HW-06

Task 1.

The model is

$y_{it} = x'_{it}\beta + c_i + u_{it}, i = 1, ..., n, t = 1, 2.$

The OLS estimator in

$y_{i2} - \bar{y}_i = (x_{it} - \bar{x}_i)'\beta + (u_{i2} - \bar{u}_i)$

is FE estimator, where

$y_{i2} - \bar{y}_i = y_{i2} - 1/2(y_{i1} + y_{i2}) = 1/2(y_{i2} - y_{i1}) = 1/2\Delta y_{i2},$

$x_{i2} - \bar{x}_i = x_{i2} - 1/2(x_{i1} + x_{i2}) = 1/2(x_{i2} - x_{i1}) = 1/2\Delta x_{i2},$

$u_{i2} - \bar{u}_i = u_{i2} - 1/2(u_{i1} + u_{i2}) = 1/2(u_{i2} - u_{i1}) = 1/2\Delta u_{i2}.$

Therefore,

$y_{i2} - \bar{y}_i = (x_{it} - \bar{x}_i)'\beta + (u_{i2} - \bar{u}_i)$

can be rewritten as

$1/2\Delta y_{i2} = 1/2\Delta x'_{i2}\beta + 1/2\Delta u_{i2},$

$\Delta y_{i2} = \Delta x'_{i2}\beta + \Delta u_{i2},$

which is an equation for FD estimator, i.e. FE and FD estimators are numerically identical in this case.

Task 2.

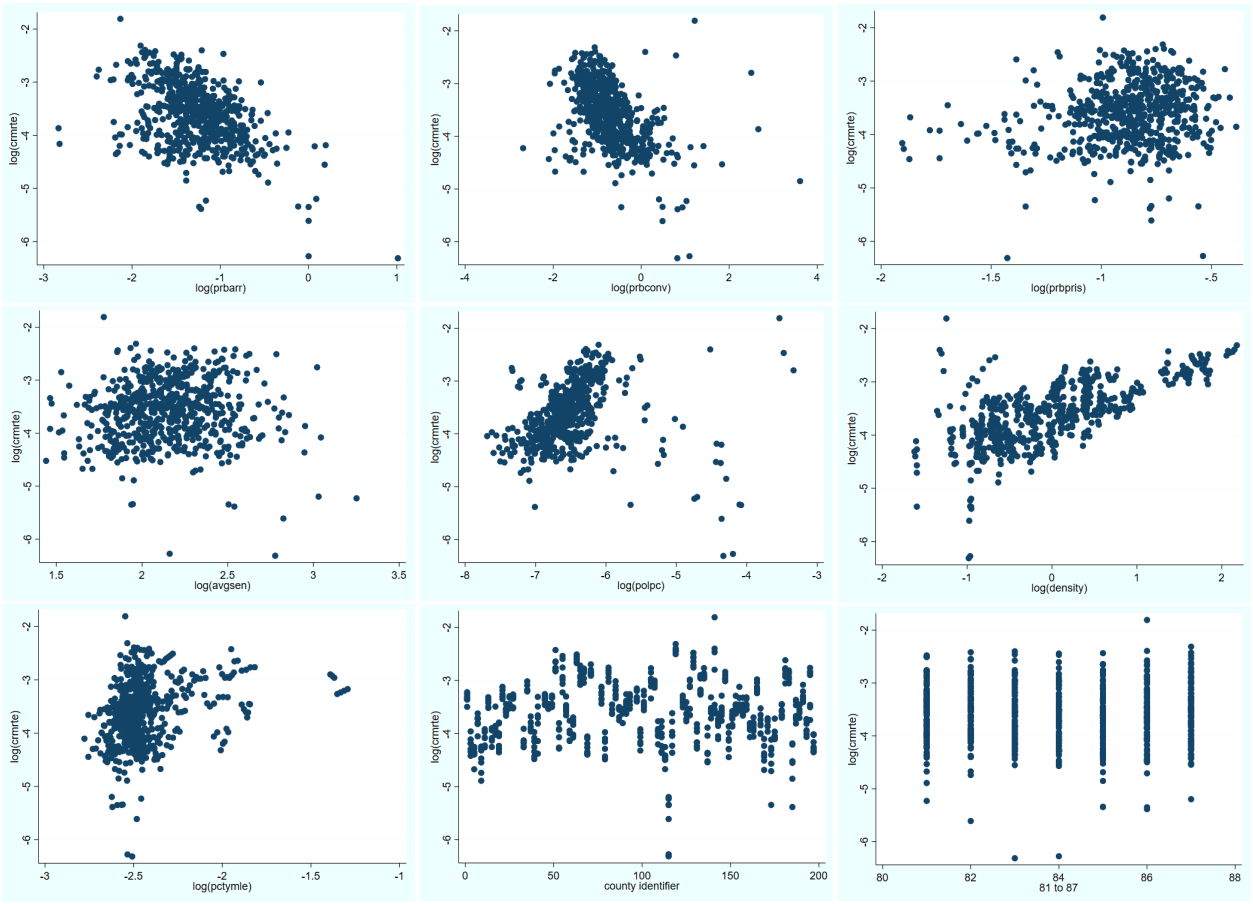
(1)

Descriptive statistics on the variables of main interest:

Variable	Obs	Mean	Std. Dev.	Min	Max
crmrte	630	.0315876	.0181209	.0018116	.163835
prbarr	630	.3073682	.1712047	.0588235	2.75
prbconv	630	.6886176	1.690345	.0683761	37
prbpris	630	.4255184	.0872452	.148936	.678571
avgsen	630	8.95454	2.658082	4.22	25.83
polpc	630	.0019168	.0027349	.0004585	.0355781
density	630	1.386062	1.439703	.1977186	8.827652
taxpc	630	30.23919	11.4547	14.30256	119.7615
pctymle	630	.0889739	.0243493	.0621577	.2743584
wser	630	224.6705	104.8667	1.843794	2177.068

However the data is heterogeneous; therefore, scatter plots for the values of interest are plotted on a logarithmic scale:

```
scatter lcrmrte lprbarr
scatter lcrmrte lprbconv
scatter lcrmrte lprbpris
scatter lcrmrte lavgsen
scatter lcrmrte lpolpc
scatter lcrmrte ldensity
scatter lcrmrte lpctymle
scatter lcrmrte county
scatter lcrmrte year
```



```
corr lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc
```

	lcrmrte	lprbarr	lprbconv	lprbpris	lavgsen	lpolpc
lcrmrte	1.0000					
lprbarr	-0.4498	1.0000				
lprbconv	-0.4569	-0.0973	1.0000			
lprbpris	0.1805	-0.0212	-0.1581	1.0000		
lavgsen	0.0214	-0.0483	-0.0269	0.0029	1.0000	
lpolpc	0.1395	0.0531	0.2730	-0.0560	0.0336	1.0000

If all the observation are pooled together no relation can be seen between `lcrmrte` and `lprbpris`, `lcrmrte` and `lavgsen`, negative relation `lcrmrte` and `lprbarr`, `lcrmrte` and `lprbconv`. That is if probability to be arrested or to be convicted is low, then crime is higher. However looking on pairplots is not enough, e.g. probability to be convicted might be correlated to police per capita. Almost no difference can be observed between the `lcrmrte` grouped by years, however, between the counties the difference can be seen.

(2)

```
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc
```

Source	SS	df	MS	Number of obs	=	630
				F(5, 624)	=	162.65
Model	116.778368	5	23.3556736	Prob > F	=	0.0000
Residual	89.6019767	624	.143592911	R-squared	=	0.5658
				Adj R-squared	=	0.5624
Total	206.380345	629	.328108656	Root MSE	=	.37894

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.7215113	.0367089	-19.65	0.000	-.7935993	-.6494234
lprbconv	-.5492767	.0262701	-20.91	0.000	-.6008652	-.4976882
lprbpris	.2379716	.0664302	3.58	0.000	.1075178	.3684254
lavgsen	-.0652007	.0553516	-1.18	0.239	-.1738987	.0434972
lpolpc	.3625234	.0299608	12.10	0.000	.3036873	.4213596
_cons	-2.206729	.2386927	-9.25	0.000	-2.675467	-1.73799

If a pooled regression model is chosen to explain `lcrmrte`, than it is assumed that there are no unique attributes of individuals within the measurement set, and no universal effects across time. Though, these results can't be realistic, because probably there are some common factor for each of the counties.

(3)

Estimate the same model for each separate cross-section.

```
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==81
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==82
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==83
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==84
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==85
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==86
reg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc if year==87
```

Рисунок 1 — 1981

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	21.21
Model	14.4530184	5	2.89060368	Prob > F	=	0.0000
Residual	11.449483	84	.13630337	R-squared	=	0.5580
				Adj R-squared	=	0.5317
Total	25.9025014	89	.291039342	Root MSE	=	.36919

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.6389785	.0991133	-6.45	0.000	-.8360763	-.4418808
lprbconv	-.5742229	.0678576	-8.46	0.000	-.7091653	-.4392806
lprbpris	.0908728	.1889373	0.48	0.632	-.2848497	.4665953
lavgsen	-.0389218	.1312269	-0.30	0.768	-.299881	.2220374
lpolpc	.2980306	.0885235	3.37	0.001	.1219918	.4740693
_cons	-2.688402	.6721831	-4.00	0.000	-4.025112	-1.351692

Рисунок 2 — 1982

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	21.66
Model	14.8694631	5	2.97389261	Prob > F	=	0.0000
Residual	11.5350724	84	.137322291	R-squared	=	0.5631
				Adj R-squared	=	0.5371
Total	26.4045355	89	.296680174	Root MSE	=	.37057

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.6833121	.0994148	-6.87	0.000	-.8810094	-.4856148
lprbconv	-.5972914	.0801288	-7.45	0.000	-.7566362	-.4379466
lprbpris	.2425427	.1640054	1.48	0.143	-.0836001	.5686855
lavgsen	-.0879718	.1524012	-0.58	0.565	-.3910384	.2150948
lpolpc	.3039994	.0848964	3.58	0.001	.1351736	.4728252
_cons	-2.479068	.6633709	-3.74	0.000	-3.798253	-1.159882

Рисунок 3 — 1983

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	31.74
Model	19.3942555	5	3.87885111	Prob > F	=	0.0000
Residual	10.2648559	84	.122200665	R-squared	=	0.6539
				Adj R-squared	=	0.6333
Total	29.6591114	89	.333248443	Root MSE	=	.34957

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.7654428	.0835683	-9.16	0.000	-.9316275	-.5992581
lprbconv	-.4664764	.0688177	-6.78	0.000	-.6033279	-.329625
lprbpris	.4981606	.1396416	3.57	0.001	.2204678	.7758533
lavgsen	-.1795763	.1517595	-1.18	0.240	-.4813666	.1222141
lpolpc	.4176287	.0760655	5.49	0.000	.2663641	.5688934
_cons	-1.370831	.6181525	-2.22	0.029	-2.600095	-.1415673

Рисунок 4 — 1984

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	20.62
Model	16.9919863	5	3.39839726	Prob > F	=	0.0000
Residual	13.842251	84	.164788703	R-squared	=	0.5511
				Adj R-squared	=	0.5244
Total	30.8342373	89	.346452105	Root MSE	=	.40594

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.6800545	.1099577	-6.18	0.000	-.8987175	-.4613915
lprbconv	-.5770381	.0842731	-6.85	0.000	-.7446244	-.4094518
lprbpris	.1064558	.243549	0.44	0.663	-.3778681	.5907798
lavgsen	-.0254459	.1926989	-0.13	0.895	-.4086487	.357757
lpolpc	.3632997	.0753655	4.82	0.000	.2134272	.5131723
_cons	-2.426434	.6166852	-3.93	0.000	-3.65278	-1.200088

Рисунок 5 — 1985

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	20.83
Model	17.3961672	5	3.47923345	Prob > F	=	0.0000
Residual	14.0305151	84	.167029942	R-squared	=	0.5535
				Adj R-squared	=	0.5270
Total	31.4266824	89	.353108791	Root MSE	=	.40869

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.842586	.1130809	-7.45	0.000	-1.06746	-.6177123
lprbconv	-.5112046	.0660793	-7.74	0.000	-.6426105	-.3797988
lprbpris	.1702136	.2158408	0.79	0.433	-.2590095	.5994366
lavgsen	-.0375874	.1749804	-0.21	0.830	-.3855552	.3103804
lpolpc	.3760042	.0810506	4.64	0.000	.2148262	.5371821
_cons	-2.399902	.6398518	-3.75	0.000	-3.672318	-1.127487

Рисунок 6 — 1986

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	34.05
Model	22.4219479	5	4.48438959	Prob > F	=	0.0000
Residual	11.0642858	84	.131717688	R-squared	=	0.6696
				Adj R-squared	=	0.6499
Total	33.4862337	89	.376249817	Root MSE	=	.36293

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.6944479	.0985755	-7.04	0.000	-.8904761	-.4984196
lprbconv	-.647814	.0675528	-9.59	0.000	-.7821501	-.5134779
lprbpris	.2807411	.1641958	1.71	0.091	-.0457802	.6072625
lavgsen	-.1259598	.1490572	-0.85	0.400	-.4223763	.1704568
lpolpc	.4759127	.0724661	6.57	0.000	.3318059	.6200195
_cons	-1.33185	.6372348	-2.09	0.040	-2.599062	-.0646389

Рисунок 7 — 1987

Source	SS	df	MS	Number of obs	=	90
				F(5, 84)	=	15.62
Model	12.9102805	5	2.58205611	Prob > F	=	0.0000
Residual	13.8894211	84	.165350251	R-squared	=	0.4817
				Adj R-squared	=	0.4509
Total	26.7997016	89	.301120243	Root MSE	=	.40663

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.7339084	.1093422	-6.71	0.000	-.9513473	-.5164696
lprbconv	-.4340935	.0796492	-5.45	0.000	-.5924847	-.2757023
lprbpris	.1307631	.1958738	0.67	0.506	-.2587533	.5202796
lavgsen	-.1456424	.1692714	-0.86	0.392	-.4822572	.1909723
lpolpc	.4141207	.1271017	3.26	0.002	.1613652	.6668763
_cons	-1.708116	1.052529	-1.62	0.108	-3.801185	.3849527

In 1981, 1982, 1984, 1986, 1987 `lprbpris` is insignificant (on 5% level), though in pooled regression it has a significant negative effect.

(4)

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc, be
```

Between regression (regression on group means) Number of obs = 630
Group variable: **county** Number of groups = 90

R-sq: Obs per group:
within = 0.0405 min = 7
between = 0.7099 avg = 7.0
overall = 0.4888 max = 7

F(5,84) = 41.11
sd(u_i + avg(e_i.))= .3048712 Prob > F = 0.0000

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.8128525	.0925787	-8.78	0.000	-.9969554	-.6287496
lprbconv	-.5920724	.070137	-8.44	0.000	-.7315476	-.4525973
lprbpris	1.16067	.237592	4.89	0.000	.6881926	1.633148
lavgsen	-.1312699	.2085175	-0.63	0.531	-.5459298	.28339
lpolpc	.3446985	.0716332	4.81	0.000	.202248	.487149
_cons	-1.515489	.7063476	-2.15	0.035	-2.920139	-.1108394

In “between” regression in comparison to pooled `lprbpris` has much stronger effect, and in comparison to most of the regressions on cross-section data this effect is significant. Other significant coefficient estimates are roughly the same.

(5)

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc, fe
```

```
Fixed-effects (within) regression               Number of obs      =       630
Group variable: county                          Number of groups   =        90

R-sq:                                           Obs per group:
     within  = 0.3590                                         min =         7
     between = 0.4302                                         avg =       7.0
     overall = 0.4198                                         max =         7

                                                F(5,535)           =     59.92
corr(u_i, Xb)  = 0.2215                         Prob > F           =    0.0000

------------------------------------------------------------------------------
     lcrmrte |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lprbarr |  -.3835369   .0334672   -11.46   0.000    -.4492801   -.3177938
    lprbconv |  -.3059757   .0218578   -14.00   0.000    -.3489133   -.2630381
    lprbpris |  -.1954515   .0333637    -5.86   0.000    -.2609915   -.1299116
     lavgsen |   .0356643   .0261247     1.37   0.173    -.0156552    .0869838
      lpolpc |   .4137712   .0274687    15.06   0.000     .3598113     .467731
       _cons |  -1.872858   .1729314   -10.83   0.000    -2.212566   -1.53315
-------------+----------------------------------------------------------------
     sigma_u |  .42736725
     sigma_e |  .14681793
         rho |  .89443836   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(89, 535) = 40.69                     Prob > F = 0.0000
```

In fixed effects model in comparison to between-estimates the estimates of `lprbarr` and `lprbconv` are still significant, but are almost twice smaller by absolute value. The estimate of `lprbpris` is significant, but in comparison to between-estimates it becomes negative. Cornwell and Trumbull concluded that cross-section estimates do not account for an individual effect, therefore, are misleading.

(6)

```
F test that all u_i=0: F(89, 535) = 40.69                     Prob > F = 0.0000
```

To test the fixed effects model against the pooled regression model, F-test is used. The test is significant, i.e., hypothesis that all counties' effects are equal to 0 is rejected, therefore, the fixed effects model is preferred over pooled regression.

(7)

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc, fe
predict uu, u
local list "lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc"

foreach xx of local list {
display "`xx'"
xtreg `xx', fe
predict mm, xb
predict u1, u
gen tm_`xx' = u1+mm
drop u1 mm
}

reg uu west central urban pctmin80 tm_lprbarr tm_lprbconv tm_lprbpris
tm_lavgsen tm_lpol
```

Source	SS	df	MS	Number of obs	=	630
				F(9, 620)	=	208.40
Model	85.5175906	9	9.50195451	Prob > F	=	0.0000
Residual	28.2688545	620	.045594927	R-squared	=	0.7516
				Adj R-squared	=	0.7480
Total	113.786445	629	.180900549	Root MSE	=	.21353

uu	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
west	-.3159483	.0341209	-9.26	0.000	-.3829549	-.2489418
central	-.0567069	.0227318	-2.49	0.013	-.1013475	-.0120662
urban	.1332446	.0369903	3.60	0.000	.060603	.2058861
pctmin80	.0062172	.0008046	7.73	0.000	.0046371	.0077974
tm_lprbarr	-.4301418	.0269604	-15.95	0.000	-.4830866	-.3771969
tm_lprbconv	-.3082678	.0206731	-14.91	0.000	-.3488656	-.26767
tm_lprbpris	.8765429	.0677316	12.94	0.000	.7435319	1.009554
tm_lavgsen	-.2785488	.0576916	-4.83	0.000	-.3918434	-.1652543
tm_lpolpc	-.0551223	.0199678	-2.76	0.006	-.094335	-.0159096
_cons	.173909	.1985676	0.88	0.381	-.2160375	.5638555

In western and central North Carolina crime rate is lower, in urban counties and counties with higher minority percentage – higher.

(8)

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc d8*, fe
test d82 d83 d84 d85 d86 d87
```

```
 ( 1)  d82 = 0
 ( 2)  d83 = 0
 ( 3)  d84 = 0
 ( 4)  d85 = 0
 ( 5)  d86 = 0
 ( 6)  d87 = 0

       F(  6,   529) =   11.73
            Prob > F =    0.0000
```

By F-test we conclude that dummy variables are significant, therefore, it can be useful to account for time dummies.

(9)

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc d8*
ldensity lwcon lwtuc lwtrd lwfir lwser lwmfg lwfed lwsta lwloc
lpctymle ltaxpc lmix, fe
```

```
Fixed-effects (within) regression               Number of obs      =       630
Group variable: county                          Number of groups   =        90

R-sq:                                           Obs per group:
     within  = 0.4635                                         min =         7
     between = 0.5534                                         avg =       7.0
     overall = 0.5444                                         max =         7

                                                F(24,516)          =     18.57
corr(u_i, Xb)  = -0.2233                        Prob > F           =    0.0000
```

lcrmrte	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lprbarr	-.3553352	.0331411	-10.72	0.000	-.4204433	-.2902272
lprbconv	-.28167	.0212032	-13.28	0.000	-.3233252	-.2400149
lprbpris	-.1725937	.0324023	-5.33	0.000	-.2362504	-.108937
lavgsen	-.0022518	.0261755	-0.09	0.931	-.0536756	.0491719
lpolpc	.4125651	.0269519	15.31	0.000	.3596162	.4655139
d82	.0220252	.0261164	0.84	0.399	-.0292824	.0733327
d83	-.041761	.0359918	-1.16	0.246	-.1124694	.0289474
d84	-.0457774	.0471339	-0.97	0.332	-.1383753	.0468205
d85	-.0204236	.0646682	-0.32	0.752	-.1474689	.1066217
d86	.0300543	.0795825	0.38	0.706	-.1262912	.1863999
d87	.0939942	.0948951	0.99	0.322	-.092434	.2804225
ldensity	.4039363	.2851002	1.42	0.157	-.1561635	.9640361
lwcon	-.0378999	.0391845	-0.97	0.334	-.1148807	.039081
lwtuc	.0457869	.0191931	2.39	0.017	.0080806	.0834932
lwtrd	-.0206108	.0405906	-0.51	0.612	-.100354	.0591324
lwfir	-.0038305	.0283148	-0.14	0.892	-.0594569	.051796
lwser	.0086382	.0192507	0.45	0.654	-.0291811	.0464575
lwmfg	-.3587417	.112218	-3.20	0.001	-.579202	-.1382814
lwfed	-.3082912	.1768173	-1.74	0.082	-.6556614	.0390791
lwsta	.0494109	.1144341	0.43	0.666	-.1754031	.2742249
lwloc	.1822251	.1180615	1.54	0.123	-.0497152	.4141655
lpctymle	.6235668	.3647114	1.71	0.088	-.0929351	1.340069
ltaxpc	.0144755	.0448261	0.32	0.747	-.0735885	.1025395
lmix	.0005681	.0151308	0.04	0.970	-.0291575	.0302936
_cons	2.340509	1.689701	1.39	0.167	-.9790297	5.660047
sigma_u	.37754187					
sigma_e	.13677145					
rho	.88398703	(fraction of variance due to u_i)				

F test that all u_i=0: F(89, 516) = 32.82 Prob > F = 0.0000

With all the time-varying regressors `lprbpris` is again significant and negative.

Coefficient of `lpctymle` is positive and significant, therefore, if crime rate is positively dependent on percentage of young male, the government should work on programs to lower unemployment rate for this group, provide them with education programs, etc.

Higher wages for tranport, utility and communal servives correspond to higher crime rates (this may be caused by the fact that this type of job doen't require a university degree but specific skills are needed, so if wages in this sector are higher the competition is also higher; therefore, some groups, especially the ones in need, can't get the job and might commit crime), higher wages for manufacturing lowers crime rate (this job is quite hard and in most cases not payed as well, so in counties where workers are underpayed more crimes are commited).

(10)

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc, re
```

```
Random-effects GLS regression                   Number of obs      =       630
Group variable: county                          Number of groups   =        90

R-sq:                                           Obs per group:
     within  = 0.3538                                         min =         7
     between = 0.4730                                         avg =       7.0
     overall = 0.4572                                         max =         7

                                                Wald chi2(5)       =    374.30
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

lcrmrte	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lprbarr	-.4485975	.0326419	-13.74	0.000	-.5125745	-.3846205
lprbconv	-.3469171	.0214454	-16.18	0.000	-.3889493	-.3048848
lprbpris	-.1876919	.0348083	-5.39	0.000	-.2559148	-.1194689
lavgsen	.0276295	.0274935	1.00	0.315	-.0262568	.0815157
lpolpc	.4184813	.0269885	15.51	0.000	.3655847	.4713779
_cons	-1.92944	.177319	-10.88	0.000	-2.276979	-1.581901
sigma_u	.2997784					
sigma_e	.14681793					
rho	.80654279	(fraction of variance due to u_i)				

Random effects model assuming that the unique, time constant attributes of individuals that are not correlated with the individual regressors. The same regressors have significant estimates of their coefficients, with the same signs as in FE-model.

(11)

```
xttest0
```

```
Breusch and Pagan Lagrangian multiplier test for random effects

        lcrmrte[county,t] = Xb + u[county] + e[county,t]

        Estimated results:
                             |       Var      sd = sqrt(Var)
                     ---------+------------------------------
                      lcrmrte |    .3281087        .5728077
                            e |    .0215555        .1468179
                            u |    .0898671        .2997784

        Test:   Var(u) = 0
                                    chibar2(01) =    933.68
                                Prob > chibar2 =    0.0000
```

To test the random effects model in comparison to pooled regression model Breusch-Pagan LM-test is used, where the null is is that the variance of the unobserved fixed effects is zero. The null is rejected therefore RE should be prefered over pooled regression.

```
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc, re
est store RE
xtreg lcrmrte lprbarr lprbconv lprbpris lavgsen lpolpc, fe
est store FE
hausman FE RE, sigmamore
```

	Coefficients (b) FE	(B) RE	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
lprbarr	-.3835369	-.4485975	.0650606	.0139921
lprbconv	-.3059757	-.3469171	.0409414	.0088373
lprbpris	-.1954515	-.1876919	-.0077597	.006471
lavgsen	.0356643	.0276295	.0080348	.003558
lpolpc	.4137712	.4184813	-.0047101	.011013

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

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 74.31
Prob>chi2 = 0.0000

Test the random effects model in comparison to fixed effects model Hausman test is used. The unique attributes of individuals may or may not be correlated with the individual dependent variables. Under null hypothesis individual effects and the regressors are uncorrelated. In this case it is rejected; therefore, RE-estimates are inconsistent and FE is prefered over RE.