



APPENDIX

I. Coding

Coding	Trading Partner	Code (Trade Sector)
11	Japan	1
12	Japan	2
13	Japan	3
14	Japan	4
15	Japan	5
16	Japan	6
17	Japan	7
18	Japan	8
21	USA	1
22	USA	2
23	USA	3
24	USA	4
25	USA	5
26	USA	6
27	USA	7
28	USA	8
31	Singapore	1
32	Singapore	2
33	Singapore	3
34	Singapore	4
35	Singapore	5
36	Singapore	6

37	Singapore	7
38	Singapore	8
41	Korea	1
42	Korea	2
43	Korea	3
44	Korea	4
45	Korea	5
46	Korea	6
47	Korea	7
48	Korea	8
51	Germany	1
52	Germany	2
53	Germany	3
54	Germany	4
55	Germany	5
56	Germany	6
57	Germany	7
58	Germany	8

II. Calculated Exchange Rate Uncertainty

Year	Exchange Rate	U10	U5	U3
1987	Rp/Yen	7.218601	5.567408	3.942963
1988	Rp/Yen	6.786996	4.401519	3.286312
1989	Rp/Yen	5.473395	3.248029	1.640903
1990	Rp/Yen	4.655504	2.541347	1.220998
1991	Rp/Yen	4.578727	1.634782	1.150698
1992	Rp/Yen	4.381313	1.250962	1.235551
1993	Rp/Yen	3.518602	1.402302	1.424435
1994	Rp/Yen	3.446929	1.564969	1.379155
1995	Rp/Yen	3.255047	1.600515	1.317228
1996	Rp/Yen	1.724722	1.401833	1.366131
1997	Rp/Yen	1.383743	1.250254	1.286926
1998	Rp/Yen	4.597888	4.01229	4.142129
1999	Rp/Yen	3.308391	2.661069	2.470171
2000	Rp/Yen	3.414793	2.706128	2.195198
2001	Rp/Yen	2.864349	2.389855	1.521246
2002	Rp/Yen	2.261555	2.481595	1.574556
2003	Rp/Yen	2.440751	2.295087	1.840166
2004	Rp/Yen	2.35824	1.759665	1.555607
2005	Rp/Yen	2.451546	1.748343	1.130585
2006	Rp/Yen	2.895617	1.9964	1.526379
1987	Rp/US \$	4.315988	2.758468	1.964577

1988	Rp/US \$	3.999585	2.144528	1.689704
1989	Rp/US \$	3.155807	1.898386	1.405801
1990	Rp/US \$	2.986302	1.674303	1.108555
1991	Rp/US \$	2.797705	1.422133	1.116388
1992	Rp/US \$	2.560862	1.11221	1.042959
1993	Rp/US \$	1.860485	1.099735	1.077265
1994	Rp/US \$	1.620006	1.128279	1.130925
1995	Rp/US \$	1.42675	1.18289	1.156274
1996	Rp/US \$	1.344411	1.191896	1.103661
1997	Rp/US \$	1.393103	1.424684	1.42743
1998	Rp/US \$	6.344322	6.435051	6.310939
1999	Rp/US \$	3.693905	3.273348	2.827648
2000	Rp/US \$	3.741591	3.165528	2.220141
2001	Rp/US \$	3.996065	3.190609	1.520178
2002	Rp/US \$	3.026972	2.401144	1.393616
2003	Rp/US \$	2.646643	2.059931	1.641803
2004	Rp/US \$	2.694109	1.677763	1.667924
2005	Rp/US \$	2.725741	1.599591	1.175074
2006	Rp/US \$	3.08564	1.82196	1.294439
1987	Rp/S \$	3.378809	2.332232	1.75198
1988	Rp/S \$	3.222122	1.93869	1.710113
1989	Rp/S \$	2.760887	1.817615	1.476134
1990	Rp/S \$	2.909804	1.883734	1.284183
1991	Rp/S \$	2.965904	1.777326	1.358543
1992	Rp/S \$	2.980874	1.525368	1.355187
1993	Rp/S \$	2.262374	1.371709	1.122663
1994	Rp/S \$	2.176701	1.340341	1.118714
1995	Rp/S \$	2.154773	1.279572	1.160776
1996	Rp/S \$	1.904731	1.177779	1.137692
1997	Rp/S \$	1.870542	1.433246	1.3427
1998	Rp/S \$	5.788318	4.864364	4.452665
1999	Rp/S \$	3.344494	2.479869	2.231904
2000	Rp/S \$	3.077675	2.333354	2.090789
2001	Rp/S \$	3.001608	2.325971	1.733477
2002	Rp/S \$	2.367135	2.35097	1.419482
2003	Rp/S \$	2.632496	2.428593	1.708611
2004	Rp/S \$	2.513736	1.720707	1.642046
2005	Rp/S \$	2.470114	1.631064	1.151253
2006	Rp/S \$	2.734413	1.786627	1.262384
1987	Rp/Won	3.147764	2.376422	1.998877
1988	Rp/Won	3.669731	2.596969	2.363334
1989	Rp/Won	3.86167	2.896733	2.269107
1990	Rp/Won	3.704493	2.593086	1.568047

1991	Rp/Won	3.433933	2.116523	1.257754
1992	Rp/Won	3.024931	1.427093	1.065092
1993	Rp/Won	2.31008	1.231031	1.158525
1994	Rp/Won	2.211126	1.159099	1.142992
1995	Rp/Won	2.176764	1.097027	1.103057
1996	Rp/Won	1.804461	1.124202	1.054171
1997	Rp/Won	1.401178	1.098518	1.083333
1998	Rp/Won	2.755413	2.688661	2.605811
1999	Rp/Won	2.025749	1.882161	1.710509
2000	Rp/Won	2.279605	2.029495	1.736665
2001	Rp/Won	2.167147	1.859477	1.341647
2002	Rp/Won	1.713532	1.809505	1.348894
2003	Rp/Won	1.774569	1.753636	1.498468
2004	Rp/Won	1.774569	1.753636	1.498468
2005	Rp/Won	1.844946	1.378552	1.381634
2006	Rp/Won	1.678811	1.270623	1.210922
1987	Rp/DM	2.752627	4.526026	3.817835
1988	Rp/DM	4.545933	3.580849	2.917908
1989	Rp/DM	3.951282	2.79307	1.501953
1990	Rp/DM	3.496612	2.8093	1.292523
1991	Rp/DM	3.969737	1.774555	1.262136
1992	Rp/DM	3.519455	1.423165	1.395435
1993	Rp/DM	3.302555	1.251652	1.147003
1994	Rp/DM	2.842578	1.220945	1.137266
1995	Rp/DM	2.612872	1.233682	1.218437
1996	Rp/DM	1.9224	1.12204	1.115344
1997	Rp/DM	1.279517	1.126171	1.128161
1998	Rp/DM	1.326483	4.933427	4.702249
1999	Rp/DM	5.5217	5.958007	4.924064
2000	Rp/Euro	6.165283	4.076199	3.173
2001	Rp/Euro	4.682477	3.73423	1.396462
2002	Rp/Euro	4.516101	2.734226	1.346533
2003	Rp/Euro	3.560428	1.28021	1.209427
2004	Rp/Euro	3.424948	1.276341	1.29899
2005	Rp/Euro	3.385898	1.301059	1.330205
2006	Rp/Euro	3.195803	1.379088	1.36067

III. Data of Foreign Direct Investment in Indonesia

Sector		Total	
		Units IUT	Investment Value
22	Transport, Storage and Communication	317	20.945.623,2
14	Metal, Machinery and Electronics Industry	822	9.431.314,8
11	Chemical and Pharmaceutical Industry	348	7.841.047,4
6	Food Industry	362	4.202.674,9
18	Electricity, Gas and Water	20	3.740.994,7
24	Other Services	915	3.740.992,7
16	Transportation Equipment Industry	276	3.675.910,4
19	Construction	188	3.487.223,7
20	Trade and Reparation	1.791	3.428.110,1

10	Paper and Printing Industry	109	3.022.356,1
12	Rubber and Plastic Industry	303	2.038.317,7
7	Textile Industry	453	2.035.899,4
21	Hotel and Restaurant	176	1.895.346,2
1	Food Crops and Plantation	87	1.481.395,4
23	Real Estate, Industrial Estate and Office Building	84	1.359.541,2
5	Mining	168	996.282,7
13	Non Metal Mineral Industri	81	881.238,8
17	Other Industry	264	781.017,9
9	Wood Industry	148	778.431,6
8	Leather and Shoes Industry	97	498.829,4
2	Livestock	40	205.965,7
3	Forestry	5	167.231,4
4	Fishery	44	110.275,0
15	Medicine Equipment, Optical, and Clock Industry	31	107.360,6
	Total	7.129	76.853.381,1

Notes:

- IUP (Izin Usaha Tetap) is units of foreign direct investment.
- Investment value is in US\$.000
- Period of data is between 1 January 1999 and 31 January 2009
- Code of sector classification follows the Klasifikasi Baku Lapangan Usaha Indonesia (KBLI) by Badan Pusat Statistik (BPS).

Source: Badan Koordinasi Penanaman Modal (BKPM) or Indonesian Investment Coordinating Board

IV. Indonesia's Tariff Profile 2006



Indonesia

Part A.1 Tariffs and imports: Summary and duty ranges

Summary		Total	Ag	Non-Ag	WTO member since		1995
Simple average final bound		37.1	47.0	35.6	Binding coverage:		Total 96.6
Simple average MFN applied	2006	6.9	8.2	6.8			Non-Ag 96.1
Trade weighted average	2005	4.8	6.1	4.7	Ag: Tariff quotas (in %)		0.9
Imports in billion US\$	2005	57.4	5.3	52.1	Ag: Special safeguards (in %)		0.9

Frequency distribution	Duty Free	0 <= 5	5 <= 10	10 <= 15	15 <= 25	25 <= 50	50 <= 100	> 100	NAV in %
	Tariff lines and import values (in %)								
Agricultural products									
Final bound	0	0	0.6	0	0	87.4	8.5	3.3	0
MFN applied	2006	13.3	78.0	3.4	1.4	1.4	0.5	0.2	1.3
Imports	2005	40.2	46.1	0.3	2.2	8.7	2.0	0.0	12.0
Non-agricultural products									
Final bound		2.9	0	0.1	3.7	0	89.4	0.0	0
MFN applied	2006	22.7	42.4	17.3	14.5	2.7	0.2	0.1	0.1
Imports	2005	54.9	25.0	8.0	6.9	2.7	2.3	0.1	0

Part A.2 Tariffs and imports by product groups

Product groups	Final bound duties				MFN applied duties			Imports	
	AVG	Duty free in %	Max	Binding in %	AVG	Duty free in %	Max	Share in %	Duty free in %
Animal products	44.0	0	50	100	4.2	16.1	5	0.4	20.4
Dairy products	74.0	0	210	100	5.0	0	5	0.9	0
Fruit, vegetables, plants	45.8	0	60	100	5.1	3.8	20	0.7	0.4
Coffee, tea	45.3	0	60	100	4.8	4.2	5	0.2	0.7
Cereals & preparations	44.6	0	160	100	5.6	9.9	170	2.2	33.7
Oilseeds, fats & oils	39.9	0	60	100	4.2	35.1	15	1.6	88.7
Sugars and confectionery	58.3	0	95	100	8.3	0	25	1.1	0
Beverages & tobacco	85.0	0	150	100	56.0	1.1	170	0.4	0.0
Cotton	37.4	0	40	100	4.0	20.0	5	1.0	99.5
Other agricultural products	40.7	0	60	100	4.3	22.7	20	0.7	66.1
Fish & fish products	40.0	0	40	100	4.9	5.2	15	0.2	55.8
Minerals & metals	38.8	0.1	40	97.7	6.8	19.5	25	13.5	40.5
Petroleum	40.0	0	40	100	2.2	78.6	30	30.3	83.7
Chemicals	38.0	0.1	60	97.0	5.4	20.4	30	13.3	37.9
Wood, paper, etc.	39.4	0	40	98.8	5.3	21.4	15	2.7	51.8
Textiles	26.3	0	40	99.7	9.2	1.9	20	1.8	15.2
Clothing	35.0	0	40	100	14.1	0	15	0.1	0
Leather, footwear, etc.	39.8	0	50	99.3	7.7	12.4	20	1.3	7.7
Non-electrical machinery	34.9	6.5	40	98.3	2.3	71.3	15	14.1	64.1
Electrical machinery	30.3	23.6	40	97.7	6.1	28.9	15	5.6	26.4
Transport equipment	38.9	0	40	54.1	12.3	40.7	80	6.7	20.8
Manufactures, n.e.s.	35.7	8.8	40	88.1	7.2	18.0	20	1.4	17.5

Part B Exports to major trading partners and duties faced

Major markets	Bilateral imports		Diversification		MFN AVG of		Pref. margin	Duty free imports	
	in million		95% trade in no. of		traded TL			TL in %	Value in %
		US\$	HS 2 digit	HS 6 digit	Simple	Weighted	Weighted		
Japan	2005	20,760	48	230	7.7	1.4	0.3	56.1	73.5
European Communities	2005	13,181	70	531	5.8	4.5	1.9	55.4	64.3
United States	2005	11,692	60	344	5.7	6.5	0.7	60.8	64.6
Singapore	2005	10,360	73	461	0.0	0.0	0.0	99.9	100.0
China	2005	8,436	42	209	9.1	5.1	0.4	14.3	51.1
Korea, Republic of	2005	8,184	31	88	10.1	3.6	0.0	13.8	7.0

V. Data-Set with k=3

V.1. Stata Output for Pooled Least Square Model

```
. regress lntrade lngdppc lnpop lndist u31 u32 u33 u34 u35 u36 u37 u38
```

Source	SS	df	MS	Number of obs = 800		
-----+-----				F(11, 788) = 98.63		
Model	2178.26669	11	198.024244	Prob > F	= 0.0000	
Residual	1582.08515	788	2.00772227	R-squared	= 0.5793	
-----+-----				Adj R-squared = 0.5734		
Total	3760.35184	799	4.7063227	Root MSE	= 1.4169	

Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----						
lngdppc	1.035235	.0952873	10.86	0.000	.8481878	1.222282
lnpop	.172135	.0726814	2.37	0.018	.0294629	.3148071
lndist	-.6601917	.1405964	-4.70	0.000	-.9361795	-.384204
u31	.2171952	.0861142	2.52	0.012	.0481548	.3862356
u32	-1.508523	.0861142	-17.52	0.000	-1.677564	-1.339483
u33	.3514693	.0861142	4.08	0.000	.1824289	.5205097
u34	.4760764	.0861142	5.53	0.000	.307036	.6451167
u35	-.8271093	.0861142	-9.60	0.000	-.9961497	-.658069
u36	.4279386	.0861142	4.97	0.000	.2588982	.5969789
u37	.7056182	.0861142	8.19	0.000	.5365778	.8746586
u38	.8790189	.0861142	10.21	0.000	.7099785	1.048059
_cons	5.285036	1.822082	2.90	0.004	1.708327	8.861745

V.2. Test of Heteroscedasticity

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Intrade

chi2(1) = 332.91

Prob > chi2 = 0.0000

V.3. Test of Multicollinearity

. vif

Variable	VIF	1/VIF
Inpop	4.63	0.215768
Indist	4.19	0.238850
u31	1.29	0.773913
u32	1.29	0.773913

```

u33 | 1.29 0.773913
u34 | 1.29 0.773913
u35 | 1.29 0.773913
u36 | 1.29 0.773913
u37 | 1.29 0.773913
u38 | 1.29 0.773913
-----+-----
lngdppc | 1.23 0.812232

```

```

-----+-----
Mean VIF | 1.85

```

V.4. Test of Autocorrelation

```
. xtserial Intrade lngdppc lnpop Indist u31 u32 u33 u34 u35 u36 u37 u38, output
```

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 39) = 13.019

Prob > F = 0.0009

V.5. Stata Output for Pooled Least Square Model, robust

```
. regress Intrade lngdppc lnpop Indist u31 u32 u33 u34 u35 u36 u37 u38, robust
```

Linear regression

Number of obs = 800

F(11, 788) = 58.62

Prob > F = 0.0000

R-squared = 0.5793

Root MSE = 1.4169

	Robust					
Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	1.035235	.0906437	11.42	0.000	.8573033	1.213166
lnpop	.172135	.0736547	2.34	0.020	.0275524	.3167176
Indist	-.6601917	.156283	-4.22	0.000	-.966972	-.3534114
u31	.2171952	.0745877	2.91	0.004	.070781	.3636093
u32	-1.508523	.2471026	-6.10	0.000	-1.993581	-1.023466
u33	.3514693	.0854107	4.12	0.000	.1838099	.5191287
u34	.4760764	.1559049	3.05	0.002	.1700383	.7821144
u35	-.8271093	.1440948	-5.74	0.000	-1.109964	-.5442542
u36	.4279386	.080822	5.29	0.000	.2692867	.5865904
u37	.7056182	.1015455	6.95	0.000	.5062866	.9049498
u38	.8790189	.1056092	8.32	0.000	.6717102	1.086328
_cons	5.285036	1.736514	3.04	0.002	1.876296	8.693776

V.6. Stata Ouput for Fixed-Effect Model

Fixed-effects (within) regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3526 Obs per group: min = 20

 between = 0.0142 avg = 20.0

 overall = 0.0274 max = 20

F(10,750) = 40.84

corr(u_i, Xb) = -0.3080 Prob > F = 0.0000

```

-----
Intrade |   Coef.  Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
lngdppc |  .8724071  .1519455   5.74  0.000   .574118  1.170696
lnpop   |  .4749139  .3412874   1.39  0.164  -.1950783  1.144906
Indist  | (dropped)
u31     |  .1900149  .0552281   3.44  0.001   .0815947  .298435
u32     |  .0795335  .0552281   1.44  0.150  -.0288867  .1879536
u33     |  .054681   .0552281   0.99  0.322  -.0537391  .1631012
u34     |  .1371107  .0552281   2.48  0.013   .0286905  .2455308
u35     |  .1312771  .0552281   2.38  0.018   .0228569  .2396972
u36     |  .1062662  .0552281   1.92  0.055  -.002154   .2146863
u37     |  .1248746  .0552281   2.26  0.024   .0164544  .2332947
u38     |  .0805738  .0552281   1.46  0.145  -.0278463  .188994
_cons   | -8.66675  10.27468  -0.84  0.399  -28.83731  11.50381
-----+-----
sigma_u | 2.2155966
sigma_e | .50532386
rho     | .95055358 (fraction of variance due to u_i)
-----
F test that all u_i=0:   F(39, 750) = 139.63       Prob > F = 0.0000

```

V.7. Stata Output for Fixed-Effects Model, robust

```
. xtreg Intrade lngdppc lnpop Indist u31 u32 u33 u34 u35 u36 u37 u38, fe robust
```

Fixed-effects (within) regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3526 Obs per group: min = 20
 between = 0.0142 avg = 20.0
 overall = 0.0274 max = 20

F(10,750) = 35.79

corr(u_i, Xb) = -0.3080 Prob > F = 0.0000

(Std. Err. adjusted for clustering on coding)

Robust						
Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	.8724071	.1647717	5.29	0.000	.5489384	1.195876
lnpop	.4749139	.3423591	1.39	0.166	-.1971821	1.14701
Indist	(dropped)					
u31	.1900149	.0355343	5.35	0.000	.1202564	.2597734
u32	.0795335	.0851364	0.93	0.351	-.0876004	.2466674
u33	.054681	.0416191	1.31	0.189	-.0270227	.1363847
u34	.1371107	.049215	2.79	0.005	.0404951	.2337262
u35	.1312771	.0461391	2.85	0.005	.0407	.2218542
u36	.1062662	.026553	4.00	0.000	.0541391	.1583932
u37	.1248746	.0321285	3.89	0.000	.0618022	.187947
u38	.0805738	.0455271	1.77	0.077	-.0088018	.1699495
_cons	-8.66675	10.15594	-0.85	0.394	-28.60421	11.27071
sigma_u	2.2155966					
sigma_e	.50532386					

rho | .95055358 (fraction of variance due to u_i)

V.8. Stata Output for Random-Effects Model

. xtreg Intrade lngdppc lnpop lndist u31 u32 u33 u34 u35 u36 u37 u38, re

Random-effects GLS regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3503 Obs per group: min = 20

 between = 0.1146 avg = 20.0

 overall = 0.1318 max = 20

Random effects u_i ~ Gaussian Wald chi2(11) = 384.10

corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

-----+-----
Intrade | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-----+-----
lngdppc | .9491302 .1090327 8.71 0.000 .7354301 1.16283

lnpop | .2921572 .224154 1.30 0.192 -1.471766 .7314911

lndist | -.8570813 .4642755 -1.85 0.065 -1.767044 .0528819

u31 | .1956271 .0566162 3.46 0.001 .0846615 .3065928

u32 | .0223759 .0566162 0.40 0.693 -0.0885898 .1333415

u33 | .0707706 .0566162 1.25 0.211 -0.0401951 .1817362

u34 | .1548393 .0566162 2.73 0.006 .0438736 .2658049

u35 | .0985891 .0566162 1.74 0.082 -0.0123765 .2095548

u36 | .1233227 .0566162 2.18 0.029 .0123571 .2342884

```

u37 | .1519989 .0566162 2.68 0.007 .0410333 .2629646
u38 | .1161583 .0566162 2.05 0.040 .0051926 .227124
_cons | 3.854049 4.34552 0.89 0.375 -4.663014 12.37111

```

```
-----+-----
sigma_u | 1.1961275
```

```
sigma_e | .50532386
```

```
rho | .84855212 (fraction of variance due to u_i)
```

V.9. Stata Output for Random-Effects Model, robust

```
. xtreg lntrade lngdppc lnpop lndist u31 u32 u33 u34 u35 u36 u37 u38, re robust
```

```
Random-effects GLS regression           Number of obs   =    800
```

```
Group variable: coding                 Number of groups =    40
```

```
R-sq: within = 0.3503                   Obs per group: min =   20
```

```
between = 0.1146                         avg =   20.0
```

```
overall = 0.1318                         max =   20
```

```
Random effects u_i ~ Gaussian           Wald chi2(12)   = 16220.23
```

```
corr(u_i, X) = 0 (assumed)              Prob > chi2     = 0.0000
```

(Std. Err. adjusted for clustering on coding)

```
-----+-----
|           Robust
Intrade |   Coef.  Std. Err.   z  P>|z|  [95% Conf. Interval]
```

```
-----+-----
lngdppc | .9491302 .1140475  8.32 0.000  .7256013  1.172659
```


lnpop		.2921572	.2187764	1.34	0.182	-.1366366	.7209511
lndist		-.8570813	.4566235	-1.88	0.061	-1.752047	.0378843
u31		.1956271	.0339642	5.76	0.000	.1290585	.2621958
u32		.0223759	.0911481	0.25	0.806	-.1562712	.2010229
u33		.0707706	.0426699	1.66	0.097	-.0128608	.154402
u34		.1548393	.0558476	2.77	0.006	.04538	.2642985
u35		.0985891	.0428304	2.30	0.021	.0146432	.1825351
u36		.1233227	.0272264	4.53	0.000	.06996	.1766855
u37		.1519989	.0320191	4.75	0.000	.0892426	.2147553
u38		.1161583	.0480647	2.42	0.016	.0219533	.2103634
_cons		3.854049	4.060406	0.95	0.343	-4.1042	11.8123

sigma_u		1.1961275
sigma_e		.50532386
rho		.84855212 (fraction of variance due to u_i)

V.10. Stata Output for Hausman Test

```
. hausman fixed
```

---- Coefficients ----

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.

lngdppc		.8724071	.9491302	-.0767231	.1189239
lnpop		.4749139	.2921572	.1827567	.2633375
u31		.1900149	.1956271	-.0056123	.0104459
u32		.0795335	.0223759	.0571576	.

```

u33 | .054681 .0707706 -.0160895 .
u34 | .1371107 .1548393 -.0177286 .
u35 | .1312771 .0985891 .0326879 .0171573
u36 | .1062662 .1233227 -.0170566 .
u37 | .1248746 .1519989 -.0271243 .0026482
u38 | .0805738 .1161583 -.0355845 .

```

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(10) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 16.86$$

$$\text{Prob}>\text{chi2} = 0.0776$$

(V_b-V_B is not positive definite)

V.11. Stata Output for FGLS Model

```
. xtgls lntrade lngdppc lnpop lndist u31 u32 u33 u34 u35 u36 u37 u38
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: homoskedastic

Correlation: no autocorrelation

Estimated covariances = 1 Number of obs = 800

Estimated autocorrelations = 0 Number of groups = 40

Estimated coefficients = 12 Time periods = 20
 Wald chi2(11) = 1101.47
 Prob > chi2 = 0.0000

Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	1.035235	.09457	10.95	0.000	.8498811	1.220589
lnpop	.172135	.0721343	2.39	0.017	.0307545	.3135156
lndist	-.6601917	.1395379	-4.73	0.000	-.933681	-.3867024
u31	.2171952	.0854659	2.54	0.011	.0496851	.3847053
u32	-1.508523	.0854659	-17.65	0.000	-1.676033	-1.341013
u33	.3514693	.0854659	4.11	0.000	.1839592	.5189794
u34	.4760764	.0854659	5.57	0.000	.3085663	.6435865
u35	-.8271093	.0854659	-9.68	0.000	-.9946194	-.6595992
u36	.4279386	.0854659	5.01	0.000	.2604285	.5954487
u37	.7056182	.0854659	8.26	0.000	.5381081	.8731283
u38	.8790189	.0854659	10.29	0.000	.7115088	1.046529
_cons	5.285036	1.808365	2.92	0.003	1.740706	8.829366

V.12. Stata Output for Treated FGLS Model

```
. xtgls Intrade lngdppc lnpop lndist u31 u32 u33 u34 u35 u36 u37 u38, p(h) c(a)
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: heteroskedastic

Correlation: common AR(1) coefficient for all panels (0.7025)

Estimated covariances = 40 Number of obs = 800
 Estimated autocorrelations = 1 Number of groups = 40
 Estimated coefficients = 12 Time periods = 20
 Wald chi2(11) = 504.55
 Prob > chi2 = 0.0000

Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	.966549	.0735273	13.15	0.000	.8224383	1.11066
lnpop	.2928627	.0549066	5.33	0.000	.1852477	.4004776
lnDIST	-.8113279	.1125304	-7.21	0.000	-1.031883	-.5907724
u31	.1266452	.0244063	5.19	0.000	.0788097	.1744807
u32	-.350336	.1002684	-3.49	0.000	-.5468584	-.1538137
u33	.1785326	.0375418	4.76	0.000	.1049521	.2521132
u34	.3750605	.0811399	4.62	0.000	.2160293	.5340918
u35	-.2596572	.0587757	-4.42	0.000	-.3748555	-.1444589
u36	.1665465	.0263207	6.33	0.000	.1149588	.2181341
u37	.2754399	.0394555	6.98	0.000	.1981086	.3527712
u38	.3562577	.0551794	6.46	0.000	.2481081	.4644072
_cons	3.518053	1.290078	2.73	0.006	.9895458	6.04656

VI. Data-Set for k=5

VI.1. Stata Output for Pooled Least Square Model

```
. regress Intrade lngdppc lnpop lndist u51 u52 u53 u54 u55 u56 u57 u58
```

Source	SS	df	MS	Number of obs = 800		
-----+-----				F(11, 788) = 101.35		
Model	2203.08978	11	200.280889	Prob > F = 0.0000		
Residual	1557.26205	788	1.97622088	R-squared = 0.5859		
-----+-----				Adj R-squared = 0.5801		
Total	3760.35184	799	4.7063227	Root MSE = 1.4058		

Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
-----+-----						
lngdppc	1.036137	.0945738	10.96	0.000	.8504904	1.221783
lnpop	.1714622	.0721178	2.38	0.018	.0298964	.3130279
lndist	-.6601706	.139524	-4.73	0.000	-.9340533	-.3862878
u51	.1709818	.0705577	2.42	0.016	.0324785	.3094851
u52	-1.233128	.0705577	-17.48	0.000	-1.371631	-1.094625
u53	.2761734	.0705577	3.91	0.000	.1376701	.4146767
u54	.3684143	.0705577	5.22	0.000	.229911	.5069176
u55	-.6981705	.0705577	-9.90	0.000	-.8366738	-.5596672
u56	.3409155	.0705577	4.83	0.000	.2024122	.4794188
u57	.5673124	.0705577	8.04	0.000	.4288091	.7058156
u58	.7135853	.0705577	10.11	0.000	.575082	.8520886
_cons	5.314212	1.807501	2.94	0.003	1.766126	8.862298

VI.2. Test of Heteroscedasticity

```
. hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Intrade

chi2(1) = 243.51

Prob > chi2 = 0.0000

VI.3. Test of Multicollinearity

```
. vif
```

Variable	VIF	1/VIF
Inpop	4.64	0.215715
Indist	4.19	0.238730
u51	1.34	0.747792
u52	1.34	0.747792
u53	1.34	0.747792
u54	1.34	0.747792
u55	1.34	0.747792
u56	1.34	0.747792
u57	1.34	0.747792
u58	1.34	0.747792
lngdppc	1.23	0.811597
Mean VIF	1.89	


```

u54 | .3684143 .1237696 2.98 0.003 .1254571 .6113714
u55 | -.6981705 .097745 -7.14 0.000 -.8900418 -.5062992
u56 | .3409155 .0580844 5.87 0.000 .2268969 .454934
u57 | .5673124 .0708905 8.00 0.000 .4281557 .706469
u58 | .7135853 .0716222 9.96 0.000 .5729923 .8541782
_cons | 5.314212 1.700069 3.13 0.002 1.977012 8.651411

```

VI.6. Stata Ouput for Fixed-Effect Model

```
. xtreg Intrade lngdppc lnpop lndist u51 u52 u53 u54 u55 u56 u57 u58, fe
```

```

Fixed-effects (within) regression      Number of obs   =    800
Group variable: coding                 Number of groups =    40

R-sq:  within = 0.3503                 Obs per group:  min =    20
      between = 0.0192                   avg =    20.0
      overall = 0.0368                   max =    20

                                F(10,750)   =   40.44
corr(u_i, Xb) = -0.1971                Prob > F      =   0.0000

```

```
Intrade |   Coef.  Std. Err.   t   P>|t|   [95% Conf. Interval]
```

```

lngdppc | .9821772 .163543   6.01 0.000   .6611208  1.303234
lnpop   | .2672428 .3616987   0.74 0.460  -.4428195  .9773051
lndist  | (dropped)
u51     | .169109 .0479798   3.52 0.000   .0749183  .2632997

```



```

u52 | .1235265 .0479798 2.57 0.010 .0293358 .2177172
u53 | .0397321 .0479798 0.83 0.408 -.0544586 .1339228
u54 | .1080005 .0479798 2.25 0.025 .0138098 .2021912
u55 | .0734054 .0479798 1.53 0.126 -.0207853 .1675961
u56 | .0958886 .0479798 2.00 0.046 .0016979 .1900793
u57 | .1106121 .0479798 2.31 0.021 .0164214 .2048028
u58 | .0627552 .0479798 1.31 0.191 -.0314355 .1569459
_cons | -2.833759 10.82259 -0.26 0.794 -24.07993 18.41241

```

```

-----+-----
sigma_u | 2.1389519
sigma_e | .5062028
rho | .94696287 (fraction of variance due to u_i)
-----+-----

```

F test that all $u_i=0$: $F(39, 750) = 136.60$ $\text{Prob} > F = 0.0000$

VI.7. Stata Output for Fixed-Effects Model, robust

```
. xtreg lntrade lngdppc lnpop lndist u51 u52 u53 u54 u55 u56 u57 u58, fe robust
```

Fixed-effects (within) regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3503 Obs per group: min = 20

 between = 0.0192 avg = 20.0

 overall = 0.0368 max = 20

$F(10,750) = 33.96$

$\text{corr}(u_i, Xb) = -0.1971$ $\text{Prob} > F = 0.0000$

(Std. Err. adjusted for clustering on coding)

	Robust					
Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	.9821772	.1745166	5.63	0.000	.6395782	1.324776
lnpop	.2672428	.3610782	0.74	0.459	-.4416015	.9760871
Indist	(dropped)					
u51	.169109	.0345335	4.90	0.000	.1013151	.2369029
u52	.1235265	.0781393	1.58	0.114	-.0298713	.2769243
u53	.0397321	.0360701	1.10	0.271	-.0310782	.1105424
u54	.1080005	.0392962	2.75	0.006	.0308568	.1851441
u55	.0734054	.0440686	1.67	0.096	-.0131072	.1599179
u56	.0958886	.0242296	3.96	0.000	.0483226	.1434545
u57	.1106121	.029687	3.73	0.000	.0523327	.1688916
u58	.0627552	.0390661	1.61	0.109	-.0139367	.1394472
_cons	-2.833759	10.6647	-0.27	0.791	-23.76998	18.10246
sigma_u	2.1389519					
sigma_e	.5062028					
rho	.94696287 (fraction of variance due to u_i)					

VI.8. Stata Output for Random-Effects Model

```
. xtreg Intrade lngdppc lnpop Indist u51 u52 u53 u54 u55 u56 u57 u58, re
```

Random-effects GLS regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3480 Obs per group: min = 20
 between = 0.1029 avg = 20.0
 overall = 0.1214 max = 20

Random effects u_i ~ Gaussian Wald chi2(11) = 379.79
 corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	1.007447	.113823	8.85	0.000	.7843582	1.230536
lnpop	.2080985	.2308945	0.90	0.367	-.2444463	.6606434
Indist	-.7246485	.4747473	-1.53	0.127	-1.655136	.2058391
u51	.1717907	.0487805	3.52	0.000	.0761827	.2673987
u52	.0686991	.0487805	1.41	0.159	-.0269089	.1643071
u53	.0523436	.0487805	1.07	0.283	-.0432644	.1479516
u54	-.1216268	.0487805	2.49	0.013	.0260188	.2172347
u55	.0433455	.0487805	0.89	0.374	-.0522625	.1389535
u56	.1088635	.0487805	2.23	0.026	.0132555	.2044715
u57	.1325476	.0487805	2.72	0.007	.0369396	.2281556
u58	.0929086	.0487805	1.90	0.057	-.0026994	.1885166
_cons	4.890038	4.426408	1.10	0.269	-3.785562	13.56564
sigma_u	1.2122779					
sigma_e	.5062028					
rho	.85152827 (fraction of variance due to u_i)					

VI.9. Stata Output for Random-Effects Model, robust

. xtreg Intrade lngdppc lnpop lndist u51 u52 u53 u54 u55 u56 u57 u58, re robust

Random-effects GLS regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3480 Obs per group: min = 20

 between = 0.1029 avg = 20.0

 overall = 0.1214 max = 20

Random effects u_i ~ Gaussian Wald chi2(12) = 15479.69

corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

(Std. Err. adjusted for clustering on coding)

	Robust					
Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	1.007447	.118832	8.48	0.000	.7745409	1.240354
lnpop	.2080985	.2271787	0.92	0.360	-.2371636	.6533607
lndist	-.7246485	.4723154	-1.53	0.125	-1.65037	.2010728
u51	.1717907	.0344854	4.98	0.000	.1042007	.2393808
u52	.0686991	.0829907	0.83	0.408	-.0939596	.2313578
u53	.0523436	.0372636	1.40	0.160	-.0206917	.1253788
u54	.1216268	.0469178	2.59	0.010	.0296696	.2135839
u55	.0433455	.0419179	1.03	0.301	-.0388121	.1255031
u56	.1088635	.0245951	4.43	0.000	.060658	.157069

```

u57 | .1325476 .0303697 4.36 0.000 .0730241 .1920712
u58 | .0929086 .0420925 2.21 0.027 .0104089 .1754083
_cons | 4.890038 4.138897 1.18 0.237 -3.222051 13.00213

```

```
-----+-----
sigma_u | 1.2122779
```

```
sigma_e | .5062028
```

```
rho | .85152827 (fraction of variance due to u_i)
```

VI.10. Stata Output for Hausman Test

```
. hausman fixed
```

```
---- Coefficients ----
```

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
lngdppc	.9821772	1.007447	-.02527	.1278084
lnpop	.2672428	.2080985	.0591443	.2806552
u51	.169109	.1717907	-.0026817	.0018234
u52	.1235265	.0686991	.0548274	.
u53	.0397321	.0523436	-.0126115	.
u54	.1080005	.1216268	-.0136263	.
u55	.0734054	.0433455	.0300598	.013599
u56	.0958886	.1088635	-.0129749	.
u57	.1106121	.1325476	-.0219355	.
u58	.0627552	.0929086	-.0301534	.

```
-----+-----
b = consistent under Ho and Ha; obtained from xtreg
```

```
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
```

Test: Ho: difference in coefficients not systematic

$$\chi^2(10) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 10.90$$

$$\text{Prob} > \chi^2 = 0.3655$$

(V_b-V_B is not positive definite)

VI.11. Stata Output for FGLS Model

```
. xtgls Intrade lngdppc lnpop Indist u51 u52 u53 u54 u55 u56 u57 u58
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: homoskedastic

Correlation: no autocorrelation

Estimated covariances = 1 Number of obs = 800

Estimated autocorrelations = 0 Number of groups = 40

Estimated coefficients = 12 Time periods = 20

Wald $\chi^2(11) = 1131.78$

Prob > $\chi^2 = 0.0000$

```
-----+-----
Intrade |   Coef.  Std. Err.   z  P>|z|  [95% Conf. Interval]
-----+-----
lngdppc | 1.036137  .0938618  11.04  0.000  .852171  1.220103
lnpop   | .1714622  .0715749   2.40  0.017  .0311779 .3117464
```

Indist		-.6601706	.1384737	-4.77	0.000	-.931574	-.3887672
u51		.1709818	.0700265	2.44	0.015	.0337323	.3082312
u52		-1.233128	.0700265	-17.61	0.000	-1.370378	-1.095879
u53		.2761734	.0700265	3.94	0.000	.1389239	.4134229
u54		.3684143	.0700265	5.26	0.000	.2311648	.5056637
u55		-.6981705	.0700265	-9.97	0.000	-.8354199	-.560921
u56		.3409155	.0700265	4.87	0.000	.203666	.4781649
u57		.5673124	.0700265	8.10	0.000	.4300629	.7045618
u58		.7135853	.0700265	10.19	0.000	.5763358	.8508347
_cons		5.314212	1.793893	2.96	0.003	1.798245	8.830178

VI.12. Stata Output for Treated FGLS Model

. xtgls lntrade lngdppc lnpop Indist u51 u52 u53 u54 u55 u56 u57 u58, p(h) c(a)

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: heteroskedastic

Correlation: common AR(1) coefficient for all panels (0.7448)

Estimated covariances = 40 Number of obs = 800

Estimated autocorrelations = 1 Number of groups = 40

Estimated coefficients = 12 Time periods = 20

Wald chi2(11) = 488.30

Prob > chi2 = 0.0000

Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
-----+-----					
lngdppc	.9938835	.0767735	12.95	0.000	.8434102 1.144357
lnpop	.2699402	.0586118	4.61	0.000	.1550632 .3848172
lndist	-.7587254	.1190442	-6.37	0.000	-.9920478 -.5254031
u51	.1302414	.0214114	6.08	0.000	.0882759 .1722069
u52	-.2810984	.0848781	-3.31	0.001	-.4474565 -.1147403
u53	.1666588	.0331285	5.03	0.000	.1017281 .2315895
u54	.3456989	.0688306	5.02	0.000	.2107934 .4806045
u55	-.217964	.0516942	-4.22	0.000	-.3192827 -.1166453
u56	.1540507	.0221986	6.94	0.000	.1105423 .1975591
u57	.2503579	.0332734	7.52	0.000	.1851433 .3155725
u58	.3170232	.0458663	6.91	0.000	.2271268 .4069195
_cons	3.440656	1.353489	2.54	0.011	.7878662 6.093447
-----+-----					

VII. Data-Set for k=10

VII.1. Stata Output for Pooled Least Square Model

```
. regress Intrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8
```

Source	SS	df	MS	Number of obs =	800
-----+-----				F(11, 788) =	123.78
Model	2381.84317	11	216.531197	Prob > F =	0.0000
Residual	1378.50867	788	1.74937648	R-squared =	0.6334
-----+-----				Adj R-squared =	0.6283
Total	3760.35184	799	4.7063227	Root MSE =	1.3226

Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	1.03139	.0889636	11.59	0.000	.8567559	1.206023
lnpop	.173016	.0679127	2.55	0.011	.0397048	.3063272
lndist	-.6526276	.131194	-4.97	0.000	-.9101587	-.3950965
u10_1	.0834395	.0539563	1.55	0.122	-.0224756	.1893546
u10_2	-.9902578	.0539563	-18.35	0.000	-1.096173	-.8843427
u10_3	.1697878	.0539563	3.15	0.002	.0638727	.2757029
u10_4	.2450765	.0539563	4.54	0.000	.1391614	.3509916
u10_5	-.5857654	.0539563	-10.86	0.000	-.6916805	-.4798503
u10_6	.2124069	.0539563	3.94	0.000	.1064918	.318322
u10_7	.3931981	.0539563	7.29	0.000	.287283	.4991132
u10_8	.5025359	.0539563	9.31	0.000	.3966208	.608451
_cons	5.398413	1.699871	3.18	0.002	2.061601	8.735225

VII.2. Test of Heteroscedasticity

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Intrade

chi2(1) = 121.94

Prob > chi2 = 0.0000

VII.3. Test of Multicollinearity

. vif

Variable	VIF	1/VIF
lnpop	4.64	0.215333
Indist	4.18	0.239015
u10_1	1.62	0.616071
u10_2	1.62	0.616071
u10_3	1.62	0.616071
u10_4	1.62	0.616071
u10_5	1.62	0.616071
u10_6	1.62	0.616071
u10_7	1.62	0.616071
u10_8	1.62	0.616071
lngdppc	1.23	0.811904
Mean VIF	2.09	

VII.4. Test of Autocorrelation

. xtserial Intrade lngdppc lnpop Indist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, output

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

$$F(1, 39) = 15.649$$

$$\text{Prob} > F = 0.0003$$

VII.5. Stata Output for Pooled Least Square Model, robust

```
. regress lntrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, robust
```

Linear regression

Number of obs = 800

F(11, 788) = 117.98

Prob > F = 0.0000

R-squared = 0.6334

Root MSE = 1.3226

	Robust					
Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	1.03139	.0858952	12.01	0.000	.8627792	1.2
lnpop	.173016	.0705991	2.45	0.014	.0344315	.3116005
lndist	-.6526276	.1481222	-4.41	0.000	-.9433885	-.3618667
u10_1	.0834395	.045202	1.85	0.065	-.0052911	.1721702
u10_2	-.9902578	.0796138	-12.44	0.000	-1.146538	-.8339776
u10_3	.1697878	.0470212	3.61	0.000	.0774861	.2620895
u10_4	.2450765	.0852523	2.87	0.004	.077728	.412425
u10_5	-.5857654	.0596701	-9.82	0.000	-.7028966	-.4686341
u10_6	.2124069	.0447153	4.75	0.000	.1246317	.3001822
u10_7	.3931981	.0485668	8.10	0.000	.2978626	.4885336
u10_8	.5025359	.0495967	10.13	0.000	.4051787	.5998932
_cons	5.398413	1.57851	3.42	0.001	2.299831	8.496995

VII.6. Stata Output for Fixed-Effect Model

```
. xtreg Intrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, fe
```

Fixed-effects (within) regression Number of obs = 800

Group variable: coding Number of groups = 40

R-sq: within = 0.3379 Obs per group: min = 20

 between = 0.0012 avg = 20.0

 overall = 0.0052 max = 20

 F(10,750) = 38.27

corr(u_i, Xb) = -0.5184 Prob > F = 0.0000

Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	.7544998	.1619402	4.66	0.000	.4365899	1.07241
lnpop	.7973273	.3479099	2.29	0.022	.1143342	1.48032
lndist	(dropped)					
u10_1	-.0910979	.0463752	1.96	0.050	.0000573	.1821386
u10_2	.128456	.0463752	2.77	0.006	.0374153	.2194966
u10_3	-.0070594	.0463752	-0.15	0.879	-.0981	.0839813
u10_4	.0746214	.0463752	1.61	0.108	-.0164193	.165662
u10_5	.020144	.0463752	0.43	0.664	-.0708967	.1111846
u10_6	.0151499	.0463752	0.33	0.744	-.0758907	.1061905
u10_7	.0794643	.0463752	1.71	0.087	-.0115763	.170505
u10_8	-.025503	.0463752	-0.55	0.583	-.1165437	.0655376
_cons	-18.56627	10.37301	-1.79	0.074	-38.92985	1.797324

```

sigma_u | 2.4930136
sigma_e | .51102237
rho | .95967675 (fraction of variance due to u_i)

```

F test that all $u_i=0$: $F(39, 750) = 116.12$ $\text{Prob} > F = 0.0000$

VII.7. Stata Output for Fixed-Effects Model, robust

```

. xtreg lntrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, fe robust

```

```

Fixed-effects (within) regression      Number of obs   =    800
Group variable: coding                 Number of groups =    40

R-sq:  within = 0.3379                 Obs per group:  min =    20
      between = 0.0012                   avg =    20.0
      overall  = 0.0052                   max =    20

                                F(10,750)   =   33.36
corr(u_i, Xb) = -0.5184                 Prob > F     =   0.0000

```

(Std. Err. adjusted for clustering on coding)

	Robust					
Intrade	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdppc	.7544998	.1829222	4.12	0.000	.3953993	1.1136
lnpop	.7973273	.3591773	2.22	0.027	.0922148	1.50244
lndist	(dropped)					
u10_1	.0910979	.0322715	2.82	0.005	.0277447	.1544512

```

u10_2 | .128456 .0838312 1.53 0.126 -.0361158 .2930277
u10_3 | -.0070594 .0349805 -0.20 0.840 -.0757307 .061612
u10_4 | .0746214 .0408346 1.83 0.068 -.0055424 .1547851
u10_5 | .020144 .0443419 0.45 0.650 -.0669051 .107193
u10_6 | .0151499 .0273935 0.55 0.580 -.0386272 .068927
u10_7 | .0794643 .0321906 2.47 0.014 .0162699 .1426587
u10_8 | -.025503 .0402456 -0.63 0.526 -.1045104 .0535043
_cons | -18.56627 10.47346 -1.77 0.077 -39.12705 1.994518

```

```

-----+-----
sigma_u | 2.4930136
sigma_e | .51102237
rho | .95967675 (fraction of variance due to u_i)

```

VII.8. Stata Output for Random-Effects Model

```

. xtreg Intrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, re

```

```

Random-effects GLS regression      Number of obs   =    800
Group variable: coding             Number of groups =    40

R-sq: within = 0.3322              Obs per group: min =    20
      between = 0.0861                  avg =    20.0
      overall = 0.1054                  max =    20

```

```

Random effects u_i ~ Gaussian      Wald chi2(11)   =  352.19
corr(u_i, X) = 0 (assumed)         Prob > chi2     =  0.0000

```

```

-----+-----
Intrade |   Coef.  Std. Err.   z  P>|z|  [95% Conf. Interval]

```

```

-----+-----
lngdppc | .919785 .1162893 7.91 0.000 .6918621 1.147708
lnpop | .4138983 .2276468 1.82 0.069 -.0322812 .8600778
lndist | -1.064664 .4696143 -2.27 0.023 -1.985091 -.1442365
u10_1 | .100569 .0469129 2.14 0.032 .0086215 .1925166
u10_2 | .0580306 .0469129 1.24 0.216 -.0339169 .1499782
u10_3 | .0156796 .0469129 0.33 0.738 -.0762679 .1076272
u10_4 | .0969007 .0469129 2.07 0.039 .0049531 .1888482
u10_5 | -.0134054 .0469129 -0.29 0.775 -.1053529 .0785422
u10_6 | .0393566 .0469129 0.84 0.402 -.052591 .1313041
u10_7 | .1120469 .0469129 2.39 0.017 .0200993 .2039944
u10_8 | .0224903 .0469129 0.48 0.632 -.0694573 .1144378
_cons | 1.589048 4.369513 0.36 0.716 -6.97504 10.15314

```

```

-----+-----
sigma_u | 1.2037016
sigma_e | .51102237
rho | .84728799 (fraction of variance due to u_i)
-----+-----

```

VII.9. Stata Output for Random-Effects Model, robust

```

. xtreg lntrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, re robust

```

```

Random-effects GLS regression           Number of obs   =    800
Group variable: coding                  Number of groups =    40

R-sq:  within = 0.3322                  Obs per group:  min =    20
      between = 0.0861                    avg =    20.0
      overall = 0.1054                    max =    20

```

Random effects u_i ~ Gaussian Wald chi2(12) = 15677.38
 corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

(Std. Err. adjusted for clustering on coding)

	Robust					
Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	.919785	.1255748	7.32	0.000	.6736629	1.165907
lnpop	.4138983	.2256392	1.83	0.067	-.0283464	.8561429
lndist	-1.064664	.4706901	-2.26	0.024	-1.987199	-.142128
u10_1	.100569	.0328814	3.06	0.002	.0361227	.1650154
u10_2	-.0580306	.0880688	0.66	0.510	-.114581	.2306423
u10_3	.0156796	.0349886	0.45	0.654	-.0528969	.0842561
u10_4	.0969007	.0500313	1.94	0.053	-.001159	.1949603
u10_5	-.0134054	.0413514	-0.32	0.746	-.0944527	.067642
u10_6	.0393566	.0282116	1.40	0.163	-.0159372	.0946503
u10_7	.1120469	.031994	3.50	0.000	.0493398	.1747539
u10_8	.0224903	.0436008	0.52	0.606	-.0629658	.1079463
_cons	1.589048	4.056477	0.39	0.695	-6.361502	9.539597
sigma_u	1.2037016					
sigma_e	.51102237					
rho	.84728799 (fraction of variance due to u_i)					

VII.10. Stata Output for Hausman Test

. hausman fixed

---- Coefficients ----

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.

lngdppc	.7544998	.919785	-.1652852	.1330094
lnpop	.7973273	.4138983	.383429	.2794554
u10_1	.0910979	.100569	-.0094711	.
u10_2	.128456	.0580306	.0704253	.
u10_3	-.0070594	.0156796	-.022739	.
u10_4	.0746214	.0969007	-.0222793	.
u10_5	.020144	-.0134054	.0335493	.0160083
u10_6	.0151499	.0393566	-.0242067	.
u10_7	.0794643	.1120469	-.0325825	.0035526
u10_8	-.025503	.0224903	-.0479933	.

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\text{chi2}(10) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 30.88$$

$$\text{Prob}>\text{chi2} = 0.0006$$

(V_b-V_B is not positive definite)

VII.11. Stata Output for FGLS Model

```
. xtgls Intrade lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: homoskedastic

Correlation: no autocorrelation

Estimated covariances = 1 Number of obs = 800
 Estimated autocorrelations = 0 Number of groups = 40
 Estimated coefficients = 12 Time periods = 20
 Wald chi2(11) = 1382.27
 Prob > chi2 = 0.0000

Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	1.03139	.0882939	11.68	0.000	.8583368	1.204442
lnpop	.173016	.0674014	2.57	0.010	.0409117	.3051203
lndist	-.6526276	.1302063	-5.01	0.000	-.9078273	-.3974279
u10_1	.0834395	.0535501	1.56	0.119	-.0215168	.1883958
u10_2	-.9902578	.0535501	-18.49	0.000	-1.095214	-.8853015
u10_3	.1697878	.0535501	3.17	0.002	.0648316	.2747441
u10_4	.2450765	.0535501	4.58	0.000	.1401202	.3500328
u10_5	-.5857654	.0535501	-10.94	0.000	-.6907217	-.4808091
u10_6	.2124069	.0535501	3.97	0.000	.1074507	.3173632
u10_7	.3931981	.0535501	7.34	0.000	.2882418	.4981544
u10_8	.5025359	.0535501	9.38	0.000	.3975797	.6074922
_cons	5.398413	1.687074	3.20	0.001	2.091808	8.705018

VII.12. Stata Output for Treated FGLS Model

```
. xtgls lngdppc lnpop lndist u10_1 u10_2 u10_3 u10_4 u10_5 u10_6
u10_7 u10_8, p(h) c(a)
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: heteroskedastic

Correlation: common AR(1) coefficient for all panels (0.7549)

```
Estimated covariances = 40      Number of obs = 800
Estimated autocorrelations = 1    Number of groups = 40
Estimated coefficients = 12      Time periods = 20
Wald chi2(11) = 567.70
Prob > chi2 = 0.0000
```

Intrade	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lngdppc	.9543168	.075673	12.61	0.000	.8060004	1.102633
lnpop	.2464681	.0610054	4.04	0.000	.1268998	.3660363
lndist	-.6756481	.1282436	-5.27	0.000	-.9270009	-.4242953
u10_1	.0927232	.0192573	4.81	0.000	.0549795	.1304669
u10_2	-.3640795	.0705967	-5.16	0.000	-.5024465	-.2257124
u10_3	.1480049	.0266077	5.56	0.000	.0958549	.200155
u10_4	.3222519	.0526127	6.12	0.000	.2191329	.4253709
u10_5	-.2765303	.0384719	-7.19	0.000	-.3519338	-.2011267
u10_6	.1251367	.0186723	6.70	0.000	.0885397	.1617337
u10_7	.235362	.0275412	8.55	0.000	.1813822	.2893417

u10_8	.2664126	.0370468	7.19	0.000	.1938022	.3390229
_cons	4.307742	1.330519	3.24	0.001	1.699973	6.915511

