



Exercise 1

	month	period	district	tot_pop	tot_white	tot_black	tot_hisp	p50_inc
crime_type	crimes	NUID	tenure	arrest				
4430	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	5 66	370	0					
4431	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	5 147	203	0					
4432	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	5 220	479	1					
4433	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	5 256	151	2					
4434	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	164 66	370	0					
4435	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	164 147	203	0					
4436	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	164 220	479	1					
4437	2007-01-01	1	1	38472	22608	4953	2543	91084.91
drug	164 256	151	2					
4438	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	61 66	370	0					
4439	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	61 147	203	0					
4440	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	61 220	479	1					
4441	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	61 256	151	2					
4442	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	227 66	370	0					
4443	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	227 147	203	0					
4444	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	227 220	479	1					
4445	2007-01-01	1	1	38472	22608	4953	2543	91084.91
other	227 256	151	2					
4446	2007-01-01	1	1	38472	22608	4953	2543	91084.91
property	547 66	370	0					
4447	2007-01-01	1	1	38472	22608	4953	2543	91084.91
property	547 147	203	0					
4448	2007-01-01	1	1	38472	22608	4953	2543	91084.91
property	547 220	479	1					
4449	2007-01-01	1	1	38472	22608	4953	2543	91084.91
property	547 256	151	2					

Exercise 2

	month	crimes
1	2002-01-01	38405
2	2002-02-01	33909
3	2002-03-01	38583
4	2002-04-01	40032
5	2002-05-01	42913
6	2002-06-01	42834
7	2002-07-01	46012
8	2002-08-01	44210
9	2002-09-01	42389
10	2002-10-01	43144
11	2002-11-01	37151
12	2002-12-01	37171
13	2003-01-01	36715
14	2003-02-01	32509
15	2003-03-01	38651
16	2003-04-01	39789

17	2003-05-01	41194
18	2003-06-01	40813
19	2003-07-01	43413
20	2003-08-01	44267

	month	period	district	tot_pop	tot_white	tot_black	tot_hisp	p50_inc
crime_type		crimes						
1	2005-01-01	1	1	38472	22608	4953	2543	91084.91
drug		1						
2	2005-01-01	1	1	38472	22608	4953	2543	91084.91
drug		188						
3	2005-01-01	1	1	38472	22608	4953	2543	91084.91
other		62						
4	2005-01-01	1	1	38472	22608	4953	2543	91084.91
other		302						
5	2005-01-01	1	1	38472	22608	4953	2543	91084.91
property		624						
6	2005-01-01	1	1	38472	22608	4953	2543	91084.91
property		160						
7	2005-01-01	1	1	38472	22608	4953	2543	91084.91
violent		150						
8	2005-01-01	1	1	38472	22608	4953	2543	91084.91
violent		62						
9	2005-01-01	1	2	37992	630	35966	628	29890.17
drug		1						
10	2005-01-01	1	2	37992	630	35966	628	29890.17
drug		208						
11	2005-01-01	1	2	37992	630	35966	628	29890.17
other		128						
12	2005-01-01	1	2	37992	630	35966	628	29890.17
other		140						
13	2005-01-01	1	2	37992	630	35966	628	29890.17
property		457						
14	2005-01-01	1	2	37992	630	35966	628	29890.17
property		52						
15	2005-01-01	1	2	37992	630	35966	628	29890.17
violent		290						
16	2005-01-01	1	2	37992	630	35966	628	29890.17
violent		75						
17	2005-01-01	1	3	78629	3217	71792	1371	28047.56
drug		259						
18	2005-01-01	1	3	78629	3217	71792	1371	28047.56
other		148						
19	2005-01-01	1	3	78629	3217	71792	1371	28047.56
other		161						
20	2005-01-01	1	3	78629	3217	71792	1371	28047.56
property		548						

	month	period	district	tot_pop	tot_white	tot_black	tot_hisp	p50_inc
crime_type.x		Total_crimes_per_resident						
1	2005-01-01	1	1	38472	22608	4953	2543	91084.91
drug		0.004912664			violent			
2	2005-01-01	1	1	38472	22608	4953	2543	91084.91
other		0.009461426			violent			

3	2005-01-01	1	1	38472	22608	4953	2543	91084.91
property				0.020378457	violent			
4	2005-01-01	1	1	38472	22608	4953	2543	91084.91
violent				0.005510501	violent			
5	2005-01-01	1	2	37992	630	35966	628	29890.17
drug				0.005501158	violent			
6	2005-01-01	1	2	37992	630	35966	628	29890.17
other				0.007054117	violent			
7	2005-01-01	1	2	37992	630	35966	628	29890.17
property				0.013397557	violent			
8	2005-01-01	1	2	37992	630	35966	628	29890.17
violent				0.009607286	violent			
9	2005-01-01	1	3	78629	3217	71792	1371	28047.56
drug				0.003293950	violent			
10	2005-01-01	1	3	78629	3217	71792	1371	28047.56
other				0.003929848	violent			
11	2005-01-01	1	3	78629	3217	71792	1371	28047.56
property				0.007707080	violent			
12	2005-01-01	1	3	78629	3217	71792	1371	28047.56
violent				0.006778669	violent			
13	2005-01-01	1	4	124519	9926	77314	35387	39010.22
drug				0.001823015	violent			
14	2005-01-01	1	4	124519	9926	77314	35387	39010.22
other				0.002264715	violent			
15	2005-01-01	1	4	124519	9926	77314	35387	39010.22
property				0.005734065	violent			
16	2005-01-01	1	4	124519	9926	77314	35387	39010.22
violent				0.004947036	violent			
17	2005-01-01	1	5	74384	843	70053	2524	33146.90
drug				0.003172725	violent			
18	2005-01-01	1	5	74384	843	70053	2524	33146.90
other				0.003670144	violent			
19	2005-01-01	1	5	74384	843	70053	2524	33146.90
property				0.006278232	violent			
20	2005-01-01	1	5	74384	843	70053	2524	33146.90
violent				0.005848032	violent			
Violent_crimes_per_resident crime_type Property_crimes_per_resident								
1				0.005510501	property		0.020378457	
2				0.005510501	property		0.020378457	
3				0.005510501	property		0.020378457	
4				0.005510501	property		0.020378457	
5				0.009607286	property		0.013397557	
6				0.009607286	property		0.013397557	
7				0.009607286	property		0.013397557	
8				0.009607286	property		0.013397557	
9				0.006778669	property		0.007707080	
10				0.006778669	property		0.007707080	
11				0.006778669	property		0.007707080	
12				0.006778669	property		0.007707080	
13				0.004947036	property		0.005734065	
14				0.004947036	property		0.005734065	
15				0.004947036	property		0.005734065	
16				0.004947036	property		0.005734065	
17				0.005848032	property		0.006278232	
18				0.005848032	property		0.006278232	
19				0.005848032	property		0.006278232	
20				0.005848032	property		0.006278232	

Exercise 3

Call:

```
lm(formula = md6$arrest ~ md6$tenure + md6$Total_crimes + md6$p50_inc +
  md6$tot_white + md6$tot_black + md6$tot_hisp - 1)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.7225	-0.4789	-0.4213	0.5350	4.5764

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
md6\$tenure	2.398e-04	3.847e-05	6.233	4.6e-10	***
md6\$Total_crimes	1.923e-05	1.394e-05	1.379	0.168	
md6\$p50_inc	5.710e-06	1.967e-07	29.034	< 2e-16	***
md6\$tot_white	-4.833e-08	1.354e-07	-0.357	0.721	
md6\$tot_black	4.059e-06	1.308e-07	31.026	< 2e-16	***
md6\$tot_hisp	1.074e-06	7.750e-08	13.865	< 2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.713 on 52993 degrees of freedom
 (2402 observations deleted due to missingness)
 Multiple R-squared: 0.3275, Adjusted R-squared: 0.3275
 F-statistic: 4302 on 6 and 52993 DF, p-value: < 2.2e-16

Exercise 4

Call:

```
lm(formula = md6$arrest ~ md6$tenure + md6$Total_crimes + md6$p50_inc +
    md6$tot_white + md6$tot_black + md6$tot_hisp + md6$district +
    factor(md6$month) - 1)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.7210	-0.5104	-0.4495	0.4914	4.5301

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
md6\$tenure	2.783e-05	3.931e-05	0.708	0.47887	
md6\$Total_crimes	-1.098e-05	1.425e-05	-0.770	0.44135	
md6\$p50_inc	-6.259e-07	3.056e-07	-2.048	0.04055	*
md6\$tot_white	3.465e-07	1.394e-07	2.486	0.01294	*
md6\$tot_black	6.417e-07	1.963e-07	3.269	0.00108	**
md6\$tot_hisp	1.176e-07	8.543e-08	1.377	0.16860	
md6\$district	-6.978e-05	5.495e-04	-0.127	0.89896	
factor(md6\$month)2007-01-01	5.269e-01	3.572e-02	14.752	< 2e-16	***
factor(md6\$month)2007-02-01	5.436e-01	3.576e-02	15.203	< 2e-16	***
factor(md6\$month)2007-03-01	5.467e-01	3.558e-02	15.368	< 2e-16	***
factor(md6\$month)2007-04-01	4.520e-01	3.557e-02	12.706	< 2e-16	***
factor(md6\$month)2007-05-01	6.089e-01	3.539e-02	17.204	< 2e-16	***
factor(md6\$month)2007-06-01	4.330e-01	3.541e-02	12.227	< 2e-16	***
factor(md6\$month)2007-07-01	5.200e-01	3.546e-02	14.662	< 2e-16	***
factor(md6\$month)2007-08-01	5.705e-01	3.553e-02	16.054	< 2e-16	***
factor(md6\$month)2007-09-01	5.470e-01	3.560e-02	15.365	< 2e-16	***
factor(md6\$month)2007-10-01	4.667e-01	3.549e-02	13.153	< 2e-16	***
factor(md6\$month)2007-11-01	4.634e-01	3.518e-02	13.172	< 2e-16	***
factor(md6\$month)2007-12-01	5.052e-01	3.506e-02	14.410	< 2e-16	***
factor(md6\$month)2008-01-01	4.761e-01	3.531e-02	13.484	< 2e-16	***
factor(md6\$month)2008-02-01	5.388e-01	3.531e-02	15.258	< 2e-16	***
factor(md6\$month)2008-03-01	4.792e-01	3.522e-02	13.606	< 2e-16	***
factor(md6\$month)2008-04-01	5.117e-01	3.492e-02	14.653	< 2e-16	***
factor(md6\$month)2008-05-01	4.699e-01	3.504e-02	13.412	< 2e-16	***
factor(md6\$month)2008-06-01	5.558e-01	3.482e-02	15.961	< 2e-16	***
factor(md6\$month)2008-07-01	5.420e-01	3.458e-02	15.675	< 2e-16	***
factor(md6\$month)2008-08-01	5.206e-01	3.470e-02	15.005	< 2e-16	***

factor(md6\$month)2008-09-01	4.770e-01	3.453e-02	13.814	< 2e-16	***
factor(md6\$month)2008-10-01	5.134e-01	3.433e-02	14.955	< 2e-16	***
factor(md6\$month)2008-11-01	4.760e-01	3.441e-02	13.831	< 2e-16	***
factor(md6\$month)2008-12-01	4.787e-01	3.444e-02	13.897	< 2e-16	***
factor(md6\$month)2009-01-01	5.251e-01	3.452e-02	15.212	< 2e-16	***
factor(md6\$month)2009-02-01	5.314e-01	3.466e-02	15.333	< 2e-16	***
factor(md6\$month)2009-03-01	4.938e-01	3.455e-02	14.295	< 2e-16	***
factor(md6\$month)2009-04-01	4.556e-01	3.481e-02	13.089	< 2e-16	***
factor(md6\$month)2009-05-01	4.201e-01	3.494e-02	12.024	< 2e-16	***
factor(md6\$month)2009-06-01	4.391e-01	3.497e-02	12.556	< 2e-16	***
factor(md6\$month)2009-07-01	4.274e-01	3.482e-02	12.273	< 2e-16	***
factor(md6\$month)2009-08-01	4.717e-01	3.483e-02	13.542	< 2e-16	***
factor(md6\$month)2009-09-01	4.297e-01	3.486e-02	12.326	< 2e-16	***
factor(md6\$month)2009-10-01	4.234e-01	3.487e-02	12.144	< 2e-16	***
factor(md6\$month)2009-11-01	5.256e-01	3.497e-02	15.029	< 2e-16	***
factor(md6\$month)2009-12-01	5.281e-01	3.489e-02	15.136	< 2e-16	***
factor(md6\$month)2010-01-01	4.834e-01	3.489e-02	13.852	< 2e-16	***
factor(md6\$month)2010-02-01	4.269e-01	3.507e-02	12.175	< 2e-16	***
factor(md6\$month)2010-03-01	5.454e-01	3.511e-02	15.534	< 2e-16	***
factor(md6\$month)2010-04-01	4.636e-01	3.519e-02	13.174	< 2e-16	***
factor(md6\$month)2010-05-01	4.633e-01	3.534e-02	13.108	< 2e-16	***
factor(md6\$month)2010-06-01	5.498e-01	3.534e-02	15.557	< 2e-16	***
factor(md6\$month)2010-07-01	5.401e-01	3.542e-02	15.249	< 2e-16	***
factor(md6\$month)2010-08-01	6.811e-01	3.543e-02	19.223	< 2e-16	***
factor(md6\$month)2010-09-01	5.063e-01	3.542e-02	14.295	< 2e-16	***
factor(md6\$month)2010-10-01	4.365e-01	3.534e-02	12.349	< 2e-16	***
factor(md6\$month)2010-11-01	4.861e-01	3.558e-02	13.662	< 2e-16	***
factor(md6\$month)2010-12-01	4.245e-01	3.557e-02	11.934	< 2e-16	***
factor(md6\$month)2011-01-01	5.520e-01	3.586e-02	15.391	< 2e-16	***
factor(md6\$month)2011-02-01	4.600e-01	3.638e-02	12.643	< 2e-16	***
factor(md6\$month)2011-03-01	4.389e-01	3.640e-02	12.057	< 2e-16	***
factor(md6\$month)2011-04-01	3.665e-01	3.641e-02	10.065	< 2e-16	***
factor(md6\$month)2011-05-01	4.569e-01	3.652e-02	12.509	< 2e-16	***
factor(md6\$month)2011-06-01	5.505e-01	3.634e-02	15.148	< 2e-16	***
factor(md6\$month)2011-07-01	5.650e-01	3.635e-02	15.541	< 2e-16	***
factor(md6\$month)2011-08-01	4.386e-01	3.640e-02	12.050	< 2e-16	***
factor(md6\$month)2011-09-01	4.488e-01	3.542e-02	12.672	< 2e-16	***
factor(md6\$month)2011-10-01	5.355e-01	3.542e-02	15.117	< 2e-16	***
factor(md6\$month)2011-11-01	5.751e-01	3.543e-02	16.231	< 2e-16	***
factor(md6\$month)2011-12-01	4.919e-01	3.550e-02	13.857	< 2e-16	***
factor(md6\$month)2012-01-01	4.783e-01	3.550e-02	13.475	< 2e-16	***
factor(md6\$month)2012-02-01	5.761e-01	3.520e-02	16.365	< 2e-16	***
factor(md6\$month)2012-03-01	5.708e-01	3.512e-02	16.251	< 2e-16	***
factor(md6\$month)2012-04-01	5.085e-01	3.529e-02	14.409	< 2e-16	***
factor(md6\$month)2012-05-01	4.370e-01	3.532e-02	12.373	< 2e-16	***
factor(md6\$month)2012-06-01	5.220e-01	3.533e-02	14.775	< 2e-16	***
factor(md6\$month)2012-07-01	4.894e-01	3.534e-02	13.848	< 2e-16	***
factor(md6\$month)2012-08-01	5.283e-01	3.533e-02	14.955	< 2e-16	***
factor(md6\$month)2012-09-01	5.049e-01	3.540e-02	14.264	< 2e-16	***
factor(md6\$month)2012-10-01	4.427e-01	3.534e-02	12.524	< 2e-16	***
factor(md6\$month)2012-11-01	4.978e-01	3.526e-02	14.117	< 2e-16	***
factor(md6\$month)2012-12-01	3.808e-01	3.526e-02	10.799	< 2e-16	***
factor(md6\$month)2013-01-01	4.315e-01	3.533e-02	12.213	< 2e-16	***
factor(md6\$month)2013-02-01	4.732e-01	3.540e-02	13.366	< 2e-16	***
factor(md6\$month)2013-03-01	3.783e-01	3.549e-02	10.661	< 2e-16	***
factor(md6\$month)2013-04-01	6.331e-01	3.534e-02	17.915	< 2e-16	***
factor(md6\$month)2013-05-01	5.425e-01	3.536e-02	15.343	< 2e-16	***
factor(md6\$month)2013-06-01	4.518e-01	3.542e-02	12.755	< 2e-16	***
factor(md6\$month)2013-07-01	4.942e-01	3.551e-02	13.919	< 2e-16	***
factor(md6\$month)2013-08-01	4.615e-01	3.552e-02	12.995	< 2e-16	***
factor(md6\$month)2013-09-01	5.105e-01	3.558e-02	14.350	< 2e-16	***
factor(md6\$month)2013-10-01	4.445e-01	3.557e-02	12.499	< 2e-16	***
factor(md6\$month)2013-11-01	4.837e-01	3.557e-02	13.601	< 2e-16	***
factor(md6\$month)2013-12-01	5.032e-01	3.555e-02	14.154	< 2e-16	***

```

factor(md6$month)2014-01-01  4.568e-01  3.568e-02  12.806 < 2e-16 ***
factor(md6$month)2014-02-01  4.696e-01  3.569e-02  13.158 < 2e-16 ***
factor(md6$month)2014-03-01  4.766e-01  3.568e-02  13.358 < 2e-16 ***
factor(md6$month)2014-04-01  3.945e-01  6.301e-02   6.261 3.86e-10 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.7066 on 52904 degrees of freedom
 (2402 observations deleted due to missingness)
 Multiple R-squared: 0.3406, Adjusted R-squared: 0.3394
 F-statistic: 287.7 on 95 and 52904 DF, p-value: < 2.2e-16

Exercise 5

Within

	Estimate	Std. Error	t value	Pr(> t)
p50_inc	-5.196425e-08	3.150039e-07	-1.649639e-01	0.8689725
Total_Crime_Per_Resident	-2.170781e-01	1.743968e-01	-1.244737e+00	0.2132288
Black_Share	4.185821e-02	4.731660e-02	8.846410e-01	0.3763505
White_Share	4.405629e-02	8.330600e-02	5.288490e-01	0.5969103
Hispanic_Share	7.962477e-02	9.055350e-02	8.793119e-01	0.3792324

Between

	Estimate	Std. Error	t value	Pr(> t)
p50_inc_1	1.364919e-03	1.020355e-03	1.33769060	1.810210e-01
Total_Crime_Per_Resident_1	-1.488764e+03	6.123068e+02	-2.43140183	1.505408e-02
Black_Share_1	-1.195977e+02	1.691840e+02	-0.70690871	4.796360e-01
White_Share_1	-3.597887e+02	3.044372e+02	-1.18181573	2.373007e-01
Hispanic_Share_1	-4.717382e+02	3.286514e+02	-1.43537580	1.512043e-01

First Difference

I didn't solve it.Sorry for that.

GMM

	total_crime_district	median_income	share_of_black	share_of_hispanic	share_of_white
	-218146.5	-9972097	-11.64609	-74.30712	-67.29415