Replication of Ashraf and Galor (2011)

```
packages = c("dplyr", "readr", "haven", "estimatr",
             "conleyreg", "lmtest", "sandwich", "tibble",
             "quantreg", "stargazer")
sapply(packages, library, character.only = TRUE)
```

Load in the data:

```
data = read_dta("../datasets/1-ashraf-galor/20081371_Dataset.dta")
wb_regions = read_csv("../datasets/world-regions-according-to-the-world-bank.csv")
```

```
Rows: 217 Columns: 4
-- Column specification --------------------------------------------------------
Delimiter: ","
chr (3): Entity, Code, World Region according to the World Bank
dbl (1): Year

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

Merge with World Bank regions:

```
wb_regions = wb_regions |>
  janitor::clean_names() |>
  select(-entity, -year) |>
  rename(wb_region = world_region_according_to_the_world_bank)

data_set = left_join(data, wb_regions, by = "code") |>
  mutate(wb_region = case_when(
    code == "WBG" ~ "Middle East and North Africa",
    code %in% c("ADO", "CHI", "IMY", "ROM", "YUG") ~ "Europe and Central Asia",
```

```
    code %in% c("FSM", "TMP") ~ "East Asia and Pacific",
    code == "ANT" ~ "Latin America and Caribbean",
    code %in% c("MYT", "ZAR") ~ "Sub-Saharan Africa",
    TRUE ~ wb_region))

parallel_10 = c("ARG", "CHL", "PRY", "URY", "NAM", "BWA", "ZWE", "ZAF",
                "SWZ", "LSO", "MOZ", "MDG", "AUS", "NZL", "ZMB", "BRA",
                "PER", "BOL", "MWI")

final_data = data_set |>
  mutate(mena = as.integer(wb_region == "Middle East and North Africa"),
         eur = as.integer(wb_region == "Europe and Central Asia"),
         sa = as.integer(wb_region == "South Asia"),
         eap = as.integer(wb_region == "East Asia and Pacific"),
         na = as.integer(wb_region == "North America"),
         latam = as.integer(wb_region == "Latin America and Caribbean"),
         afr = as.integer(wb_region == "Sub-Saharan Africa")) |>
  mutate(control = as.integer(eur == 1 | sa == 1)) |>
  mutate(south_10  = as.integer(code %in% parallel_10))
```

The following code replicates Column 5 of Table 2 (impact of years since Neolitic transition on log population density in 1500 CE). The first equation follows Ashraf and Galor's regression, while the second substitutes their continental dummies for Kelly's controls (Europe, South Asia, and below 10 degrees south).

```
mod1 = lm(ln_pd1500 ~ ln_yst + pc_lnar_lnas + ln_abslat +
                  distcr1000 + land100cr + africa + europe + asia,
                data = final_data |> filter(cleanhibbs == 1))
mod1_se = vcovHC(mod1, type = "HC1")
coeftest(mod1, vcov = mod1_se)
```

```
t test of coefficients:

               Estimate Std. Error t value  Pr(>|t|)
(Intercept)  -11.411374   1.943507 -5.8715 7.705e-08 ***
ln_yst         1.389285   0.224050  6.2008 1.832e-08 ***
pc_lnar_lnas   0.573347   0.095186  6.0234 3.986e-08 ***
ln_abslat     -0.278140   0.131490 -2.1153 0.0372641 *
distcr1000     0.220475   0.345959  0.6373 0.5256115
land100cr      1.184626   0.376676  3.1449 0.0022734 **
```

```
africa          1.413648   0.279448  5.0587 2.323e-06 ***
europe          1.425447   0.413824  3.4446 0.0008822 ***
asia            1.115810   0.438666  2.5436 0.0127369 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
mod2 = lm(ln_pd1500 ~ ln_yst + pc_lnar_lnas + ln_abslat +
                  distcr1000 + land100cr + eur + sa + south_10,
                data = final_data |> filter(cleanhibbs == 1))
mod2_se = vcovHC(mod2, type = "HC1")
coeftest(mod2, vcov = mod2_se)
```

```
t test of coefficients:

             Estimate Std. Error t value  Pr(>|t|)
(Intercept)  -5.43133    2.02518 -2.6819  0.008759 **
ln_yst        0.78356    0.23871  3.2825  0.001482 **
pc_lnar_lnas  0.54582    0.11343  4.8120 6.232e-06 ***
ln_abslat    -0.11698    0.12431 -0.9410  0.349289
distcr1000    0.23780    0.42692  0.5570  0.578949
land100cr     0.36726    0.35499  1.0346  0.303734
eur           0.60549    0.34437  1.7582  0.082226 .
sa            1.18633    0.26639  4.4534 2.499e-05 ***
south_10     -1.13307    0.38504 -2.9427  0.004170 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#output = stargazer(mod1, mod2,
#          se = list(rob1, rob2),
#          type = "latex",
#          dep.var.labels = "Log Population Density in 1500 CE",
#          covariate.labels = c("Log years since Neolithic transition",
#                               "Log land productivity", "Log absolute latitude",
#                               "Mean distance to nearest coast or river",
#                               "Percentage of land within 100km of coast or river",
#                               "Africa", "Europe", "Asia", "Eur", "SA", "South_10"),
#          star.cutoffs = c(0.05, 0.01, 0.001),
#          star.char = c("*", "**", "***"),
#          omit.stat = c("f", "ser"))
```