BMI-Randomization_full.R

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#*** MSBA 6440 ***#
#*** Modified, Original Script by Gordon Burtch***

# BMI example with randomization

# read the data
BMI = read.csv("BMI_pill.csv")

#check balance of some observable covariates between treated and control groups.
t.test(height ~ magicpill, data = BMI)
```

```
##
##  Welch Two Sample t-test
##
## data:  height by magicpill
## t = -0.30601, df = 376.88, p-value = 0.7598
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.7333199  0.5358093
## sample estimates:
## mean in group 0 mean in group 1
##        56.93160        57.03036
```

```
t.test(weight ~ magicpill, data = BMI)
```

```
##
##  Welch Two Sample t-test
##
## data:  weight by magicpill
## t = 0.38354, df = 374.55, p-value = 0.7015
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -6.524866  9.687110
## sample estimates:
## mean in group 0 mean in group 1
##        175.5419        173.9607
```

```
t.test(gender ~ magicpill, data = BMI)
```

```
##
##  Welch Two Sample t-test
##
## data:  gender by magicpill
## t = 0.60068, df = 387.92, p-value = 0.5484
## alternative hypothesis: true difference in means is not equal to 0
```

```
## 95 percent confidence interval:
##  -0.06863251  0.12901898
## sample estimates:
## mean in group 0 mean in group 1
##       0.5138889       0.4836957
```

```
#Let's see if BMI changes with receipt of the randomly assigned pill.
mp<-lm(log(bmi) ~ magicpill, data = BMI)
summary(mp)
```

```
##
## Call:
## lm(formula = log(bmi) ~ magicpill, data = BMI)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.3251 -0.1616  0.0419  0.2416  0.7935
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  3.55643    0.02514 141.447  < 2e-16 ***
## magicpill   -0.15842    0.03707  -4.273 2.41e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3695 on 398 degrees of freedom
## Multiple R-squared:  0.04387,    Adjusted R-squared:  0.04147
## F-statistic: 18.26 on 1 and 398 DF,  p-value: 2.413e-05
```

```
#Let's see if this changes when we control for some observables (if its randomly assigned then this won
mp2<-lm(log(bmi) ~ magicpill + log(height) + log(weight) + gender, data = BMI)
summary(mp2)
```

```
##
## Call:
## lm(formula = log(bmi) ~ magicpill + log(height) + log(weight) +
##     gender, data = BMI)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.3299 -0.1681  0.0498  0.2275  0.7130
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 15.96344    4.23651   3.768  0.00019 ***
## magicpill   -0.15977    0.03647  -4.381 1.52e-05 ***
## log(height) -3.13220    1.02420  -3.058  0.00238 **
## log(weight)  0.07132    0.07307   0.976  0.32966
## gender      -0.23017    0.11547  -1.993  0.04691 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3627 on 395 degrees of freedom
```

```
## Multiple R-squared:  0.08569,    Adjusted R-squared:  0.07643
## F-statistic: 9.255 on 4 and 395 DF,  p-value: 3.712e-07
```