCol ~ Ind + Col  -0.49344081 -4.1998312 0.1174906 3.155707e-05      1
##                   Min. Q
## yNull ~ Ind + Col  0.268
## yInd ~ Ind + Col   0.001
## yCol ~ Ind + Col   0.001
## [1] ------------------------------------------------------------------------
```

C.5 Covariate-adjustment

```
    hypotheses <- c("Ind = 0", "Col = 1", "Ind - Col = 0")
    equations <- c("yNull ~ Ind + Col + Gen + LnInc", "yInd ~ Ind + Col + Gen + LnInc", "yC

    for (h in hypotheses) {

        RES <- matrix(nrow = 1, ncol = 5)

        for (eqn in equations) {
```

```
            # RES <- rbind(RES, RegTest(eqn, clustvars = TestData$ID, hypotheses = c(h), da
            RES <- rbind(RES, PermTest(eqn, treatvars = c("Treat"), clustvars = TestData$ID

        }

        RES <- RES[2:nrow(RES), 1:ncol(RES)]
        RES <- cbind(RES, FDR(RES[, 4]))

        rownames(RES) <- equations
        colnames(RES)[6] <- "Min. Q"

        print("-------------------------------------------------------------------------", quote
        print(paste("H_0:", h), quote = FALSE)
        print(RES, quote = FALSE)
        print("-------------------------------------------------------------------------", quote

    }
```

```
## [1] -------------------------------------------------------------------------
## [1] H_0: Ind = 0
##                                        Estimate        Tstat        SE
## yNull ~ Ind + Col + Gen + LnInc -0.0838609672 -0.760948827 0.1102058
## yInd ~ Ind + Col + Gen + LnInc   0.7249313293  6.785240614 0.1068394
## yCol ~ Ind + Col + Gen + LnInc   0.0004284829  0.004138265 0.1035417
##                                           P ExactP Min. Q
## yNull ~ Ind + Col + Gen + LnInc 4.470428e-01      1  0.809
## yInd ~ Ind + Col + Gen + LnInc  3.255396e-11      1  0.001
## yCol ~ Ind + Col + Gen + LnInc  9.966998e-01      1  0.000
## [1] -------------------------------------------------------------------------
## [1] -------------------------------------------------------------------------
## [1] H_0: Col = 1
##                                       Estimate      Tstat        SE
## yNull ~ Ind + Col + Gen + LnInc -0.13251551 -10.189492 0.1111454
## yInd ~ Ind + Col + Gen + LnInc   0.06925256  -8.267642 0.1125771
## yCol ~ Ind + Col + Gen + LnInc   0.49417368  -4.676050 0.1081739
##                                           P ExactP Min. Q
## yNull ~ Ind + Col + Gen + LnInc 0.000000e+00      1  0.001
## yInd ~ Ind + Col + Gen + LnInc  1.221245e-15      1  0.001
## yCol ~ Ind + Col + Gen + LnInc  3.758547e-06      1  0.001
## [1] -------------------------------------------------------------------------
## [1] -------------------------------------------------------------------------
## [1] H_0: Ind - Col = 0
##                                       Estimate      Tstat        SE
## yNull ~ Ind + Col + Gen + LnInc  0.04865454  0.4156246 0.1170637
## yInd ~ Ind + Col + Gen + LnInc   0.65567877  5.7018178 0.1149947
## yCol ~ Ind + Col + Gen + LnInc  -0.49374519 -4.2093488 0.1172973
##                                           P ExactP Min. Q
## yNull ~ Ind + Col + Gen + LnInc 6.778612e-01      1  0.292
## yInd ~ Ind + Col + Gen + LnInc  2.019126e-08      1  0.001
## yCol ~ Ind + Col + Gen + LnInc  3.031964e-05      1  0.001
## [1] -------------------------------------------------------------------------
```