

Unemployment and crime rate: Two year panel data and fixed effects model

Source: crime2 (Wooldridge) Data on 46 cities in 1982 and 1987

1. pop population
2. unem unemployment rate
3. officers number police officers
4. pcinc per capita income
5. year 82 or 87
6. d87 =1 if year = 87
7. crmrte crimes per 1000 people
8. area land area, square miles
9. offarea officers per sq mile
10. lawexpc law enforce. expend. pc, \$
11. city city number 1 to 46

. sum crmrte offarea lawexpc polpc unem pcinc if year==87

Variable	Obs	Mean	Std. Dev.	Min	Max
crmrte	46	103.8727	34.78523	50.01925	179.4173
offarea	46	12.27184	10.23428	1.269868	44.85477
lawexpc	46	1113.951	329.3595	635.7	2262.44
unem	46	5.88913	1.509706	2.4	10.4
pcinc	46	10619.54	1685.336	6494	14474

- (1) reg crmrte unem if year==87
- (2) reg crmrte unem area west offarea lawexpc pcinc if year==87
- (3) reg crmrte unem d87
- (4) reg crmrte unem d87 area west offarea lawexpc pcinc
- (5) reg crmrte d87 ncity2-ncity46
- (6) reg crmrte unem d87 offarea lawexpc pcinc ncity2-ncity46

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
Crime rate	1987	1987	1982-1987	1982-1987	1982-1987	1982-1987
Unemployment rate	-4.161 (1.22)	-6.7 (1.80)	0.427 (0.36)	-0.54 (0.41)	2.218 (2.53)*	2.932 (2.59)*
Land area (sq miles)		0.059 (1.23)		0.013 (0.46)		
West		-21.963 (1.79)		-9.143 (1.22)		
Officers per square mile		-0.114 (0.17)		0.088 (0.22)		1.838 (1.03)
Law enforcement expend pc (\$)		0.021 (1.15)		0.02 (1.51)		-0.007 (0.51)
Per capita income (\$)		-0.002 (0.53)		-0.002 (0.63)		-0.006 (1.00)
Year 1987			7.94 (1.00)	3.207 (0.28)	15.402 (3.28)**	39.576 (1.75)
ncity2					17.292 (1.22)	12.531 (0.71)
ncity3					4.689 (0.33)	-10.681 (0.58)
ncity4					7.007 (0.48)	-0.048 0.00

ncity45					-17.753 (1.25)	-16.979 (0.78)
ncity46					-3.277 (0.23)	-45.015 (1.34)
Constant	128.378 (6.18)**	140.06 (2.74)**	93.42 (7.33)**	98.832 (3.58)**	51.489 (4.17)**	91.618 (1.95)
Observations	46	46	92	92	92	92
R-squared	0.03	0.16	0.01	0.07	0.89	0.90

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

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. tabulate city, gen(ncity) [generates dummy variables ncity1 ncity2 ncity3 ... ncity45 ncity46]
. reg crmrte unem d87 ncity2-ncity46
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Source	SS	df	MS	Number of obs = 92		
Model	72200.7324	47	1536.1858	F(47, 44) = 7.64		
Residual	8844.77129	44	201.017529	Prob > F = 0.0000		
Total	81045.5037	91	890.609931	R-squared = 0.8909		
				Adj R-squared = 0.7743		
				Root MSE = 14.178		

crmrte	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
unem	2.217997	.8778657	2.53	0.015	.4487745	3.987219
d87	15.40219	4.702116	3.28	0.002	5.925702	24.87869
ncity2	17.29172	14.19545	1.22	0.230	-11.31733	45.90076
ncity3	4.688527	14.23908	0.33	0.744	-24.00846	33.38551
ncity4	7.006747	14.45368	0.48	0.630	-22.12274	36.13623
ncity5	24.49799	14.61705	1.68	0.101	-4.960738	53.95671
ncity6	43.56559	14.57534	2.99	0.005	14.19093	72.94025
ncity7	2.546187	14.23123	0.18	0.859	-26.13498	31.22735
ncity8	12.02717	14.19545	0.85	0.401	-16.58187	40.63622
ncity9	-10.2511	14.20257	-0.72	0.474	-38.8745	18.3723
ncity43	44.38133	14.22751	3.12	0.003	15.70767	73.05499
ncity44	1.722018	14.19138	0.12	0.904	-26.87882	30.32286
ncity45	-17.75309	14.17813	-1.25	0.217	-46.32724	10.82106
ncity46	-3.277064	14.51653	-0.23	0.822	-32.53321	25.97908
_cons	51.48925	12.34577	4.17	0.000	26.60798	76.37052

Stata command for fixed effects model

```
. xtreg crmrte unem d87, fe i(city)
```

Fixed-effects (within) regression	Number of obs	=	92
Group variable (i): city	Number of groups	=	46
R-sq: within = 0.1961	Obs per group: min	=	2
between = 0.0036	avg	=	2.0
overall = 0.0067	max	=	2
corr(u_i, Xb) = -0.1477	F(2,44)	=	5.37
	Prob > F	=	0.0082

crmrte	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
unem	2.217997	.8778657	2.53	0.015	.4487745	3.987219
d87	15.40219	4.702116	3.28	0.002	5.925702	24.87869
_cons	75.40839	9.07054	8.31	0.000	57.12792	93.68886
sigma_u	28.529801					
sigma_e	14.178065					
rho	.80194675	(fraction of variance due to u_i)				
F test that all u_i=0:				F(45, 44) =	7.87	Prob > F = 0.0000

Multi-year panel data: Impact of enterprise zones on employment

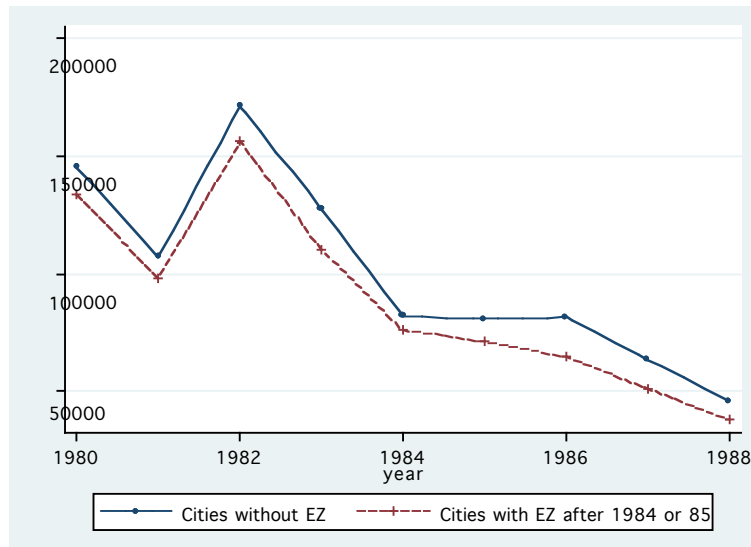
Source: data file EZUNEM (Wooldridge). 22 cities in Indiana, from 1980 to 1988. Six enterprise zones created in 1984, and 4 more in 1985

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. sum
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Variable	Obs	Mean	Std. Dev.	Min	Max
year	198	1984	2.588534	1980	1988
uclms	198	95383.39	89173.63	12360	667208
ez	198	.2323232	.4233845	0	1

```
. table year, c(n uclms mean uclms min uclms max uclms)
```

year	N(uclms)	mean(uclms)	min(uclms)	max(uclms)
1980	22	140267.2	48490	533598
1981	22	103229	34489	435754
1982	22	164579.3	46225	667208
1983	22	119835.9	34154	545625
1984	22	79541.59	30062	340092
1985	22	76527.23	25004	325797
1986	22	74040.95	21100	303724
1987	22	58051.14	16913	262512
1988	22	42378.32	12360	209103



Create dummy variables for year 1980 to 1988: d80 to d88
Create dummy variables for cities c1 to c22
. reg luclms ez d81-d88 c2-c22

Source	SS	df	MS	Number of obs =	198
Model	93.7818454	30	3.12606151	F(30, 167) =	77.75
Residual	6.71437093	167	.040205814	Prob > F =	0.0000
				R-squared =	0.9332
				Adj R-squared =	0.9212
Total	100.496216	197	.510133078	Root MSE =	.20051

luclms	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
ez	-.1044144	.0554191	-1.88	0.061	-.2138267 .0049979
d81	-.3216314	.0604572	-5.32	0.000	-.4409903 -.2022725
d82	.1354959	.0604572	2.24	0.026	.016137 .2548548
d83	-.2192554	.0604572	-3.63	0.000	-.3386144 -.0998965
d84	-.579152	.0623179	-9.29	0.000	-.7021843 -.4561196
d85	-.5917876	.0654953	-9.04	0.000	-.7210931 -.4624821
d86	-.621265	.0654953	-9.49	0.000	-.7505704 -.4919595
d87	-.8889487	.0654953	-13.57	0.000	-1.018254 -.7596432
d88	-1.227633	.0654953	-18.74	0.000	-1.356938 -1.098327
c2	-.1934845	.099411	-1.95	0.053	-.3897488 .0027797
c3	-.3789357	.099411	-3.81	0.000	-.5752 -.1826714
c20	-.3509751	.0945231	-3.71	0.000	-.5375894 -.1643608
c21	.4577925	.0945231	4.84	0.000	.2711782 .6444068
c22	.2186422	.099411	2.20	0.029	.0223779 .4149065
_cons	11.67615	.0800792	145.81	0.000	11.51805 11.83425

. xtreg luclms ez d81-d88, fe i(city)

Fixed-effects (within) regression
Group variable (i): city

Number of obs = 198
Number of groups = 22

R-sq: within = 0.8416
between = 0.0002
overall = 0.3528

Obs per group: min = 9
avg = 9.0
max = 9

corr(u_i, Xb) = -0.0039

F(9,167) = 98.59
Prob > F = 0.0000

luclms	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
ez	-.1044144	.0554191	-1.88	0.061	-.2138267 .0049979
d81	-.3216314	.0604572	-5.32	0.000	-.4409903 -.2022725
d82	.1354959	.0604572	2.24	0.026	.016137 .2548548
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d86	-.621265	.0654953	-9.49	0.000	-.7505704 -.4919595
d87	-.8889487	.0654953	-13.57	0.000	-1.018254 -.7596432
d88	-1.227633	.0654953	-18.74	0.000	-1.356938 -1.098327
_cons	11.69439	.0427497	273.55	0.000	11.60999 11.77879
sigma_u	.55551507				
sigma_e	.20051387				
rho	.88473197	(fraction of variance due to u_i)			

F test that all u_i=0: F(21, 167) = 68.95 Prob > F = 0.0000