Statistics/Data analysis

```
      name:  <unnamed>
       log:  C:\Users\NEW USER\\Country-Level Dataset Log.smcl
  log type:  smcl
 opened on:   3 Dec 2020, 19:40:19

1 . use "$datadir\countrydatasetwith2010version13_3_.dta", clear

2 .
3 . /* Set data directory and log directory; started a log for all Stata commands and output; brought
  > country-level dataset into memory.
  >
  > The country-level dataset comes mostly from the World Bank's World Development Indicators (WDI) as
  >  well as two variables measuring environmental governance and institutions from Freedom House. */
4 .
5 . summarize
```

Variable	Obs	Mean	Std. Dev.	Min	Max
cn	0				
cc	0				
year	531	2000	8.172665	1990	2010
ag_lnd	504	38.77301	22.30507	.525641	86.48154
ag_surf	503	271804.7	700736.1	7.4	5220030
co2_em	505	4.605212	6.485877	.0181349	58.52217
elec_cons_kh	375	3868.092	5185.706	22.51489	51439.91
elec_cons_kg	403	2386.677	2757.014	42.98937	18401.3
srf_area	526	744788.8	2007951	20	1.71e+07
exp_gds_srv	495	40.14247	27.99478	4.021389	219.4121
ext_dbt	327	2.19e+10	5.54e+10	3.82e+07	5.60e+11
for_dir_in~t	489	7.03e+09	2.94e+10	-2.20e+10	3.21e+11
gdp_curr	521	2.29e+11	9.94e+11	2.84e+07	1.50e+13
gdpcap	521	8722.309	13895.74	98.03187	102863.1
gdp_grwth	503	3.882542	5.416369	-51.03086	35.38456
grs_cap_frm	479	23.50937	11.10468	0	131.0497
imp_gds_srv	495	45.36215	27.68967	4.631322	213.5375
ind_va	451	29.81403	13.18773	4.993775	96.7361
off_dev_asst	412	4.03e+08	6.23e+08	-2.56e+08	6.06e+09
serv_va	451	54.18183	15.33121	2.428377	92.83361
gdp_defl	503	48.66765	404.3905	-20.93467	6261.24
gdp_deflator	514	141.0169	291.2919	2.68e-10	3218.615
mrch_trd	499	65.73597	43.36896	7.802789	374.0895
net_brtr	433	108.6388	29.94763	29.55416	237.5
mil_expnd	388	2.903074	6.045631	.0373755	102.898
frtl_rte	518	3.365119	1.738296	.939	8.667
msl_immun	491	82.20163	16.70678	25	99
imprv_san	486	68.08004	31.22069	2.6	100
imprv_h2o	495	83.29495	18.4772	13.2	100
lifeexp	519	67.15366	10.12991	32.61156	82.97805
mort_rte_u~5	513	56.42456	59.0015	2.4	328.2
pop_grwth	531	1.597279	1.360082	-2.096943	10.39837
tot_pop	531	3.34e+07	1.27e+08	15089	1.34e+09
popdens	526	306.7747	1587.312	1.405897	21595.35
urban	531	54.11438	23.95198	5.416	100
intnet_usrs	528	14.01295	22.58958	0	93.39
cell_subsc~p	528	35.80263	47.70859	0	209.9152
pol_rgt_ind	478	3.487448	2.198448	1	7
cvl_lib_ind	479	3.43215	1.788822	1	7

```
6 .
7 . summarize co2_em
```

Variable	Obs	Mean	Std. Dev.	Min	Max
co2_em	**505**	**4.605212**	**6.485877**	**.0181349**	**58.52217**

```
8 .
9 . bysort cn (co2_em) : drop if missing(co2_em[1]) | missing(co2_em[_N])
  (69 observations deleted)

10.
11. describe
```

Contains data from **C:\Users\NEW USER\\countrydatasetwith2010version13_3_.dta**
obs: **462**
vars: **39** **18 Jan 2018 11:25**

variable name	storage type	display format	value label	variable label
cn	str30	%30s		**Country name**
cc	str3	%9s		**Country code**
year	int	%8.0g		**Year**
ag_lnd	float	%9.0g		**Agricultural land as % of land area**
ag_surf	float	%9.0g		**Agricultural land as % of land area**
co2_em	float	%9.0g		**CO2 emissions (metric tons per capita)**
elec_cons_kh	float	%9.0g		**Electric power consumption (kWh per capita)**
elec_cons_kg	float	%9.0g		**Energy use (kg of oil equivalent per capita)**
srf_area	float	%9.0g		**Surface area (sq. km)**
exp_gds_srv	float	%9.0g		**Exports of goods and services (% of GDP)**
ext_dbt	double	%10.0g		**External debt stocks, total (DOD, current US$)**
for_dir_invst	double	%10.0g		**Foreign direct investment, net inflows (BoP, current US$)**
gdp_curr	double	%10.0g		**GDP in current U.S. dollars**
gdpcap	float	%9.0g		**GDP per capita**
gdp_grwth	float	%9.0g		**GDP growth (annual %)**
grs_cap_frm	float	%9.0g		**Gross capital formation (% of GDP)**
imp_gds_srv	float	%9.0g		**Imports of goods and services (% of GDP)**
ind_va	float	%9.0g		**Industry value-added (% of GDP)**
off_dev_asst	double	%10.0g		**Official dev. assistance and official aid (current US$)**
serv_va	float	%9.0g		**Services, etc. value-added (% of GDP)**
gdp_defl	float	%9.0g		**Inflation, GDP deflator (annual %)**
gdp_deflator	float	%9.0g		**GDP deflator (base year varies by country)**
mrch_trd	float	%9.0g		**Merchandise trade (% of GDP)**
net_brtr	float	%9.0g		**Net barter terms of trade (2000 = 100)**
mil_expnd	float	%9.0g		**Military expenditure (% of GDP)**
frtl_rte	float	%9.0g		**Fertility rate, total (births per woman)**
msl_immun	byte	%8.0g		**% of children age 12-23 months immunized for measles**
imprv_san	float	%9.0g		**% of urban pop w/ access to improved sanitation facilities**
imprv_h2o	float	%9.0g		**% of pop w/ access to improved water source**
lifeexp	float	%9.0g		**Life expectancy**
mort_rte_undr5	float	%9.0g		**Mortality rate of children 5 and under (per 1,000)**
pop_grwth	float	%9.0g		**Population growth (annual %)**
tot_pop	long	%12.0g		**Total population**
popdens	float	%9.0g		**Population density**
urban	float	%9.0g		**% of population urban**
intnet_usrs	float	%9.0g		**Internet users, per 100 people**
cell_subscrip	float	%9.0g		**Mobile cellular subscriptions per 100 people**
pol_rgt_ind	byte	%8.0g		**Political rights index**
cvl_lib_ind	byte	%8.0g		**Civil liberties index**

Sorted by: **cn co2_em**
Note: Dataset has changed since last saved.

```
12.
13. /* Ran descriptive statistics for the dataset. After also pulling up our data in data editor, we c
  > an see that our dependent variable, co2_em, only has observations for 154 countries for all three
  > years.
  >
  > Bysort command with drop and missing conditions to drop all observations (countries = cn) if they
  > were missing co2_em for any year. There are now have 462 observations. */
14.
15. ssc install mdesc
  checking mdesc consistency and verifying not already installed...
  all files already exist and are up to date.

16. mdesc
```

Variable	Missing	Total	Percent Missing
cn	0	462	0.00
cc	0	462	0.00
year	0	462	0.00
ag_lnd	7	462	1.52
ag_surf	8	462	1.73
co2_em	0	462	0.00
elec_cons_kh	147	462	31.82
elec_cons_kg	119	462	25.76
srf_area	4	462	0.87
exp_gds_srv	26	462	5.63
ext_dbt	162	462	35.06
for_dir_in~t	18	462	3.90
gdp_curr	5	462	1.08
gdpcap	5	462	1.08
gdp_grwth	16	462	3.46
grs_cap_frm	43	462	9.31
imp_gds_srv	26	462	5.63
ind_va	70	462	15.15
off_dev_asst	90	462	19.48
serv_va	70	462	15.15
gdp_defl	16	462	3.46
gdp_deflator	11	462	2.38
mrch_trd	8	462	1.73
net_brtr	74	462	16.02
mil_expnd	114	462	24.68
frtl_rte	13	462	2.81
msl_immun	18	462	3.90
imprv_san	35	462	7.58
imprv_h2o	29	462	6.28
lifeexp	12	462	2.60
mort_rte_u~5	15	462	3.25
pop_grwth	0	462	0.00
tot_pop	0	462	0.00
popdens	4	462	0.87
urban	0	462	0.00
intnet_usrs	3	462	0.65
cell_subsc~p	3	462	0.65
pol_rgt_ind	30	462	6.49
cvl_lib_ind	29	462	6.28

```
17.
18. /* Installed the mdesc package to view missing values for each variable.
  > Variables of interest are listed below with the number of missing observations for each variable:
  >
  > Gdpcap = 5
  > intnet_usrs = 3
  > elec_cons_kg = 119
  > pop_growth = 0
  > tot_pop = 0
  > popdens = 4
  > urban = 0
  > ag_lnd = 7
  > ind_va = 70
  > pol_rgt_ind = 30
  >
  > Replacing the 255 missing observations with the mean of the other observations in the dataset for
  > variables gdpcap intnet_usrs elec_cons_kg popdens ag_lnd ind_va pol_rgt_ind. */
```

```
19.
20. foreach var of varlist gdpcap intnet_usrs elec_cons_kg popdens ag_lnd ind_va pol_rgt_ind {
    2. gen _`var' = `var'
    3. egen stmean`var'=mean(`var')
    4. replace _`var'=stmean`var' if missing(`var')
    5. gen miss`var'= missing(`var')
    6. summarize `var' _`var' stmean`var'
    7. }
  (5 missing values generated)
  (5 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
gdpcap	457	9148.805	14482.4	98.03187	102863.1
_gdpcap	462	9148.805	14403.64	98.03187	102863.1
stmeangdpcap	462	9148.805	0	9148.805	9148.805

```
  (3 missing values generated)
  (3 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
intnet_usrs	459	13.797	22.49985	0	93.39
_intnet_usrs	462	13.797	22.42653	0	93.39
stmeanintn~s	462	13.797	0	13.797	13.797

```
  (119 missing values generated)
  (119 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
elec_cons_kg	343	2319.868	2916.197	42.98937	18401.3
_elec_cons~g	462	2319.868	2511.768	42.98937	18401.3
stmeanelec~g	462	2319.868	0	2319.868	2319.868

```
  (4 missing values generated)
  (4 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
popdens	458	338.8066	1698.642	1.405897	21595.35
_popdens	462	338.8066	1691.256	1.405897	21595.35
stmeanpopd~s	462	338.8066	0	338.8066	338.8066

```
  (7 missing values generated)
  (7 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
ag_lnd	455	37.66702	22.37773	.525641	86.48154
_ag_lnd	462	37.66702	22.20719	.525641	86.48154
stmeanag_lnd	462	37.66702	0	37.66702	37.66702

```
  (70 missing values generated)
  (70 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
ind_va	392	28.84705	12.53444	4.993775	75.3772
_ind_va	462	28.84705	11.54364	4.993775	75.3772
stmeanind_va	462	28.84705	0	28.84705	28.84705

```
  (30 missing values generated)
  (30 real changes made)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
pol_rgt_ind	432	3.476852	2.189284	1	7
_pol_rgt_ind	462	3.476852	2.116851	1	7
stmeanpol_~d	462	3.476852	0	3.476852	3.476852

```
21.
22. /* Used a foreach loop to first flag the variables with missing values that are being replaced, th
  > en created new variables "_`var'" where the missing values with the mean of all other observations
  >  of that variable are replaced. */
23.
24. gen year1990 = (year==1990)

25. gen year2000 = (year==2000)

26. gen year2010 = (year==2010)

27.
28. /* Generated year dummy variables for years 2000 and 2010.*/
29.
30. recode _pol_rgt_ind (1/4=1) (5/7=0)
  (_pol_rgt_ind: 335 changes made)

31. sum co2_em _gdpcap, d

           CO2 emissions (metric tons per capita)
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .0338492       .0181349
 5%     .0738839       .0205421
10%      .119013       .0210966       Obs                 462
25%     .4930546       .0246189       Sum of Wgt.         462

50%     1.770185                      Mean           4.515345
                       Largest       Std. Dev.      6.659069
75%     6.226035       36.9041
90%     10.59447       38.33784       Variance       44.34319
95%     18.43502       42.63908       Skewness       3.184106
99%     29.69343       58.52217       Kurtosis       17.83836

                          _gdpcap
-------------------------------------------------------------
      Percentiles      Smallest
 1%     156.5919       98.03187
 5%     243.5613       124.0509
10%     340.1566       128.6355       Obs                 462
25%     760.7787       155.7644       Sum of Wgt.         462

50%     2578.266                      Mean           9148.805
                       Largest       Std. Dev.      14403.64
75%     11264.02       74277.13
90%      27989.3       87646.27       Variance       2.07e+08
95%     38332.16       88207.33       Skewness         2.6982
99%     70870.23       102863.1       Kurtosis       12.24577

32. twoway scatter co2_em _gdpcap

33. graph save "$datadir\Country-Level Descriptive Statistics _gdpcap.gph", asis replace
  (note: file C:\Users\NEW USER\\Country-Level Descriptive Statistics _gdpcap.gph not found)
  file C:\Users\NEW USER\\Country-Level Descriptive Statistics _gdpcap.gph saved

34. sktest _gdpcap

  Skewness and kurtosis tests for normality
                                                    ------ Joint test ------
    Variable |       Obs   Pr(skewness)   Pr(kurtosis)   Adj chi2(2)  Prob>chi2
-------------+-------------------------------------------------------------------
     _gdpcap |       462          0.0000          0.0000        212.17      0.0000

35. graph twoway scatter co2_em _gdpcap
```

```
. gen _lngdpcap=log(_gdpcap)

.
. /*Recoded the political rights index variable into a dummy variable so that countries that are "mo
> re free" (1 - 4) are coded as 1, while countries
> that are "less free" (5 - 7) are coded as 0. */
.
. /*Generated a log of GDP per capita, which showed skewness.*/
.
. gen lngdpcappol_rgt_ind = _pol_rgt_ind*_lngdpcap

.
. /*Generated an interaction term, taking the new variables replaced with means (_pol_rgt_ind and _l
> ngdpcap)*/
.
. gen tot_pop10mil = (tot_pop/10000000)

. gen tot_popsq = tot_pop10mil*tot_pop10mil

. gen _popdens100 = (_popdens/100)

. gen _ag_lnd100 = (_ag_lnd/100)

. rename _elec_cons_kg _energy_cons_kg

. encode cc, generate(cc_num)

.
. /*Divided total population by 10,000,000 in order to have visible regression results above "0.000"
>  in output.
>
> Generated a quadratic (squared term) of total population as well.
>
> Divided popluation density by 100 in order to have visible regression results above "0.000" in our
>  output.
>
> Divided agricultural land by 100 in order to have visible regression results above "0.000" in our
> output.
>
> Renamed _elec_cons_kg _energy_cons_kg as the original name is misleading; variable does not repres
> ent electricity consumption, but energy (oil) consumption.
>
> Created a new country-code variable, "cc_num", which is the destringed version of the original cou
> ntry-code variable.
>
> */
. label variable _lngdpcap "Log of GDP per capita"

. label variable _pol_rgt_ind "Political rights index"

. label variable lngdpcappol_rgt_ind "Political rights index x GDP per Capita"

. label variable _intnet_usrs "Internet users per 100 people"

. label variable _energy_cons_kg "Energy consumption per capita"

. label variable tot_pop10mil "Total population (divided by 10,000,000)"

. label variable tot_popsq "Total population squared (divided by 10,000,000)"

. label variable _popdens100 "Population density per sq. km"

. label variable _ag_lnd100 "Agricultural land as % of land area (divided by 100)"
```

```
63. label variable _ind_va "Value-added of industry as % of GDP"

64.
65. /* Relabeled variables. */
66.
67. ssc install outreg2
  checking outreg2 consistency and verifying not already installed...
  all files already exist and are up to date.

68.
69. tabstat co2_em _gdpcap _intnet_usrs _energy_cons_kg pop_grwth tot_pop10mil _popdens100 urban _ag_l
  > nd100 _ind_va _pol_rgt_ind year2000 year2010, statistics(mean sum max min range sd variance)

    stats |    co2_em   _gdpcap  _intne~s  _energ~g  pop_gr~h  tot_po~l  _pop~100     urban  _ag_~100
  >    _ind_va
----------+-----------------------------------------------------------------------------------------
     mean |  4.515345  9148.805    13.797  2319.868  1.773615  3.579602  3.388066  53.84688  .3766702
  >   28.84705
      sum |  2086.089   4226748  6374.215   1071779  819.4103  1653.776  1565.286  24877.26  174.0216
  >   13327.34
      max |  58.52217  102863.1     93.39   18401.3  10.39837  133.7705  215.9535       100  .8648155
  >    75.3772
      min |  .0181349  98.03187         0  42.98937 -1.803751  .0015089   .014059     5.416  .0052564
  >   4.993775
    range |  58.50404  102765.1     93.39  18358.31  12.20212   133.769  215.9394    94.584  .8595591
  >   70.38342
       sd |  6.659069  14403.64  22.42653  2511.768  1.318728  13.49421  16.91256  24.71085  .2220719
  >   11.54364
 variance |  44.34319  2.07e+08   502.949   6308977  1.739045  182.0937  286.0347  610.6263  .0493159
  >   133.2556
----------+-----------------------------------------------------------------------------------------

    stats |  _pol_r~d  year2000  year2010
----------+---------------------------------
     mean |  .6601732  .3333333  .3333333
      sum |        305       154       154
      max |          1         1         1
      min |          0         0         0
    range |          1         1         1
       sd |  .4741637  .4719155  .4719155
 variance |  .2248312  .2227043  .2227043
----------+---------------------------------

70.
71. outreg2 using "$output\Table 1.doc", replace sum(log) keep(co2_em _gdpcap _intnet_usrs _energy_con
  > s_kg pop_grwth tot_pop10mil _popdens100 urban _ag_lnd100 _ind_va _pol_rgt_ind year2000 year2010) s
  > ortvar(co2_em _gdpcap _intnet_usrs _energy_cons_kg pop_grwth tot_pop10mil _popdens100 urban _ag_ln
  > d100 _ind_va _pol_rgt_ind year2000 year2010) label title("Table 1: Descriptive Statistics for CO2
  > Emissions (Dependent Variable), Economic and Control Variables")

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
        year |        462        2000    8.173817        1990       2010
      ag_lnd |        455    37.66702    22.37773    .525641   86.48154
     ag_surf |        454    274475.3    713585.2         7.4    5220030
      co2_em |        462    4.515345    6.659069   .0181349   58.52217
elec_cons_kh |        315    3906.107    5606.496    22.51489   51439.91
-------------+--------------------------------------------------------
elec_cons_kg |        343    2319.868    2916.197    42.98937    18401.3
    srf_area |        458      705514     1672278          20    9984670
 exp_gds_srv |        436    39.37904    28.88656    4.021389   219.4121
     ext_dbt |        300     2.26e+10    5.70e+10    3.82e+07    5.60e+11
for_dir_in~t |        444     6.84e+09    2.90e+10   -2.20e+10    3.21e+11
-------------+--------------------------------------------------------
    gdp_curr |        457     2.37e+11    1.04e+12    2.84e+07    1.50e+13
      gdpcap |        457    9148.805     14482.4    98.03187    102863.1
   gdp_grwth |        446    3.831153    5.340542   -51.03086    28.61594
 grs_cap_frm |        419    23.16839    11.37445           0    131.0497
 imp_gds_srv |        436    44.26154    27.99191    4.631322   213.5375
-------------+--------------------------------------------------------
      ind_va |        392    28.84705    12.53444    4.993775     75.3772
off_dev_asst |        372     4.20e+08    6.48e+08   -2.56e+08    6.06e+09
     serv_va |        392    55.03139     14.9517    13.25032    92.83361
    gdp_defl |        446      53.238    429.1983   -9.880848    6261.24
```

gdp_deflator	451	131.11	271.0835	2.68e-10	3218.615
mrch_trd	454	63.50815	43.4652	7.802789	374.0895
net_brtr	388	108.4343	30.21313	29.55416	237.5
mil_expnd	348	2.996009	6.364389	.0373755	102.898
frtl_rte	449	3.539283	1.760632	.939	8.667
msl_immun	444	81.18468	16.97567	25	99
imprv_san	427	65.58852	31.74066	2.6	100
imprv_h2o	433	82.12587	19.10524	13.2	100
lifeexp	450	66.77735	10.6015	32.61156	82.97805
mort_rte_u~5	447	59.60984	61.54618	2.4	328.2
pop_grwth	462	1.773615	1.318728	-1.803751	10.39837
tot_pop	462	3.58e+07	1.35e+08	15089	1.34e+09
popdens	458	338.8066	1698.642	1.405897	21595.35
urban	462	53.84688	24.71085	5.416	100
intnet_usrs	459	13.797	22.49985	0	93.39
cell_subsc~p	459	35.44158	47.43682	0	209.9152
pol_rgt_ind	432	3.476852	2.189284	1	7
cvl_lib_ind	433	3.420323	1.781789	1	7
_gdpcap	462	9148.805	14403.64	98.03187	102863.1
stmeangdpcap	462	9148.805	0	9148.805	9148.805
missgdpcap	462	.0108225	.103579	0	1
_intnet_usrs	462	13.797	22.42653	0	93.39
stmeanintn~s	462	13.797	0	13.797	13.797
missintnet~s	462	.0064935	.0804073	0	1
_energy_co~g	462	2319.868	2511.768	42.98937	18401.3
stmeanelec~g	462	2319.868	0	2319.868	2319.868
misselec_c~g	462	.2575758	.4377731	0	1
_popdens	462	338.8066	1691.256	1.405897	21595.35
stmeanpopd~s	462	338.8066	0	338.8066	338.8066
misspopdens	462	.008658	.0927452	0	1
_ag_lnd	462	37.66702	22.20719	.525641	86.48154
stmeanag_lnd	462	37.66702	0	37.66702	37.66702
missag_lnd	462	.0151515	.1222878	0	1
_ind_va	462	28.84705	11.54364	4.993775	75.3772
stmeanind_va	462	28.84705	0	28.84705	28.84705
missind_va	462	.1515152	.358939	0	1
_pol_rgt_ind	462	.6601732	.4741637	0	1
stmeanpol_~d	462	3.476852	0	3.476852	3.476852
misspol_rg~d	462	.0649351	.2466784	0	1
year1990	462	.3333333	.4719155	0	1
year2000	462	.3333333	.4719155	0	1
year2010	462	.3333333	.4719155	0	1
_lngdpcap	462	7.96044	1.637373	4.585293	11.54115
lngdpcappo~d	462	5.530558	4.16924	0	11.54115
tot_pop10mil	462	3.579602	13.49421	.0015089	133.7705
tot_popsq	462	194.5132	1570.201	2.28e-06	17894.54
_popdens100	462	3.388066	16.91256	.014059	215.9535
_ag_lnd100	462	.3766702	.2220719	.0052564	.8648155
cc_num	462	77.5	44.50322	1	154

Following variable is string, not included:
cn cc
C:\Users\NEW USER\\Table 1.doc
dir : seeout

```
72.
73. /* Created a summary statement with all variables of interest. Used the outreg2 code to export the
  >  statistics. */
74.
75. correlate co2_em _gdpcap _intnet_usrs _energy_cons_kg pop_grwth tot_pop10mil _popdens100 urban _ag
  > _lnd100 _ind_va _pol_rgt_ind year2000 year2010
  (obs=462)

             |   co2_em  _gdpcap _intne~s _energ~g pop_gr~h tot_po~l _pop~100    urban _ag_~100  _in
  > d_va _pol_r~d
-------------+---------------------------------------------------------------------------------------
             |
      co2_em |   1.0000
     _gdpcap |   0.5788   1.0000
_intnet_usrs |   0.3520   0.7472   1.0000
_energy_co~g |   0.8600   0.6042   0.4062   1.0000
   pop_grwth |   0.0754  -0.1619  -0.2232   0.0854   1.0000
tot_pop10mil |  -0.0266  -0.0473  -0.0074  -0.0753  -0.0633   1.0000
 _popdens100 |   0.0169   0.1586   0.0974   0.0258   0.0040  -0.0221   1.0000
       urban |   0.5338   0.5959   0.4630   0.4384  -0.2103  -0.0826   0.2339   1.0000
  _ag_lnd100 |  -0.2407  -0.1708  -0.1117  -0.2718  -0.1101   0.1314  -0.0598  -0.1361   1.0000
     _ind_va |   0.2448  -0.0192  -0.0163   0.1392   0.0386   0.0901  -0.1109   0.2053  -0.0942   1.
  > 0000
_pol_rgt_ind |   0.0348   0.2376   0.2223   0.0281  -0.3808  -0.0389   0.0567   0.2739   0.0209  -0.
  > 1260   1.0000
    year2000 |   0.0092  -0.0750  -0.1651   0.0329  -0.0447   0.0003   0.0057  -0.0027   0.0016  -0.
  > 0024   0.0323
    year2010 |   0.0280   0.2421   0.5996   0.0762  -0.0420   0.0267   0.0095   0.0982   0.0042  -0.
  > 0253   0.0808

             | year2000 year2010
-------------+------------------
    year2000 |   1.0000
    year2010 |  -0.5000   1.0000


76.
77. ssc install estout
  checking estout consistency and verifying not already installed...
  all files already exist and are up to date.

78. estpost correlate co2_em _gdpcap _intnet_usrs _energy_cons_kg pop_grwth tot_pop10mil _popdens100 u
  > rban _ag_lnd100 _ind_va _pol_rgt_ind year2000 year2010, matrix listwise

             |      e(b)     e(rho)       e(p)   e(count)
-------------+--------------------------------------------
co2_em       |
      co2_em |          1          1                  462
     _gdpcap |  .5788219   .5788219   1.12e-42        462
_intnet_usrs |   .351991    .351991   6.38e-15        462
_energy_co~g |  .8600167   .8600167   1.7e-136        462
   pop_grwth |  .0753949   .0753949   .1055621        462
tot_pop10mil | -.0265931  -.0265931   .5685761        462
 _popdens100 |  .0169188   .0169188   .7168316        462
       urban |  .5338079   .5338079   2.18e-35        462
  _ag_lnd100 | -.2407407  -.2407407   1.63e-07        462
     _ind_va |   .244811    .244811   9.87e-08        462
_pol_rgt_ind |  .0348251   .0348251   .4552233        462
    year2000 |  .0091726   .0091726   .8441196        462
    year2010 |  .0279965   .0279965   .5483401        462
_gdpcap      |
     _gdpcap |          1          1                  462
_intnet_usrs |  .7471807   .7471807   1.20e-83        462
_energy_co~g |  .6041682   .6041682   2.65e-47        462
   pop_grwth | -.1619394  -.1619394   .0004751        462
tot_pop10mil | -.0473412  -.0473412   .3099282        462
 _popdens100 |  .1586071   .1586071   .0006226        462
       urban |  .5958694   .5958694   9.61e-46        462
  _ag_lnd100 | -.1708091  -.1708091   .0002255        462
     _ind_va | -.0191578  -.0191578   .6812898        462
_pol_rgt_ind |  .2375578   .2375578   2.39e-07        462
    year2000 | -.0750133  -.0750133    .107343        462
    year2010 |  .2421257   .2421257   1.37e-07        462
_intnet_usrs |
_intnet_usrs |          1          1                  462
_energy_co~g |  .4062408   .4062408   8.73e-20        462
```

pop_grwth	-.2232031	-.2232031	1.26e-06	462
tot_pop10mil	-.0074276	-.0074276	.8734964	462
_popdens100	.0974189	.0974189	.036327	462
urban	.4629613	.4629613	6.40e-26	462
_ag_lnd100	-.1117241	-.1117241	.0162861	462
_ind_va	-.0162754	-.0162754	.7271622	462
_pol_rgt_ind	.222345	.222345	1.39e-06	462
year2000	-.1651301	-.1651301	.0003649	462
year2010	.5996144	.5996144	1.92e-46	462
_energy_co~g				
_energy_co~g	1	1		462
pop_grwth	.0853646	.0853646	.0667699	462
tot_pop10mil	-.0753206	-.0753206	.1059069	462
_popdens100	.0257708	.0257708	.5805973	462
urban	.438435	.438435	3.99e-23	462
_ag_lnd100	-.2717624	-.2717624	2.89e-09	462
_ind_va	.1391932	.1391932	.0027145	462
_pol_rgt_ind	.0281495	.0281495	.5461549	462
year2000	.0329306	.0329306	.4801319	462
year2010	.0762201	.0762201	.101791	462
pop_grwth				
pop_grwth	1	1		462
tot_pop10mil	-.0632716	-.0632716	.1745757	462
_popdens100	.0040111	.0040111	.9314812	462
urban	-.2103029	-.2103029	5.14e-06	462
_ag_lnd100	-.1101439	-.1101439	.0178725	462
_ind_va	.0385692	.0385692	.4081942	462
_pol_rgt_ind	-.380828	-.380828	2.15e-17	462
year2000	-.044715	-.044715	.3375642	462
year2010	-.0419838	-.0419838	.3679286	462
tot_pop10mil				
tot_pop10mil	1	1		462
_popdens100	-.0220787	-.0220787	.6359739	462
urban	-.0826382	-.0826382	.0759863	462
_ag_lnd100	.1313932	.1313932	.0046721	462
_ind_va	.090114	.090114	.0529142	462
_pol_rgt_ind	-.0389362	-.0389362	.4037455	462
year2000	.0002811	.0002811	.995192	462
year2010	.026697	.026697	.5670666	462
_popdens100				
_popdens100	1	1		462
urban	.2339394	.2339394	3.67e-07	462
_ag_lnd100	-.0597931	-.0597931	.1995374	462
_ind_va	-.1108716	-.1108716	.0171259	462
_pol_rgt_ind	.0567072	.0567072	.223775	462
year2000	.0056517	.0056517	.903571	462
year2010	.0094618	.0094618	.8392697	462
urban				
urban	1	1		462
_ag_lnd100	-.136062	-.136062	.0033868	462
_ind_va	.205309	.205309	8.65e-06	462
_pol_rgt_ind	.2738737	.2738737	2.16e-09	462
year2000	-.0027048	-.0027048	.9537638	462
year2010	.0982401	.0982401	.0347741	462
_ag_lnd100				
_ag_lnd100	1	1		462
_ind_va	-.0942077	-.0942077	.0429769	462
_pol_rgt_ind	.020872	.020872	.6545425	462
year2000	.0016168	.0016168	.972352	462
year2010	.0042052	.0042052	.9281739	462
_ind_va				
_ind_va	1	1		462
_pol_rgt_ind	-.1259815	-.1259815	.0067011	462
year2000	-.0023866	-.0023866	.9591995	462
year2010	-.025322	-.025322	.5872071	462
_pol_rgt_ind				
_pol_rgt_ind	1	1		462
year2000	.0323136	.0323136	.4884013	462
year2010	.080784	.080784	.0828262	462
year2000				
year2000	1	1		462
year2010	-.5	-.5	1.36e-30	462
year2010				
year2010	1	1		462

```
79. est store c1

80. esttab * using Appendix.rtf, replace unstack not noobs compress
  (output written to Appendix.rtf)

81.
82. /* Created a correlation matrix with all of variables to be used in each of our models, finding ev
  > idence of multicollinearity.
  >
  > Used the estout package to export the correlation matrix to an appendix. */
83.
84. /* MODEL 1: BASE REGRESSION */
85.
86. reg co2_em _lngdpcap year2000 year2010
```

Source	SS	df	MS	Number of obs	=	462
				F(3, 458)	=	114.10
Model	8743.48109	3	2914.4937	Prob > F	=	0.0000
Residual	11698.7312	458	25.5430813	R-squared	=	0.4277
				Adj R-squared	=	0.4240
Total	20442.2123	461	44.3431937	Root MSE	=	5.054

co2_em	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_lngdpcap	2.747201	.1487468	18.47	0.000	2.45489	3.039512
year2000	-.2018507	.576993	-0.35	0.727	-1.335732	.9320311
year2010	-2.090102	.594264	-3.52	0.000	-3.257924	-.92228
_cons	-16.5896	1.195313	-13.88	0.000	-18.93858	-14.24062

```
87.
88. /* Ran a regression predicting CO2 emissions from the log of GDP per capita with dummy variables f
  > or the year 2000 and year 2010. Omitted 1990 because of multicollinearity. This will be the compar
  > ison year for years 2000 and 2010. */
89.
90. /* MODEL 2: REGRESSION + POTENTIALLY OMITTED VARIABLES */
91.
92. reg co2_em _lngdpcap _intnet_usrs _energy_cons_kg pop_grwth tot_pop10mil _popdens100 urban _ag_lnd
  > 100 _ind_va _pol_rgt_ind year2000 year2010
```

Source	SS	df	MS	Number of obs	=	462
				F(12, 449)	=	161.83
Model	16603.375	12	1383.61458	Prob > F	=	0.0000
Residual	3838.83731	449	8.54974901	R-squared	=	0.8122
				Adj R-squared	=	0.8072
Total	20442.2123	461	44.3431937	Root MSE	=	2.924

co2_em	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_lngdpcap	1.359922	.1832676	7.42	0.000	.9997534	1.720091
_intnet_usrs	-.03028	.0104215	-2.91	0.004	-.050761	-.0097991
_energy_cons_kg	.0018019	.0000741	24.31	0.000	.0016562	.0019476
pop_grwth	.5516635	.1257145	4.39	0.000	.3046017	.7987253
tot_pop10mil	.025433	.010339	2.46	0.014	.0051141	.0457519
_popdens100	-.0203236	.0084961	-2.39	0.017	-.0370207	-.0036265
urban	.0195976	.0090803	2.16	0.031	.0017525	.0374428
_ag_lnd100	.6825521	.6541512	1.04	0.297	-.603026	1.96813
_ind_va	.0323864	.0128534	2.52	0.012	.0071262	.0576467
_pol_rgt_ind	-.5840335	.331672	-1.76	0.079	-1.235856	.0677886
year2000	-.3902176	.3429799	-1.14	0.256	-1.064263	.2838277
year2010	-.8309732	.4397396	-1.89	0.059	-1.695176	.03323
_cons	-12.52729	1.271304	-9.85	0.000	-15.02573	-10.02884

```
93.
94. /* Ran a regression predicting CO2 emissions based on GDP per capita, GDP growth, internet users,
  > energy consumption, population growth, total population (divided by 10,000,000), population densit
  > y (divided by 100), urbanicity, agricultural industry, value-added industry, and year. */
95.
96. /* MODEL 3: REGRESSION W/ INTERACTION TERM AND FUNCTIONAL FORM TERM */
97.
98. reg co2_em _lngdpcap _pol_rgt_ind lngdpcappol_rgt_ind _intnet_usrs _energy_cons_kg pop_grwth tot_p
  > op10mil tot_popsq _popdens100 urban _ag_lnd100 _ind_va year2000 year2010
```

Source	SS	df	MS		
Model	**16755.5406**	**14**	**1196.82433**	Number of obs	= **462**
Residual	**3686.67176**	**447**	**8.24758783**	F(14, 447)	= **145.11**
				Prob > F	= **0.0000**
Total	**20442.2123**	**461**	**44.3431937**	R-squared	= **0.8197**
				Adj R-squared	= **0.8140**
				Root MSE	= **2.8719**

co2_em	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_lngdpcap	**1.953951**	**.2337633**	**8.36**	**0.000**	**1.49454**	**2.413363**
_pol_rgt_ind	**5.636622**	**1.635877**	**3.45**	**0.001**	**2.421656**	**8.851588**
lngdpcappol_rgt_ind	**-.8538694**	**.2189016**	**-3.90**	**0.000**	**-1.284073**	**-.4236653**
_intnet_usrs	**-.0183718**	**.0107942**	**-1.70**	**0.089**	**-.0395854**	**.0028419**
_energy_cons_kg	**.0017722**	**.0000734**	**24.13**	**0.000**	**.0016279**	**.0019165**
pop_grwth	**.4371686**	**.1268163**	**3.45**	**0.001**	**.1879383**	**.6863988**
tot_pop10mil	**.1007781**	**.0372228**	**2.71**	**0.007**	**.0276248**	**.1739315**
tot_popsq	**-.0006829**	**.0003185**	**-2.14**	**0.033**	**-.0013088**	**-.0000569**
_popdens100	**-.019214**	**.0083546**	**-2.30**	**0.022**	**-.0356332**	**-.0027947**
urban	**.0153191**	**.0089743**	**1.71**	**0.089**	**-.002318**	**.0329562**
_ag_lnd100	**.8173452**	**.6473064**	**1.26**	**0.207**	**-.4547965**	**2.089487**
_ind_va	**.0219828**	**.0128635**	**1.71**	**0.088**	**-.0032977**	**.0472632**
year2000	**-.6050369**	**.3414444**	**-1.77**	**0.077**	**-1.276073**	**.0659987**
year2010	**-1.368508**	**.4548203**	**-3.01**	**0.003**	**-2.26236**	**-.4746565**
_cons	**-15.94272**	**1.510928**	**-10.55**	**0.000**	**-18.91213**	**-12.97332**

```
99.
100 /* Ran the same regression adding in an interaction term of political rights plus the log of GDP p
  > er capita as well as total population-squared. */
101
102 test _pol_rgt_ind lngdpcappol_rgt_ind

   ( 1)  _pol_rgt_ind = 0
   ( 2)  lngdpcappol_rgt_ind = 0

         F(  2,   447) =    9.39
              Prob > F =    0.0001

103 test _lngdpcap lngdpcappol_rgt_ind

   ( 1)  _lngdpcap = 0
   ( 2)  lngdpcappol_rgt_ind = 0

         F(  2,   447) =   36.65
              Prob > F =    0.0000

104 test tot_pop10mil tot_popsq

   ( 1)  tot_pop10mil = 0
   ( 2)  tot_popsq = 0

         F(  2,   447) =    5.09
              Prob > F =    0.0065
```

```
105
106 /* Conducted a joint F-test on the interaction term, which is jointly significant at less than the
  >  1% level. This means that both the direct and indirect effects of _pol_rgt_ind and _gdpcap are st
  > atistically significant. Tot_pop and tot_popsq is jointly significant as well. */
107
108 estat vif
```

Variable	VIF	1/VIF
lngdpcappo~d	**46.56**	**0.021479**
_pol_rgt_ind	**33.63**	**0.029735**
tot_pop10mil	**14.10**	**0.070911**
tot_popsq	**13.98**	**0.071528**
_lngdpcap	**8.19**	**0.122118**
_intnet_usrs	**3.28**	**0.305297**
urban	**2.75**	**0.363787**
year2010	**2.58**	**0.388345**
_energy_co~g	**1.90**	**0.525868**
pop_grwth	**1.56**	**0.639683**
year2000	**1.45**	**0.689061**
_ind_va	**1.23**	**0.811377**
_ag_lnd100	**1.15**	**0.865803**
_popdens100	**1.12**	**0.896091**
Mean VIF	**9.53**	

```
109
110 /* Generated VIF values for the previous regression model. Based on these results, there is eviden
  > ce of multicollinearity for lngdpcappol_rgt_ind, _pol_rgt_ind, totpop10mil, tot_popsq, and _lngdpc
  > ap as their VIFs are  above 5.*/
111
112 predict residuals, residuals

113 twoway scatter residuals co2_em

114 graph save "$datadir\Country-Level Dataset Model 3 residuals.gph", replace
  (note: file C:\Users\NEW USER\Country-Level Dataset Model 3 residuals.gph not found)
  (file C:\Users\NEW USER\Country-Level Dataset Model 3 residuals.gph saved)

115 graph export "$datadir\Country-Level Dataset Model 3 residuals.png", replace
  (note: file C:\Users\NEW USER\\Country-Level Dataset Model 3 residuals.png not found)
  (file C:\Users\NEW USER\\Country-Level Dataset Model 3 residuals.png written in PNG format)

116
117 /* Graphed the residuals to see if there is heteroskedasticity, which there seems to be. */
118
119 reg co2_em _lngdpcap _pol_rgt_ind lngdpcappol_rgt_ind _intnet_usrs _energy_cons_kg pop_grwth tot_p
  > op10mil tot_popsq _popdens100 urban _ag_lnd100 _ind_va year2000 year2010
```

Source	SS	df	MS		
Model	**16755.5406**	**14**	**1196.82433**	Number of obs	= **462**
Residual	**3686.67176**	**447**	**8.24758783**	F(14, 447)	= **145.11**
Total	**20442.2123**	**461**	**44.3431937**	Prob > F	= **0.0000**
				R-squared	= **0.8197**
				Adj R-squared	= **0.8140**
				Root MSE	= **2.8719**

co2_em	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_lngdpcap	**1.953951**	**.2337633**	**8.36**	**0.000**	**1.49454**	**2.413363**
_pol_rgt_ind	**5.636622**	**1.635877**	**3.45**	**0.001**	**2.421656**	**8.851588**
lngdpcappol_rgt_ind	**-.8538694**	**.2189016**	**-3.90**	**0.000**	**-1.284073**	**-.4236653**
_intnet_usrs	**-.0183718**	**.0107942**	**-1.70**	**0.089**	**-.0395854**	**.0028419**
_energy_cons_kg	**.0017722**	**.0000734**	**24.13**	**0.000**	**.0016279**	**.0019165**
pop_grwth	**.4371686**	**.1268163**	**3.45**	**0.001**	**.1879383**	**.6863988**
tot_pop10mil	**.1007781**	**.0372228**	**2.71**	**0.007**	**.0276248**	**.1739315**
tot_popsq	**-.0006829**	**.0003185**	**-2.14**	**0.033**	**-.0013088**	**-.0000569**
_popdens100	**-.019214**	**.0083546**	**-2.30**	**0.022**	**-.0356332**	**-.0027947**
urban	**.0153191**	**.0089743**	**1.71**	**0.089**	**-.002318**	**.0329562**
_ag_lnd100	**.8173452**	**.6473064**	**1.26**	**0.207**	**-.4547965**	**2.089487**
_ind_va	**.0219828**	**.0128635**	**1.71**	**0.088**	**-.0032977**	**.0472632**
year2000	**-.6050369**	**.3414444**	**-1.77**	**0.077**	**-1.276073**	**.0659987**
year2010	**-1.368508**	**.4548203**	**-3.01**	**0.003**	**-2.26236**	**-.4746565**
_cons	**-15.94272**	**1.510928**	**-10.55**	**0.000**	**-18.91213**	**-12.97332**

```
120 estat imtest, white

  White's test for Ho: homoskedasticity
           against Ha: unrestricted heteroskedasticity

           chi2(111)     =    393.96
           Prob > chi2   =    0.0000

  Cameron & Trivedi's decomposition of IM-test

---------------------------------------------------
              Source |       chi2     df      p
---------------------+-----------------------------
  Heteroskedasticity |     393.96    111   0.0000
            Skewness |      36.16     14   0.0010
            Kurtosis |       2.53      1   0.1114
---------------------+-----------------------------
               Total |     432.66    126   0.0000
---------------------------------------------------

121
122 /* Ran a White Test to see if there is heteroskedasticity and confirmed to reject the null and aff
  > irm that the model has unrestricted heteroskedasticity. */
123
124 reg co2_em _lngdpcap year2000 year2010, r

  Linear regression                               Number of obs     =        462
                                                  F(3, 458)         =      70.09
                                                  Prob > F          =     0.0000
                                                  R-squared         =     0.4277
                                                  Root MSE          =      5.054

------------------------------------------------------------------------------
             |               Robust
      co2_em |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _lngdpcap |    2.747201   .1956074    14.04   0.000     2.362802      3.1316
    year2000 |   -.2018507   .5574734    -0.36   0.717    -1.297373    .8936721
    year2010 |   -2.090102   .5480402    -3.81   0.000    -3.167087   -1.013117
       _cons |    -16.5896   1.391884   -11.92   0.000    -19.32487   -13.85433
------------------------------------------------------------------------------

125 outreg2 using "$output\Table 4.doc", replace paren label bdec(3) drop (Var1 Var2) title("Table 4:
  > Results of Fixed Effects Regression on CO2 Emissions for 154 Countries, 1990 - 2010")
  C:\Users\NEW USER\\Table 4.doc
  dir : seeout

126
127 reg co2_em _lngdpcap _intnet_usrs _energy_cons_kg _pol_rgt_ind pop_grwth tot_pop10mil _popdens100
  > urban _ag_lnd100 _ind_va  year2000 year2010, r

  Linear regression                               Number of obs     =        462
                                                  F(12, 449)        =      90.13
                                                  Prob > F          =     0.0000
                                                  R-squared         =     0.8122
                                                  Root MSE          =      2.924

------------------------------------------------------------------------------
             |               Robust
      co2_em |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _lngdpcap |    1.359922   .3473119     3.92   0.000     .6773635    2.042481
  _intnet_usrs |    -.03028   .0167468    -1.81   0.071    -.0631918    .0026318
_energy_cons_kg |    .0018019   .0002715     6.64   0.000     .0012684    .0023354
  _pol_rgt_ind |   -.5840335   .3390691    -1.72   0.086    -1.250393    .0823259
     pop_grwth |    .5516635    .224171     2.46   0.014     .1111089    .9922182
  tot_pop10mil |     .025433   .0043965     5.78   0.000     .0167927    .0340734
  _popdens100 |   -.0203236   .0070558    -2.88   0.004      -.03419   -.0064572
         urban |    .0195976    .012156     1.61   0.108     -.004292    .0434873
    _ag_lnd100 |    .6825521   .5386242     1.27   0.206    -.3759852    1.741089
       _ind_va |    .0323864   .0149533     2.17   0.031     .0029992    .0617736
      year2000 |   -.3902176   .3570184    -1.09   0.275    -1.091852     .311417
      year2010 |   -.8309732   .4020543    -2.07   0.039    -1.621115   -.0408315
         _cons |   -12.52729   2.316176    -5.41   0.000    -17.07918   -7.975396
------------------------------------------------------------------------------
```

```
128 outreg2 using "$output\Table 4.doc", append paren label bdec(3) drop(Var1 Var2)
  C:\Users\NEW USER\\Table 4.doc
  dir : seeout

129
130 reg co2_em _lngdpcap _pol_rgt_ind lngdpcappol_rgt_ind _intnet_usrs _energy_cons_kg pop_grwth tot_p
  > op10mil tot_popsq _popdens100 urban _ag_lnd100 _ind_va year2000 year2010, r

  Linear regression                               Number of obs     =        462
                                                  F(14, 447)        =      88.68
                                                  Prob > F          =     0.0000
                                                  R-squared         =     0.8197
                                                  Root MSE          =     2.8719

------------------------------------------------------------------------------
             |               Robust
      co2_em |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    _lngdpcap |   1.953951   .4363442     4.48   0.000     1.096411    2.811492
  _pol_rgt_ind |   5.636622   2.143994     2.63   0.009     1.423061    9.850182
lngdpcappol_rgt_ind |  -.8538694   .3220879    -2.65   0.008    -1.486864   -.2208748
  _intnet_usrs |  -.0183718   .0159896    -1.15   0.251     -.049796    .0130524
_energy_cons_kg |   .0017722   .0002686     6.60   0.000     .0012444       .0023
    pop_grwth |   .4371686   .2159826     2.02   0.044     .0127011    .8616361
  tot_pop10mil |   .1007781    .023042     4.37   0.000     .0554941    .1460622
    tot_popsq |  -.0006829   .0001842    -3.71   0.000     -.001045   -.0003208
  _popdens100 |   -.019214   .0077552    -2.48   0.014    -.0344551   -.0039728
        urban |   .0153191   .0121412     1.26   0.208    -.0085419    .0391801
    _ag_lnd100 |   .8173452   .5202409     1.57   0.117    -.2050765    1.839767
      _ind_va |   .0219828    .016507     1.33   0.184    -.0104582    .0544237
     year2000 |  -.6050369   .3370043    -1.80   0.073    -1.267347    .0572726
     year2010 |  -1.368508   .4008982    -3.41   0.001    -2.156387   -.5806288
        _cons |  -15.94272   2.739041    -5.82   0.000    -21.32572   -10.55973
------------------------------------------------------------------------------

131 outreg2 using "$output\Table 4.doc", append paren label bdec(3) drop(Var1 Var2)
  C:\Users\NEW USER\\Table 4.doc
  dir : seeout

132
133 /* Re-ran all of the previous regression models with robust standard errors in order to mitigate h
  > eteroskedasticity. Used the outreg command to export the results into a table. */
134
135 /* MODEL 4: FIXED COUNTRY EFFECTS */
136
137 areg co2_em _lngdpcap _pol_rgt_ind lngdpcappol_rgt_ind _intnet_usrs _energy_cons_kg pop_grwth tot_
  > pop10mil tot_popsq _popdens100 urban _ag_lnd100 _ind_va year2000 year2010, absorb(cc_num) r

  Linear regression, absorbing indicators         Number of obs     =        462
  Absorbed variable: cc_num                       No. of categories =        154
                                                  F(  14,    294)   =       4.38
                                                  Prob > F          =     0.0000
                                                  R-squared         =     0.9529
                                                  Adj R-squared     =     0.9261
                                                  Root MSE          =     1.8101

------------------------------------------------------------------------------
             |               Robust
      co2_em |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    _lngdpcap |   .3425229   .4251208     0.81   0.421    -.4941428    1.179189
  _pol_rgt_ind |  -.4568974   2.196663    -0.21   0.835    -4.780074     3.86628
lngdpcappol_rgt_ind |   .0729168   .3465722     0.21   0.834      -.60916    .7549937
  _intnet_usrs |  -.0119165   .0096073    -1.24   0.216    -.0308244    .0069914
_energy_cons_kg |   .0016571   .0004404     3.76   0.000     .0007903    .0025239
    pop_grwth |   .1138005   .3247126     0.35   0.726    -.5252552    .7528562
  tot_pop10mil |   .1607053   .0952856     1.69   0.093    -.0268231    .3482337
    tot_popsq |  -.0005763   .0004234    -1.36   0.174    -.0014096    .0002569
  _popdens100 |  -.1169909   .1274578    -0.92   0.359    -.3678363    .1338544
        urban |   .0363729   .0268668     1.35   0.177    -.0165027    .0892485
    _ag_lnd100 |  -.7563435   2.185842    -0.35   0.730    -5.058224    3.545537
      _ind_va |   .0030435   .0181984     0.17   0.867    -.0327722    .0388592
     year2000 |  -.4722558   .2538228    -1.86   0.064    -.9717959    .0272842
     year2010 |  -.7266626   .3667833    -1.98   0.049    -1.448516   -.0048091
        _cons |  -3.623222   3.669483    -0.99   0.324    -10.84501    3.598563
------------------------------------------------------------------------------
```

```
138 outreg2 using "$output\Table 4.doc", append paren label bdec(3) drop(Var1 Var2)
  C:\Users\NEW USER\\Table 4.doc
  dir : seeout

139
140 /* Ran a regression using fixed effects by country and time using the areg command. */
141
142 test _pol_rgt_ind lngdpcappol_rgt_ind

   ( 1)  _pol_rgt_ind = 0
   ( 2)  lngdpcappol_rgt_ind = 0

         F(  2,   294) =    0.02
              Prob > F =    0.9780

143 test _lngdpcap lngdpcappol_rgt_ind

   ( 1)  _lngdpcap = 0
   ( 2)  lngdpcappol_rgt_ind = 0

         F(  2,   294) =    0.85
              Prob > F =    0.4293

144 test tot_pop10mil tot_popsq

   ( 1)  tot_pop10mil = 0
   ( 2)  tot_popsq = 0

         F(  2,   294) =    2.00
              Prob > F =    0.1368

145
146 /* Conducted a joint F-test on the interaction term again, which is now insignificant. Tot_pop and
  >  tot_popsq are also insignificant. */
147
148 xtreg co2_em _lngdpcap _pol_rgt_ind lngdpcappol_rgt_ind _intnet_usrs _energy_cons_kg pop_grwth tot
  > _pop10mil tot_popsq _popdens100 urban _ag_lnd100 _ind_va year2000 year2010, fe i (cc_num) r

Fixed-effects (within) regression               Number of obs      =       462
Group variable: cc_num                          Number of groups   =       154

R-sq:                                           Obs per group:
     within  = 0.4082                                         min =         3
     between = 0.7061                                         avg =       3.0
     overall = 0.6823                                         max =         3

                                                F(14,153)          =      3.92
corr(u_i, Xb)  = 0.0686                         Prob > F           =    0.0000

                                    (Std. Err. adjusted for 154 clusters in cc_num)
------------------------------------------------------------------------------
             |               Robust
      co2_em |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    _lngdpcap |   .3425229   .4338739     0.79   0.431    -.5146342     1.19968
  _pol_rgt_ind |  -.4568974   2.285873    -0.20   0.842    -4.972846    4.059051
lngdpcappol_rgt_ind |   .0729168   .3572065     0.20   0.839    -.6327769    .7786106
  _intnet_usrs |  -.0119165    .008757    -1.36   0.176    -.0292167    .0053838
_energy_cons_kg |   .0016571   .0004922     3.37   0.001     .0006847    .0026295
    pop_grwth |   .1138005   .1761715     0.65   0.519    -.2342421    .4618432
  tot_pop10mil |   .1607053   .1018494     1.58   0.117    -.0405074     .361918
     tot_popsq |  -.0005763   .0004521    -1.27   0.204    -.0014695    .0003168
   _popdens100 |  -.1169909    .145237    -0.81   0.422    -.4039198    .1699379
         urban |   .0363729   .0264345     1.38   0.171    -.0158508    .0885966
    _ag_lnd100 |  -.7563435   1.846793    -0.41   0.683    -4.404849    2.892162
      _ind_va |   .0030435   .0171379     0.18   0.859     -.030814     .036901
     year2000 |  -.4722558   .2680391    -1.76   0.080    -1.001791    .0572796
     year2010 |  -.7266626   .3628096    -2.00   0.047    -1.443426   -.0098996
        _cons |  -3.623222   3.116364    -1.16   0.247     -9.77988    2.533436
-------------+----------------------------------------------------------------
      sigma_u |  3.4796151
      sigma_e |  1.8101471
          rho |  .78701526   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

```
149
150 /* Ran a regression using fixed effects by country and time using the xtreg command. */
151
152 test _pol_rgt_ind lngdpcappol_rgt_ind

   ( 1)  _pol_rgt_ind = 0
   ( 2)  lngdpcappol_rgt_ind = 0

         F(  2,   153) =    0.02
              Prob > F =    0.9789

153 test _lngdpcap lngdpcappol_rgt_ind

   ( 1)  _lngdpcap = 0
   ( 2)  lngdpcappol_rgt_ind = 0

         F(  2,   153) =    0.71
              Prob > F =    0.4939

154 test tot_pop10mil tot_popsq

   ( 1)  tot_pop10mil = 0
   ( 2)  tot_popsq = 0

         F(  2,   153) =    1.74
              Prob > F =    0.1789

155
156 /* Conducted a joint F-test on the interaction term and quadratic term, which are still insignific
  > ant. */
157
158 preserve

159 drop if cn == "Qatar"
  (3 observations deleted)

160 areg co2_em _lngdpcap _pol_rgt_ind lngdpcappol_rgt_ind _intnet_usrs _energy_cons_kg pop_grwth tot_
  > pop10mil tot_popsq _popdens100 urban _ag_lnd100 _ind_va year2000 year2010, absorb(cc_num) r

  Linear regression, absorbing indicators         Number of obs     =        459
  Absorbed variable: cc_num                       No. of categories =        153
                                                  F(  14,    292)   =       4.02
                                                  Prob > F          =     0.0000
                                                  R-squared         =     0.9616
                                                  Adj R-squared     =     0.9398
                                                  Root MSE          =     1.4338

------------------------------------------------------------------------------
             |               Robust
      co2_em |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    _lngdpcap |   .1786631   .3893154     0.46   0.647    -.5875569    .9448831
  _pol_rgt_ind |  -1.331504   1.906545    -0.70   0.485    -5.083817    2.420809
lngdpcappol_rgt_ind |   .2210006   .2960622     0.75   0.456    -.3616857    .8036869
  _intnet_usrs |  -.0096182    .007968    -1.21   0.228    -.0253002    .0060638
_energy_cons_kg |   .0013817   .0003965     3.48   0.001     .0006013    .0021621
    pop_grwth |  -.0151783   .1610179    -0.09   0.925    -.3320811    .3017246
 tot_pop10mil |   .1444341   .0935573     1.54   0.124    -.0396981    .3285663
    tot_popsq |  -.0004779   .0004308    -1.11   0.268    -.0013258    .0003701
  _popdens100 |  -.1087749   .1216921    -0.89   0.372    -.3482798    .1307299
        urban |   .0297048   .0237709     1.25   0.212    -.0170791    .0764888
   _ag_lnd100 |  -.7237165    2.08361    -0.35   0.729    -4.824513     3.37708
      _ind_va |   .0115981   .0174039     0.67   0.506    -.0226549    .0458512
     year2000 |  -.5271659   .2404492    -2.19   0.029    -1.000399   -.0539328
     year2010 |  -.6420346   .3289294    -1.95   0.052    -1.289408    .0053384
        _cons |   -1.73607   2.600956    -0.67   0.505    -6.855066    3.382926
------------------------------------------------------------------------------
```

```
161 restore

162
163 /* Ran a regression without Qatar, which was one of the outliers (in the 99th percentile). Then re
  > stored the dataset. Dropping Qatar does not change the data much, so keeping it in the dataset. */
164
165 log close
       name:  <unnamed>
        log:  C:\Users\NEW USER\\Country-Level Dataset Log.smcl
   log type:  smcl
  closed on:   3 Dec 2020, 19:41:10
```