# Code Appendix (R)

```
reg_eq = function(dependent, independent, fixed_effects, clustering) {
    independent_str = paste(independent, collapse = " + ")
    fixed_effects_str = paste(fixed_effects, collapse = " + ")
    eqn = paste(dependent, " ~ ", independent_str, "|", fixed_effects_str,
        "| 0 |", clustering)
    return(as.formula(eqn))
}
```

```
data = read.csv("regression_data.csv")
```

```
weatherdaily = c("avgtemp10", "skycover", "pressureavgsealevel",
    "windspeed", "precipitationwaterequiv", "avgdewpt")
weatherdailyt = c("skycover", "avgdewpt", "pressureavgsealevel",
    "windspeed", "precipitationwaterequiv")
weathertemp = c("press6t4", "dew6t4", "prcp6t4", "wind6t4", "skycover")
weather6t4 = c("temp6t410", "press6t4", "dew6t4", "prcp6t4",
    "wind6t4", "skycover")
heat = c("heat10", "press6t4", "prcp6t4", "wind6t4", "skycover")
dailyheat = c("dailyheat", "skycover", "pressureavgsealevel",
    "windspeed", "precipitationwaterequiv")
dummies = c("dayofweek", "nat_name", "c_asy_type", "year", "cm",
    "chair")
pollutants = c("ozone", "co", "pm25")
```

```
# qui xi: reg res $weatherdaily $pollutants $dummies , vce
# (cluster cm)
base_dev = felm(reg_eq("res", c(weatherdaily, pollutants), dummies,
    "cm"), data = data)


# qui xi: reg res $weather6t4 $pollutants $dummies , vce
# (cluster cm)
base_6t4 = felm(reg_eq("res", c("deviations", weather6t4, pollutants),
    dummies, "cm"), data = data)


# qui xi: reg res ltemp6t410 $weather6t4 $dummies
# $pollutants , vce (cluster cm)
lag_6t4 = felm(reg_eq("res", c("ltemp6t410", weather6t4, pollutants),
    dummies, "cm"), data = data)


# qui xi: reg res letemp6t410 $weather6t4 $dummies
# $pollutants , vce (cluster cm)
lead_6t4 = felm(reg_eq("res", c("letemp6t410", weather6t4, pollutants),
```

```
    dummies, "cm"), data = data)


# qui xi: reg res ltemp6t410 temp6t410 letemp6t410 press6t4
# dew6t4 prcp6t4 wind6t4 skycover $dummies $pollutants ,
# vce (cluster cm)
all_6t4_one = felm(reg_eq("res", c("ltemp6t410", "letemp6t410",
    weather6t4, pollutants), dummies, "cm"), data = data)
```

```
# function to get F-Stat for weather variables as described
# in paper
get_waldstat_F <- function(model, variables) (round(waldtest(model,
    variables)["F"], 3))


# function to get pvals for F-Stat for weather variables as
# described in paper
get_waldstat_pF <- function(model, variables) (round(waldtest(model,
    variables)["p.F"], 5))
```

```
# esttab base_6t4 lag_6t4 lead_6t4 all_6t4_one using
# base_6t4.tex,replace keep(ltemp6t410 temp6t410
# letemp6t410 ) se brackets star(* 0.10 ** 0.05 *** 0.01
# mtitles('base' '1-Day lag' '1-Day lead' 'all')\t


stargazer(base_6t4, lag_6t4, lead_6t4, all_6t4_one, dep.var.labels = "Result",
    covariate.labels = c("Temperature$_t/1,000$", "Temperature$_{t-1}/1,000$",
        "Temperature$_{t+1}/1,000$"), column.labels = c("Base",
        "1 Day Lag", "1 Day Lead", "1 Day Lag and Lead"), type = "latex",
    keep = c(".*temp.*"), keep.stat = c("n"), order = c(4, 2,
        3), add.lines = list(c("F-Statistic for Weather Variables",
        c(get_waldstat_F(base_6t4, weather6t4), get_waldstat_F(lag_6t4,
            c("ltemp6t410", weather6t4)), get_waldstat_F(lead_6t4,
            c("letemp6t410", weather6t4)), get_waldstat_F(all_6t4_one,
            c("ltemp6t410", "letemp6t410", weather6t4)))), c("p-value",
        c(get_waldstat_pF(base_6t4, weather6t4), get_waldstat_pF(lag_6t4,
            c("ltemp6t410", weather6t4)), get_waldstat_pF(lead_6t4,
            c("letemp6t410", weather6t4)), get_waldstat_pF(all_6t4_one,
            c("ltemp6t410", "letemp6t410", weather6t4))))))
```

```
# qui xi: reg res l3avgtemp10 l2avgtemp10 lavgtemp10
# temp6t410 le1avgtemp10 le2avgtemp10 le3avgtemp10 press6t4
# dew6t4 prcp6t4 wind6t4 $dummies $pollutants , vce
# (cluster cm)
all_6t4_one = felm(reg_eq("res", c("l3avgtemp10", "l2avgtemp10",
    "lavgtemp10", "temp6t410", "le1avgtemp10", "le2avgtemp10",
    "le3avgtemp10", "press6t4", "dew6t4", "prcp6t4", "wind6t4",
    pollutants), dummies, "cm"), data = data)


figure_5_pt = summary(all_6t4_one)$coefficients[1:7, 1]
figure_5_se = summary(all_6t4_one)$coefficients[1:7, 2]
```

```
figure_5 = ggplot() + geom_line(aes(x = 1:7, y = figure_5_pt),
    col = "red") + geom_point(aes(x = 1:7, y = figure_5_pt)) +
    geom_errorbar(aes(x = 1:7, y = figure_5_pt, ymin = figure_5_pt -
        1.95 * figure_5_se, ymax = figure_5_pt + 1.95 * figure_5_se),
        width = 0.2, position = position_dodge(0.05)) + geom_hline(yintercept = 0,
    linetype = "dotted", col = "red") + theme_bw() + labs(x = "Lagged/Leaded Temperature",
    y = "Point Estimates") + scale_x_continuous(breaks = 1:7,
    labels = c(-3:3))



figure_5
```

```
alt_dummies = c("nat_name", "dayofweek", "c_asy_type", "chair",
    "cm", "jm", "city", "year", "ym", "date")
# qui reg res $weather6t4 $pollutants , vce (cluster cm)
base_6t4_nothing_dummies = 0
base_6t4_nothing = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_nothing_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants $dummies
base_1_dummies = dummies
base_1 = felm(reg_eq("res", c(weather6t4, pollutants), base_1_dummies,
    0), data = data)


# qui reg res $weather6t4 $pollutants
base_2_dummies = 0
base_2 = felm(reg_eq("res", c(weather6t4, pollutants), base_2_dummies,
    0), data = data)


# qui reg res $weather6t4 $pollutants i.nati , cluster (cm)
base_6t4_nati_dummies = c("nat_name")
base_6t4_nati = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_nati_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants i.nati i.dayofweek ,
# cluster (cm)
base_6t4_nati_dow_dummies = c("nat_name", "dayofweek")
base_6t4_nati_dow = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_nati_dow_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants i.nati i.type
# i.dayofweek , cluster (cm)
base_6t4_nati_dow_type_dummies = c("nat_name", "c_asy_type",
    "dayofweek")
base_6t4_nati_dow_type = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_nati_dow_type_dummies, "cm"), data = data)
```

```
# qui reg res $weather6t4 $pollutants i.nati i.type
# i.dayofweek i.chair , cluster (cm)
base_6t4_nati_dow_type_j_dummies = c("nat_name", "c_asy_type",
    "dayofweek", "chair")
base_6t4_nati_dow_type_j = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_nati_dow_type_j_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants i.nati i.type
# i.dayofweek i.chair i.cm , cluster (cm)
base_6t4_nati_dow_type_j_cm_dummies = c("nat_name", "c_asy_type",
    "dayofweek", "chair", "cm")
base_6t4_nati_dow_type_j_cm = felm(reg_eq("res", c(weather6t4,
    pollutants), base_6t4_nati_dow_type_j_cm_dummies, "cm"),
    data = data)


# qui reg res $weather6t4 $pollutants i.nati i.type
# i.dayofweek i.chair i.ct i.ym , cluster (cm)
base_6t4_city_ym_dummies = c("nat_name", "c_asy_type", "dayofweek",
    "chair", "city", "ym")
base_6t4_city_ym = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_city_ym_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants i.nati i.type
# i.dayofweek i.chair i.cym , cluster (cm)
base_6t4_cym_dummies = c("nat_name", "c_asy_type", "dayofweek",
    "chair", "cym")
base_6t4_cym = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_cym_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants i.nati i.type
# i.dayofweek i.chair i.jm i.ct i.year , cluster (cm)
base_6t4_jm_ct_year_dummies = c("nat_name", "c_asy_type", "dayofweek",
    "jm", "city", "year")
base_6t4_jm_ct_year = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_jm_ct_year_dummies, "cm"), data = data)


# qui reg res $weather6t4 $pollutants i.nati i.type i.chair
# i.cm i.year i.date, cluster (cm)
base_6t4_date_dummies = c("date", "nat_name", "c_asy_type", "year",
    "cm", "chair")
base_6t4_date = felm(reg_eq("res", c(weather6t4, pollutants),
    base_6t4_date_dummies, "cm"), data = data)

# they don't have cym for some reason
models_afe = list(base_6t4_nati, base_6t4_nati_dow, base_6t4_nati_dow_type,
    base_6t4_nati_dow_type_j, base_6t4_nati_dow_type_j_cm, base_6t4_city_ym,
    base_6t4_jm_ct_year, base_6t4_date)
```

```
get_indicator <- function(dummies) {
    output = c()
    for (cov in alt_dummies) {
        indicator = cov %in% dummies
        output = c(output, indicator)
    }
    return(output)
}

dummies_list = list(base_6t4_nati_dummies, base_6t4_nati_dow_dummies,
    base_6t4_nati_dow_type_dummies, base_6t4_nati_dow_type_j_dummies,
    base_6t4_nati_dow_type_j_cm_dummies, base_6t4_city_ym_dummies,
    base_6t4_jm_ct_year_dummies, base_6t4_date_dummies)
fe_indicators = NULL
for (afe in dummies_list) {
    output = get_indicator(afe)
    fe_indicators = rbind(fe_indicators, output)
}

fe_indicators = t(fe_indicators)

fe_vars = c("Nationality FEs", "Day of Week FEs", "Type of Application FEs",
    "Judge FEs", "City-Month FEs", "Judge-Month FEs", "City FEs",
    "Year FEs", "Year-Month FEs", "Date FEs")

stargazer_addlines = NULL

for (i in 1:length(fe_vars)) {
    stargazer_addlines[[i]] = c(fe_vars[i], fe_indicators[i,
        ])
}

stargazer(models_afe, dep.var.labels = "Result", covariate.labels = c("Temperature"),
    apply.coef = multiply.by.100, apply.se = multiply.by.100,
    type = "latex", keep = c("temp6t410"), keep.stat = c("n"),
    add.lines = stargazer_addlines)
```

```
# qui reg res $weather6t4 $pollutants $dummies
no_pollution = felm(reg_eq("res", weather6t4, dummies, "cm"),
    data = data)


# Not California

CA_cities = c("SAN PEDRO", "SAN FRANCISCO", "SAN DIEGO", "LOS ANGELES",
    "LAS VEGAS", "LANCASTER", "IMPERIAL")
data$CA = data$city %in% CA_cities
no_CA = felm(reg_eq("res", c("deviations", weather6t4, pollutants),
    dummies, "cm"), data = subset(data, CA == FALSE))



# quietly reg res $weather6t4 $dummies $pollutants if
```

```
# skycover<0.1 , vce (cluster cm)

clearsky = felm(reg_eq("res", c("deviations", weather6t4, pollutants),
    dummies, "cm"), data = subset(data, skycover < 0.1))


# quietly reg res $weather6t4 $dummies $pollutants if
# precipitationwaterequiv==0 , vce (cluster cm)

norain = felm(reg_eq("res", c("deviations", weather6t4, pollutants),
    dummies, "cm"), data = subset(data, precipitationwaterequiv ==
    0))


# quietly reg res $weather6t4 $dummies $pollutants if
# precipitationwaterequiv==0 & lprcp==0, vce (cluster cm)

norain2 = felm(reg_eq("res", c("deviations", weather6t4, pollutants),
    dummies, "cm"), data = subset(data, precipitationwaterequiv ==
    0 & lprcp == 0))


# qui reg res $heat $pollutants $dummies, cluster (cm)

heat_6t4 = felm(reg_eq("res", c(heat, pollutants), dummies, "cm"),
    data = data)


# qui reg res $heat $dummies $pollutants if heat10>=0.075 ,
# cluster (cm)

heat_75 = felm(reg_eq("res", c(heat, pollutants), dummies, "cm"),
    data = subset(data, heat10 > 0.075))


# judges

judge_means = aggregate(data[, c("res", "ij_name")], list(data$ij_name),
    mean)[, 2:3]
names(judge_means)[1] = "rate"
data = merge(data, judge_means, by = "ij_name")
judge_cutoffs = quantile(judge_means$rate, c(0.1, 0.25, 0.75,
    0.9))


judge_quartile = felm(reg_eq("res", c("deviations", weather6t4,
    pollutants), dummies, "cm"), data = subset(data, rate > judge_cutoffs[2] &
    rate <= judge_cutoffs[3]))

judge_decile = felm(reg_eq("res", c("deviations", weather6t4,
    pollutants), dummies, "cm"), data = subset(data, rate > judge_cutoffs[1] &
    rate <= judge_cutoffs[4]))
```

```
models_robust = list(no_pollution, no_CA, clearsky, norain, norain2,
    heat_6t4, heat_75, judge_quartile, judge_decile)


stargazer(models_robust, dep.var.labels = "Result", covariate.labels = c("Temperature",
    "Heat Index"), type = "latex", keep = c("temp6t410", "heat10"),
    keep.stat = c("n"))
```

```
data = data %>%
    mutate(across(all_of(dummies), as.factor))
lm_model = lm(res ~ ., data = subset(data, select = c("res",
    "deviations", weather6t4, pollutants, dummies)))
hv = as.data.frame(hatvalues(lm_model))
names(hv)[1] = "leverage_scores"
```

```
hv$X = as.integer(rownames(hv))
leverage_plot = ggplot() + geom_point(aes(x = hv$X, y = hv$leverage_scores),
    size = 0.5) + labs(y = "Leverage Score", x = "Index") + theme_bw()
leverage_plot = ggMarginal(leverage_plot, margins = "y", size = 10)
leverage_plot
```

```
hv_subset = subset(hv, leverage_scores < 0.05)
leverage_plot2 = ggplot() + geom_point(aes(x = hv_subset$X, y = hv_subset$leverage_scores),
    size = 0.5) + labs(y = "Leverage Score", x = "Index") + theme_bw()
leverage_plot2 = ggMarginal(leverage_plot2, margins = "y", size = 10)
leverage_plot2
```

```
hv_subset = subset(hv, leverage_scores < 0.01)
leverage_plot3 = ggplot() + geom_point(aes(x = hv_subset$X, y = hv_subset$leverage_scores),
    size = 0.5) + labs(y = "Leverage Score", x = "Index") + theme_bw()
leverage_plot3 = ggMarginal(leverage_plot3, margins = "y", size = 10)
leverage_plot3
```

```
hv_subset = subset(hv, leverage_scores < 0.005)
leverage_plot4 = ggplot() + geom_point(aes(x = hv_subset$X, y = hv_subset$leverage_scores),
    size = 0.5) + labs(y = "Leverage Score", x = "Index") + theme_bw()
leverage_plot4 = ggMarginal(leverage_plot4, margins = "y", size = 10)
leverage_plot4
```

```
data$leverage_scores = hv$leverage_scores

dropped_leverage_0 = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies,
                                 'cm'), data = subset(data, leverage_scores <= 1))

dropped_leverage_1 = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies,
                                 'cm'), data = subset(data, leverage_scores <= 0.05))

dropped_leverage_2 = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies,
                                 'cm'), data = subset(data, leverage_scores <= 0.01))

dropped_leverage_3 = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies,
```

```
                                'cm'), data = subset(data, leverage_scores <= 0.005))


stargazer(dropped_leverage_0, dropped_leverage_1, dropped_leverage_2, dropped_leverage_3,
          dep.var.labels = 'Result',
          covariate.labels = c('Temperature$_t/1,000$'),
          column.labels = c("<= 1","<= 0.05", "<= 0.01", "<= 0.005"),
          type = "latex",
          keep = c(".*temp.*"),
          keep.stat = c('n'),
          add.lines = list(c("F-Statistic for Weather Variables",
                             c(get_waldstat_F(dropped_leverage_0, weather6t4),
                               get_waldstat_F(dropped_leverage_1, weather6t4),
                               get_waldstat_F(dropped_leverage_2, weather6t4),
                               get_waldstat_F(dropped_leverage_3, weather6t4))),
                           c("p-value",
                             c(get_waldstat_pF(dropped_leverage_0, weather6t4),
                               get_waldstat_pF(dropped_leverage_1, weather6t4),
                               get_waldstat_pF(dropped_leverage_2, weather6t4),
                               get_waldstat_pF(dropped_leverage_3, weather6t4)))

          )
)
```

```
data$leverage_scores = hv$leverage_scores
cutoffs = c(1, 0.05, 0.01, 0.005)

dropped_obs = c()
point_estimates = c()
standard_errors = c()

for (cutoff in cutoffs) {
    dropped_data = subset(data, leverage_scores <= cutoff)
    dropped_obs = c(dropped_obs, nrow(data) - nrow(dropped_data))
    base_6t4 = felm(reg_eq("res", c("deviations", weather6t4,
        pollutants), dummies, "cm"), data = dropped_data)
    point_estimates = c(point_estimates, summary(base_6t4)$coefficients[2,
        1])
    standard_errors = c(standard_errors, summary(base_6t4)$coefficients[2,
        2])
}


xlabels = c()

for (i in 1:4) {
    label = paste("<= ", cutoffs[i], " (", dropped_obs[i], ")")
    xlabels = c(xlabels, label)
}

leverage_results = ggplot() + geom_line(aes(x = 1:4, y = point_estimates),
    col = "red") + geom_point(aes(x = 1:4, y = point_estimates),
    size = 4) + geom_errorbar(aes(x = 1:4, y = point_estimates,
```

```
    ymin = point_estimates - 1.95 * standard_errors, ymax = point_estimates +
        1.95 * standard_errors), width = 0.1, position = position_dodge(0.05)) +
    geom_hline(yintercept = 0, linetype = "dotted", col = "red") +
    theme_bw() + labs(x = "Leverage Score Cutoff (Dropped Observations)",
    y = "Point Estimates") + scale_x_continuous(breaks = 1:4,
    labels = xlabels, limits = c(0.8, 4.2))

leverage_results
```

```
data = data %>%
    mutate(across(all_of(dummies), as.factor))


logit_model = glm(res ~ ., data = subset(data, select = c("res",
    "deviations", weather6t4, pollutants, dummies)), family = binomial(link = logit))

saveRDS(logit_model, file = "logit_fit.rds")

summary(logit_model)

stargazer(logit_model, dep.var.labels = "Result", covariate.labels = c("Temperature"),
    type = "text", keep = c("temp6t410"), keep.stat = c("n"))
```

```
ape = margins(logit_model, variables = "temp6t410")
summary(ape)
```

```
judge_avg_leverage = aggregate(data[, c("leverage_scores")],
    list(data$ij_name), mean)
colnames(judge_avg_leverage)[1] = "judge"
colnames(judge_avg_leverage)[2] = "mean_leverage"

ggplot(data = judge_avg_leverage, aes(x = judge, y = mean_leverage)) +
    geom_point() + geom_hline(yintercept = 0.025, color = "red") +
    labs(x = "Judge Index", y = "Mean Leverage Score") + theme_bw()
```

```
origin_avg_leverage = aggregate(data[, c("leverage_scores")],
    list(data$nat_name), mean)
colnames(origin_avg_leverage)[1] = "origin"
colnames(origin_avg_leverage)[2] = "mean_leverage"

ggplot() + geom_point(aes(x = as.integer(rownames(origin_avg_leverage)),
    y = origin_avg_leverage$mean_leverage)) + labs(x = "Country Index",
    y = "Mean Leverage") + geom_hline(yintercept = 0.025, color = "red") +
    theme_bw()
```

```
city_avg_leverage = aggregate(data[, c("leverage_scores")], list(data$city),
    mean)
colnames(city_avg_leverage)[1] = "city"
colnames(city_avg_leverage)[2] = "mean_leverage"


ggplot() + geom_point(aes(x = as.integer(rownames(city_avg_leverage)),
```

```
    y = city_avg_leverage$mean_leverage)) + labs(x = "City Index",
    y = "Mean Leverage") + geom_hline(yintercept = 0.045, color = "red") +
    theme_bw()
```

```
low_lev_judges = subset(judge_avg_leverage, mean_leverage < 0.025)$judge
low_lev_origin = subset(origin_avg_leverage, mean_leverage < 0.025)$origin
low_lev_city = subset(city_avg_leverage, mean_leverage < 0.025)$city

judge_data = subset(data, ij_name %in% low_lev_judges)
origin_data = subset(data, nat_name %in% low_lev_origin)
city_data = subset(data, city %in% low_lev_city)




judge_model = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies, 'cm'),
                   data = judge_data)

origin_model = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies, 'cm'),
                    data = origin_data)

city_model = felm(reg_eq('res', c('deviations', weather6t4, pollutants), dummies, 'cm'),
                  data = city_data)

stargazer(judge_model, origin_model, city_model,
          dep.var.labels = 'Result',
          covariate.labels = c('Temperature$_t/1,000$'),
          column.labels = c("Judges","Nationality", "Courthouse City"),
          type = "latex",
          keep = c(".*temp.*"),
          keep.stat = c('n'),
          add.lines = list(c("F-Statistic for Weather Variables",
                             c(get_waldstat_F(judge_model, weather6t4),
                               get_waldstat_F(origin_model, weather6t4),
                               get_waldstat_F(city_model,weather6t4))),
                           c("p-value",
                             c(get_waldstat_pF(judge_model, weather6t4),
                               get_waldstat_pF(origin_model, weather6t4),
                               get_waldstat_pF(city_model, weather6t4)))

          )
)
```