table1.R

datalab

2023-06-16

```
#################################################################
#################       OLS       #############
################      October 10, 2018     ##################
####  Rerun: December 15, 2022 - checks out with the paper


rm(list=ls())
library(foreign)
library(plyr)
library(readstata13)
library(multiwayvcov)
library(sandwich)
library(lmtest)
library(stargazer)



data=read.csv("~/Dropbox/Personal Research 2017/replications/karn_nov16.csv")
names(data)
```

```
##   [1] "X.1"              "dist_name"        "vilname91"        "v1"
##   [5] "dist_code"        "thsil_code"       "block_code"       "vill_code"
##   [9] "loc_code"         "area"             "h_cntr"           "mcw_cntr"
##  [13] "mh_cntr"          "cwc_cntr"         "phc_cntr"         "hc_cntr"
##  [17] "fpc_cntr"         "tb_cntr"          "nh_cntr"          "chw_cntr"
##  [21] "rp_cntr"          "smp_cntr"         "oth_cntr"         "well"
##  [25] "canal"            "loc_town"         "st_code"          "talu_code"
##  [29] "st_town"          "agri_land"        "near_town"        "circl_code"
##  [33] "m_pop"            "f_pop"            "village_name"     "st_name"
##  [37] "subdist_n"        "cdblock_c"        "cdblock_n"        "neastt_n"
##  [41] "neastt_d"         "tot_sc"           "m_sc"             "f_sc"
##  [45] "tot_st"           "m_st"             "f_st"             "com_hctr"
##  [49] "hosall"           "hosalt"           "dispens"          "vethosp"
##  [53] "mobclin"          "famwel"           "ngmf_op"          "ngmf_iop"
##  [57] "ngmf_char"        "ngmfprwmedd"      "ngmfprwothd"      "ngmfprwnod"
##  [61] "ngmftrpr"         "ngmfmedshop"      "ngmfoth"          "nonagrarea"
##  [65] "permpastr"        "fallland"         "curfalland"       "netarea"
##  [69] "roadall"          "fp"               "taptr"            "tapuntr"
##  [73] "hp"               "covwell"          "uncovwell"        "tw"
##  [77] "power_binary"     "mchhc"            "prhc"             "primsch"
##  [81] "midsch"           "secsch"           "sensecsch"        "disp"
##  [85] "phs_cntr"         "prhsc"            "stname"           "stname1991"
##  [89] "d_name"           "distname91"       "year"             "primary_binary"
```

```
##  [93] "middle_binary"     "totalhealth"       "health_binary"     "high_binary"
##  [97] "tap_binary"        "all_disp"          "all_hosp"          "area_na_cu"
## [101] "ayu_disp"          "ayu_hosp"          "canal_govt"        "canal_pvt"
## [105] "college"           "crsoc_fac"         "dist_town"         "edu_fac"
## [109] "fwc_cntr"          "handpump"          "hom_disp"          "hom_hosp"
## [113] "ind_sch"           "lake"              "m_home"            "m_sch"
## [117] "nw_fac"            "n_home"            "other"             "other_soc"
## [121] "oth_sch"           "phs_cnt"           "ph_cntr"           "power_agr"
## [125] "power_all"         "power_dom"         "power_oth"         "power_supl"
## [129] "p_sch"             "p_t_fac"           "rang_mcw"          "rang_m_sch"
## [133] "rang_nac"          "rang_nw"           "rang_oth"          "rang_phc"
## [137] "rang_p_sch"        "rang_spcl"         "sou_summ"          "sp_cl_fac"
## [141] "s_sch"             "s_s_sch"           "tot_exp"           "tot_inc"
## [145] "tr_sch"            "tubewell"          "un_disp"           "un_hosp"
## [149] "lost"              "st_c"              "dist_c"            "subdist_c"
## [153] "vill_c"            "gp_n"              "gov_ps_n"          "pr_ps_n"
## [157] "gov_ms_n"          "pr_ms_n"           "gov_secs_n"        "pr_secs_n"
## [161] "gov_sens_n"        "pr_sens_n"         "gov_oth_n"         "pr_oth_n"
## [165] "prim_hctr"         "prim_hsubctr"      "macwf"             "nviltms"
## [169] "nviltmsna"         "nviltsecs"         "nviltsecsna"       "power"
## [173] "hplost"            "lostmandi"         "lostdata2011"      "disp_cntr"
## [177] "eudu_inst"         "gr_coll"           "hand_pump"         "h_sch"
## [181] "oth_fac"           "ph_fac"            "pnt_fac"           "power_ea"
## [185] "power_eag"         "power_edea"        "power_eo"          "pu_coll"
## [189] "state_code"        "state_name"        "tube_well"         "thsil_name"
## [193] "vill_name"         "lost91"            "lost01"            "vn91"
## [197] "medfac"            "rangmed"           "tot_hh"            "pucca_binary"
## [201] "kucha_binary"      "tot_pop"           "uncult"            "tot_irr"
## [205] "cultwaste"         "tot_unir"          "land_forest"       "drink_wat"
## [209] "rang_water"        "river"             "dist_fr_town"      "tbcl"
## [213] "tank"              "tap"               "X"                 "VILLAGE_ID"
## [217] "NAME"              "SUB_DISTRI"        "DISTRICT"          "STATE_UT"
## [221] "C_CODE01"          "LEVEL"             "TOT_NM_HH"         "TOT_POP"
## [225] "M_POP"             "F_POP"             "TOT_L6"            "M_L6"
## [229] "F_L6"              "TOT_SC"            "M_SC"              "F_SC"
## [233] "TOT_ST"            "M_ST"              "F_ST"              "TOT_LIT"
## [237] "M_LIT"             "F_LIT"             "TOT_ILLT"          "M_ILLT"
## [241] "F_ILLT"            "TOT_W"             "M_W"               "F_W"
## [245] "TOT_MNW"           "M_MNW"             "F_MNW"             "TOT_CULT"
## [249] "M_CULT"            "F_CULT"            "TOT_AGLB"          "M_AGLB"
## [253] "F_AGLB"            "TOT_MFHH"          "M_MFHH"            "F_MFHH"
## [257] "TOT_OTH_W"         "M_OTH_W"           "F_OTH_W"           "TOT_MRW"
## [261] "M_MRW"             "F_MRW"             "T_MRG_CULT"        "M_MRG_CULT"
## [265] "F_MRG_CULT"        "T_MRG_AGLB"        "M_MRG_AGLB"        "F_MRG_AGLB"
## [269] "T_MRG_HH"          "M_MRG_HH"          "F_MRG_HH"          "T_MRG_OTH"
## [273] "M_MRG_OTH"         "F_MRG_OTH"         "TOT_NNW"           "M_NNW"
## [277] "F_NNW"             "Latitude"          "Longitude"         "NEAR_FID_border1"
## [281] "NEAR_DIST_border1" "NEAR_ANGLE"        "temp_av"           "wc2010mt_1"
## [285] "TerrainRug"        "Slope"             "border1"           "NEAR_FID_border2"
## [289] "NEAR_DIST_border2" "border2"
```

```
summary(data$Latitude)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   13.49   14.28   14.96   15.25   16.21   17.75     138
```

```r
summary(data$Longitude)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   74.12   75.26   75.89   75.90   76.48   77.67     138
```

```r
summary(data$border1)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   0.000   0.000   1.000   0.599   1.000   1.000    5146
```

```r
summary(data$border2)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   0.000   0.000   1.000   0.569   1.000   1.000    6425
```

```r
summary(data$Slope)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    0.00   89.98   89.99   87.69   89.99   90.00     138
```

```r
########################
##### Distances #####

#Distance to Mysore-Bombay Border
rd10.mb=data[which(data$NEAR_DIST_border1<10000),] #20 km

table(rd10.mb$border1)
```

```
##
##   0   1
## 559 599
```

```r
#Distance to Hyderabad-Bombay Border
rd10.hb=data[which(data$NEAR_DIST_border2<10000),] #20 km

table(rd10.hb$border2)
```

```
##
##   0   1
## 447 493
```

```r
#baseline bandwidth
#Mysore
#outcome-health centers
health.mys=lm(health_binary~border1+TOT_POP+
        TOT_SC+TOT_ST+Slope+TerrainRug+Latitude+Longitude, data=rd10.mb) #OLS estimation
summary(health.mys)
```

```
##
## Call:
## lm(formula = health_binary ~ border1 + TOT_POP + TOT_SC + TOT_ST +
##     Slope + TerrainRug + Latitude + Longitude, data = rd10.mb)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.61507 -0.25714 -0.15230 -0.04444  0.95711
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept) -8.060e+00  3.256e+00  -2.475 0.013449 *
## border1     -1.566e-02  2.705e-02  -0.579 0.562715
## TOT_POP      5.123e-05  1.525e-05   3.361 0.000803 ***
## TOT_SC       1.598e-04  4.501e-05   3.550 0.000401 ***
## TOT_ST       2.693e-04  5.690e-05   4.733 2.48e-06 ***
## Slope        8.639e-04  1.115e-03   0.775 0.438427
## TerrainRug  -4.570e-03  6.731e-03  -0.679 0.497256
## Latitude     1.004e-02  7.923e-02   0.127 0.899168
## Longitude    1.056e-01  4.478e-02   2.358 0.018563 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4055 on 1149 degrees of freedom
## Multiple R-squared:  0.08269,    Adjusted R-squared:  0.0763
## F-statistic: 12.95 on 8 and 1149 DF,  p-value: < 2.2e-16
```

```
health.mys.cl=cluster.vcov(health.mys, rd10.mb$dist_name)
health.mys.se=sqrt(diag(health.mys.cl)) #cluster standard errors

#outcome - paved roads
pucca.mys=lm(pucca_binary~border1+TOT_POP+
        TOT_SC+TOT_ST+Slope+TerrainRug+Latitude+Longitude, data=rd10.mb) #OLS estimation
summary(pucca.mys)
```

```
##
## Call:
## lm(formula = pucca_binary ~ border1 + TOT_POP + TOT_SC + TOT_ST +
##     Slope + TerrainRug + Latitude + Longitude, data = rd10.mb)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.14259  0.00381  0.12851  0.20686  0.34971
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.346e-01  2.789e+00   0.048 0.961506
## border1     -1.147e-01  2.317e-02  -4.950 8.55e-07 ***
## TOT_POP      4.916e-05  1.306e-05   3.765 0.000175 ***
## TOT_SC       1.179e-04  3.856e-05   3.058 0.002282 **
## TOT_ST       1.674e-04  4.874e-05   3.434 0.000616 ***
## Slope        1.653e-03  9.547e-04   1.732 0.083579 .
## TerrainRug  -5.889e-03  5.766e-03  -1.021 0.307298
## Latitude    -3.803e-02  6.787e-02  -0.560 0.575398
## Longitude    1.420e-02  3.836e-02   0.370 0.711356
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3474 on 1149 degrees of freedom
## Multiple R-squared:  0.08797,    Adjusted R-squared:  0.08162
## F-statistic: 13.85 on 8 and 1149 DF,  p-value: < 2.2e-16
```

```
pucca.mys.cl=cluster.vcov(pucca.mys, rd10.mb$dist_name)
pucca.mys.se=sqrt(diag(pucca.mys.cl)) #clustered standard errors
```

```r
#Hyderabad
#outcome-health centers
health.hyd=lm(health_binary~border2+TOT_POP+
        TOT_SC+TOT_ST+Slope+TerrainRug+Latitude+Longitude, data=rd10.hb) #ols estimation
summary(health.hyd)
```

```
##
## Call:
## lm(formula = health_binary ~ border2 + TOT_POP + TOT_SC + TOT_ST +
##     Slope + TerrainRug + Latitude + Longitude, data = rd10.hb)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.5923 -0.2983 -0.1980  0.4540  0.9461
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  6.609e+00  6.765e+00   0.977   0.3289
## border2     -7.928e-02  3.088e-02  -2.568   0.0104 *
## TOT_POP      7.992e-05  1.577e-05   5.068 4.86e-07 ***
## TOT_SC       1.924e-04  4.535e-05   4.242 2.43e-05 ***
## TOT_ST       1.374e-04  5.941e-05   2.313   0.0210 *
## Slope       -9.785e-05  1.075e-03  -0.091   0.9275
## TerrainRug   1.574e-02  1.735e-02   0.908   0.3643
## Latitude     5.671e-02  3.707e-02   1.530   0.1264
## Longitude   -9.766e-02  9.410e-02  -1.038   0.2996
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4304 on 931 degrees of freedom
## Multiple R-squared:  0.08954,    Adjusted R-squared:  0.08172
## F-statistic: 11.44 on 8 and 931 DF,  p-value: 1.42e-15
```

```r
health.hyd.cl=cluster.vcov(health.hyd, rd10.hb$dist_name)
health.hyd.se=sqrt(diag(health.hyd.cl)) #cluster standard errors

#outcome - paved roads
pucca.hyd=lm(pucca_binary~border2+TOT_POP+
        TOT_SC+TOT_ST+Slope+TerrainRug+Latitude+Longitude, data=rd10.hb) #ols estimation
summary(pucca.hyd)
```

```
##
## Call:
## lm(formula = pucca_binary ~ border2 + TOT_POP + TOT_SC + TOT_ST +
##     Slope + TerrainRug + Latitude + Longitude, data = rd10.hb)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.05870  0.03066  0.10487  0.16440  0.32280
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.368e+00  5.019e+00   1.070   0.2851
## border2      8.443e-03  2.291e-02   0.369   0.7126
```

```
## TOT_POP      5.695e-05  1.170e-05   4.867 1.33e-06 ***
## TOT_SC       7.932e-05  3.364e-05   2.358   0.0186 *
## TOT_ST       9.568e-05  4.408e-05   2.171   0.0302 *
## Slope       -3.509e-04  7.978e-04  -0.440   0.6602
## TerrainRug   2.385e-02  1.287e-02   1.853   0.0642 .
## Latitude     6.916e-02  2.750e-02   2.515   0.0121 *
## Longitude   -7.548e-02  6.982e-02  -1.081   0.2799
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3193 on 931 degrees of freedom
## Multiple R-squared:  0.05943,    Adjusted R-squared:  0.05135
## F-statistic: 7.353 on 8 and 931 DF,  p-value: 1.628e-09
```

```
pucca.hyd.cl=cluster.vcov(pucca.hyd, rd10.hb$dist_name)
pucca.hyd.se=sqrt(diag(pucca.hyd.cl)) #clustered standard errors
```

```
stargazer(health.mys, pucca.mys, health.hyd, pucca.hyd, se=list(health.mys.se, pucca.mys.se, health.hyd
          omit=c("TOT_POP", "TOT_SC", "TOT_ST", "Slope", "TerrainRug", "Latitude", "Longitude"),
          dep.var.labels=c("Health Centers", "Paved Roads", "Health Centers", "Paved Roads"),
          covariate.labels = c("Indirect Rule (Mysore)", "Indirect Rule (Hyderabad)", "Constant"),
          add.lines = list(c("Controls","\\checkmark","\\checkmark","\\checkmark","\\checkmark")),
          omit.stat = c("rsq", "f", "adj.rsq", "ser"))
```

```
##
## % Table created by stargazer v.5.2.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harva
## % Date and time: Fri, Jun 16, 2023 - 14:32:42
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}}lcccc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & \multicolumn{4}{c}{\textit{Dependent variable:}} \\
## \cline{2-5}
## \\[-1.8ex] & Health Centers & Paved Roads & Health Centers & Paved Roads \\
## \\[-1.8ex] & (1) & (2) & (3) & (4)\\
## \hline \\[-1.8ex]
##  Indirect Rule (Mysore) & $-$0.016 & $-$0.115$^{***}$ &  &  \\
##   & (0.026) & (0.035) &  &  \\
##   & & & & \\
##  Indirect Rule (Hyderabad) &  &  & $-$0.079$^{***}$ & 0.008 \\
##   &  &  & (0.016) & (0.063) \\
##   & & & & \\
##  Constant & $-$8.060$^{**}$ & 0.135 & 6.609 & 5.368 \\
##   & (3.199) & (5.072) & (6.761) & (6.828) \\
##   & & & & \\
## \hline \\[-1.8ex]
## Controls & \checkmark & \checkmark & \checkmark & \checkmark \\
## Observations & 1,158 & 1,158 & 940 & 940 \\
## \hline
```

```
## \hline \\[-1.8ex]
## \textit{Note:}  & \multicolumn{4}{r}{$^{*}$p$<$0.1; $^{**}$p$<$0.05; $^{***}$p$<$0.01} \\
## \end{tabular}
## \end{table}
```