Data Management & Analysis Final Project

Replication and Extention for Acemoglu, Naidu, Restrepo and Robinson (2019)

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Contents

0.1 Setup

```
pacman::p_load(
  rmdformats,
  knitr,
  tinytex,
  haven,
  tidyverse,
  kableExtra,
  plm,
  texreg
)
options(max.print = "75")
opts_chunk$set(
  fig.align = "center",
  echo = TRUE,
  cache = TRUE,
  prompt = FALSE,
  tidy = FALSE,
  comment = NA,
  message = FALSE,
  warning = FALSE
)
opts_knit$set(width = 75)
```

1 About this Report

1.1 Project Type

1.2 Summary of the Paper (Honoka Ohtani)

1.2.1 What the problem is

1.2.2 Why it is important

1.2.3 How you solve the problem

1.2.4 What we find

1.3 Data (Shoya Abe)

We utilize data obtained from the replication files available in the data archive on Professor Daron Acemoglu's homepage. This dataset consists of a large panel of 175 countries. The sample size is 9,384, and the number of variables is 1,177. A list of variables is provided in the appendix.

```
data <- read_dta("data/raw/DDCGdata_final.dta")

summarize_data <- function(data, n = 10) {
  cat("Sample size (number of rows):", nrow(data), "\n")
  cat("Number of variables (columns):", ncol(data), "\n")
```

```
}

summarize_data(data)
```

```
Sample size (number of rows): 9384
Number of variables (columns): 1177
```

1.4 Econometric Methods (Shoya Abe)

Here, we briefly explain the empirical methods we use for replication. The original paper used a number of emiprical methods to strengthen the robustness of the results. Among them, we reproduce three methods[1].

1.4.1 Event Study (Figure.1)

First, we conduct the event study. We estimate the average treatment effect (ATT) for the treated group using the procedure described below.

First, let T_c denote the year in which a given country experienced the democratization event. For any country c and year t, we define the relative year as

$$\tau_{c,t} = t - T_c. \tag{1}$$

Then, taking the outcome y in the year immediately preceding democratization (i.e., when $\tau = -1$) as the baseline, the outcome of interest is defined as

$$\text{gdpDiff}_{c,t} = y_{c,t} - y_{c,T_c-1}. \tag{2}$$

Next, we estimate the following regression model using the control group that did not experience democratization:

$$\text{gdpDiff}_{c,t} = \sum_{\tau=-15,\ \tau\neq-1}^{30} \beta_\tau \, \mathbf{1}\{\tau_{c,t} = \tau\} + \epsilon_{c,t}. \tag{3}$$

The estimated coefficient $\hat{\beta}_{\tau_{c,t}}$ from (3) can be interpreted as the counterfactual outcome for country c in year t in the absence of democratization. Therefore, the average difference between the observed outcome and this counterfactual outcome provides an estimate of the ATT for relative year τ, which is calculated as

$$\text{ATT}(\tau) = \frac{1}{N_\tau^{\text{treated}}} \sum_{\substack{(c,t)\in\text{treated} \\ \tau_{c,t}=\tau}} \left(\text{gdpDiff}_{c,t} - \hat{\beta}_\tau\right). \tag{4}$$

[1] We also worked on Arellano Bond estimation in table.2. However, it took an enormous amount of computation time and the results obtained were quite different from the original results. In other words, replication failed. However, in the belief that it is desirable to disclose the entire analysis process and results, we disclose the analysis code and results in the appendix.

1.4.2 Dynamic Liner Panel Model (Table.2)

Next, we estimate the following dynamic linear panel model.

$$y_{ct} = \beta D_{ct} + \gamma_1 y_{ct-1} + \alpha_c + \delta_t + \epsilon_{ct}, \tag{1}$$

$$y_{ct} = \beta D_{ct} + \sum_{j=1}^{2} \gamma_j y_{ct-j} + \alpha_c + \delta_t + \epsilon_{ct}, \tag{2}$$

$$y_{ct} = \beta D_{ct} + \sum_{j=1}^{4} \gamma_j y_{ct-j} + \alpha_c + \delta_t + \epsilon_{ct}, \tag{3}$$

$$y_{ct} = \beta D_{ct} + \sum_{j=1}^{8} \gamma_j y_{ct-j} + \alpha_c + \delta_t + \epsilon_{ct}, \tag{4}$$

where y_{ct} is the log of GDP per capita in country c at time t and D_{ct} is a dummy variable that takes the value 1 if country c is a democracy at time t and 0 otherwise.

1.4.3 Instrumental Variable (IV) Method (Table.6)

Finally, we perform the instrumental variable (IV) method. The instrumental variables used in this analysis are as follows.

$$Z_{ct} = \frac{1}{|I_c|} \sum_{c^* \in I_c} D_{c^* t}. \tag{5}$$

Using this instrumental variable, we will perform the following 2SLS estimation.

$$y_{ct} = \beta D_{ct} + \sum_{j=1}^{p} \gamma y_{ct-j} + \alpha_c + \delta_t + \epsilon_{ct}, \tag{5}$$

$$D_{ct} = \sum_{j=1}^{q} \pi_j Z_{ct-j} + \sum_{j=1}^{p} \phi_j y_{ct-j} + \theta_c + \mu_t + v_{ct} \tag{6}$$

2 Replication

2.1 Figure.1 (Shoya Abe)

2.1.1 Preprocessing

```
data_f1 <- data %>%
  rename(id = "_ID") %>%
  group_by(id) %>%
  arrange(year) %>%
  mutate(
    prev_dem = dplyr::lag(dem, 1),
    transition = case_when(
      dem == 1 & prev_dem == 0 ~ 1,
      dem == 0 & prev_dem == 0 ~ 0,
      TRUE ~ NA_real_
    ),
```

```
    lag1 = dplyr::lag(y, 1),
    lag2 = dplyr::lag(y, 2),
    lag3 = dplyr::lag(y, 3),
    lag4 = dplyr::lag(y, 4)
  ) %>%
  filter(
    !is.na(lag1) & !is.na(lag2) &
      !is.na(lag3) & !is.na(lag4)
  ) %>%
  ungroup()

for (t in -15:-2) {
  col_name <- paste0("gdpDiff_m", abs(t))
  data_f1 <- data_f1 %>%
    group_by(id) %>%
    arrange(year) %>%
    mutate(!!col_name := dplyr::lag(y, abs(t)) - lag1) %>%
    ungroup()
}

data_f1 <- data_f1 %>%
  mutate(
    gdpDiff_m1 = 0,
    gdpDiff_0 = y - lag1
  )

for (t in 1:30) {
  col_name <- paste0("gdpDiff_p", t)
  data_f1 <- data_f1 %>%
    group_by(id) %>%
    arrange(year) %>%
    mutate(!!col_name := dplyr::lead(y, t) - lag1) %>%
    ungroup()
}

data_f1 <- data_f1 %>%
  filter(!is.na(transition))
```

2.1.2 Estimation

```
estimateATT <- function(outcome_col) {
  sub_data <- data_f1 %>%
    filter(!is.na(.data[[outcome_col]]), !is.na(transition))
  if (nrow(sub_data) == 0) return(NA)
  year_levels <- sort(unique(sub_data$year))
  sub_data <- sub_data %>%
    mutate(year_factor = factor(year, levels = year_levels))
  control_data <- sub_data %>%
    filter(transition == 0)
  treated_data <- sub_data %>%
    filter(transition == 1)
  if (nrow(control_data) < 2 ||
```

```
      length(unique(control_data$year)) < 2) return(NA)
  model_formula <- as.formula(
    paste(outcome_col, "~ year_factor - 1")
  )
  control_model <- tryCatch(
    lm(model_formula, data = control_data),
    error = function(e) NULL
  )
  if (is.null(control_model)) return(NA)
  predicted_outcomes <- tryCatch(
    predict(control_model, newdata = treated_data),
    error = function(e) rep(NA, nrow(treated_data))
  )
  treatment_effects <- treated_data[[outcome_col]] - predicted_outcomes
  mean(treatment_effects, na.rm = TRUE)
}

relative_times <- c(seq(-15, -1), seq(0, 30))
atets <- numeric(length(relative_times))

for (i in seq_along(relative_times)) {
  t_val <- relative_times[i]
  if (t_val < 0) {
    col_name <- paste0("gdpDiff_m", abs(t_val))
  } else {
    col_name <- if (t_val == 0) {
      "gdpDiff_0"
    } else {
      paste0("gdpDiff_p", t_val)
    }
  }
  atets[i] <- estimateATT(col_name)
}

results_df <- data.frame(
  RelativeTime = relative_times,
  ATT = atets
)
```

2.1.3 Plot

```
figure_1 <- ggplot(results_df, aes(x = RelativeTime, y = ATT)) +
  geom_line(color = "black") +
  scale_x_continuous(breaks = seq(-15, 30, 5)) +
  labs(
    x = "Years around Democratization",
    y = "Change in GDP per capita (log points)"
  ) +
  theme_bw()

ggsave(
  "output/figure_1.pdf",
```

```
  width = 14,
  height = 8,
  units = "cm"
)
```

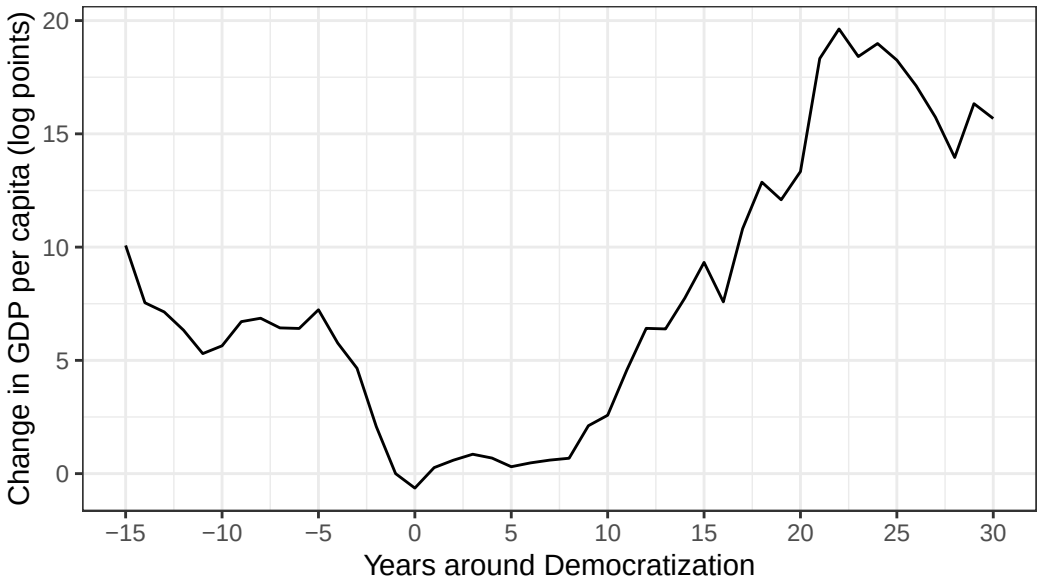

Figure 1: The Long-Term Impact of Democratization on Economic Growth

2.2 Table.1 (Honoka Ohtani)

2.2.1 Preprocessing

```
var_info <- tibble(
  var = c(
    "gdppercapitaconstant2000us",
    "loginvpc",
    "ltrade2",
    "lp_bl",
    "ls_bl",
    "lgov",
    "mortnew",
    "unrestn",
    "marketref"
  ),
  label = c(
    "GDP per capita",
    "Investment share of GDP",
    "Trade share of GDP",
    "Primary-school enrollment rate",
    "Secondary-school enrollment rate",
    "Tax revenue share of GDP",
```

```
    "Child mortality per 1,000 births",
    "Unrest rate",
    "Market reforms index (0-100)"
  )
)

data_sub <- data %>%
  select(dem, all_of(var_info$var))
```

2.2.2 Caliculation

```
calc_stats <- function(variable) {
  non_demo <- data_sub %>%
    filter(dem == 0) %>%
    pull(.data[[variable]])
  non_demo <- non_demo[!is.na(non_demo)]
  demo <- data_sub %>%
    filter(dem == 1) %>%
    pull(.data[[variable]])
  demo <- demo[!is.na(demo)]
  tibble(
    var = variable,
    n_non_demo = length(non_demo),
    mean_non_demo = mean(non_demo),
    sd_non_demo = sd(non_demo),
    n_demo = length(demo),
    mean_demo = mean(demo),
    sd_demo = sd(demo)
  )
}

summary_table <- map_dfr(var_info$var, calc_stats) %>%
  left_join(var_info, by = "var") %>%
  select(label, n_non_demo, mean_non_demo, sd_non_demo, n_demo, mean_demo, sd_demo)
```

2.2.3 Tabulation

```
latex_table <- summary_table %>%
  kbl(
    caption = "Summary Statistics by Democracy Status",
    format = "latex",
    booktabs = TRUE,
    digits = 2,
    col.names = c("", "N", "Mean", "SD", "N", "Mean", "SD")
  ) %>%
  add_header_above(c(" " = 1, "Nondemocracies" = 3, "Democracies" = 3)) %>%
  kable_styling(latex_options = c("HOLD_position", "striped"))

save_kable(latex_table, file = "output/table_1.tex")
```

Table 1: Summary Statistics by Democracy Status

	Nondemocracies			Democracies		
	N	Mean	SD	N	Mean	SD
GDP per capita	3376	2074.46	3838.65	3558	8149.97	9334.83
Investment share of GDP	3222	297.18	50.15	3339	309.94	31.84
Trade share of GDP	3175	406.06	67.95	3485	419.29	58.74
Primary-school enrollment rate	817	32.14	19.56	689	38.10	20.05
Secondary-school enrollment rate	817	19.53	17.15	689	34.37	19.72
Tax revenue share of GDP	3122	-201.59	62.93	2564	-168.61	49.82
Child mortality per 1,000 births	4142	77.29	49.64	3615	33.26	32.65
Unrest rate	3739	28.70	45.24	3610	21.91	41.37
Market reforms index (0–100)	3476	21.89	23.26	2829	52.11	24.75

2.3 Table.2 (Honoka Ohtani)

2.3.1 Preprocessing

```
data_t2 <- data %>%
  select(1:30) %>%
  group_by(country_name) %>%
  arrange(year) %>%
  mutate(
    lag1 = dplyr::lag(y, 1),
    lag2 = dplyr::lag(y, 2),
    lag3 = dplyr::lag(y, 3),
    lag4 = dplyr::lag(y, 4),
    lag5 = dplyr::lag(y, 5),
    lag6 = dplyr::lag(y, 6),
    lag7 = dplyr::lag(y, 7),
    lag8 = dplyr::lag(y, 8)
  ) %>%
  ungroup()
```

2.3.2 Estimation

```
data_m1 <- data_t2 %>%
  drop_na(y, dem, lag1) %>%
  pdata.frame(index = c("country_name", "year"))
model_1 <- plm(
  y ~ dem + lag1,
  data = data_m1,
  model = "within",
  effect = "twoways"
)

data_m2 <- data_t2 %>%
  drop_na(y, dem, lag1, lag2) %>%
```

```
  pdata.frame(index = c("country_name", "year"))
model_2 <- plm(
  y ~ dem + lag1 + lag2,
  data = data_m2,
  model = "within",
  effect = "twoways"
)

data_m3 <- data_t2 %>%
  drop_na(y, dem, lag1, lag2, lag3, lag4) %>%
  pdata.frame(index = c("country_name", "year"))
model_3 <- plm(
  y ~ dem + lag1 + lag2 + lag3 + lag4,
  data = data_m3,
  model = "within",
  effect = "twoways"
)

data_m4 <- data_t2 %>%
  drop_na(
    y, dem, lag1, lag2, lag3, lag4,
    lag5, lag6, lag7, lag8
  ) %>%
  pdata.frame(index = c("country_name", "year"))
model_4 <- plm(
  y ~ dem + lag1 + lag2 + lag3 + lag4 +
    lag5 + lag6 + lag7 + lag8,
  data = data_m4,
  model = "within",
  effect = "twoways"
)

beta_hat_1 <- coef(model_1)["dem"]
gamma_hat_1 <- coef(model_1)["lag1"]
long_run_effect_1 <- beta_hat_1 / (1 - sum(gamma_hat_1))

beta_hat_2 <- coef(model_2)["dem"]
gamma_hat_2 <- coef(model_2)[c("lag1", "lag2")]
long_run_effect_2 <- beta_hat_2 / (1 - sum(gamma_hat_2))

beta_hat_3 <- coef(model_3)["dem"]
gamma_hat_3 <- coef(model_3)[c("lag1", "lag2", "lag3", "lag4")]
long_run_effect_3 <- beta_hat_3 / (1 - sum(gamma_hat_3))

beta_hat_4 <- coef(model_4)["dem"]
gamma_hat_4 <- coef(model_4)[
  c("lag1", "lag2", "lag3", "lag4",
    "lag5", "lag6", "lag7", "lag8")
]
long_run_effect_4 <- beta_hat_4 / (1 - sum(gamma_hat_4))

lre <- round(
  c(long_run_effect_1, long_run_effect_2,
```

```
    long_run_effect_3, long_run_effect_4),
  3
)

pers1 <- sum(coef(model_1)[2])
pers2 <- sum(coef(model_2)[2:3])
pers3 <- sum(coef(model_3)[2:5])
pers4 <- sum(coef(model_4)[2:9])
pers <- round(c(pers1, pers2, pers3, pers4), 3)

dem_shortrun <- coef(model_1)["dem"]
lag1_mod1 <- coef(model_1)[2]
effect1 <- dem_shortrun
effect2 <- (effect1 * lag1_mod1) + dem_shortrun
effects_mod1 <- c(effect1, effect2)
for (i in 3:30) {
  eff <- (effects_mod1[i - 1] * lag1_mod1) + dem_shortrun
  effects_mod1 <- c(effects_mod1, eff)
}
eff_25_1 <- effects_mod1[25]

dem_shortrun <- coef(model_2)["dem"]
lag1_mod2 <- coef(model_2)[2]
lag2_mod2 <- coef(model_2)[3]
effect1 <- dem_shortrun
effect2 <- (effect1 * lag1_mod2) + dem_shortrun
effect3 <- (effect2 * lag1_mod2) +
  (effect1 * lag2_mod2) + dem_shortrun
effects_mod2 <- c(effect1, effect2, effect3)
for (i in 4:30) {
  eff <- (effects_mod2[i - 1] * lag1_mod2) +
    (effects_mod2[i - 2] * lag2_mod2) +
    dem_shortrun
  effects_mod2 <- c(effects_mod2, eff)
}
eff_25_2 <- effects_mod2[25]

dem_shortrun <- coef(model_3)["dem"]
lag1_mod3 <- coef(model_3)[2]
lag2_mod3 <- coef(model_3)[3]
lag3_mod3 <- coef(model_3)[4]
lag4_mod3 <- coef(model_3)[5]
effect1 <- dem_shortrun
effect2 <- (effect1 * lag1_mod3) + dem_shortrun
effect3 <- (effect2 * lag1_mod3) +
  (effect1 * lag2_mod3) + dem_shortrun
effect4 <- (effect3 * lag1_mod3) +
  (effect2 * lag2_mod3) +
  (effect1 * lag3_mod3) + dem_shortrun
effects_mod3 <- c(effect1, effect2, effect3, effect4)
for (i in 5:30) {
  eff <- (effects_mod3[i - 1] * lag1_mod3) +
    (effects_mod3[i - 2] * lag2_mod3) +
```

```
    (effects_mod3[i - 3] * lag3_mod3) +
    (effects_mod3[i - 4] * lag4_mod3) +
    dem_shortrun
  effects_mod3 <- c(effects_mod3, eff)
}
eff_25_3 <- effects_mod3[25]

dem_shortrun <- coef(model_4)["dem"]
lag1_mod4 <- coef(model_4)[2]
lag2_mod4 <- coef(model_4)[3]
lag3_mod4 <- coef(model_4)[4]
lag4_mod4 <- coef(model_4)[5]
lag5_mod4 <- coef(model_4)[6]
lag6_mod4 <- coef(model_4)[7]
lag7_mod4 <- coef(model_4)[8]
lag8_mod4 <- coef(model_4)[9]
effect1 <- dem_shortrun
effect2 <- (effect1 * lag1_mod4) + dem_shortrun
effect3 <- (effect2 * lag1_mod4) +
  (effect1 * lag2_mod4) + dem_shortrun
effect4 <- (effect3 * lag1_mod4) +
  (effect2 * lag2_mod4) +
  (effect1 * lag3_mod4) + dem_shortrun
effect5 <- (effect4 * lag1_mod4) +
  (effect3 * lag2_mod4) +
  (effect2 * lag3_mod4) +
  (effect1 * lag4_mod4) + dem_shortrun
effect6 <- (effect5 * lag1_mod4) +
  (effect4 * lag2_mod4) +
  (effect3 * lag3_mod4) +
  (effect2 * lag4_mod4) +
  (effect1 * lag5_mod4) + dem_shortrun
effect7 <- (effect6 * lag1_mod4) +
  (effect5 * lag2_mod4) +
  (effect4 * lag3_mod4) +
  (effect3 * lag4_mod4) +
  (effect2 * lag5_mod4) +
  (effect1 * lag6_mod4) + dem_shortrun
effect8 <- (effect7 * lag1_mod4) +
  (effect6 * lag2_mod4) +
  (effect5 * lag3_mod4) +
  (effect4 * lag4_mod4) +
  (effect3 * lag5_mod4) +
  (effect2 * lag6_mod4) +
  (effect1 * lag7_mod4) + dem_shortrun
effects_mod4 <- c(
  effect1, effect2, effect3, effect4,
  effect5, effect6, effect7, effect8
)
for (i in 9:30) {
  eff <- (effects_mod4[i - 1] * lag1_mod4) +
    (effects_mod4[i - 2] * lag2_mod4) +
    (effects_mod4[i - 3] * lag3_mod4) +
```

```
    (effects_mod4[i - 4] * lag4_mod4) +
    (effects_mod4[i - 5] * lag5_mod4) +
    (effects_mod4[i - 6] * lag6_mod4) +
    (effects_mod4[i - 7] * lag7_mod4) +
    (effects_mod4[i - 8] * lag8_mod4) +
    dem_shortrun
  effects_mod4 <- c(effects_mod4, eff)
}
eff_25_4 <- effects_mod4[25]

eff_25 <- round(
  c(eff_25_1, eff_25_2, eff_25_3, eff_25_4),
  3
)

se1 <- sqrt(diag(vcov(model_1)))
se2 <- sqrt(diag(vcov(model_2)))
se3 <- sqrt(diag(vcov(model_3)))
se4 <- sqrt(diag(vcov(model_4)))

override.coef.1 <- c(
  coef(model_1)["dem"],
  coef(model_1)["lag1"],
  NA, NA, NA, NA, NA, NA, NA
)
override.se.1 <- c(
  se1["dem"],
  se1["lag1"],
  NA, NA, NA, NA, NA, NA, NA
)

override.coef.2 <- c(
  coef(model_2)["dem"],
  coef(model_2)["lag1"],
  coef(model_2)["lag2"],
  NA, NA, NA, NA, NA, NA
)
override.se.2 <- c(
  se2["dem"],
  se2["lag1"],
  se2["lag2"],
  NA, NA, NA, NA, NA, NA
)

override.coef.3 <- c(
  coef(model_3)["dem"],
  coef(model_3)["lag1"],
  coef(model_3)["lag2"],
  coef(model_3)["lag3"],
  coef(model_3)["lag4"],
  NA, NA, NA, NA
)
override.se.3 <- c(
```

```
  se3["dem"],
  se3["lag1"],
  se3["lag2"],
  se3["lag3"],
  se3["lag4"],
  NA, NA, NA, NA
)

override.coef.4 <- c(
  coef(model_4)["dem"],
  coef(model_4)["lag1"],
  coef(model_4)["lag2"],
  coef(model_4)["lag3"],
  coef(model_4)["lag4"],
  coef(model_4)["lag5"],
  coef(model_4)["lag6"],
  coef(model_4)["lag7"],
  coef(model_4)["lag8"]
)
override.se.4 <- c(
  se4["dem"],
  se4["lag1"],
  se4["lag2"],
  se4["lag3"],
  se4["lag4"],
  se4["lag5"],
  se4["lag6"],
  se4["lag7"],
  se4["lag8"]
)
```

2.3.3 Tabulation

```
models <- list(model_1, model_2, model_3, model_4)
texreg(
  models,
  override.coef = list(
    override.coef.1,
    override.coef.2,
    override.coef.3,
    override.coef.4
  ),
  override.se = list(
    override.se.1,
    override.se.2,
    override.se.3,
    override.se.4
  ),
  custom.model.names = c("(1)", "(2)", "(3)", "(4)"),
  custom.coef.names = c(
    "Democracy", "Lag 1", "Lag 2",
    "Lag 3", "Lag 4", "Lag 5",
```

	(1)	(2)	(3)	(4)
Democracy	0.97***	0.65**	0.79***	0.89***
	(0.24)	(0.23)	(0.23)	(0.24)
Lag 1	0.97***	1.27***	1.24***	1.23***
	(0.00)	(0.01)	(0.01)	(0.01)
Lag 2		−0.30***	−0.21***	−0.21***
		(0.01)	(0.02)	(0.02)
Lag 3			−0.03	−0.02
			(0.02)	(0.02)
Lag 4			−0.04***	−0.04
			(0.01)	(0.02)
Lag 5				−0.02
				(0.02)
Lag 6				0.01
				(0.02)
Lag 7				0.02
				(0.02)
Lag 8				−0.01
				(0.01)
Persistence	0.97	0.97	0.96	0.96
Long run effect	35.59	19.60	21.24	22.01
Effect after 25 years	17.79	13.80	16.90	17.72
R^2	0.96	0.96	0.96	0.96
Adj. R^2	0.96	0.96	0.96	0.96
Num. obs.	6790	6642	6336	5688

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 2: Effect of Democracy on (Log) GDP per Capita

```
    "Lag 6", "Lag 7", "Lag 8"
  ),
  custom.gof.rows = list(
    "Persistence" = pers,
    "Long run effect" = lre,
    "Effect after 25 years" = eff_25
  ),
  file = "output/table_2_FE.tex",
  caption = "Effect of Democracy on (Log) GDP per Capita"
)
```

2.4 Table.6 (Shoya Abe)

2.4.1 Preprocessing

```
data_t6 <- data %>%
  group_by(country_name) %>%
  arrange(year) %>%
  mutate(
    lag1 = dplyr::lag(y, 1),
```

```
    lag2 = dplyr::lag(y, 2),
    lag3 = dplyr::lag(y, 3),
    lag4 = dplyr::lag(y, 4),
    lag5 = dplyr::lag(y, 5),
    lag6 = dplyr::lag(y, 6),
    lag7 = dplyr::lag(y, 7),
    lag8 = dplyr::lag(y, 8)
  ) %>%
  ungroup() %>%
  pdata.frame(index = c("country_name", "year"))
```

2.4.2 Estimation

```
model_iv_1 <- plm(
  y ~ dem + plm::lag(y, 1:4) |
    plm::lag(demreg, 1) + plm::lag(y, 1:4),
  data = data_t6,
  effect = "twoways"
)
model_iv_2 <- plm(
  y ~ dem + plm::lag(y, 1:4) |
    plm::lag(demreg, 1:4) + plm::lag(y, 1:4),
  data = data_t6,
  effect = "twoways"
)
model_iv_3 <- plm(
  y ~ dem + plm::lag(y, 1:4) + sov1 + sov2 + sov3 + sov4 |
    plm::lag(demreg, 1:4) + plm::lag(y, 1:4) +
    sov1 + sov2 + sov3 + sov4,
  data = data_t6,
  effect = "twoways"
)
model_iv_4 <- plm(
  y ~ dem + plm::lag(y, 1:4) +
    rtrend2 + rtrend3 + rtrend4 + rtrend5 + rtrend6 + rtrend7 |
    plm::lag(demreg, 1:4) + plm::lag(y, 1:4) +
    rtrend2 + rtrend3 + rtrend4 + rtrend5 + rtrend6 + rtrend7,
  data = data_t6,
  effect = "twoways",
  model = "within"
)

beta_hat_1 <- coef(model_iv_1)["dem"]
gamma_hat_1 <- coef(model_iv_1)[2:5]
long_run_effect_1 <- beta_hat_1 / (1 - sum(gamma_hat_1))

beta_hat_2 <- coef(model_iv_2)["dem"]
gamma_hat_2 <- coef(model_iv_2)[2:5]
long_run_effect_2 <- beta_hat_2 / (1 - sum(gamma_hat_2))

beta_hat_3 <- coef(model_iv_3)["dem"]
```

```r
gamma_hat_3 <- coef(model_iv_3)[2:5]
long_run_effect_3 <- beta_hat_3 / (1 - sum(gamma_hat_3))

beta_hat_4 <- coef(model_iv_4)["dem"]
gamma_hat_4 <- coef(model_iv_4)[2:5]
long_run_effect_4 <- beta_hat_4 / (1 - sum(gamma_hat_4))

lre <- round(
  c(long_run_effect_1, long_run_effect_2,
    long_run_effect_3, long_run_effect_4),
  3
)

sre <- c()

dem_shortrun <- coef(model_iv_1)["dem"]
lag1 <- coef(model_iv_1)[2]
lag2 <- coef(model_iv_1)[3]
lag3 <- coef(model_iv_1)[4]
lag4 <- coef(model_iv_1)[5]
effect1 <- dem_shortrun
effect2 <- effect1 * lag1 + dem_shortrun
effect3 <- effect2 * lag1 + effect1 * lag2 + dem_shortrun
effect4 <- effect3 * lag1 + effect2 * lag2 +
  effect1 * lag3 + dem_shortrun
effects <- c(effect1, effect2, effect3, effect4)
for (i in 5:30) {
  eff <- effects[i - 1] * lag1 +
    effects[i - 2] * lag2 +
    effects[i - 3] * lag3 +
    effects[i - 4] * lag4 + dem_shortrun
  effects <- c(effects, eff)
}
sre <- c(sre, effects[25])

dem_shortrun <- coef(model_iv_2)["dem"]
lag1 <- coef(model_iv_2)[2]
lag2 <- coef(model_iv_2)[3]
lag3 <- coef(model_iv_2)[4]
lag4 <- coef(model_iv_2)[5]
effect1 <- dem_shortrun
effect2 <- effect1 * lag1 + dem_shortrun
effect3 <- effect2 * lag1 + effect1 * lag2 + dem_shortrun
effect4 <- effect3 * lag1 + effect2 * lag2 +
  effect1 * lag3 + dem_shortrun
effects <- c(effect1, effect2, effect3, effect4)
for (i in 5:30) {
  eff <- effects[i - 1] * lag1 +
    effects[i - 2] * lag2 +
    effects[i - 3] * lag3 +
    effects[i - 4] * lag4 + dem_shortrun
  effects <- c(effects, eff)
}
```

```r
sre <- c(sre, effects[25])

dem_shortrun <- coef(model_iv_3)["dem"]
lag1 <- coef(model_iv_3)[2]
lag2 <- coef(model_iv_3)[3]
lag3 <- coef(model_iv_3)[4]
lag4 <- coef(model_iv_3)[5]
effect1 <- dem_shortrun
effect2 <- effect1 * lag1 + dem_shortrun
effect3 <- effect2 * lag1 + effect1 * lag2 + dem_shortrun
effect4 <- effect3 * lag1 + effect2 * lag2 +
  effect1 * lag3 + dem_shortrun
effects <- c(effect1, effect2, effect3, effect4)
for (i in 5:30) {
  eff <- effects[i - 1] * lag1 +
    effects[i - 2] * lag2 +
    effects[i - 3] * lag3 +
    effects[i - 4] * lag4 + dem_shortrun
  effects <- c(effects, eff)
}
sre <- c(sre, effects[25])

dem_shortrun <- coef(model_iv_4)["dem"]
lag1 <- coef(model_iv_4)[2]
lag2 <- coef(model_iv_4)[3]
lag3 <- coef(model_iv_4)[4]
lag4 <- coef(model_iv_4)[5]
effect1 <- dem_shortrun
effect2 <- effect1 * lag1 + dem_shortrun
effect3 <- effect2 * lag1 + effect1 * lag2 + dem_shortrun
effect4 <- effect3 * lag1 + effect2 * lag2 +
  effect1 * lag3 + dem_shortrun
effects <- c(effect1, effect2, effect3, effect4)
for (i in 5:30) {
  eff <- effects[i - 1] * lag1 +
    effects[i - 2] * lag2 +
    effects[i - 3] * lag3 +
    effects[i - 4] * lag4 + dem_shortrun
  effects <- c(effects, eff)
}
sre <- c(sre, effects[25])

sre <- round(sre, 3)

pers1 <- sum(coef(model_iv_1)[2:5])
pers2 <- sum(coef(model_iv_2)[2:5])
pers3 <- sum(coef(model_iv_3)[2:5])
pers4 <- sum(coef(model_iv_4)[2:5])
pers <- round(c(pers1, pers2, pers3, pers4), 3)
```

2.4.3 Tabulation

```
override.coef.1 <- coef(model_iv_1)["dem", drop = FALSE]
override.coef.2 <- coef(model_iv_2)["dem", drop = FALSE]
override.coef.3 <- coef(model_iv_3)["dem", drop = FALSE]
override.coef.4 <- coef(model_iv_4)["dem", drop = FALSE]
override.se.1 <- sqrt(diag(vcov(model_iv_1)))["dem"]
override.se.2 <- sqrt(diag(vcov(model_iv_2)))["dem"]
override.se.3 <- sqrt(diag(vcov(model_iv_3)))["dem"]
override.se.4 <- sqrt(diag(vcov(model_iv_4)))["dem"]
models <- list(model_iv_1, model_iv_2, model_iv_3, model_iv_4)

texreg(
  models,
  override.coef = list(
    override.coef.1,
    override.coef.2,
    override.coef.3,
    override.coef.4
  ),
  override.se = list(
    override.se.1,
    override.se.2,
    override.se.3,
    override.se.4
  ),
  custom.model.names = c(
    "1 Lag", "4 Lags",
    "Soviet Dummies",
    "Regional Trends"
  ),
  custom.coef.map = list(dem = "Democracy"),
  custom.gof.rows = list(
    "Persistence" = pers,
    "Long run effect" = lre,
    "Effect after 25 years" = sre
  ),
  file = "output/table_6_iv.tex",
  caption = "Effect of Democracy on (Log) GDP per Capita",
  include.rsquared = FALSE,
  include.adjrs = FALSE,
  include.fstat = FALSE
)
```

3 Extention

3.1 Confidence Interval by the Bootstrap Method (Shoya Abe)

In Figure 1 of the original paper, confidence intervals are not presented. We employ the bootstrap method to derive the confidence interval for the estimated ATT. This allows us to visualize the uncertainty associated with the estimated ATT.

	1 Lag	4 Lags	Soviet Dummies	Regional Trends
Democracy	0.97	1.15	1.29	1.70*
	(0.61)	(0.61)	(0.67)	(0.78)
Persistence	0.96	0.96	0.96	0.95
Long run effect	26.32	31.52	35.72	36.79
Effect after 25 years	20.84	24.87	27.93	32.05
Num. obs.	6312	6309	6309	6309

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 3: Effect of Democracy on (Log) GDP per Capita

3.1.1 Bootstrap Method

We explain the bootstrap method used in our analysis. The bootstrap method is a computational simulation technique that allows us to estimate the distribution of a statistic in a finite sample. The procedure is conducted as follows:

1. Randomly draw n observations with replacement from the original sample to generate n bootstrap samples.
2. Estimate the ATT for each bootstrap sample.
3. Compute the standard error of the ATT estimates obtained from the bootstrap samples.
4. Use this standard error to estimate the confidence interval.

Here, we derive the confidence interval using two different methods. The first method assumes that the distribution of the estimated ATT follows a normal distribution and estimates the confidence interval using the 2.5% and 97.5% percentiles. This corresponds to the light blue-shaded interval in Figure 3. The second method estimates the confidence interval using the 2.5% and 97.5% percentiles of the bootstrap distribution. This corresponds to the pink-shaded interval in Figure 3.

3.1.2 Estimation

We estimate the confidence interval by executing the following code. The number of bootstrap replications is 200.

```
compute_atets <- function(data_boot) {
  original_data <- data_f1
  data_f1 <<- data_boot
  out <- numeric(length(relative_times))
  for (i in seq_along(relative_times)) {
    t_val <- relative_times[i]
    if (t_val < 0) {
      col_name <- paste0("gdpDiff_m", abs(t_val))
    } else {
      col_name <- if (t_val == 0) "gdpDiff_0" else paste0("gdpDiff_p", t_val)
    }
    out[i] <- estimateATT(col_name)
  }
  data_f1 <<- original_data
  out
```

```
}

B <- 200
set.seed(123)
boot_mat <- matrix(NA, nrow = B, ncol = length(relative_times))
unique_ids <- unique(data_f1$id)

for (b in seq_len(B)) {
  sampled_ids <- sample(unique_ids, size = length(unique_ids), replace = TRUE)
  bs_data <- lapply(sampled_ids, function(x) {
    data_f1[data_f1$id == x, ]
  }) %>% bind_rows()
  boot_mat[b, ] <- compute_atets(bs_data)
}

boot_se <- apply(boot_mat, 2, sd, na.rm = TRUE)
ci_lower_normal <- atets - 1.96 * boot_se
ci_upper_normal <- atets + 1.96 * boot_se

ci_lower_perc <- apply(boot_mat, 2, quantile, probs = 0.025, na.rm = TRUE)
ci_upper_perc <- apply(boot_mat, 2, quantile, probs = 0.975, na.rm = TRUE)

results_with_ci <- data.frame(
  RelativeTime = relative_times,
  ATT = atets,
  ciL_normal = ci_lower_normal,
  ciU_normal = ci_upper_normal,
  ciL_perc = ci_lower_perc,
  ciU_perc = ci_upper_perc
)
```

3.1.3 Plot

```
figure_1_withCI <- ggplot(results_with_ci, aes(x = RelativeTime, y = ATT)) +
  geom_line(color = "black") +
  geom_ribbon(aes(ymin = ciL_perc, ymax = ciU_perc), fill = "pink", alpha = 0.3) +
  geom_ribbon(aes(ymin = ciL_normal, ymax = ciU_normal), fill = "skyblue", alpha = 0.3) +
  scale_x_continuous(breaks = seq(-15, 30, 5)) +
  labs(
    x = "Years around Democratization",
    y = "Change in GDP per capita (log points)"
  ) +
  theme_bw()

ggsave("output/figure_1_withCI.pdf",
       figure_1_withCI,
       width = 14,
       height = 8,
       units = "cm")
```

Figure 1 appears to strongly support the claim that "Democracy does cause growth". However, when we look at Figure 2, which includes confidence intervals, the picture changes completely. While we do not deny

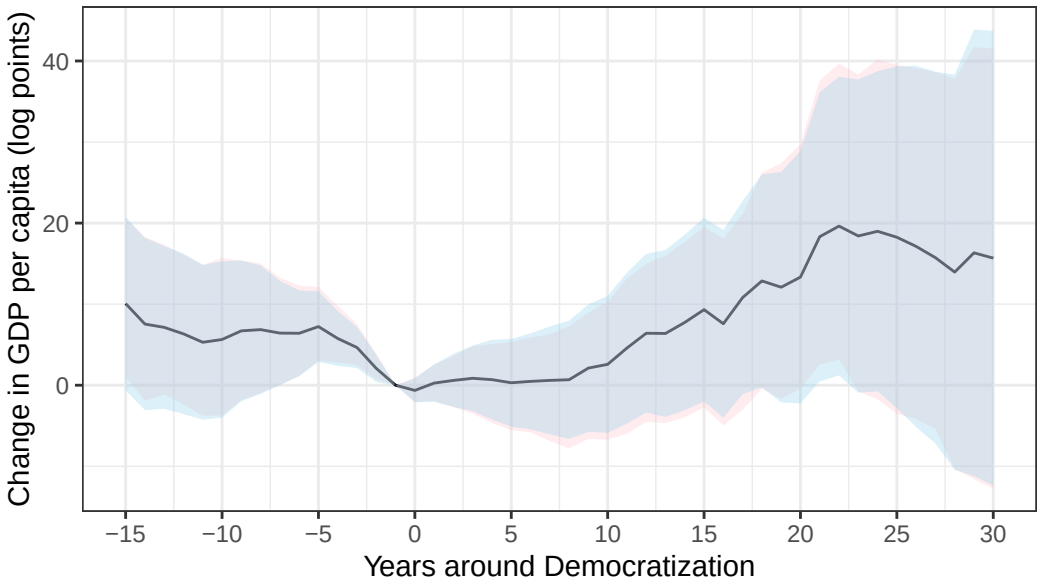

Figure 2: The Long-Term Impact of Democratization on Economic Growth (with the confidence interval)

that democratization has a positive effect on economic growth, it becomes clear that the long-term effects of democratization on economic growth are highly uncertain. Perhaps the authors chose not to display the confidence intervals, even if unintentionally, in a way that emphasized the claim that "Democracy does cause growth."

4 References

Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A Robinson. 2019. "Democracy Does Cause Growth." *Journal of Political Economy* 127 (1): 47–100.

Hansen, Bruce. 2022. *Econometrics*. Princeton University Press.

5 Appendix

5.1 List of Variables (Shoya Abe)

```
var_labels <- sapply(data, function(x) attr(x, "label"))
list_var <- tibble(
  variable = names(var_labels),
  label = var_labels
)

kable(
  list_var,
  format = "latex",
  booktabs = TRUE,
  longtable = TRUE,
  caption = "List of Variables"
) %>%
  kable_styling(latex_options = "repeat_header")
```

Table 4: List of Variables

variable	label
country_name	Country name
wbcode	World Bank country code
year	Year (from 1960 to 2010)
gdppercapitaconstant2000us	GDP per capita (constant 2000 US$, from World Bank)
lp_bl	Percentage of population with at most primary (Barro-Lee)
ls_bl	Percentage of population with at most secondary (Barro-Lee)
lh_bl	Percentage of population with tertiary education (Barro-Lee)
taxratio	Tax revenue as a share of GDP (from Hendrix)
region	Geographical region
wbcode2	Generated numeric country code
demCGV	Democracy measure by CGV
demBMR	Democracy measure by BMR
yeardem	Identifier for a democratization during this year
yearrev	Identifier for a reversal to autocracy during this year
secenr	Secondary enrollment from World bank
prienr	Primary enrollment from World Bank
tradewb	Exports plus Imports as a share of GDP from World Bank
mortnew	Child mortality per 1000 births from World Bank
ginv	Gross investment as a share of GDP
rtfpna	TFP at constant national prices (2005=1) from PWT
y	log of GDP per capita in 2000 constant dollars (multiplied by a 100)
dem	Democracy measure by ANRR
yy1	year== 1960.0000
yy2	year== 1961.0000
yy3	year== 1962.0000
yy4	year== 1963.0000
yy5	year== 1964.0000

Table 4: List of Variables *(continued)*

variable	label
yy6	year== 1965.0000
yy7	year== 1966.0000
yy8	year== 1967.0000
yy9	year== 1968.0000
yy10	year== 1969.0000
yy11	year== 1970.0000
yy12	year== 1971.0000
yy13	year== 1972.0000
yy14	year== 1973.0000
yy15	year== 1974.0000
yy16	year== 1975.0000
yy17	year== 1976.0000
yy18	year== 1977.0000
yy19	year== 1978.0000
yy20	year== 1979.0000
yy21	year== 1980.0000
yy22	year== 1981.0000
yy23	year== 1982.0000
yy24	year== 1983.0000
yy25	year== 1984.0000
yy26	year== 1985.0000
yy27	year== 1986.0000
yy28	year== 1987.0000
yy29	year== 1988.0000
yy30	year== 1989.0000
yy31	year== 1990.0000
yy32	year== 1991.0000
yy33	year== 1992.0000
yy34	year== 1993.0000
yy35	year== 1994.0000
yy36	year== 1995.0000
yy37	year== 1996.0000
yy38	year== 1997.0000
yy39	year== 1998.0000
yy40	year== 1999.0000
yy41	year== 2000.0000
yy42	year== 2001.0000
yy43	year== 2002.0000
yy44	year== 2003.0000
yy45	year== 2004.0000
yy46	year== 2005.0000
yy47	year== 2006.0000
yy48	year== 2007.0000
yy49	year== 2008.0000
yy50	year== 2009.0000
yy51	year== 2010.0000
InitReg	Democratic status after independence or in 1960

Table 4: List of Variables *(continued)*

variable	label
unrest	Occurrence of events of unrest (from Banks CNTS)
loginvpc	log investment (multiplied by 100)
ltfp	log TFP (multiplied by 100)
ltrade2	lof of trade (multiplied by 100)
lprienr	lof of primary enrollment (multiplied by 100)
lsecenr	log of secondary enrollment (multiplied by 100)
lgov	log of taxes to GDP (multiplied by a 100)
lmort	log of child mortality rate (multiplied by a 100)
unrestn	Likelihood of unrest (0-100 scale)
demFH	democracy measure based on Freedom House
demPOL	democracy measure based on Polity IV
demPS	democracy measure by PS
demPOL_xconst	dummy for constraints on executive (based on polity)
demPOL_parcomp	dummy for competitiveness of participation (based on polity)
demPOL_exrec	dummy for quality of executive recruitment process (based on Polity)
demFH_pr	Dummy for political rights (based on Freedom House)
demFH_cl	Dummy for civil liberties (based on Freedom House)
demevent	Event of democratization
revevent	Event of reversal to autocracy
democ	Cummulative number of democratizations
rever	Cummulative number of reversals
demext	Democratic status at beginning of sample
regionINITREG	Region/Initial regime at start of sample cells
demreg	Average democracy in the region*initial regime (leaving own country out)
tradewbreg	Regional trade
unrestreg	Regional unrest
yreg	Regional GDP per capita
rtrend1	Region 1 trend
rtrend2	Region 2 trend
rtrend3	Region 3 trend
rtrend4	Region 4 trend
rtrend5	Region 5 trend
rtrend6	Region trend 6
rtrend7	region trend 7
region60	Region/Democratic in 1960 cells
regionDA	Region/Always democratic cells
regionREG	Region/Detailed regime in 1960 cells
demreg60	Average democracy in the region*initial regim (using regime in 1960, jackniffed)
demregDA	Average democracy in the region*initial regim (using always democracy, jackniffe
demregREGIME	Average democracy in the region*initial regime (detailed regimes, jackniffed)
d60_1	region60==AFR_dem
d60_2	region60==AFR_nd
d60_3	region60==EAP_dem
d60_4	region60==EAP_nd
d60_5	region60==ECA_nd
d60_6	region60==INL_dem

Table 4: List of Variables *(continued)*

variable	label
d60_7	region60==INL_nd
d60_8	region60==LAC_dem
d60_9	region60==LAC_nd
d60_10	region60==MNA_dem
d60_11	region60==MNA_nd
d60_12	region60==SAS_dem
d60_13	region60==SAS_nd
dDA_1	regionDA==AFR_dem
dDA_2	regionDA==AFR_nd
dDA_3	regionDA==EAP_dem
dDA_4	regionDA==EAP_nd
dDA_5	regionDA==ECA_nd
dDA_6	regionDA==INL_dem
dDA_7	regionDA==INL_nd
dDA_8	regionDA==LAC_dem
dDA_9	regionDA==LAC_nd
dDA_10	regionDA==MNA_nd
dDA_11	regionDA==SAS_dem
dDA_12	regionDA==SAS_nd
dREG_1	regionREG==AFRBritishColony
dREG_2	regionREG==AFRCivilDictator
dREG_3	regionREG==AFRFrenchColony
dREG_4	regionREG==AFRMilitaryDictator
dREG_5	regionREG==AFRParlamentaryDemocracy
dREG_6	regionREG==AFRRoyalDictator
dREG_7	regionREG==AFRSocialistRegime
dREG_8	regionREG==EAPBritishColony
dREG_9	regionREG==EAPCivilDictator
dREG_10	regionREG==EAPMilitaryDictator
dREG_11	regionREG==EAPMixedAndPresidentialDemocracy
dREG_12	regionREG==EAPRoyalDictator
dREG_13	regionREG==EAPSocialistRegime
dREG_14	regionREG==ECAMilitaryDictator
dREG_15	regionREG==ECASocialistRegime
dREG_16	regionREG==INLCivilDictator
dREG_17	regionREG==INLFrenchColony
dREG_18	regionREG==INLMilitaryDictator
dREG_19	regionREG==INLMixedAndPresidentialDemocracy
dREG_20	regionREG==INLParlamentaryDemocracy
dREG_21	regionREG==LACBritishColony
dREG_22	regionREG==LACFrenchColony
dREG_23	regionREG==LACMilitaryDictator
dREG_24	regionREG==LACMixedAndPresidentialDemocracy
dREG_25	regionREG==LACSocialistRegime
dREG_26	regionREG==MNABritishColony
dREG_27	regionREG==MNACivilDictator

Table 4: List of Variables *(continued)*

variable	label
dREG_28	regionREG==MNAFrenchColony
dREG_29	regionREG==MNAMilitaryDictator
dREG_30	regionREG==MNAParlamentaryDemocracy
dREG_31	regionREG==MNARoyalDictator
dREG_32	regionREG==SASBritishColony
dREG_33	regionREG==SASMilitaryDictator
dREG_34	regionREG==SASParlamentaryDemocracy
dREG_35	regionREG==SASRoyalDictator
gdp1960	GDP per capita in 1960 from Madisson
region_initreg_year	Region/Initial regime/year cells
incomequint50s_year	Income quintiles in 50s/year cells
sov1	Soviets post 89
sov2	Soviets post 90
sov3	Soviets post 91
sov4	Soviets post 92
marketref	Index of market reforms
regdum1	region_initreg_year==AFR_dem1960
regdum2	region_initreg_year==AFR_dem1961
regdum3	region_initreg_year==AFR_dem1962
regdum4	region_initreg_year==AFR_dem1963
regdum5	region_initreg_year==AFR_dem1964
regdum6	region_initreg_year==AFR_dem1965
regdum7	region_initreg_year==AFR_dem1966
regdum8	region_initreg_year==AFR_dem1967
regdum9	region_initreg_year==AFR_dem1968
regdum10	region_initreg_year==AFR_dem1969
regdum11	region_initreg_year==AFR_dem1970
regdum12	region_initreg_year==AFR_dem1971
regdum13	region_initreg_year==AFR_dem1972
regdum14	region_initreg_year==AFR_dem1973
regdum15	region_initreg_year==AFR_dem1974
regdum16	region_initreg_year==AFR_dem1975
regdum17	region_initreg_year==AFR_dem1976
regdum18	region_initreg_year==AFR_dem1977
regdum19	region_initreg_year==AFR_dem1978
regdum20	region_initreg_year==AFR_dem1979
regdum21	region_initreg_year==AFR_dem1980
regdum22	region_initreg_year==AFR_dem1981
regdum23	region_initreg_year==AFR_dem1982
regdum24	region_initreg_year==AFR_dem1983
regdum25	region_initreg_year==AFR_dem1984
regdum26	region_initreg_year==AFR_dem1985
regdum27	region_initreg_year==AFR_dem1986
regdum28	region_initreg_year==AFR_dem1987
regdum29	region_initreg_year==AFR_dem1988
regdum30	region_initreg_year==AFR_dem1989
regdum31	region_initreg_year==AFR_dem1990

Table 4: List of Variables *(continued)*

variable	label
regdum32	region_initreg_year==AFR_dem1991
regdum33	region_initreg_year==AFR_dem1992
regdum34	region_initreg_year==AFR_dem1993
regdum35	region_initreg_year==AFR_dem1994
regdum36	region_initreg_year==AFR_dem1995
regdum37	region_initreg_year==AFR_dem1996
regdum38	region_initreg_year==AFR_dem1997
regdum39	region_initreg_year==AFR_dem1998
regdum40	region_initreg_year==AFR_dem1999
regdum41	region_initreg_year==AFR_dem2000
regdum42	region_initreg_year==AFR_dem2001
regdum43	region_initreg_year==AFR_dem2002
regdum44	region_initreg_year==AFR_dem2003
regdum45	region_initreg_year==AFR_dem2004
regdum46	region_initreg_year==AFR_dem2005
regdum47	region_initreg_year==AFR_dem2006
regdum48	region_initreg_year==AFR_dem2007
regdum49	region_initreg_year==AFR_dem2008
regdum50	region_initreg_year==AFR_dem2009
regdum51	region_initreg_year==AFR_dem2010
regdum52	region_initreg_year==AFR_nd1960
regdum53	region_initreg_year==AFR_nd1961
regdum54	region_initreg_year==AFR_nd1962
regdum55	region_initreg_year==AFR_nd1963
regdum56	region_initreg_year==AFR_nd1964
regdum57	region_initreg_year==AFR_nd1965
regdum58	region_initreg_year==AFR_nd1966
regdum59	region_initreg_year==AFR_nd1967
regdum60	region_initreg_year==AFR_nd1968
regdum61	region_initreg_year==AFR_nd1969
regdum62	region_initreg_year==AFR_nd1970
regdum63	region_initreg_year==AFR_nd1971
regdum64	region_initreg_year==AFR_nd1972
regdum65	region_initreg_year==AFR_nd1973
regdum66	region_initreg_year==AFR_nd1974
regdum67	region_initreg_year==AFR_nd1975
regdum68	region_initreg_year==AFR_nd1976
regdum69	region_initreg_year==AFR_nd1977
regdum70	region_initreg_year==AFR_nd1978
regdum71	region_initreg_year==AFR_nd1979
regdum72	region_initreg_year==AFR_nd1980
regdum73	region_initreg_year==AFR_nd1981
regdum74	region_initreg_year==AFR_nd1982
regdum75	region_initreg_year==AFR_nd1983
regdum76	region_initreg_year==AFR_nd1984
regdum77	region_initreg_year==AFR_nd1985
regdum78	region_initreg_year==AFR_nd1986

Table 4: List of Variables *(continued)*

variable	label
regdum79	region_initreg_year==AFR_nd1987
regdum80	region_initreg_year==AFR_nd1988
regdum81	region_initreg_year==AFR_nd1989
regdum82	region_initreg_year==AFR_nd1990
regdum83	region_initreg_year==AFR_nd1991
regdum84	region_initreg_year==AFR_nd1992
regdum85	region_initreg_year==AFR_nd1993
regdum86	region_initreg_year==AFR_nd1994
regdum87	region_initreg_year==AFR_nd1995
regdum88	region_initreg_year==AFR_nd1996
regdum89	region_initreg_year==AFR_nd1997
regdum90	region_initreg_year==AFR_nd1998
regdum91	region_initreg_year==AFR_nd1999
regdum92	region_initreg_year==AFR_nd2000
regdum93	region_initreg_year==AFR_nd2001
regdum94	region_initreg_year==AFR_nd2002
regdum95	region_initreg_year==AFR_nd2003
regdum96	region_initreg_year==AFR_nd2004
regdum97	region_initreg_year==AFR_nd2005
regdum98	region_initreg_year==AFR_nd2006
regdum99	region_initreg_year==AFR_nd2007
regdum100	region_initreg_year==AFR_nd2008
regdum101	region_initreg_year==AFR_nd2009
regdum102	region_initreg_year==AFR_nd2010
regdum103	region_initreg_year==EAP_dem1960
regdum104	region_initreg_year==EAP_dem1961
regdum105	region_initreg_year==EAP_dem1962
regdum106	region_initreg_year==EAP_dem1963
regdum107	region_initreg_year==EAP_dem1964
regdum108	region_initreg_year==EAP_dem1965
regdum109	region_initreg_year==EAP_dem1966
regdum110	region_initreg_year==EAP_dem1967
regdum111	region_initreg_year==EAP_dem1968
regdum112	region_initreg_year==EAP_dem1969
regdum113	region_initreg_year==EAP_dem1970
regdum114	region_initreg_year==EAP_dem1971
regdum115	region_initreg_year==EAP_dem1972
regdum116	region_initreg_year==EAP_dem1973
regdum117	region_initreg_year==EAP_dem1974
regdum118	region_initreg_year==EAP_dem1975
regdum119	region_initreg_year==EAP_dem1976
regdum120	region_initreg_year==EAP_dem1977
regdum121	region_initreg_year==EAP_dem1978
regdum122	region_initreg_year==EAP_dem1979
regdum123	region_initreg_year==EAP_dem1980
regdum124	region_initreg_year==EAP_dem1981

Table 4: List of Variables *(continued)*

variable	label
regdum125	region_initreg_year==EAP_dem1982
regdum126	region_initreg_year==EAP_dem1983
regdum127	region_initreg_year==EAP_dem1984
regdum128	region_initreg_year==EAP_dem1985
regdum129	region_initreg_year==EAP_dem1986
regdum130	region_initreg_year==EAP_dem1987
regdum131	region_initreg_year==EAP_dem1988
regdum132	region_initreg_year==EAP_dem1989
regdum133	region_initreg_year==EAP_dem1990
regdum134	region_initreg_year==EAP_dem1991
regdum135	region_initreg_year==EAP_dem1992
regdum136	region_initreg_year==EAP_dem1993
regdum137	region_initreg_year==EAP_dem1994
regdum138	region_initreg_year==EAP_dem1995
regdum139	region_initreg_year==EAP_dem1996
regdum140	region_initreg_year==EAP_dem1997
regdum141	region_initreg_year==EAP_dem1998
regdum142	region_initreg_year==EAP_dem1999
regdum143	region_initreg_year==EAP_dem2000
regdum144	region_initreg_year==EAP_dem2001
regdum145	region_initreg_year==EAP_dem2002
regdum146	region_initreg_year==EAP_dem2003
regdum147	region_initreg_year==EAP_dem2004
regdum148	region_initreg_year==EAP_dem2005
regdum149	region_initreg_year==EAP_dem2006
regdum150	region_initreg_year==EAP_dem2007
regdum151	region_initreg_year==EAP_dem2008
regdum152	region_initreg_year==EAP_dem2009
regdum153	region_initreg_year==EAP_dem2010
regdum154	region_initreg_year==EAP_nd1960
regdum155	region_initreg_year==EAP_nd1961
regdum156	region_initreg_year==EAP_nd1962
regdum157	region_initreg_year==EAP_nd1963
regdum158	region_initreg_year==EAP_nd1964
regdum159	region_initreg_year==EAP_nd1965
regdum160	region_initreg_year==EAP_nd1966
regdum161	region_initreg_year==EAP_nd1967
regdum162	region_initreg_year==EAP_nd1968
regdum163	region_initreg_year==EAP_nd1969
regdum164	region_initreg_year==EAP_nd1970
regdum165	region_initreg_year==EAP_nd1971
regdum166	region_initreg_year==EAP_nd1972
regdum167	region_initreg_year==EAP_nd1973
regdum168	region_initreg_year==EAP_nd1974
regdum169	region_initreg_year==EAP_nd1975
regdum170	region_initreg_year==EAP_nd1976
regdum171	region_initreg_year==EAP_nd1977

Table 4: List of Variables *(continued)*

variable	label
regdum172	region_initreg_year==EAP_nd1978
regdum173	region_initreg_year==EAP_nd1979
regdum174	region_initreg_year==EAP_nd1980
regdum175	region_initreg_year==EAP_nd1981
regdum176	region_initreg_year==EAP_nd1982
regdum177	region_initreg_year==EAP_nd1983
regdum178	region_initreg_year==EAP_nd1984
regdum179	region_initreg_year==EAP_nd1985
regdum180	region_initreg_year==EAP_nd1986
regdum181	region_initreg_year==EAP_nd1987
regdum182	region_initreg_year==EAP_nd1988
regdum183	region_initreg_year==EAP_nd1989
regdum184	region_initreg_year==EAP_nd1990
regdum185	region_initreg_year==EAP_nd1991
regdum186	region_initreg_year==EAP_nd1992
regdum187	region_initreg_year==EAP_nd1993
regdum188	region_initreg_year==EAP_nd1994
regdum189	region_initreg_year==EAP_nd1995
regdum190	region_initreg_year==EAP_nd1996
regdum191	region_initreg_year==EAP_nd1997
regdum192	region_initreg_year==EAP_nd1998
regdum193	region_initreg_year==EAP_nd1999
regdum194	region_initreg_year==EAP_nd2000
regdum195	region_initreg_year==EAP_nd2001
regdum196	region_initreg_year==EAP_nd2002
regdum197	region_initreg_year==EAP_nd2003
regdum198	region_initreg_year==EAP_nd2004
regdum199	region_initreg_year==EAP_nd2005
regdum200	region_initreg_year==EAP_nd2006
regdum201	region_initreg_year==EAP_nd2007
regdum202	region_initreg_year==EAP_nd2008
regdum203	region_initreg_year==EAP_nd2009
regdum204	region_initreg_year==EAP_nd2010
regdum205	region_initreg_year==ECA_nd1960
regdum206	region_initreg_year==ECA_nd1961
regdum207	region_initreg_year==ECA_nd1962
regdum208	region_initreg_year==ECA_nd1963
regdum209	region_initreg_year==ECA_nd1964
regdum210	region_initreg_year==ECA_nd1965
regdum211	region_initreg_year==ECA_nd1966
regdum212	region_initreg_year==ECA_nd1967
regdum213	region_initreg_year==ECA_nd1968
regdum214	region_initreg_year==ECA_nd1969
regdum215	region_initreg_year==ECA_nd1970
regdum216	region_initreg_year==ECA_nd1971
regdum217	region_initreg_year==ECA_nd1972
regdum218	region_initreg_year==ECA_nd1973

Table 4: List of Variables *(continued)*

variable	label
regdum219	region_initreg_year==ECA_nd1974
regdum220	region_initreg_year==ECA_nd1975
regdum221	region_initreg_year==ECA_nd1976
regdum222	region_initreg_year==ECA_nd1977
regdum223	region_initreg_year==ECA_nd1978
regdum224	region_initreg_year==ECA_nd1979
regdum225	region_initreg_year==ECA_nd1980
regdum226	region_initreg_year==ECA_nd1981
regdum227	region_initreg_year==ECA_nd1982
regdum228	region_initreg_year==ECA_nd1983
regdum229	region_initreg_year==ECA_nd1984
regdum230	region_initreg_year==ECA_nd1985
regdum231	region_initreg_year==ECA_nd1986
regdum232	region_initreg_year==ECA_nd1987
regdum233	region_initreg_year==ECA_nd1988
regdum234	region_initreg_year==ECA_nd1989
regdum235	region_initreg_year==ECA_nd1990
regdum236	region_initreg_year==ECA_nd1991
regdum237	region_initreg_year==ECA_nd1992
regdum238	region_initreg_year==ECA_nd1993
regdum239	region_initreg_year==ECA_nd1994
regdum240	region_initreg_year==ECA_nd1995
regdum241	region_initreg_year==ECA_nd1996
regdum242	region_initreg_year==ECA_nd1997
regdum243	region_initreg_year==ECA_nd1998
regdum244	region_initreg_year==ECA_nd1999
regdum245	region_initreg_year==ECA_nd2000
regdum246	region_initreg_year==ECA_nd2001
regdum247	region_initreg_year==ECA_nd2002
regdum248	region_initreg_year==ECA_nd2003
regdum249	region_initreg_year==ECA_nd2004
regdum250	region_initreg_year==ECA_nd2005
regdum251	region_initreg_year==ECA_nd2006
regdum252	region_initreg_year==ECA_nd2007
regdum253	region_initreg_year==ECA_nd2008
regdum254	region_initreg_year==ECA_nd2009
regdum255	region_initreg_year==ECA_nd2010
regdum256	region_initreg_year==INL_dem1960
regdum257	region_initreg_year==INL_dem1961
regdum258	region_initreg_year==INL_dem1962
regdum259	region_initreg_year==INL_dem1963
regdum260	region_initreg_year==INL_dem1964
regdum261	region_initreg_year==INL_dem1965
regdum262	region_initreg_year==INL_dem1966
regdum263	region_initreg_year==INL_dem1967
regdum264	region_initreg_year==INL_dem1968

Table 4: List of Variables *(continued)*

variable	label
regdum265	region_initreg_year==INL_dem1969
regdum266	region_initreg_year==INL_dem1970
regdum267	region_initreg_year==INL_dem1971
regdum268	region_initreg_year==INL_dem1972
regdum269	region_initreg_year==INL_dem1973
regdum270	region_initreg_year==INL_dem1974
regdum271	region_initreg_year==INL_dem1975
regdum272	region_initreg_year==INL_dem1976
regdum273	region_initreg_year==INL_dem1977
regdum274	region_initreg_year==INL_dem1978
regdum275	region_initreg_year==INL_dem1979
regdum276	region_initreg_year==INL_dem1980
regdum277	region_initreg_year==INL_dem1981
regdum278	region_initreg_year==INL_dem1982
regdum279	region_initreg_year==INL_dem1983
regdum280	region_initreg_year==INL_dem1984
regdum281	region_initreg_year==INL_dem1985
regdum282	region_initreg_year==INL_dem1986
regdum283	region_initreg_year==INL_dem1987
regdum284	region_initreg_year==INL_dem1988
regdum285	region_initreg_year==INL_dem1989
regdum286	region_initreg_year==INL_dem1990
regdum287	region_initreg_year==INL_dem1991
regdum288	region_initreg_year==INL_dem1992
regdum289	region_initreg_year==INL_dem1993
regdum290	region_initreg_year==INL_dem1994
regdum291	region_initreg_year==INL_dem1995
regdum292	region_initreg_year==INL_dem1996
regdum293	region_initreg_year==INL_dem1997
regdum294	region_initreg_year==INL_dem1998
regdum295	region_initreg_year==INL_dem1999
regdum296	region_initreg_year==INL_dem2000
regdum297	region_initreg_year==INL_dem2001
regdum298	region_initreg_year==INL_dem2002
regdum299	region_initreg_year==INL_dem2003
regdum300	region_initreg_year==INL_dem2004
regdum301	region_initreg_year==INL_dem2005
regdum302	region_initreg_year==INL_dem2006
regdum303	region_initreg_year==INL_dem2007
regdum304	region_initreg_year==INL_dem2008
regdum305	region_initreg_year==INL_dem2009
regdum306	region_initreg_year==INL_dem2010
regdum307	region_initreg_year==INL_nd1960
regdum308	region_initreg_year==INL_nd1961
regdum309	region_initreg_year==INL_nd1962
regdum310	region_initreg_year==INL_nd1963
regdum311	region_initreg_year==INL_nd1964

Table 4: List of Variables *(continued)*

variable	label
regdum312	region_initreg_year==INL_nd1965
regdum313	region_initreg_year==INL_nd1966
regdum314	region_initreg_year==INL_nd1967
regdum315	region_initreg_year==INL_nd1968
regdum316	region_initreg_year==INL_nd1969
regdum317	region_initreg_year==INL_nd1970
regdum318	region_initreg_year==INL_nd1971
regdum319	region_initreg_year==INL_nd1972
regdum320	region_initreg_year==INL_nd1973
regdum321	region_initreg_year==INL_nd1974
regdum322	region_initreg_year==INL_nd1975
regdum323	region_initreg_year==INL_nd1976
regdum324	region_initreg_year==INL_nd1977
regdum325	region_initreg_year==INL_nd1978
regdum326	region_initreg_year==INL_nd1979
regdum327	region_initreg_year==INL_nd1980
regdum328	region_initreg_year==INL_nd1981
regdum329	region_initreg_year==INL_nd1982
regdum330	region_initreg_year==INL_nd1983
regdum331	region_initreg_year==INL_nd1984
regdum332	region_initreg_year==INL_nd1985
regdum333	region_initreg_year==INL_nd1986
regdum334	region_initreg_year==INL_nd1987
regdum335	region_initreg_year==INL_nd1988
regdum336	region_initreg_year==INL_nd1989
regdum337	region_initreg_year==INL_nd1990
regdum338	region_initreg_year==INL_nd1991
regdum339	region_initreg_year==INL_nd1992
regdum340	region_initreg_year==INL_nd1993
regdum341	region_initreg_year==INL_nd1994
regdum342	region_initreg_year==INL_nd1995
regdum343	region_initreg_year==INL_nd1996
regdum344	region_initreg_year==INL_nd1997
regdum345	region_initreg_year==INL_nd1998
regdum346	region_initreg_year==INL_nd1999
regdum347	region_initreg_year==INL_nd2000
regdum348	region_initreg_year==INL_nd2001
regdum349	region_initreg_year==INL_nd2002
regdum350	region_initreg_year==INL_nd2003
regdum351	region_initreg_year==INL_nd2004
regdum352	region_initreg_year==INL_nd2005
regdum353	region_initreg_year==INL_nd2006
regdum354	region_initreg_year==INL_nd2007
regdum355	region_initreg_year==INL_nd2008
regdum356	region_initreg_year==INL_nd2009
regdum357	region_initreg_year==INL_nd2010
regdum358	region_initreg_year==LAC_dem1960

Table 4: List of Variables *(continued)*

variable	label
regdum359	region_initreg_year==LAC_dem1961
regdum360	region_initreg_year==LAC_dem1962
regdum361	region_initreg_year==LAC_dem1963
regdum362	region_initreg_year==LAC_dem1964
regdum363	region_initreg_year==LAC_dem1965
regdum364	region_initreg_year==LAC_dem1966
regdum365	region_initreg_year==LAC_dem1967
regdum366	region_initreg_year==LAC_dem1968
regdum367	region_initreg_year==LAC_dem1969
regdum368	region_initreg_year==LAC_dem1970
regdum369	region_initreg_year==LAC_dem1971
regdum370	region_initreg_year==LAC_dem1972
regdum371	region_initreg_year==LAC_dem1973
regdum372	region_initreg_year==LAC_dem1974
regdum373	region_initreg_year==LAC_dem1975
regdum374	region_initreg_year==LAC_dem1976
regdum375	region_initreg_year==LAC_dem1977
regdum376	region_initreg_year==LAC_dem1978
regdum377	region_initreg_year==LAC_dem1979
regdum378	region_initreg_year==LAC_dem1980
regdum379	region_initreg_year==LAC_dem1981
regdum380	region_initreg_year==LAC_dem1982
regdum381	region_initreg_year==LAC_dem1983
regdum382	region_initreg_year==LAC_dem1984
regdum383	region_initreg_year==LAC_dem1985
regdum384	region_initreg_year==LAC_dem1986
regdum385	region_initreg_year==LAC_dem1987
regdum386	region_initreg_year==LAC_dem1988
regdum387	region_initreg_year==LAC_dem1989
regdum388	region_initreg_year==LAC_dem1990
regdum389	region_initreg_year==LAC_dem1991
regdum390	region_initreg_year==LAC_dem1992
regdum391	region_initreg_year==LAC_dem1993
regdum392	region_initreg_year==LAC_dem1994
regdum393	region_initreg_year==LAC_dem1995
regdum394	region_initreg_year==LAC_dem1996
regdum395	region_initreg_year==LAC_dem1997
regdum396	region_initreg_year==LAC_dem1998
regdum397	region_initreg_year==LAC_dem1999
regdum398	region_initreg_year==LAC_dem2000
regdum399	region_initreg_year==LAC_dem2001
regdum400	region_initreg_year==LAC_dem2002
regdum401	region_initreg_year==LAC_dem2003
regdum402	region_initreg_year==LAC_dem2004
regdum403	region_initreg_year==LAC_dem2005
regdum404	region_initreg_year==LAC_dem2006

Table 4: List of Variables *(continued)*

variable	label
regdum405	region_initreg_year==LAC_dem2007
regdum406	region_initreg_year==LAC_dem2008
regdum407	region_initreg_year==LAC_dem2009
regdum408	region_initreg_year==LAC_dem2010
regdum409	region_initreg_year==LAC_nd1960
regdum410	region_initreg_year==LAC_nd1961
regdum411	region_initreg_year==LAC_nd1962
regdum412	region_initreg_year==LAC_nd1963
regdum413	region_initreg_year==LAC_nd1964
regdum414	region_initreg_year==LAC_nd1965
regdum415	region_initreg_year==LAC_nd1966
regdum416	region_initreg_year==LAC_nd1967
regdum417	region_initreg_year==LAC_nd1968
regdum418	region_initreg_year==LAC_nd1969
regdum419	region_initreg_year==LAC_nd1970
regdum420	region_initreg_year==LAC_nd1971
regdum421	region_initreg_year==LAC_nd1972
regdum422	region_initreg_year==LAC_nd1973
regdum423	region_initreg_year==LAC_nd1974
regdum424	region_initreg_year==LAC_nd1975
regdum425	region_initreg_year==LAC_nd1976
regdum426	region_initreg_year==LAC_nd1977
regdum427	region_initreg_year==LAC_nd1978
regdum428	region_initreg_year==LAC_nd1979
regdum429	region_initreg_year==LAC_nd1980
regdum430	region_initreg_year==LAC_nd1981
regdum431	region_initreg_year==LAC_nd1982
regdum432	region_initreg_year==LAC_nd1983
regdum433	region_initreg_year==LAC_nd1984
regdum434	region_initreg_year==LAC_nd1985
regdum435	region_initreg_year==LAC_nd1986
regdum436	region_initreg_year==LAC_nd1987
regdum437	region_initreg_year==LAC_nd1988
regdum438	region_initreg_year==LAC_nd1989
regdum439	region_initreg_year==LAC_nd1990
regdum440	region_initreg_year==LAC_nd1991
regdum441	region_initreg_year==LAC_nd1992
regdum442	region_initreg_year==LAC_nd1993
regdum443	region_initreg_year==LAC_nd1994
regdum444	region_initreg_year==LAC_nd1995
regdum445	region_initreg_year==LAC_nd1996
regdum446	region_initreg_year==LAC_nd1997
regdum447	region_initreg_year==LAC_nd1998
regdum448	region_initreg_year==LAC_nd1999
regdum449	region_initreg_year==LAC_nd2000
regdum450	region_initreg_year==LAC_nd2001
regdum451	region_initreg_year==LAC_nd2002

Table 4: List of Variables *(continued)*

variable	label
regdum452	region_initreg_year==LAC_nd2003
regdum453	region_initreg_year==LAC_nd2004
regdum454	region_initreg_year==LAC_nd2005
regdum455	region_initreg_year==LAC_nd2006
regdum456	region_initreg_year==LAC_nd2007
regdum457	region_initreg_year==LAC_nd2008
regdum458	region_initreg_year==LAC_nd2009
regdum459	region_initreg_year==LAC_nd2010
regdum460	region_initreg_year==MNA_dem1960
regdum461	region_initreg_year==MNA_dem1961
regdum462	region_initreg_year==MNA_dem1962
regdum463	region_initreg_year==MNA_dem1963
regdum464	region_initreg_year==MNA_dem1964
regdum465	region_initreg_year==MNA_dem1965
regdum466	region_initreg_year==MNA_dem1966
regdum467	region_initreg_year==MNA_dem1967
regdum468	region_initreg_year==MNA_dem1968
regdum469	region_initreg_year==MNA_dem1969
regdum470	region_initreg_year==MNA_dem1970
regdum471	region_initreg_year==MNA_dem1971
regdum472	region_initreg_year==MNA_dem1972
regdum473	region_initreg_year==MNA_dem1973
regdum474	region_initreg_year==MNA_dem1974
regdum475	region_initreg_year==MNA_dem1975
regdum476	region_initreg_year==MNA_dem1976
regdum477	region_initreg_year==MNA_dem1977
regdum478	region_initreg_year==MNA_dem1978
regdum479	region_initreg_year==MNA_dem1979
regdum480	region_initreg_year==MNA_dem1980
regdum481	region_initreg_year==MNA_dem1981
regdum482	region_initreg_year==MNA_dem1982
regdum483	region_initreg_year==MNA_dem1983
regdum484	region_initreg_year==MNA_dem1984
regdum485	region_initreg_year==MNA_dem1985
regdum486	region_initreg_year==MNA_dem1986
regdum487	region_initreg_year==MNA_dem1987
regdum488	region_initreg_year==MNA_dem1988
regdum489	region_initreg_year==MNA_dem1989
regdum490	region_initreg_year==MNA_dem1990
regdum491	region_initreg_year==MNA_dem1991
regdum492	region_initreg_year==MNA_dem1992
regdum493	region_initreg_year==MNA_dem1993
regdum494	region_initreg_year==MNA_dem1994
regdum495	region_initreg_year==MNA_dem1995
regdum496	region_initreg_year==MNA_dem1996
regdum497	region_initreg_year==MNA_dem1997
regdum498	region_initreg_year==MNA_dem1998

Table 4: List of Variables *(continued)*

variable	label
regdum499	region_initreg_year==MNA_dem1999
regdum500	region_initreg_year==MNA_dem2000
regdum501	region_initreg_year==MNA_dem2001
regdum502	region_initreg_year==MNA_dem2002
regdum503	region_initreg_year==MNA_dem2003
regdum504	region_initreg_year==MNA_dem2004
regdum505	region_initreg_year==MNA_dem2005
regdum506	region_initreg_year==MNA_dem2006
regdum507	region_initreg_year==MNA_dem2007
regdum508	region_initreg_year==MNA_dem2008
regdum509	region_initreg_year==MNA_dem2009
regdum510	region_initreg_year==MNA_dem2010
regdum511	region_initreg_year==MNA_nd1960
regdum512	region_initreg_year==MNA_nd1961
regdum513	region_initreg_year==MNA_nd1962
regdum514	region_initreg_year==MNA_nd1963
regdum515	region_initreg_year==MNA_nd1964
regdum516	region_initreg_year==MNA_nd1965
regdum517	region_initreg_year==MNA_nd1966
regdum518	region_initreg_year==MNA_nd1967
regdum519	region_initreg_year==MNA_nd1968
regdum520	region_initreg_year==MNA_nd1969
regdum521	region_initreg_year==MNA_nd1970
regdum522	region_initreg_year==MNA_nd1971
regdum523	region_initreg_year==MNA_nd1972
regdum524	region_initreg_year==MNA_nd1973
regdum525	region_initreg_year==MNA_nd1974
regdum526	region_initreg_year==MNA_nd1975
regdum527	region_initreg_year==MNA_nd1976
regdum528	region_initreg_year==MNA_nd1977
regdum529	region_initreg_year==MNA_nd1978
regdum530	region_initreg_year==MNA_nd1979
regdum531	region_initreg_year==MNA_nd1980
regdum532	region_initreg_year==MNA_nd1981
regdum533	region_initreg_year==MNA_nd1982
regdum534	region_initreg_year==MNA_nd1983
regdum535	region_initreg_year==MNA_nd1984
regdum536	region_initreg_year==MNA_nd1985
regdum537	region_initreg_year==MNA_nd1986
regdum538	region_initreg_year==MNA_nd1987
regdum539	region_initreg_year==MNA_nd1988
regdum540	region_initreg_year==MNA_nd1989
regdum541	region_initreg_year==MNA_nd1990
regdum542	region_initreg_year==MNA_nd1991
regdum543	region_initreg_year==MNA_nd1992
regdum544	region_initreg_year==MNA_nd1993

Table 4: List of Variables *(continued)*

variable	label
regdum545	region_initreg_year==MNA_nd1994
regdum546	region_initreg_year==MNA_nd1995
regdum547	region_initreg_year==MNA_nd1996
regdum548	region_initreg_year==MNA_nd1997
regdum549	region_initreg_year==MNA_nd1998
regdum550	region_initreg_year==MNA_nd1999
regdum551	region_initreg_year==MNA_nd2000
regdum552	region_initreg_year==MNA_nd2001
regdum553	region_initreg_year==MNA_nd2002
regdum554	region_initreg_year==MNA_nd2003
regdum555	region_initreg_year==MNA_nd2004
regdum556	region_initreg_year==MNA_nd2005
regdum557	region_initreg_year==MNA_nd2006
regdum558	region_initreg_year==MNA_nd2007
regdum559	region_initreg_year==MNA_nd2008
regdum560	region_initreg_year==MNA_nd2009
regdum561	region_initreg_year==MNA_nd2010
regdum562	region_initreg_year==SAS_dem1960
regdum563	region_initreg_year==SAS_dem1961
regdum564	region_initreg_year==SAS_dem1962
regdum565	region_initreg_year==SAS_dem1963
regdum566	region_initreg_year==SAS_dem1964
regdum567	region_initreg_year==SAS_dem1965
regdum568	region_initreg_year==SAS_dem1966
regdum569	region_initreg_year==SAS_dem1967
regdum570	region_initreg_year==SAS_dem1968
regdum571	region_initreg_year==SAS_dem1969
regdum572	region_initreg_year==SAS_dem1970
regdum573	region_initreg_year==SAS_dem1971
regdum574	region_initreg_year==SAS_dem1972
regdum575	region_initreg_year==SAS_dem1973
regdum576	region_initreg_year==SAS_dem1974
regdum577	region_initreg_year==SAS_dem1975
regdum578	region_initreg_year==SAS_dem1976
regdum579	region_initreg_year==SAS_dem1977
regdum580	region_initreg_year==SAS_dem1978
regdum581	region_initreg_year==SAS_dem1979
regdum582	region_initreg_year==SAS_dem1980
regdum583	region_initreg_year==SAS_dem1981
regdum584	region_initreg_year==SAS_dem1982
regdum585	region_initreg_year==SAS_dem1983
regdum586	region_initreg_year==SAS_dem1984
regdum587	region_initreg_year==SAS_dem1985
regdum588	region_initreg_year==SAS_dem1986
regdum589	region_initreg_year==SAS_dem1987
regdum590	region_initreg_year==SAS_dem1988
regdum591	region_initreg_year==SAS_dem1989

Table 4: List of Variables *(continued)*

variable	label
regdum592	region_initreg_year==SAS_dem1990
regdum593	region_initreg_year==SAS_dem1991
regdum594	region_initreg_year==SAS_dem1992
regdum595	region_initreg_year==SAS_dem1993
regdum596	region_initreg_year==SAS_dem1994
regdum597	region_initreg_year==SAS_dem1995
regdum598	region_initreg_year==SAS_dem1996
regdum599	region_initreg_year==SAS_dem1997
regdum600	region_initreg_year==SAS_dem1998
regdum601	region_initreg_year==SAS_dem1999
regdum602	region_initreg_year==SAS_dem2000
regdum603	region_initreg_year==SAS_dem2001
regdum604	region_initreg_year==SAS_dem2002
regdum605	region_initreg_year==SAS_dem2003
regdum606	region_initreg_year==SAS_dem2004
regdum607	region_initreg_year==SAS_dem2005
regdum608	region_initreg_year==SAS_dem2006
regdum609	region_initreg_year==SAS_dem2007
regdum610	region_initreg_year==SAS_dem2008
regdum611	region_initreg_year==SAS_dem2009
regdum612	region_initreg_year==SAS_dem2010
regdum613	region_initreg_year==SAS_nd1960
regdum614	region_initreg_year==SAS_nd1961
regdum615	region_initreg_year==SAS_nd1962
regdum616	region_initreg_year==SAS_nd1963
regdum617	region_initreg_year==SAS_nd1964
regdum618	region_initreg_year==SAS_nd1965
regdum619	region_initreg_year==SAS_nd1966
regdum620	region_initreg_year==SAS_nd1967
regdum621	region_initreg_year==SAS_nd1968
regdum622	region_initreg_year==SAS_nd1969
regdum623	region_initreg_year==SAS_nd1970
regdum624	region_initreg_year==SAS_nd1971
regdum625	region_initreg_year==SAS_nd1972
regdum626	region_initreg_year==SAS_nd1973
regdum627	region_initreg_year==SAS_nd1974
regdum628	region_initreg_year==SAS_nd1975
regdum629	region_initreg_year==SAS_nd1976
regdum630	region_initreg_year==SAS_nd1977
regdum631	region_initreg_year==SAS_nd1978
regdum632	region_initreg_year==SAS_nd1979
regdum633	region_initreg_year==SAS_nd1980
regdum634	region_initreg_year==SAS_nd1981
regdum635	region_initreg_year==SAS_nd1982
regdum636	region_initreg_year==SAS_nd1983
regdum637	region_initreg_year==SAS_nd1984
regdum638	region_initreg_year==SAS_nd1985

Table 4: List of Variables *(continued)*

variable	label
regdum639	region_initreg_year==SAS_nd1986
regdum640	region_initreg_year==SAS_nd1987
regdum641	region_initreg_year==SAS_nd1988
regdum642	region_initreg_year==SAS_nd1989
regdum643	region_initreg_year==SAS_nd1990
regdum644	region_initreg_year==SAS_nd1991
regdum645	region_initreg_year==SAS_nd1992
regdum646	region_initreg_year==SAS_nd1993
regdum647	region_initreg_year==SAS_nd1994
regdum648	region_initreg_year==SAS_nd1995
regdum649	region_initreg_year==SAS_nd1996
regdum650	region_initreg_year==SAS_nd1997
regdum651	region_initreg_year==SAS_nd1998
regdum652	region_initreg_year==SAS_nd1999
regdum653	region_initreg_year==SAS_nd2000
regdum654	region_initreg_year==SAS_nd2001
regdum655	region_initreg_year==SAS_nd2002
regdum656	region_initreg_year==SAS_nd2003
regdum657	region_initreg_year==SAS_nd2004
regdum658	region_initreg_year==SAS_nd2005
regdum659	region_initreg_year==SAS_nd2006
regdum660	region_initreg_year==SAS_nd2007
regdum661	region_initreg_year==SAS_nd2008
regdum662	region_initreg_year==SAS_nd2009
regdum663	region_initreg_year==SAS_nd2010
dFY_1	regionINITREG==AFR_dem
dFY_2	regionINITREG==AFR_nd
dFY_3	regionINITREG==EAP_dem
dFY_4	regionINITREG==EAP_nd
dFY_5	regionINITREG==ECA_nd
dFY_6	regionINITREG==INL_dem
dFY_7	regionINITREG==INL_nd
dFY_8	regionINITREG==LAC_dem
dFY_9	regionINITREG==LAC_nd
dFY_10	regionINITREG==MNA_dem
dFY_11	regionINITREG==MNA_nd
dFY_12	regionINITREG==SAS_dem
dFY_13	regionINITREG==SAS_nd
gfa	(sum) gfa
nfa	(sum) nfa
totalassets	(sum) totalassets
totalliabilities	(sum) totalliabilities
nfagdp	(mean) nfagdp
nfagdpreg	NULL
incomequint50s_year1	NULL
incomequint50s_year2	NULL

Table 4: List of Variables *(continued)*

variable	label
quintile50s	NULL
dquint1	quintile50s== 1.0000
dquint2	quintile50s== 2.0000
dquint3	quintile50s== 3.0000
dquint4	quintile50s== 4.0000
dquint5	quintile50s== 5.0000
interfull_yy1_quintile1	NULL
interfull_yy1_quintile2	NULL
interfull_yy1_quintile3	NULL
interfull_yy1_quintile4	NULL
interfull_yy1_quintile5	NULL
interfull_yy2_quintile1	NULL
interfull_yy2_quintile2	NULL
interfull_yy2_quintile3	NULL
interfull_yy2_quintile4	NULL
interfull_yy2_quintile5	NULL
interfull_yy3_quintile1	NULL
interfull_yy3_quintile2	NULL
interfull_yy3_quintile3	NULL
interfull_yy3_quintile4	NULL
interfull_yy3_quintile5	NULL
interfull_yy4_quintile1	NULL
interfull_yy4_quintile2	NULL
interfull_yy4_quintile3	NULL
interfull_yy4_quintile4	NULL
interfull_yy4_quintile5	NULL
interfull_yy5_quintile1	NULL
interfull_yy5_quintile2	NULL
interfull_yy5_quintile3	NULL
interfull_yy5_quintile4	NULL
interfull_yy5_quintile5	NULL
interfull_yy6_quintile1	NULL
interfull_yy6_quintile2	NULL
interfull_yy6_quintile3	NULL
interfull_yy6_quintile4	NULL
interfull_yy6_quintile5	NULL
interfull_yy7_quintile1	NULL
interfull_yy7_quintile2	NULL
interfull_yy7_quintile3	NULL
interfull_yy7_quintile4	NULL
interfull_yy7_quintile5	NULL
interfull_yy8_quintile1	NULL
interfull_yy8_quintile2	NULL
interfull_yy8_quintile3	NULL
interfull_yy8_quintile4	NULL
interfull_yy8_quintile5	NULL
interfull_yy9_quintile1	NULL

Table 4: List of Variables *(continued)*

variable	label
interfull_yy9_quintile2	NULL
interfull_yy9_quintile3	NULL
interfull_yy9_quintile4	NULL
interfull_yy9_quintile5	NULL
interfull_yy10_quintile1	NULL
interfull_yy10_quintile2	NULL
interfull_yy10_quintile3	NULL
interfull_yy10_quintile4	NULL
interfull_yy10_quintile5	NULL
interfull_yy11_quintile1	NULL
interfull_yy11_quintile2	NULL
interfull_yy11_quintile3	NULL
interfull_yy11_quintile4	NULL
interfull_yy11_quintile5	NULL
interfull_yy12_quintile1	NULL
interfull_yy12_quintile2	NULL
interfull_yy12_quintile3	NULL
interfull_yy12_quintile4	NULL
interfull_yy12_quintile5	NULL
interfull_yy13_quintile1	NULL
interfull_yy13_quintile2	NULL
interfull_yy13_quintile3	NULL
interfull_yy13_quintile4	NULL
interfull_yy13_quintile5	NULL
interfull_yy14_quintile1	NULL
interfull_yy14_quintile2	NULL
interfull_yy14_quintile3	NULL
interfull_yy14_quintile4	NULL
interfull_yy14_quintile5	NULL
interfull_yy15_quintile1	NULL
interfull_yy15_quintile2	NULL
interfull_yy15_quintile3	NULL
interfull_yy15_quintile4	NULL
interfull_yy15_quintile5	NULL
interfull_yy16_quintile1	NULL
interfull_yy16_quintile2	NULL
interfull_yy16_quintile3	NULL
interfull_yy16_quintile4	NULL
interfull_yy16_quintile5	NULL
interfull_yy17_quintile1	NULL
interfull_yy17_quintile2	NULL
interfull_yy17_quintile3	NULL
interfull_yy17_quintile4	NULL
interfull_yy17_quintile5	NULL
interfull_yy18_quintile1	NULL
interfull_yy18_quintile2	NULL
interfull_yy18_quintile3	NULL

Table 4: List of Variables *(continued)*

variable	label
interfull_yy18_quintile4	NULL
interfull_yy18_quintile5	NULL
interfull_yy19_quintile1	NULL
interfull_yy19_quintile2	NULL
interfull_yy19_quintile3	NULL
interfull_yy19_quintile4	NULL
interfull_yy19_quintile5	NULL
interfull_yy20_quintile1	NULL
interfull_yy20_quintile2	NULL
interfull_yy20_quintile3	NULL
interfull_yy20_quintile4	NULL
interfull_yy20_quintile5	NULL
interfull_yy21_quintile1	NULL
interfull_yy21_quintile2	NULL
interfull_yy21_quintile3	NULL
interfull_yy21_quintile4	NULL
interfull_yy21_quintile5	NULL
interfull_yy22_quintile1	NULL
interfull_yy22_quintile2	NULL
interfull_yy22_quintile3	NULL
interfull_yy22_quintile4	NULL
interfull_yy22_quintile5	NULL
interfull_yy23_quintile1	NULL
interfull_yy23_quintile2	NULL
interfull_yy23_quintile3	NULL
interfull_yy23_quintile4	NULL
interfull_yy23_quintile5	NULL
interfull_yy24_quintile1	NULL
interfull_yy24_quintile2	NULL
interfull_yy24_quintile3	NULL
interfull_yy24_quintile4	NULL
interfull_yy24_quintile5	NULL
interfull_yy25_quintile1	NULL
interfull_yy25_quintile2	NULL
interfull_yy25_quintile3	NULL
interfull_yy25_quintile4	NULL
interfull_yy25_quintile5	NULL
interfull_yy26_quintile1	NULL
interfull_yy26_quintile2	NULL
interfull_yy26_quintile3	NULL
interfull_yy26_quintile4	NULL
interfull_yy26_quintile5	NULL
interfull_yy27_quintile1	NULL
interfull_yy27_quintile2	NULL
interfull_yy27_quintile3	NULL
interfull_yy27_quintile4	NULL

Table 4: List of Variables *(continued)*

variable	label
interfull_yy27_quintile5	NULL
interfull_yy28_quintile1	NULL
interfull_yy28_quintile2	NULL
interfull_yy28_quintile3	NULL
interfull_yy28_quintile4	NULL
interfull_yy28_quintile5	NULL
interfull_yy29_quintile1	NULL
interfull_yy29_quintile2	NULL
interfull_yy29_quintile3	NULL
interfull_yy29_quintile4	NULL
interfull_yy29_quintile5	NULL
interfull_yy30_quintile1	NULL
interfull_yy30_quintile2	NULL
interfull_yy30_quintile3	NULL
interfull_yy30_quintile4	NULL
interfull_yy30_quintile5	NULL
interfull_yy31_quintile1	NULL
interfull_yy31_quintile2	NULL
interfull_yy31_quintile3	NULL
interfull_yy31_quintile4	NULL
interfull_yy31_quintile5	NULL
interfull_yy32_quintile1	NULL
interfull_yy32_quintile2	NULL
interfull_yy32_quintile3	NULL
interfull_yy32_quintile4	NULL
interfull_yy32_quintile5	NULL
interfull_yy33_quintile1	NULL
interfull_yy33_quintile2	NULL
interfull_yy33_quintile3	NULL
interfull_yy33_quintile4	NULL
interfull_yy33_quintile5	NULL
interfull_yy34_quintile1	NULL
interfull_yy34_quintile2	NULL
interfull_yy34_quintile3	NULL
interfull_yy34_quintile4	NULL
interfull_yy34_quintile5	NULL
interfull_yy35_quintile1	NULL
interfull_yy35_quintile2	NULL
interfull_yy35_quintile3	NULL
interfull_yy35_quintile4	NULL
interfull_yy35_quintile5	NULL
interfull_yy36_quintile1	NULL
interfull_yy36_quintile2	NULL
interfull_yy36_quintile3	NULL
interfull_yy36_quintile4	NULL
interfull_yy36_quintile5	NULL
interfull_yy37_quintile1	NULL

Table 4: List of Variables *(continued)*

variable	label
interfull_yy37_quintile2	NULL
interfull_yy37_quintile3	NULL
interfull_yy37_quintile4	NULL
interfull_yy37_quintile5	NULL
interfull_yy38_quintile1	NULL
interfull_yy38_quintile2	NULL
interfull_yy38_quintile3	NULL
interfull_yy38_quintile4	NULL
interfull_yy38_quintile5	NULL
interfull_yy39_quintile1	NULL
interfull_yy39_quintile2	NULL
interfull_yy39_quintile3	NULL
interfull_yy39_quintile4	NULL
interfull_yy39_quintile5	NULL
interfull_yy40_quintile1	NULL
interfull_yy40_quintile2	NULL
interfull_yy40_quintile3	NULL
interfull_yy40_quintile4	NULL
interfull_yy40_quintile5	NULL
interfull_yy41_quintile1	NULL
interfull_yy41_quintile2	NULL
interfull_yy41_quintile3	NULL
interfull_yy41_quintile4	NULL
interfull_yy41_quintile5	NULL
interfull_yy42_quintile1	NULL
interfull_yy42_quintile2	NULL
interfull_yy42_quintile3	NULL
interfull_yy42_quintile4	NULL
interfull_yy42_quintile5	NULL
interfull_yy43_quintile1	NULL
interfull_yy43_quintile2	NULL
interfull_yy43_quintile3	NULL
interfull_yy43_quintile4	NULL
interfull_yy43_quintile5	NULL
interfull_yy44_quintile1	NULL
interfull_yy44_quintile2	NULL
interfull_yy44_quintile3	NULL
interfull_yy44_quintile4	NULL
interfull_yy44_quintile5	NULL
interfull_yy45_quintile1	NULL
interfull_yy45_quintile2	NULL
interfull_yy45_quintile3	NULL
interfull_yy45_quintile4	NULL
interfull_yy45_quintile5	NULL
interfull_yy46_quintile1	NULL
interfull_yy46_quintile2	NULL
interfull_yy46_quintile3	NULL

Table 4: List of Variables *(continued)*

variable	label
interfull_yy46_quintile4	NULL
interfull_yy46_quintile5	NULL
interfull_yy47_quintile1	NULL
interfull_yy47_quintile2	NULL
interfull_yy47_quintile3	NULL
interfull_yy47_quintile4	NULL
interfull_yy47_quintile5	NULL
interfull_yy48_quintile1	NULL
interfull_yy48_quintile2	NULL
interfull_yy48_quintile3	NULL
interfull_yy48_quintile4	NULL
interfull_yy48_quintile5	NULL
interfull_yy49_quintile1	NULL
interfull_yy49_quintile2	NULL
interfull_yy49_quintile3	NULL
interfull_yy49_quintile4	NULL
interfull_yy49_quintile5	NULL
interfull_yy50_quintile1	NULL
interfull_yy50_quintile2	NULL
interfull_yy50_quintile3	NULL
interfull_yy50_quintile4	NULL
interfull_yy50_quintile5	NULL
interfull_yy51_quintile1	NULL
interfull_yy51_quintile2	NULL
interfull_yy51_quintile3	NULL
interfull_yy51_quintile4	NULL
interfull_yy51_quintile5	NULL
country	Country Name
areakm2	Area in km2
cen_lat	latitude of country centroid
cen_lon	longitude of country centroid
elev	mean m above sea level
distcr	mean distance to coast or river
distc	mean distance to coast
distr	mean distance to river
tropicar	% land area in geographical tropics
troppop	%pop ('95) in geographical tropics
lc100km	%area 100km from icefree coast
lcr100km	%area 100km from icefree coast or sea-nav. river
pop95	1995 pop (from GPWv2)
pdenpavg	typical pop density experienced
pop100km	%pop ('95) 100km from icefree coast
pop100cr	%pop ('95) 100km from icefree coast or sea-nav. river
cen_c	dist centroid to coast(km)
cen_cr	dist centroid to coast/riv (km)
polity	NULL

Table 4: List of Variables *(continued)*

variable	label
xrreg	NULL
xrcomp	NULL
xropen	NULL
xconst	NULL
parreg	NULL
parcomp	NULL
exrec	NULL
exconst	NULL
polcomp	NULL
polity2_aug	NULL
independent	NULL
transition	NULL
interruption	NULL
interregnum	NULL
pr	NULL
cl	NULL
pr_aug	NULL
cl_aug	NULL
demt	NULL
polity2	NULL
status	NULL
NAME	NAME
LON	LON
LAT	LAT
_ID	NULL
GDPpercapitaconstantLCUN	GDP per capita (constant LCU) [NY.GDP.PCAP.KN]
rgdpl2	NULL
rgdpna_full	NULL
PopulationtotalSPPOPTOTL	Population, total [SP.POP.TOTL]
Populationages014oftotal	Population ages 0-14 (% of total) [SP.POP.0014.TO.ZS]
Populationages1564oftota	Population ages 15-64 (% of total) [SP.POP.1564.TO.ZS]

5.2 Arellano Bond Estimation for Table.2 (Shoya Abe)

```
data_t2 <- data %>%
  select(1:30) %>%
  group_by(country_name) %>%
  arrange(year) %>%
  mutate(
    lag1 = dplyr::lag(y, 1),
    lag2 = dplyr::lag(y, 2),
    lag3 = dplyr::lag(y, 3),
    lag4 = dplyr::lag(y, 4),
    lag5 = dplyr::lag(y, 5),
    lag6 = dplyr::lag(y, 6),
    lag7 = dplyr::lag(y, 7),
```

```
    lag8 = dplyr::lag(y, 8)
  ) %>%
  ungroup()

data_m1 <- data_t2 %>%
  drop_na(y, dem, lag1) %>%
  pdata.frame(index = c("country_name", "year"))
data_m2 <- data_t2 %>%
  drop_na(y, dem, lag1, lag2) %>%
  pdata.frame(index = c("country_name", "year"))
data_m3 <- data_t2 %>%
  drop_na(y, dem, lag1, lag2, lag3, lag4) %>%
  pdata.frame(index = c("country_name", "year"))
data_m4 <- data_t2 %>%
  drop_na(
    y, dem, lag1, lag2, lag3, lag4,
    lag5, lag6, lag7, lag8
  ) %>%
  pdata.frame(index = c("country_name", "year"))

maxlag <- 49

model_1_gmm <- pgmm(
  y ~ dem + lag(y, 1) |
    lag(y, 2:maxlag) + lag(dem, 1:maxlag),
  data = data_m1,
  effect = "twoways",
  model = "twosteps",
  transformation = "d"
)

model_2_gmm <- pgmm(
  y ~ dem + lag(y, 1) + lag(y, 2) |
    lag(y, 2:maxlag) + lag(dem, 1:maxlag),
  data = data_m2,
  effect = "twoways",
  model = "twosteps",
  transformation = "d"
)

model_3_gmm <- pgmm(
  y ~ dem + lag(y, 1) + lag(y, 2) +
    lag(y, 3) + lag(y, 4) |
    lag(y, 2:maxlag) + lag(dem, 1:maxlag),
  data = data_m3,
  effect = "twoways",
  model = "twosteps",
  transformation = "d"
)

model_4_gmm <- pgmm(
  y ~ dem + lag(y, 1) + lag(y, 2) +
    lag(y, 3) + lag(y, 4) +
```

```
    lag(y, 5) + lag(y, 6) +
    lag(y, 7) + lag(y, 8) |
    lag(y, 2:maxlag) + lag(dem, 1:maxlag),
  data = data_m4,
  effect = "twoways",
  model = "twosteps",
  transformation = "d"
)

compute_dynamic_effect <- function(dem_coef, lag_coefs, n_periods) {
  effects <- numeric(n_periods)
  effects[1] <- dem_coef
  k <- length(lag_coefs)
  if (n_periods > 1) {
    for (i in 2:n_periods) {
      eff <- dem_coef
      for (j in 1:min(i - 1, k)) {
        eff <- eff + effects[i - j] * lag_coefs[j]
      }
      effects[i] <- eff
    }
  }
  effects[n_periods]
}

coef_1 <- coef(model_1_gmm)
dem_coef_1 <- coef_1["dem"]
lag1_1 <- coef_1["lag(y, 1)"]
lre1 <- dem_coef_1 / (1 - lag1_1)
pers1 <- lag1_1
eff_25_1 <- compute_dynamic_effect(
  dem_coef_1, c(lag1_1), 25
)

coef_2 <- coef(model_2_gmm)
dem_coef_2 <- coef_2["dem"]
lag1_2 <- coef_2["lag(y, 1)"]
lag2_2 <- coef_2["lag(y, 2)"]
lre2 <- dem_coef_2 / (1 - (lag1_2 + lag2_2))
pers2 <- lag1_2 + lag2_2
eff_25_2 <- compute_dynamic_effect(
  dem_coef_2, c(lag1_2, lag2_2), 25
)

coef_3 <- coef(model_3_gmm)
dem_coef_3 <- coef_3["dem"]
lag1_3 <- coef_3["lag(y, 1)"]
lag2_3 <- coef_3["lag(y, 2)"]
lag3_3 <- coef_3["lag(y, 3)"]
lag4_3 <- coef_3["lag(y, 4)"]
lre3 <- dem_coef_3 / (1 - (lag1_3 +
  lag2_3 + lag3_3 + lag4_3))
pers3 <- lag1_3 + lag2_3 + lag3_3 + lag4_3
```

```r
eff_25_3 <- compute_dynamic_effect(
  dem_coef_3, c(lag1_3, lag2_3, lag3_3, lag4_3), 25
)

coef_4 <- coef(model_4_gmm)
dem_coef_4 <- coef_4["dem"]
lag1_4 <- coef_4["lag(y, 1)"]
lag2_4 <- coef_4["lag(y, 2)"]
lag3_4 <- coef_4["lag(y, 3)"]
lag4_4 <- coef_4["lag(y, 4)"]
lag5_4 <- coef_4["lag(y, 5)"]
lag6_4 <- coef_4["lag(y, 6)"]
lag7_4 <- coef_4["lag(y, 7)"]
lag8_4 <- coef_4["lag(y, 8)"]
lre4 <- dem_coef_4 / (1 - (lag1_4 +
  lag2_4 + lag3_4 + lag4_4 + lag5_4 +
  lag6_4 + lag7_4 + lag8_4))
pers4 <- lag1_4 + lag2_4 + lag3_4 +
  lag4_4 + lag5_4 + lag6_4 + lag7_4 + lag8_4
eff_25_4 <- compute_dynamic_effect(
  dem_coef_4,
  c(
    lag1_4, lag2_4, lag3_4, lag4_4,
    lag5_4, lag6_4, lag7_4, lag8_4
  ),
  25
)

lre <- round(c(lre1, lre2, lre3, lre4), 3)
pers <- round(c(pers1, pers2, pers3, pers4), 3)
eff_25 <- round(
  c(eff_25_1, eff_25_2, eff_25_3, eff_25_4),
  3
)

se1 <- sqrt(diag(vcov(model_1_gmm)))
se2 <- sqrt(diag(vcov(model_2_gmm)))
se3 <- sqrt(diag(vcov(model_3_gmm)))
se4 <- sqrt(diag(vcov(model_4_gmm)))

override.coef.1 <- c(
  coef_1["dem"],
  coef_1["lag(y, 1)"],
  rep(NA, 7)
)
override.se.1 <- c(
  se1["dem"],
  se1["lag(y, 1)"],
  rep(NA, 7)
)
override.coef.2 <- c(
  coef_2["dem"],
  coef_2["lag(y, 1)"],
```

```
  coef_2["lag(y, 2)"],
  rep(NA, 6)
)
override.se.2 <- c(
  se2["dem"],
  se2["lag(y, 1)"],
  se2["lag(y, 2)"],
  rep(NA, 6)
)
override.coef.3 <- c(
  coef_3["dem"],
  coef_3["lag(y, 1)"],
  coef_3["lag(y, 2)"],
  coef_3["lag(y, 3)"],
  coef_3["lag(y, 4)"],
  rep(NA, 4)
)
override.se.3 <- c(
  se3["dem"],
  se3["lag(y, 1)"],
  se3["lag(y, 2)"],
  se3["lag(y, 3)"],
  se3["lag(y, 4)"],
  rep(NA, 4)
)
override.coef.4 <- c(
  coef_4["dem"],
  coef_4["lag(y, 1)"],
  coef_4["lag(y, 2)"],
  coef_4["lag(y, 3)"],
  coef_4["lag(y, 4)"],
  coef_4["lag(y, 5)"],
  coef_4["lag(y, 6)"],
  coef_4["lag(y, 7)"],
  coef_4["lag(y, 8)"]
)
override.se.4 <- c(
  se4["dem"],
  se4["lag(y, 1)"],
  se4["lag(y, 2)"],
  se4["lag(y, 3)"],
  se4["lag(y, 4)"],
  se4["lag(y, 5)"],
  se4["lag(y, 6)"],
  se4["lag(y, 7)"],
  se4["lag(y, 8)"]
)

models <- list(model_1_gmm, model_2_gmm, model_3_gmm, model_4_gmm)

texreg(
  models,
  override.coef = list(
```

```
    override.coef.1,
    override.coef.2,
    override.coef.3,
    override.coef.4
  ),
  override.se = list(
    override.se.1,
    override.se.2,
    override.se.3,
    override.se.4
  ),
  custom.model.names = c("(1)", "(2)", "(3)", "(4)"),
  custom.coef.names = c(
    "Democracy", "Lag 1", "Lag 2",
    "Lag 3", "Lag 4", "Lag 5",
    "Lag 6", "Lag 7", "Lag 8"
  ),
  custom.gof.rows = list(
    "Persistence" = pers,
    "Long run effect" = lre,
    "Effect after 25 years" = eff_25
  ),
  file = "output/table_2_GMM.tex",
  caption = "Effect of Democracy on (Log) GDP per Capita: Arellano-Bond GMM Estimation"
)
```

	(1)	(2)	(3)	(4)
Democracy	2.79	2.29	0.05	1.51
	(2.12)	(1.63)	(1.42)	(0.51)
Lag 1	0.96***	0.99***	0.94***	0.93***
	(0.03)	(0.03)	(0.03)	(0.01)
Lag 2		−0.02	−0.00	−0.01
		(0.01)	(0.01)	(0.00)
Lag 3			0.00	0.00
			(0.01)	(0.00)
Lag 4			−0.02*	−0.01
			(0.01)	(0.00)
Lag 5				−0.00
				(0.00)
Lag 6				0.00
				(0.00)
Lag 7				−0.00
				(0.00)
Lag 8				−0.00
				(0.00)
Persistence	0.96	0.97	0.92	0.91
Long run effect	63.18	74.26	0.65	16.40
Effect after 25 years	42.76	40.77	0.59	15.27
n	175	175	175	175
T	50	49	47	43
Num. obs.	6790	6642	6336	5688
Num. obs. used	6542	6311	5824	4779
Sargan Test: chisq	145.66	147.27	140.10	146.09
Sargan Test: df	2398.00	2297.00	2095.00	1691.00
Sargan Test: p-value	1.00	1.00	1.00	1.00
Wald Test Coefficients: chisq	808.19	984.51	1143.95	2227.71
Wald Test Coefficients: df	2	3	5	9
Wald Test Coefficients: p-value	0.00	0.00	0.00	0.00
Wald Test Time Dummies: chisq	533.24	491.67	497.42	453.37
Wald Test Time Dummies: df	48	46	42	34
Wald Test Time Dummies: p-value	0.00	0.00	0.00	0.00

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 5: Effect of Democracy on (Log) GDP per Capita: Arellano–Bond GMM Estimation