SUPPLEMENTAL MATERIAL FOR:

THE FRENCH REVOLUTION AND GERMAN INDUSTRIALIZATION:

DUBIOUS MODELS AND DOUBTFUL CAUSALITY

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Appendix A: Basis for Table 2

We here describe the basis for our changes to the ACJR-reform index [Wehler 1987; Huber 1957; Ziekow 1992].

The Civil Code:

Parts of the French "treatment" area which belonged to the French controlled Kingdom of Westphalia and the Grand Duchy of Berg abolished French legislation after 1814/15 (Mark / Ruhr (Prussia); Westphalia (Prussia); Brunswick; Province of Saxony (Prussia); Hessen-Kassel; Hanover). Notice in Table 1 that ACJR counted only the six years as the time in which the French Civil Code was in effect.

Because Prussia never returned to the (economic and legal) *Ancien Régime* after 1815, but established a legal system adjusted to the needs of a liberalized market economy, we have counted all years after 1815 as "post-reform years" for the Prussian territories Mark/Ruhr, Westphalia, and the Province of Saxony. Because Brunswick, Hessen-Kassel and Hanover returned to the *Ancien Régime* after 1815, we took the year of the introduction of a constitution (1831/1832) to mark the watershed between the pre-reform and post-reform era. For these three territories we do not consider the six or seven years of French control (1808-1814/15) as decisive because the reform period was too short-lived to induce or facilitate any durable economic change.

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We also consider the year of the introduction of a constitution as the end point of the *Ancien Régime* in Bavaria (southern half), Hessen-Darmstadt, Saxony, and Württemberg. In doing so, we acknowledge the contribution of early German constitutionalism (*Deutscher Frühkonstitutionalismus*) to the establishment of the rule of law and to a civic order before 1848. In the Prussian provinces east of the Elbe River (Old Prussia), we have previously noted that the famous Oktoberedikt of 1807 irrevocably introduced the legal framework of a liberalized market economy—and terminated the privilege-based legal system of the *Ancien Régime* in the field of economics.

Mecklenburg-Schwerin and Schleswig-Holstein are more problematic. In Schleswig-Holstein the "national question" confounded any continuous institutional change. Constitutions were introduced and revoked. The position of the nobility was extremely strong in Mecklenburg-Schwerin. Despite this, free labor and land markets had been established in these two leading areas of agrarian capitalism long before 1848. By 1848 there were very strong liberal movements in both territories which could no longer be ignored. Therefore, our use of 1848 is a very conservative assumption for both territories and favors the ACJR reform index as compared to our revised index.

Guilds:

Brunswick: Enactment of the "trade regulation and guild act" in 1821(Gewerbe- und Gildeordnung vom 29. Oktober 1821).

Hessen-Kassel: Restorative legislation after 1815 but in general a liberal business policy to facilitate the settlement of industry. In 1834 accession to the Deutscher Zollverein (German Customs Union) which thoroughly opened the domestic market for all members of the Zollverein—which included most of Central Europe.

Hanover: The new "trade regulation act of 1847" came into force in 1848 (after one year delay). The Act precludes any protection of artisan production against competition of factory production. In 1830 the government wanted to proclaim economic freedom but this was blocked. Despite this setback, the government continued to follow a liberal trade policy thereby facilitating the development of industry.

Baden: The polity did not abolish the guilds before 1862. However when the government introduced the Civil Code in 1810 it explicitly stated that the further existence of guilds was not consistent with the Code and its liberal contract law concerning labor relations. Moreover, Baden continued to follow a liberal trade policy that promoted industrial production.

Bavaria: The government introduced a liberal concession system as early as 1807 and it remained under the strict control of central authorities. As a result, local authorities such as guilds lost all of their competences. Bavaria followed a liberal trade policy during the following decades.

Hessen-Darmstadt: Since the first laws in 1818, Hessen-Darmstadt launched a continuous and successful assault on the role of guilds.

Saxony: The new liberal constitution of 1831 implemented the legal framework for free labor markets. However, a succession of Saxon governments had pursued a liberal trade policy since the 18th century.

Württemberg: Introduction of the Common trade regulation act (Allgemeine Gewerbeordnung) in 1828 largely disempowered guilds.

Mecklenburg-Schwerin and Schleswig Holstein: Both governments followed a traditional policy concerning guilds but industrialists never had to wait until the late 1860s to establish factories. Free labor markets had existed in both leading agrarian-capitalist regions since the end of the 18th century, and the existence of guilds was no impediment to the attraction of industry. Our revised date of 1848 is therefore a very late vintage and advantages the ACJR reform index rather than ours.

Appendix B: Basis for Estimates of Labor Force in Mining and Smelting

Tipton's [1976] regions are very similar to those used here. Missing values for 1861-1907 have been interpolated or extrapolated (printed in italics). In cases of polities lacking data for 1850, the total labor force for that year is extrapolated from 1861 backward using the population growth rate 1850-1861 (population data taken from Köllmann [1980] and only for Mark/Ruhr and Westphalia from Hohorst [1978]). In general, for polities lacking data for 1850, the labor force for "mining & smelting" has been calculated by extrapolating from 1861 backward using the annual growth rate of "mining & smelting" for the period 1861-1875. Indeed a heavy-industrial boom started dynamically around 1850 and continued until 1873. In three eastern Prussian provinces (Brandenburg, Pomerania, East Prussia), and in Mecklenburg-Schwerin, the calculation was adjusted using regional data on mining workers from Fischer [1989].

In the following regions, the italicized terms refer to polities used by ACJR.

***East Prussia*:** In 1878 the Province Prussia was divided in East Prussia and West Prussia. Thus, numbers for East Prussia are only available for 1882-1907. However, for 1882 as well the numbers for combined East and West Prussia is noted by Tipton. The labor force for East Prussia for 1861-1875 is calculated by multiplying the figures from Tipton by the share of East Prussia in the old Province Prussia (both East and West) in 1882 being 75.0 percent (mining and smelting), and 59.4 percent (total employment).

***Brandenburg*:** includes Berlin.

***Mecklenburg-Schwerin*:** refers to Mecklenburg-Schwerin and Mecklenburg-Strelitz.

***Hanover*:** The labor force for Hanover 1895-1907 is calculated by multiplying the figures from Tipton by the share of Hanover in the sum of Hanover, Oldenburg, Braunschweig, Schaumburg-Lippe in 1882 being 75.9 percent (mining and smelting), and 77.5 percent (total employment).

***Prussian Saxony*:** The labor force for Prussian Saxony 1895-1907 is calculated by multiplying the figures from Tipton by the share of Prussian Saxony in the sum of District of Magdeburg, Anhalt, districts of Merseburg and Erfurt, and Thuringian states in 1882, being 84.4 percent (mining and smelting), and 64.5 percent (total employment).

***Westphalia-Prussia*:** This region refers to the districts of Minden and Münster (northern Westphalia). The labor force for Northern Westphalia for 1895-1907 is calculated by multiplying the figures from Tipton by the share of Northern Westphalia in the sum of Northern Westphalia, Lippe and Waldeck in 1882, being 91.3 percent (mining and smelting), and 85.7 percent (total employment).

***Hessen-Kassel*:** Tipton's region of Hessen-Nassau refers to the Prussian province Hessen-Nassau whose biggest part consisted of the former Electorate of Hesse (Hessen-Kassel) but also includes Nassau and Frankfurt. The labor force for Hessen-Kassel for 1895-1907 is calculated by multiplying the figures from Tipton by the share of Hessen-Nassau in the sum of Hessen-Nassau and Upper Hesse (Oberhessen) in 1882 , being 78.3 percent (mining and smelting), and 86.1 percent (total employment).

***Bavaria Southern Half*:** This region is identical with Tipton's Bavaria, excluding Rheinpfalz. Due to the fact that the labor force participation rate was fairly stable for 1882-1907 (around 53%), the total labor force could be calculated as well for 1847-1875. Early Bavarian occupational statistics (until 1840) only counted 40 miners. This represents an ascertainment error. Looking at the statistics of the Bavarian industrial population reveals that it was fairly stable between 1832 and 1852 (977,579 and 978,785 persons) [Köllmann, 1995, p. 215]. So as not to create an artificial boom in heavy industry, we assume that the number of persons occupied in mining and smelting remained constant 1850-1875. Annual statistics from the German Customs Union on mining and smelting activities in its member states for 1859-1870 support our assumption of a stagnating mining & smelting sector for 1850-1875 (which was a negligible quantity in Bavaria's economy) [Köllmann, 1995, pp. 606-607].

***Württemberg*:** Due to the fact that the labor force participation rate was fairly stable for 1882-1907 (around 50%), the total labor force could be calculated as well for 1847-1875 (population data 1850 and 1875 from Köllmann [1980, p. 34]. Annual statistics from the German Customs Union on mining and smelting activities in its member states for 1859-1870 support our assumption that in Württemberg the labor force in mining and smelting remained rather stable over the period 1850-1875 [Köllmann, 1995, pp. 630-631].

***Baden*:** Due to the fact that the labor force participation rate was fairly stable for 1882-1907 (around 52%), the total labor force could be calculated for 1847-1875 (population data for 1850 and 1875 from Köllmann [1980, p. 40]). The marginal Baden "mining and smelting" sector was not very stable 1861-1907. So as not to exaggerate the growth of "mining & smelting," and considering occupational statistics of 1829, 1,000 employed persons are assumed for 1850.

***Hessen-Darmstadt*:** The number of persons engaged in mining and smelting was so low in 1882 (200 persons) that this number was taken as well for 1850-1875. The development of the total

labor force for 1850-1875 is based on the growth rate of the total population which was nearly stagnant (0.14% p.a.), (population data from Köllmann [1980, p. 58].

***Palatinate-Bavaria*:** The labor force participation rate was fairly stable for 1882-1907 (around 48%) and thus the total labor force could be calculated for 1847-1875 (population data for 1850 and 1875 from Köllmann [1980, p. 66]. For the labor force in mining and smelting, see comments for *Bavaria Southern Half*.

***Brunswick*:** The labor force for Brunswick in 1882-1907 was calculated by multiplying the figures from Tipton by the share of Brunswick in the sum of Hannover, Oldenburg, Brunswick, and Schaumburg-Lippe in 1882, which according to customs union statistics for 1860 yields 62 percent of Oldenburg, Brunswick and Schaumburg Lippe (mining and smelting), and 77.5 percent (total employment). Values for 1850 are estimated according to contemporary statistics in order not to exaggerate the dynamics of mining & smelting in Brunswick.

***Rhineland-Prussia and Mark/Ruhr Prussia*:** Tipton's region 'Districts of Düsseldorf and Arnsberg (Ruhr)' had to be split into ACJR's regions of Mark/Ruhr (Arnsberg) and Düsseldorf. Düsseldorf must be added to the other Rhenish districts (Köln, Aachen, Koblenze, Trier) to get the values for the Prussian province of Rhineland. Data on miners for Prussian districts from Fischer [1989] and for population from Hohorst [1978] provided by GESIS served to provide weights to calculate the figures for the two ACJR regions.

Appendix Table 1. The ACJR Data on Reforms and their Dates of Enactment or Reversion

Territory	Years of French (1)	Civil code (2)	Abolition of serfdom (3)	Agrarian reform (4)	Abolition of guilds (5)	Reform index as (6)	Reform index as (7)	Pop. weights (8)
Panel A. Treatment								
Rhineland (Prussia)	19	1802	1798	1804	1795	50.25	100.25	1,439
Palatinate (Bavaria)	19	1802	1798	1804	1795	50.25	100.25	239
Mark / Ruhr (Prussia)	6	1810–15, 1900	1808	1825	1809	28.25	65.75	150
Westphalia (Prussia)	6	1810–15, 1900	1808	1825	1809	28.25	65.75	529
Brunswick	6	1808–14, 1900	1808–18, 1834	1809–18, 1834	1808–15, 1864	16.0	50.0	155
Province of Saxony (Prussia)	6	1808–15, 1900	1808	1809	1809	32.75	70.25	763
Hessen-Kassel	6	1808–14, 1900	1808–14, 1832	1809–14, 1832	1808–16, 1869	15.25	48	294
Hanover	3	1808–13, 1900	1808–14, 1833	1809–14, 1833	1808–15, 1869	14.25	47	1,090
Average	*9.98*					*32.41*	*72.88*	
Panel B. Control								
Baden	0	1810	1783	1820	1862	34.25	81.25	609
Bavaria, southern half	0	1900	1808	1826	1868	16.5	49.5	1,163
Hessen-Darmstadt	0	1900	1811	1816	1866	18.25	51.75	264
Saxony	0	1865	1832	1832	1862	9.0	52.25	1,020
Württemberg	0	1900	1817	1836	1862	11.75	46.25	925
Average	*0*					*16.31*	*54.46*	
Panel C. Control (east of the Elbe)								
Brandenburg (Prussia)	0	1900	1811	1821	1810	27	64.5	797
East Prussia (Prussia)	0	1900	1811	1821	1810	27	64.5	554
Pomerania (Prussia)	0	1900	1811	1821	1810	27	64.5	342
Silesia (Prussia)	0	1900	1811	1821	1810	27	64.5	1,053
Mecklenburg-Schwerin	0	1900	1820	1862	1869	7.5	37.25	217
Schleswig-Holstein	0	1900	1805	1805	1867	22.5	55.75	541
Average	*0*					*25.1*	*61.46*	

Source: Acemoglu, et al., 2011, p. 3292.

Appendix Table 2a: Model 1 (For Column 1 in Table 2)

```
. xtreg yearsref i.year i.fpresence#c.year,fe cluster(id)  note: 1900.year omitted because of collinearity
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9891                         Obs per group: min =         3
       between = 0.6026                                        avg =       3.0
       overall = 0.3526                                        max =         3
                                                F(3,18)           =         .
corr(u_i, Xb)  = -0.9936                        Prob > F          =         .
                                (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
             |               Robust
    yearsref |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |
        1875 |  -1.217105   .3138641    -3.88   0.001    -1.876509   -.5577012
        1900 |           0  (omitted)
fpresence#c.year |
           0 |       0.735   .030356     24.21   0.000     .6712244    .7987756
           3 |       0.655   3.06e-17    2.1e+16   0.000        .655        .655
           6 |       0.717   .0198279     36.16   0.000     .6753431    .7586569
          19 |       1.000   3.03e-17    3.3e+16   0.000            1           1
       _cons |  -1370.434   34.40461    -39.83   0.000    -1442.716   -1298.153
-------------+----------------------------------------------------------------
     sigma_u |  155.13366
     sigma_e |  2.1412616
         rho |  .99980952   (fraction of variance due to u_i)
```

Appendix Table 2b: Model 2 (For Column 2 in Table 2).

```
. xtreg yearsref i.year c.treated#c.trend,fe cluster(id)
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9771                         Obs per group: min =         3
       between = 0.1191                                        avg =       3.0
       overall = 0.5799                                        max =         3
                                                F(3,18)           =    367.29
corr(u_i, Xb)  = 0.0195                         Prob > F          =    0.0000
                          (Std. Err. adjusted for 19 clusters in id
------------------------------------------------------------------------------
             |               Robust
    yearsref |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |
        1875 |   17.15789   .8555912    20.05   0.000     15.36036    18.95543
        1900 |      36.75   1.488886    24.68   0.000     33.62197    39.87803
c.treated#c. |       .045   .0577885     0.78   0.446    -.0764091    .1664091
       _cons |   21.52632   3.956322     5.44   0.000     13.21439    29.83824
-------------+----------------------------------------------------------------
     sigma_u |  13.921073
     sigma_e |  3.0078115
         rho |  .95539939   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Appendix Table 2c: Model 3 (For Column 3 in Table 2)

```
. xtreg correctedyearsref i.year i.fpresence#c.year,fe cluster(id)  note: 1900.year omitted because of collinearity
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9986                         Obs per group: min =         3
       between = 0.2689                                        avg =       3.0
       overall = 0.1168                                        max =         3
                                                F(4,18)           =         .
corr(u_i, Xb)  = -0.7628                        Prob > F          =         .
                                  (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
                     |               Robust
Correctedyearsref |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------------------------------------------------------------------------------
                year |
                1875 |  -.0500002   .2701738    -0.19   0.855    -.6176142    .5176138
                1900 |           0  (omitted)
 fpresence#c.year |
                   0 |   1.000182   .0001866     5359.24   0.000     .9997897    1.000574
                   3 |       1.000   9.79e-15      1.0e+14   0.000            1           1
                   6 |       1.000   3.29e-08      3.0e+07   0.000     .9999999           1
                  19 |    0..954      .0654685        14.57   0.000     .8164557    1.091544
               _cons |  -1809.768    12.95402   -139.71   0.000    -1836.984   -1782.553
---------------------+---------------------------------------------------------------
             sigma_u |  34.403381
             sigma_e |  1.0098181
                 rho |  .99913918   (fraction of variance due to u_i)
```

Appendix Table 2d: Model 4 (For Column 4 in Table 2)

```
. xtreg correctedyearsref i.year c.treated#c.year,fe cluster(id)
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9984                         Obs per group: min =         3
       between = 0.0078                                        avg =       3.0
       overall = 0.5751                                        max =         3
                                                F(3,18)           =  9.95e+06
corr(u_i, Xb)  = -0.3459                        Prob > F          =    0.0000
                                (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
                             |               Robust
Correctedyearsref |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------------------------------------------------------------------------
                        year |
                        1875 |   24.95455   .2651124    94.13   0.000     24.39756    25.51153
                        1900 |   50.00909   .0091536  5463.32   0.000     49.98986    50.02832
           c.treated#c.year |  -.0116818   .0176952    -0.66   0.518    -.048858    .0254944
                       _cons |   40.56794   14.02311     2.89   0.010     11.10649    70.02939
------------------------------------------------------------------------------
                    sigma_u |  16.429877
                    sigma_e |   1.036735
                        rho |  .99603411   (fraction of variance due to u_i)
```

Appendix Table 3. Metric Tons of Coal Extraction in Germany, 1850-1900

	1850	1875	1900
RHINELAND-PRUSSIA	2099441	11792102	34172505
PALATINATE-BAVARIA	10568	162475	503812
MARK/RUHR-PRUSSIA	908147	10470679	34191592
WESTPHALIA-PRUSSIA	33652	278347	8365554
BRUNSWICK	25725	191349	1360048
PROV SAXONY-PRUSSIA	1141315	6057110	17047329
HESSEN-KASSEL	169919	367710	738252
HANOVER	47261	439731	755667
BADEN	*8500*	9782	4930
BAVARIA-SOUTHERN HALF	106837	319044	715355
HESSEN-DARMSTADT	20573	43394	255702
SAXONY	857374	3657657	6343213
WURTEMBERG	0	0	*0*
BRANDENBURG-PRUSSIA	144955	1510197	10370549
EAST PRUSSIA-PRUSSIA	0	0	0
POMERANIA-PRUSSIA	*0*	*0*	1381
SILESIA-PRUSSIA	1576741	10884265	30399234
MECKLENBURG-SCHWERIN	*3000*	10296	*12000*
SCHLESWIG-HOLSTEIN	0	0	0
GERMANY	7154008	46194138	145237123
Source: Fischer, Wolfram, (1989 [2010]) Statistik der Bergbauproduktion Deutschlands 1850 – 1914. GESIS Köln, Deutschland ZA8448 Datenfile Version 1.0.0			
Notes: Numbers in italics has been estimated based on available figures close to the relevant year.			

Appendix Table 4. Share of Total Industrial Employment Engaged in Mining and Smelting, 1850-1900.

	1850	1861	1875	1882	1895	1900
RHINELAND-PRUSSIA	4.3	5.7	8.4	8.0	7.2	8.0
PALATINATE-BAVARIA	0.9	0.9	0.8	0.7	1.0	1.2
MARK/RUHR-PRUSSIA	4.3	7.5	14.9	13.7	13.9	14.5
WESTPHALIA-PRUSSIA	0.6	0.7	0.8	0.5	3.1	4.3
BRUNSWICK	0.6	1.1	2.4	1.9	1.6	1.8
PROV SAXONY-PRUSSIA	1.1	1.5	2.3	2.8	2.9	3.2
HESSEN-KASSEL	1.7	2.0	2.2	1.2	1.2	1.2
HANOVER	1.5	1.7	1.8	1.5	1.4	1.6
BADEN	0.1	0.2	0.1	0.1	0.1	0.1
BAVARIA-SOUTHERN HALF	0.4	0.4	0.3	0.3	0.3	0.4
HESSEN-DARMSTADT	0.1	0.1	0.1	0.1	0.2	0.2
SAXONY	2.1	2.5	2.6	2.4	1.9	1.8
WURTEMBERG	0.2	0.2	0.3	0.2	0.2	0.2
BRANDENBURG-PRUSSIA	0.2	0.5	0.3	0.3	0.4	0.4
EAST PRUSSIA-PRUSSIA	0.1	0.1	0.2	0.2	0.1	0.1
POMERANIA-PRUSSIA	0.1	0.1	0.2	0.3	0.2	0.2
SILESIA-PRUSSIA	1.7	2.7	4.4	3.6	5.2	5.8
MECKLENBURG-SCHWERIN	0.1	0.1	0.2	0.3	0.5	0.5
SCHLESWIG-HOLSTEIN	0.3	0.2	0.2	0.2	0.1	0.1
GERMANY	1.2	1.6	2.5	2.3	2.5	2.8

Source: Tipton [1976]

Appendix Table 5a: Model 1 for Column 1 of Table 5.

```
. xtreg urbrate i.year coal_scaled,fe cluster(id)
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9138                         Obs per group: min =         3
       between = 0.3545                                        avg =       3.0
       overall = 0.6396                                        max =         3
                                                F(3,18)           =    100.59
corr(u_i, Xb)  = 0.0898                         Prob > F          =    0.0000
                          (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
             |               Robust
     urbrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |
       1875  |    9.219141   1.050235     8.78   0.000     7.01268    11.4256
       1900  |    19.6683    1.473281    13.35   0.000    16.57305    22.76354
coal_scaled  |    .686041    .2264938     3.03   0.007    .2101952    1.161887
       _cons |    14.02769    1.017402    13.79   0.000    11.89021    16.16517
-------------+----------------------------------------------------------------
     sigma_u |   8.668189
     sigma_e |   4.1574676
         rho |   .81298252   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Table 5b: Model 2 for Column 2 of Table 5

```
xtreg urbrate i.year coal_scaled c.(group_ei group_sw group_nw)#c.coal_scaled,fe cluster(id)
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9407                         Obs per group: min =         3
       between = 0.4122                                        avg =       3.0
       overall = 0.6822                                        max =         3
                                                F(6,18)           =    311.68
corr(u_i, Xb)  = 0.1015                         Prob > F          =    0.0000
                                 (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
                             |               Robust
                     urbrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------------------+------------------------------------------------
                        year |
                       1875  |   9.548466   1.178014     8.11   0.000     7.073551    12.02338
                       1900  |   20.76233    1.85524    11.19   0.000     16.86462    24.66004
                coal_scaled  |   .2062014   .1272626     1.62   0.123    -.0611675    .4735702
 c.group_ei#c.coal_scaled    |   .6663301   .2433988     2.74   0.014     .1549681    1.177692
c.group_sw#c.coal_scaled     |  -4.764486   5.368737    -0.89   0.387    -16.04378    6.514812
c.group_nw#c.coal_scaled     |   .7056421   .2205022     3.20   0.005     .2423843      1.1689
                       _cons |   14.14809   .7692381    18.39   0.000     12.53198     15.7642
------------------------------------------------------------------------------
                    sigma_u |  8.2825679
                    sigma_e |  3.6062802
                        rho |  .84063394   (fraction of variance due to u_i)
```

Table 5c: Model 3 for Column 3 of Table 5

```
. xtreg urbrate i.year shareagemp_int,fe cluster(id)
Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.8874                         Obs per group: min =         3
       between = 0.6788                                        avg =       3.0
       overall = 0.7750                                        max =         3
                                                F(3,18)           =    108.71
corr(u_i, Xb)  = -0.3356                        Prob > F          =    0.0000
                                (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
             |               Robust
     urbrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |
       1875  |   2.438513   3.779928     0.65   0.527    -5.502821    10.37985
       1900  |   6.492845   7.581379     0.86   0.403     -9.43504    22.42073
shareagemp_int |  -1.061164   .5057955    -2.10   0.050    -2.123801    .0014727
       _cons |    75.535     28.68265     2.63   0.017     15.27499     135.795
------------------------------------------------------------------------------
     sigma_u |  6.6206187
     sigma_e |   4.753015
         rho |   .65989343   (fraction of variance due to u_i)
```

Table 5d: Model 4 for Column 4 of Table 5

```
. xtreg urbrate i.year shareagemp_int c.(group_ei group_sw group_nw)#c.shareagemp_int,fe cluster(id)

Fixed-effects (within) regression               Number of obs      =        57
Group variable: id                              Number of groups   =        19
R-sq:  within  = 0.9630                         Obs per group: min =         3
       between = 0.0710                                        avg =       3.0
       overall = 0.1370                                        max =         3
                                                F(6,18)           =    287.31
corr(u_i, Xb)  = -0.5965                        Prob > F          =    0.0000
                                 (Std. Err. adjusted for 19 clusters in id)
------------------------------------------------------------------------------
                             |               Robust
                     urbrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------------------+------------------------------------------------------------------
                        year |
                       1875  |   4.078106    1.49837     2.72   0.014     .9301468    7.226065
                       1900  |   10.68794   2.728916     3.92   0.001     4.954705    16.42118
            shareagemp_int |  -.8965736    .247813    -3.62   0.002    -1.417209   -.3759379
  c.group_ei#c.shareagemp_int |  -.6178852   .2394096   -2.58   0.019    -1.120866   -.1149042
 c.group_sw#c.shareagemp_int |   .4432065    .204152     2.17   0.044     .0142991    .8721139
 c.group_nw#c.shareagemp_int |    .235528   .2167968     1.09   0.292    -.2199453    .6910012
                       _cons |   57.68437   7.968971     7.24   0.000     40.94218    74.42655
-------------------------------------------------------------------------------------------------
                    sigma_u |  17.642186
                    sigma_e |  2.8476819
                        rho |  .97460736   (fraction of variance due to u_i)
```