```
                                          ___  ____  ___  ____  ____(R)
                                         /__    /  ____/   /   ____/
                                        ___/   /   /___/   /   /___/
                                          Statistics/Data Analysis

                                              User: Grant Aarons
                                           Project: Assignment 3
_____
          name:  Grant Aarons Assignment 3
           log:  C:\Users\gaarons\Git\Notes\Stata\2016F\Metrics\logs\stata_3.smcl
      log type:  smcl
     opened on:  11 Jan 2017, 14:33:03

 1 . * Use s or t to get smcl or text log file
 2 . /*
   > Grant Aarons
   > gaarons@london.edu
   > Econometrics 1, London Business School
   > */
 3 . global programdir C:\Users\gaarons\Git\Notes\Stata\2016F\Metrics\programs

 4 . global datadir C:\Users\gaarons\Git\Notes\Stata\2016F\Metrics\data

 5 . global outputdir C:\Users\gaarons\Git\Notes\Stata\2016F\Metrics\output

 6 . /*
   > Program: stata_31.do
   > Description: Introduction to econometrics in stata
   > */
 7 .
 8 . do $programdir/stata_31.do

 9 . /*
   > Grant Aarons
   > gaarons@london.edu
   > Econometrics 1, London Business School
   > Assignment 3
   > */
10 . * Load the data
11 . import excel "$datadir/schaller.xls", sheet("Sheet1") firstrow clear

12 . *pause Dataset has been loaded
13 .
14 .
15 . *** Part A
16 . * Tabulate the variables we were given as standard practice
17 . tabstat inv q, stat(min max mean sd)

    stats |      inv        q
    ------+-------------------
      min |        0 -1.966133
      max | .7142991  45.44712
     mean | .1686158  1.601154
       sd | .0899994  3.803969
    ------+-------------------

18 . tabstat inv q, by(year) stat(min max mean sd)

    Summary statistics: min, max, mean, sd
      by categories of: year (year)

     year |      inv        q
    ------+-------------------
        1 | .0205936 -1.748583
          | .6704475  6.588722
          | .1927996  .5728584
          |  .112118  1.648371
    ------+-------------------
        2 | .0107318 -1.405087
          | .5325488  6.588691
          | .1718815   .597845
          | .0927825  1.577901
    ------+-------------------
        3 | .0113419 -1.508873
          | .4278665  6.862064
          | .1607248  .6349403
          | .0906696  1.647415
    ------+-------------------
        4 |  .020651 -1.917622
          | .5146071   9.03307
          | .1472462  .4967591
          | .0863553   1.78078
    ------+-------------------
        5 | .0169944 -1.636174
          | .4385091  16.39879
          | .1687614  1.575704
          | .0985533  2.936246
```

6	.0140286	-1.316996
	.5664171	19.55134
	.2085197	2.143651
	.1088841	3.536015
7	.0214348	-1.514729
	.5919886	15.757
	.1891974	1.982852
	.097126	3.214572
8	.0210933	-1.966133
	.5523365	14.29717
	.1445815	1.188414
	.0933408	2.806896
9	.0088241	-1.738319
	.6472303	25.06137
	.1469142	2.615832
	.0936516	4.240391
10	.011097	-1.219954
	.6800648	41.90479
	.1684816	3.291839
	.104496	5.477325
11	0	-1.477367
	.7142991	30.18523
	.1494652	2.990903
	.0990541	5.405804
12	.0182395	-1.211948
	.5982081	45.44712
	.1608216	3.946245
	.0958416	6.795034
13	.0338612	-1.499547
	.5844074	36.9486
	.170258	2.496707
	.092345	4.696228
14	.0159083	-1.326542
	.6414233	33.9775
	.1872097	2.878355
	.0944825	5.152764
15	.0456929	-1.344155
	.5690441	30.4778
	.2180801	2.873494
	.0922757	4.62583
16	.0360537	-.8103173
	.655834	34.83765
	.2338404	3.488654
	.1016048	5.38048
17	.0221875	-1.069489
	.6108891	26.40782
	.2184982	2.396935
	.1053458	4.369127
18	.0287359	-1.00933
	.4589968	32.06573
	.1938358	3.517091
	.0837783	5.388207
19	.0264943	-.7960994
	.6606368	27.86442
	.1970291	3.4057
	.0883814	4.786166
20	.0167316	-1.255464
	.4899229	28.40281
	.1765477	2.31209
	.073611	4.739304
21	.005226	-1.066554
	.4338658	19.17337
	.1469716	1.841841
	.0706017	3.489996

22	.0145928	-1.131676
	.4037121	23.90062
	.1444561	2.179387
	.0679987	4.141808
23	.0329763	-1.542628
	.4842557	27.49858
	.179273	2.346174
	.0853335	4.718412
24	.027034	-1.610933
	.4426112	20.43754
	.1931256	1.318847
	.0856918	3.528182
25	.0077582	-1.955251
	.4441033	13.70439
	.151674	.2314248
	.0673722	1.925192
26	.0190473	-1.428982
	.3261356	11.73812
	.1382109	.4759651
	.0570254	1.95111
27	.0209634	-1.275176
	.3595692	10.10888
	.1506596	.618547
	.0608719	1.754108
28	.0438521	-1.347831
	.4033135	7.400327
	.1579665	.2473247
	.0649604	1.413838
29	.0144415	-1.547875
	.6127569	9.157542
	.1717787	.1102235
	.0799605	1.391528
30	.0184241	-1.279086
	.361407	9.488826
	.1628513	.1234602
	.0678179	1.305088
31	.0212685	-1.405766
	.361128	10.21523
	.1569981	.2477085
	.0689526	1.521988
32	.0150045	-1.365615
	.4270046	6.407879
	.1365325	.0176893
	.065645	1.335595
33	.0092279	-1.760928
	.6422654	8.459704
	.1219511	.1681494
	.0767863	1.469953
34	.0138137	-1.722591
	.5336629	7.986071
	.1385301	.4142811
	.0793025	1.433183
35	.012056	-1.870826
	.4314426	6.277641
	.1458804	.292498
	.0779655	1.263107
Total	0	-1.966133
	.7142991	45.44712
	.1686158	1.601154
	.0899994	3.803969

```
19 . * Too long a printout by firm, but could be used
20 . *tabstat inv q, by(firm) stat(min max mean sd)
21 .
22 . * Run the required regression of inv = alpha + beta_1*q
23 . reg inv q
```

Source	SS	df	MS
Model	5.63683287	1	5.63683287
Residual	40.8484783	5,738	.00711894
Total	46.4853111	5,739	.008099897

Number of obs = 5,740
F(1, 5738) = 791.81
Prob > F = 0.0000
R-squared = 0.1213
Adj R-squared = 0.1211
Root MSE = .08437

inv	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
q	.0082388	.0002928	28.14	0.000	.0076648	.0088127
_cons	.1554243	.0012083	128.63	0.000	.1530555	.157793

```
24 .
25 . *pause Part A completed
26 .
27 .
28 . *** Part B
29 . * Create dummy variables corresponding to each firm using ``xi'' command
30 . xi firm

31 . reg inv q i.firm
```

Source	SS	df	MS
Model	18.0371613	164	.109982691
Residual	28.4481498	5,575	.005102807
Total	46.4853111	5,739	.008099897

Number of obs = 5,740
F(164, 5575) = 21.55
Prob > F = 0.0000
R-squared = 0.3880
Adj R-squared = 0.3700
Root MSE = .07143

inv	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
q	.007249	.0003543	20.46	0.000	.0065544	.0079437
firm						
2	-.0110881	.0171628	-0.65	0.518	-.0447339	.0225577
3	.1144593	.0171091	6.69	0.000	.0809188	.1479999
4	-.0299033	.0171512	-1.74	0.081	-.0635263	.0037196
5	-.0131718	.017159	-0.77	0.443	-.0468102	.0204666
6	.0295458	.0171438	1.72	0.085	-.0040628	.0631544
7	-.0179783	.0171701	-1.05	0.295	-.0516385	.0156819
8	-.0288828	.017146	-1.68	0.092	-.0624955	.0047299
9	-.0102863	.0171597	-0.60	0.549	-.043926	.0233535
10	.0012063	.0171321	0.07	0.944	-.0323793	.0347918
11	-.0333366	.017152	-1.94	0.052	-.0669612	.0002879
12	.0018204	.0171088	0.11	0.915	-.0317196	.0353604
13	-.0626703	.0172465	-3.63	0.000	-.0964802	-.0288605
14	.0299757	.017154	1.75	0.081	-.0036528	.0636042
15	.0299541	.0171049	1.75	0.080	-.0035781	.0634864
16	-.0105629	.017164	-0.62	0.538	-.0442109	.0230852
17	.0073799	.0171342	0.43	0.667	-.0262099	.0409697
18	-.0479316	.0171712	-2.79	0.005	-.0815939	-.0142694
19	.0637984	.0171457	3.72	0.000	.0301863	.0974106
20	.037534	.0171446	2.19	0.029	.003924	.071144
21	.0033487	.0171188	0.20	0.845	-.0302108	.0369082
22	.0302641	.017113	1.77	0.077	-.0032841	.0638123
23	-.0303263	.0171771	-1.77	0.078	-.064	.0033474
24	.0416049	.0170807	2.44	0.015	.00812	.0750897
25	.0983835	.0171279	5.74	0.000	.0648062	.1319608
26	-.0093883	.0171363	-0.55	0.584	-.0429821	.0242056
27	.0475203	.0171412	2.77	0.006	.0139168	.0811237
28	-.0567045	.0170798	-3.32	0.001	-.0901876	-.0232214
29	-.0106659	.0171139	-0.62	0.533	-.0442157	.022884
30	.0435252	.0171216	2.54	0.011	.0099602	.0770903
31	.0755715	.0171089	4.42	0.000	.0420314	.1091115
32	.0205752	.0171604	1.20	0.231	-.0130659	.0542164
33	.0620965	.017091	3.63	0.000	.0285915	.0956015
34	.0030676	.0171605	0.18	0.858	-.0305736	.0367088
35	.0632206	.0171094	3.70	0.000	.0296795	.0967617
36	.0552266	.0171313	3.22	0.001	.0216426	.0888107
37	-.0210293	.0171333	-1.23	0.220	-.0546173	.0125587
38	.0675202	.0171455	3.94	0.000	.0339083	.1011321

39	.0023553	.0171479	0.14	0.891	-.0312612	.0359719
40	.0053389	.0171174	0.31	0.755	-.028218	.0388957
41	-.0111797	.0170966	-0.65	0.513	-.0446957	.0223363
42	.003941	.0171214	0.23	0.818	-.0296235	.0375056
43	.009515	.0171506	0.55	0.579	-.0241068	.0431369
44	.0487956	.0171345	2.85	0.004	.0152054	.0823859
45	.0431771	.0171268	2.52	0.012	.009602	.0767523
46	.0745948	.0171477	4.35	0.000	.0409785	.1082111
47	-.0113431	.0171585	-0.66	0.509	-.0449804	.0222943
48	.0060311	.017105	0.35	0.724	-.0275013	.0395635
49	-.0075513	.0171799	-0.44	0.660	-.0412306	.026128
50	-.0351712	.0171655	-2.05	0.041	-.0688223	-.00152
51	-.014578	.0171518	-0.85	0.395	-.0482021	.0190461
52	-.0170216	.0171304	-0.99	0.320	-.0506038	.0165606
53	-.0350846	.0171745	-2.04	0.041	-.0687533	-.0014159
54	.021855	.0171225	1.28	0.202	-.0117117	.0554218
55	.0219519	.0171542	1.28	0.201	-.011677	.0555808
56	.0318367	.0171471	1.86	0.063	-.0017783	.0654517
57	.0461108	.0171369	2.69	0.007	.0125157	.0797059
58	-.0164856	.0170781	-0.97	0.334	-.0499654	.0169941
59	.0258278	.0171496	1.51	0.132	-.007792	.0594476
60	.0461384	.0170906	2.70	0.007	.0126342	.0796425
61	.0948239	.0171271	5.54	0.000	.061248	.1283997
62	.0181437	.0170817	1.06	0.288	-.0153432	.0516306
63	-.0138999	.0171558	-0.81	0.418	-.047532	.0197321
64	-.0218311	.0171141	-1.28	0.202	-.0553815	.0117193
65	.0429222	.0171283	2.51	0.012	.009344	.0765003
66	.0747595	.017076	4.38	0.000	.0412839	.1082351
67	.0701564	.0171259	4.10	0.000	.0365831	.1037298
68	.0002675	.0171323	0.02	0.988	-.0333185	.0338534
69	.0460002	.0171216	2.69	0.007	.0124352	.0795652
70	.0683109	.0171055	3.99	0.000	.0347775	.1018444
71	.0279947	.0171355	1.63	0.102	-.0055975	.061587
72	.0685164	.017128	4.00	0.000	.0349388	.102094
73	.0334759	.017076	1.96	0.050	2.71e-07	.0669515
74	.1187479	.0171123	6.94	0.000	.0852011	.1522947
75	.000034	.0171192	0.00	0.998	-.0335264	.0335943
76	-.0218521	.017176	-1.27	0.203	-.0555238	.0118196
77	.0353268	.0171035	2.07	0.039	.0017974	.0688563
78	.0150356	.0170872	0.88	0.379	-.0184619	.048533
79	.0102299	.0171945	0.59	0.552	-.023478	.0439379
80	.0039382	.0171484	0.23	0.818	-.0296793	.0375558
81	.0184951	.0171391	1.08	0.281	-.0151041	.0520943
82	-.0116276	.01716	-0.68	0.498	-.0452678	.0220127
83	.0826889	.0171298	4.83	0.000	.0491079	.1162699
84	.0102795	.017157	0.60	0.549	-.0233549	.043914
85	-.0076072	.0171474	-0.44	0.657	-.0412227	.0260084
86	.0313087	.0170968	1.83	0.067	-.0022077	.0648251
87	-.0275372	.017099	-1.61	0.107	-.0610578	.0059834
88	-.0599936	.0171762	-3.49	0.000	-.0936656	-.0263217
89	.1633283	.017079	9.56	0.000	.1298468	.1968097
90	.0081582	.0171509	0.48	0.634	-.0254643	.0417807
91	-.030904	.0171306	-1.80	0.071	-.0644867	.0026787
92	-.0180802	.0171059	-1.06	0.291	-.0516145	.0154541
93	.061324	.0170765	3.59	0.000	.0278473	.0948006
94	-.000042	.0171425	-0.00	0.998	-.0336479	.0335639
95	-.0093794	.0171398	-0.55	0.584	-.0429802	.0242213
96	-.0172457	.0171775	-1.00	0.315	-.0509202	.0164288
97	.133017	.0171655	7.75	0.000	.0993659	.166668
98	-.0031429	.0171327	-0.18	0.854	-.0367296	.0304438
99	.0409969	.0171073	2.40	0.017	.0074599	.0745338
100	.0317446	.0171282	1.85	0.064	-.0018333	.0653225
101	-.0117057	.0171386	-0.68	0.495	-.0453041	.0218927
102	-.0047098	.0170769	-0.28	0.783	-.0381872	.0287675
103	.0809494	.0171046	4.73	0.000	.0474178	.1144811
104	-.04242	.0171655	-2.47	0.013	-.0760711	-.0087689
105	-.0092774	.0171248	-0.54	0.588	-.0428487	.0242939
106	.0096833	.0171703	0.56	0.573	-.0239773	.0433439
107	.0668296	.0171257	3.90	0.000	.0332566	.1004026
108	-.0319637	.0171538	-1.86	0.062	-.0655919	.0016645
109	-.0208587	.0171625	-1.22	0.224	-.054504	.0127865
110	.0406201	.0171572	2.37	0.018	.0069853	.0742549
111	.0033588	.0171546	0.20	0.845	-.0302708	.0369884
112	-.0346632	.0172433	-2.01	0.044	-.0684668	-.0008596
113	.0231535	.0171585	1.35	0.177	-.0104839	.056791
114	.0125792	.0172291	0.73	0.465	-.0211966	.0463549
115	-.0169208	.0171619	-0.99	0.324	-.0505649	.0167232
116	.0422971	.0171135	2.47	0.013	.0087479	.0758463
117	.118987	.0170846	6.96	0.000	.0854945	.1524796
118	-.0081228	.017153	-0.47	0.636	-.0417494	.0255038

119	-.0221458	.0170959	-1.30	0.195	-.0556604	.0113688
120	.0237715	.0171219	1.39	0.165	-.0097942	.0573371
121	-.0102183	.0171641	-0.60	0.552	-.0438667	.0234301
122	-.0261932	.017147	-1.53	0.127	-.0598079	.0074216
123	.114001	.0171271	6.66	0.000	.0804252	.1475767
124	.0278888	.0171065	1.63	0.103	-.0056467	.0614242
125	-.0029403	.0171321	-0.17	0.864	-.0365259	.0306453
126	-.0069179	.0171391	-0.40	0.686	-.0405172	.0266814
127	.0136327	.0171308	0.80	0.426	-.0199503	.0472158
128	.0681524	.017084	3.99	0.000	.0346612	.1016436
129	.0146445	.017076	0.86	0.391	-.0188312	.0481202
130	-.0654175	.0171515	-3.81	0.000	-.0990411	-.0317938
131	.0228469	.0171368	1.33	0.183	-.0107479	.0564417
132	-.0359411	.0171453	-2.10	0.036	-.0695527	-.0023296
133	.0962414	.0171039	5.63	0.000	.0627111	.1297718
134	.154328	.0171078	9.02	0.000	.1207901	.1878659
135	-.0470046	.0171615	-2.74	0.006	-.0806477	-.0133614
136	.0097354	.01714	0.57	0.570	-.0238656	.0433364
137	-.021706	.0171425	-1.27	0.205	-.055312	.0118999
138	.0481099	.0171488	2.81	0.005	.0144915	.0817282
139	.1480501	.0171195	8.65	0.000	.1144893	.181611
140	.034904	.0170849	2.04	0.041	.001411	.068397
141	.0460388	.0171494	2.68	0.007	.0124193	.0796582
142	.0125785	.0170974	0.74	0.462	-.020939	.046096
143	-.0526768	.0174231	-3.02	0.003	-.0868328	-.0185207
144	.0085849	.0170765	0.50	0.615	-.0248917	.0420615
145	.026235	.017142	1.53	0.126	-.0073701	.0598401
146	.0101592	.0171455	0.59	0.554	-.0234527	.0437711
147	-.0571875	.0170837	-3.35	0.001	-.0906781	-.0236968
148	-.0134221	.0171724	-0.78	0.434	-.0470867	.0202426
149	-.031901	.0171313	-1.86	0.063	-.0654849	.0016829
150	.0948328	.0171226	5.54	0.000	.0612658	.1283997
151	.0718996	.0171187	4.20	0.000	.0383402	.105459
152	.0511302	.0170784	2.99	0.003	.0176498	.0846106
153	.0137322	.0171189	0.80	0.422	-.0198274	.0472919
154	.0102959	.0171328	0.60	0.548	-.023291	.0438828
155	.0079635	.0171219	0.47	0.642	-.0256021	.0415292
156	-.0071696	.0171092	-0.42	0.675	-.0407102	.026371
157	-.0306744	.0171116	-1.79	0.073	-.0642197	.0028709
158	-.0000973	.0171537	-0.01	0.995	-.0337252	.0335306
159	.0100507	.0171292	0.59	0.557	-.0235291	.0436306
160	-.003881	.0171547	-0.23	0.821	-.0375109	.0297488
161	-.0054513	.0170979	-0.32	0.750	-.0389697	.0280672
162	-.0424006	.0171917	-2.47	0.014	-.076103	-.0086983
163	-.0316199	.0170922	-1.85	0.064	-.0651272	.0018874
164	.2038804	.0172066	11.85	0.000	.1701489	.237612
_cons	.1394105	.0121809	11.45	0.000	.1155313	.1632898

```
32 .
33 . *pause Part B completed
34 .
35 . *** Part C
36 . * regress inv on firm dummies alone and obtain the residual
37 . reg inv i.firm
```

Source	SS	df	MS		Number of obs	=	5,740
					F(163, 5576)	=	17.79
Model	15.9015861	163	.097555743		Prob > F	=	0.0000
Residual	30.583725	5,576	.005484886		R-squared	=	0.3421
					Adj R-squared	=	0.3228
Total	46.4853111	5,739	.008099897		Root MSE	=	.07406

inv	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
firm						
2	-.0463644	.0177037	-2.62	0.009	-.0810706	-.0116582
3	.0926863	.0177037	5.24	0.000	.0579801	.1273925
4	-.0627225	.0177037	-3.54	0.000	-.0974287	-.0280163
5	-.0476682	.0177037	-2.69	0.007	-.0823744	-.012962
6	-.0016269	.0177037	-0.09	0.927	-.0363331	.0330794
7	-.0547145	.0177037	-3.09	0.002	-.0894207	-.0200083
8	-.0605399	.0177037	-3.42	0.001	-.0952461	-.0258337
9	-.0449276	.0177037	-2.54	0.011	-.0796338	-.0102214
10	-.0271394	.0177037	-1.53	0.125	-.0618456	.0075668
11	-.0663346	.0177037	-3.75	0.000	-.1010409	-.0316284
12	-.0198649	.0177037	-1.12	0.262	-.0545711	.0148413
13	-.0131799	.0177037	-0.74	0.457	-.0478861	.0215264

14	-.0034511	.0177037	-0.19	0.845	-.0381573	.0312551
15	.0096168	.0177037	0.54	0.587	-.0250894	.044323
16	-.0460741	.0177037	-2.60	0.009	-.0807804	-.0113679
17	-.0215037	.0177037	-1.21	0.225	-.0562099	.0132025
18	-.0848731	.0177037	-4.79	0.000	-.1195793	-.0501669
19	.0322069	.0177037	1.82	0.069	-.0024993	.0669131
20	.0061922	.0177037	0.35	0.727	-.028514	.0408984
21	-.0214032	.0177037	-1.21	0.227	-.0561095	.013303
22	.0072421	.0177037	0.41	0.683	-.0274641	.0419484
23	-.0683914	.0177037	-3.86	0.000	-.1030976	-.0336852
24	.0333578	.0177037	1.88	0.060	-.0013484	.068064
25	.0711326	.0177037	4.02	0.000	.0364264	.1058388
26	-.0387809	.0177037	-2.19	0.029	-.0734871	-.0040746
27	.0169559	.0177037	0.96	0.338	-.0177503	.0516621
28	-.0492857	.0177037	-2.78	0.005	-.0839919	-.0145795
29	-.0339525	.0177037	-1.92	0.055	-.0686587	.0007537
30	.0179631	.0177037	1.01	0.310	-.0167431	.0526693
31	.0538777	.0177037	3.04	0.002	.0191715	.0885839
32	-.0142134	.0177037	-0.80	0.422	-.0489196	.0204928
33	.0474473	.0177037	2.68	0.007	.012741	.0821535
34	-.0317294	.0177037	-1.79	0.073	-.0664357	.0029768
35	.0413572	.0177037	2.34	0.020	.006651	.0760634
36	.0270809	.0177037	1.53	0.126	-.0076253	.0617871
37	-.049687	.0177037	-2.81	0.005	-.0843932	-.0149808
38	.0359605	.0177037	2.03	0.042	.0012543	.0706667
39	-.0297369	.0177037	-1.68	0.093	-.0644431	.0049694
40	-.0190212	.0177037	-1.07	0.283	-.0537274	.015685
41	.0059927	.0177037	0.34	0.735	-.0287135	.0406989
42	-.0215471	.0177037	-1.22	0.224	-.0562533	.0131591
43	-.0231805	.0177037	-1.31	0.190	-.0578867	.0115257
44	.0198575	.0177037	1.12	0.262	-.0148487	.0545637
45	.0162103	.0177037	0.92	0.360	-.0184959	.0509165
46	.0425333	.0177037	2.40	0.016	.0078271	.0772395
47	-.0457316	.0177037	-2.58	0.010	-.0804378	-.0110254
48	.0263947	.0177037	1.49	0.136	-.0083115	.0611009
49	-.0461492	.0177037	-2.61	0.009	-.0808554	-.011443
50	-.0709933	.0177037	-4.01	0.000	-.1056995	-.0362871
51	-.047524	.0177037	-2.68	0.007	-.0822302	-.0128178
52	-.0449302	.0177037	-2.54	0.011	-.0796364	-.0102239
53	-.0726629	.0177037	-4.10	0.000	-.1073691	-.0379566
54	-.0039451	.0177037	-0.22	0.824	-.0386513	.0307611
55	-.0115221	.0177037	-0.65	0.515	-.0462283	.0231841
56	-.0000788	.0177037	-0.00	0.996	-.034785	.0346274
57	.0165654	.0177037	0.94	0.349	-.0181408	.0512716
58	-.0220309	.0177037	-1.24	0.213	-.0567371	.0126753
59	-.0066356	.0177037	-0.37	0.708	-.0413418	.0280706
60	.0316898	.0177037	1.79	0.074	-.0030165	.066396
61	.0677658	.0177037	3.83	0.000	.0330596	.102472
62	.0272186	.0177037	1.54	0.124	-.0074876	.0619248
63	-.0477142	.0177037	-2.70	0.007	-.0824204	-.013008
64	.0015401	.0177037	0.09	0.931	-.0331661	.0362463
65	.0155501	.0177037	0.88	0.380	-.0191561	.0502563
66	.0752376	.0177037	4.25	0.000	.0405314	.1099438
67	.0434331	.0177037	2.45	0.014	.0087269	.0781393
68	-.0281283	.0177037	-1.59	0.112	-.0628345	.006578
69	.0204488	.0177037	1.16	0.248	-.0142574	.055155
70	.0477585	.0177037	2.70	0.007	.0130522	.0824647
71	-.0011984	.0177037	-0.07	0.946	-.0359046	.0335078
72	.0412188	.0177037	2.33	0.020	.0065126	.075925
73	.0328962	.0177037	1.86	0.063	-.00181	.0676024
74	.0959444	.0177037	5.42	0.000	.0612382	.1306506
75	-.0248425	.0177037	-1.40	0.161	-.0595487	.0098637
76	-.0597242	.0177037	-3.37	0.001	-.0944304	-.025018
77	.0155004	.0177037	0.88	0.381	-.0192058	.0502066
78	.0023913	.0177037	0.14	0.893	-.0323149	.0370975
79	.051463	.0177037	2.91	0.004	.0167568	.0861692
80	-.0282713	.0177037	-1.60	0.110	-.0629775	.0064349
81	-.0115589	.0177037	-0.65	0.514	-.0462651	.0231473
82	-.0463194	.0177037	-2.62	0.009	-.0810256	-.0116132
83	.0549381	.0177037	3.10	0.002	.0202319	.0896443
84	-.0237981	.0177037	-1.34	0.179	-.0585043	.0109081
85	-.0395869	.0177037	-2.24	0.025	-.0742931	-.0048807
86	.0140537	.0177037	0.79	0.427	-.0206525	.0487599
87	-.0456679	.0177037	-2.58	0.010	-.0803741	-.0109617
88	-.0978886	.0177037	-5.53	0.000	-.1325948	-.0631824
89	.1567992	.0177037	8.86	0.000	.122093	.1915054
90	-.0246092	.0177037	-1.39	0.165	-.0593154	.010097
91	-.0588708	.0177037	-3.33	0.001	-.093577	-.0241646
92	-.0387872	.0177037	-2.19	0.028	-.0734934	-.004081
93	.0641024	.0177037	3.62	0.000	.0293962	.0988086

94	-.0308961	.0177037	-1.75	0.081	-.0656023	.0038101
95	-.0396196	.0177037	-2.24	0.025	-.0743258	-.0049134
96	-.055389	.0177037	-3.13	0.002	-.0900952	-.0206828
97	.168835	.0177037	9.54	0.000	.1341288	.2035412
98	-.031635	.0177037	-1.79	0.074	-.0663412	.0030712
99	.0621631	.0177037	3.51	0.000	.0274569	.0968693
100	.0044086	.0177037	0.25	0.803	-.0302976	.0391148
101	-.0416618	.0177037	-2.35	0.019	-.076368	-.0069556
102	-.001127	.0177037	-0.06	0.949	-.0358332	.0335792
103	.060717	.0177037	3.43	0.001	.0260108	.0954232
104	-.0782415	.0177037	-4.42	0.000	-.1129477	-.0435352
105	-.0357128	.0177037	-2.02	0.044	-.070419	-.0010066
106	-.0270939	.0177037	-1.53	0.126	-.0618001	.0076123
107	.0401573	.0177037	2.27	0.023	.0054511	.0748635
108	-.0653616	.0177037	-3.69	0.000	-.1000678	-.0306554
109	-.0560756	.0177037	-3.17	0.002	-.0907818	-.0213694
110	.0065055	.0177037	0.37	0.713	-.0282007	.0412117
111	-.0301916	.0177037	-1.71	0.088	-.0648978	.0045146
112	.0143614	.0177037	0.81	0.417	-.0203448	.0490677
113	-.0112408	.0177037	-0.63	0.525	-.045947	.0234654
114	.0594683	.0177037	3.36	0.001	.0247621	.0941745
115	-.0520106	.0177037	-2.94	0.003	-.0867168	-.0173044
116	.0191136	.0177037	1.08	0.280	-.0155926	.0538198
117	.1078621	.0177037	6.09	0.000	.0731559	.1425683
118	-.0413463	.0177037	-2.34	0.020	-.0760525	-.0066401
119	-.0390276	.0177037	-2.20	0.028	-.0737338	-.0043214
120	.0494182	.0177037	2.79	0.005	.014712	.0841244
121	-.0457608	.0177037	-2.58	0.010	-.080467	-.0110546
122	-.0580835	.0177037	-3.28	0.001	-.0927897	-.0233773
123	.0869552	.0177037	4.91	0.000	.052249	.1216614
124	.006985	.0177037	0.39	0.693	-.0277212	.0416912
125	-.0312861	.0177037	-1.77	0.077	-.0659923	.0034201
126	-.0369805	.0177037	-2.09	0.037	-.0716867	-.0022743
127	-.0143831	.0177037	-0.81	0.417	-.0490894	.0203231
128	.0574712	.0177037	3.25	0.001	.022765	.0921774
129	.013773	.0177037	0.78	0.437	-.0209332	.0484792
130	-.0983107	.0177037	-5.55	0.000	-.1330169	-.0636044
131	-.0066625	.0177037	-0.38	0.707	-.0413687	.0280437
132	-.0674566	.0177037	-3.81	0.000	-.1021628	-.0327504
133	.0762481	.0177037	4.31	0.000	.0415419	.1109543
134	.1330009	.0177037	7.51	0.000	.0982946	.1677071
135	-.082001	.0177037	-4.63	0.000	-.1167072	-.0472948
136	-.0205373	.0177037	-1.16	0.246	-.0552435	.0141689
137	-.0525667	.0177037	-2.97	0.003	-.0872729	-.0178605
138	.0158057	.0177037	0.89	0.372	-.0189005	.0505119
139	.1230968	.0177037	6.95	0.000	.0883906	.157803
140	.023623	.0177037	1.33	0.182	-.0110832	.0583292
141	.0136152	.0177037	0.77	0.442	-.021091	.0483214
142	-.0049101	.0177037	-0.28	0.782	-.0396163	.0297961
143	.0181167	.0177037	1.02	0.306	-.0165895	.0528229
144	.0112982	.0177037	0.64	0.523	-.023408	.0460044
145	-.0045251	.0177037	-0.26	0.798	-.0392313	.0301811
146	-.0214016	.0177037	-1.21	0.227	-.0561078	.0133046
147	-.0467027	.0177037	-2.64	0.008	-.0814089	-.0119965
148	-.0506048	.0177037	-2.86	0.004	-.085311	-.0158986
149	-.0600311	.0177037	-3.39	0.001	-.0947373	-.0253249
150	.069006	.0177037	3.90	0.000	.0342998	.1037122
151	.0471642	.0177037	2.66	0.008	.012458	.0818705
152	.0452041	.0177037	2.55	0.011	.0104979	.0799103
153	-.0110455	.0177037	-0.62	0.533	-.0457517	.0236608
154	-.0182215	.0177037	-1.03	0.303	-.0529277	.0164847
155	-.0176781	.0177037	-1.00	0.318	-.0523843	.0170281
156	-.0289575	.0177037	-1.64	0.102	-.0636637	.0057487
157	-.0532392	.0177037	-3.01	0.003	-.0879454	-.018533
158	-.0334624	.0177037	-1.89	0.059	-.0681686	.0012438
159	-.017543	.0177037	-0.99	0.322	-.0522492	.0171632
160	-.037459	.0177037	-2.12	0.034	-.0721652	-.0027528
161	-.0231408	.0177037	-1.31	0.191	-.0578471	.0115654
162	-.0831324	.0177037	-4.70	0.000	-.1178386	-.0484262
163	-.0468346	.0177037	-2.65	0.008	-.0815408	-.0121284
164	.2471651	.0177037	13.96	0.000	.2124589	.2818713
_cons	.1722653	.0125184	13.76	0.000	.1477243	.1968063

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38 . predict einv, residuals
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39 .
40 . * regress q on firm dummies alone and obtain the residual
41 . reg q i.firm
```

Source	SS	df	MS		
Model	42404.191	163	260.148411		
Residual	40640.1674	5,576	7.28840879		
Total	83044.3584	5,739	14.4701792		

Number of obs = 5,740
F(163, 5576) = 35.69
Prob > F = 0.0000
R-squared = 0.5106
Adj R-squared = 0.4963
Root MSE = 2.6997

q	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
firm						
2	-4.866352	.645353	-7.54	0.000	-6.131495	-3.601208
3	-3.003586	.645353	-4.65	0.000	-4.268729	-1.738443
4	-4.527385	.645353	-7.02	0.000	-5.792528	-3.262242
5	-4.758758	.645353	-7.37	0.000	-6.023901	-3.493615
6	-4.300253	.645353	-6.66	0.000	-5.565397	-3.03511
7	-5.067738	.645353	-7.85	0.000	-6.332881	-3.802595
8	-4.367086	.645353	-6.77	0.000	-5.632229	-3.101943
9	-4.778749	.645353	-7.40	0.000	-6.043893	-3.513606
10	-3.910269	.645353	-6.06	0.000	-5.175412	-2.645126
11	-4.552061	.645353	-7.05	0.000	-5.817204	-3.286918
12	-2.99148	.645353	-4.64	0.000	-4.256624	-1.726337
13	6.827187	.645353	10.58	0.000	5.562044	8.092331
14	-4.61121	.645353	-7.15	0.000	-5.876354	-3.346067
15	-2.805525	.645353	-4.35	0.000	-4.070668	-1.540381
16	-4.898768	.645353	-7.59	0.000	-6.163911	-3.633625
17	-3.984481	.645353	-6.17	0.000	-5.249625	-2.719338
18	-5.096064	.645353	-7.90	0.000	-6.361207	-3.83092
19	-4.358045	.645353	-6.75	0.000	-5.623189	-3.092902
20	-4.323588	.645353	-6.70	0.000	-5.588732	-3.058445
21	-3.414516	.645353	-5.29	0.000	-4.67966	-2.149373
22	-3.175872	.645353	-4.92	0.000	-4.441016	-1.910729
23	-5.251062	.645353	-8.14	0.000	-6.516205	-3.985919
24	-1.137682	.645353	-1.76	0.078	-2.402825	.1274617
25	-3.759242	.645353	-5.83	0.000	-5.024385	-2.494099
26	-4.054692	.645353	-6.28	0.000	-5.319835	-2.789549
27	-4.216341	.645353	-6.53	0.000	-5.481485	-2.951198
28	1.023417	.645353	1.59	0.113	-.2417258	2.288561
29	-3.212386	.645353	-4.98	0.000	-4.47753	-1.947243
30	-3.526282	.645353	-5.46	0.000	-4.791425	-2.261138
31	-2.992644	.645353	-4.64	0.000	-4.257788	-1.727501
32	-4.799077	.645353	-7.44	0.000	-6.06422	-3.533934
33	-2.02086	.645353	-3.13	0.002	-3.286003	-.7557163
34	-4.800237	.645353	-7.44	0.000	-6.065381	-3.535094
35	-3.016051	.645353	-4.67	0.000	-4.281194	-1.750908
36	-3.882698	.645353	-6.02	0.000	-5.147841	-2.617554
37	-3.95331	.645353	-6.13	0.000	-5.218453	-2.688167
38	-4.353644	.645353	-6.75	0.000	-5.618787	-3.088501
39	-4.427102	.645353	-6.86	0.000	-5.692245	-3.161959
40	-3.360462	.645353	-5.21	0.000	-4.625605	-2.095318
41	2.368921	.645353	3.67	0.000	1.103778	3.634065
42	-3.516076	.645353	-5.45	0.000	-4.781219	-2.250933
43	-4.510337	.645353	-6.99	0.000	-5.77548	-3.245193
44	-3.992002	.645353	-6.19	0.000	-5.257146	-2.726859
45	-3.720063	.645353	-5.76	0.000	-4.985206	-2.45492
46	-4.422873	.645353	-6.85	0.000	-5.688017	-3.15773
47	-4.743883	.645353	-7.35	0.000	-6.009026	-3.47874
48	2.809145	.645353	4.35	0.000	1.544001	4.074288
49	-5.324561	.645353	-8.25	0.000	-6.589704	-4.059418
50	-4.941651	.645353	-7.66	0.000	-6.206794	-3.676507
51	-4.544886	.645353	-7.04	0.000	-5.81003	-3.279743
52	-3.849973	.645353	-5.97	0.000	-5.115116	-2.58483
53	-5.183904	.645353	-8.03	0.000	-6.449047	-3.918761
54	-3.559118	.645353	-5.51	0.000	-4.824262	-2.293975
55	-4.617728	.645353	-7.16	0.000	-5.882871	-3.352585
56	-4.402726	.645353	-6.82	0.000	-5.667869	-3.137582
57	-4.075778	.645353	-6.32	0.000	-5.340921	-2.810635
58	-.7649613	.645353	-1.19	0.236	-2.030105	.500182
59	-4.478312	.645353	-6.94	0.000	-5.743455	-3.213169
60	-1.993179	.645353	-3.09	0.002	-3.258322	-.7280354
61	-3.732652	.645353	-5.78	0.000	-4.997795	-2.467508
62	1.251882	.645353	1.94	0.052	-.0132611	2.517025
63	-4.664669	.645353	-7.23	0.000	-5.929812	-3.399526
64	3.224053	.645353	5.00	0.000	1.958909	4.489196

65	-3.775961	.645353	-5.85	0.000	-5.041104	-2.510818
66	.0659443	.645353	0.10	0.919	-1.199199	1.331088
67	-3.686471	.645353	-5.71	0.000	-4.951614	-2.421327
68	-3.917178	.645353	-6.07	0.000	-5.182321	-2.652034
69	-3.524795	.645353	-5.46	0.000	-4.789938	-2.259652
70	-2.835203	.645353	-4.39	0.000	-4.100346	-1.57006
71	-4.027183	.645353	-6.24	0.000	-5.292326	-2.762039
72	-3.765691	.645353	-5.84	0.000	-5.030834	-2.500547
73	-.0799685	.645353	-0.12	0.901	-1.345112	1.185175
74	-3.145733	.645353	-4.87	0.000	-4.410876	-1.88059
75	-3.431694	.645353	-5.32	0.000	-4.696837	-2.16655
76	-5.224431	.645353	-8.10	0.000	-6.489575	-3.959288
77	-2.735045	.645353	-4.24	0.000	-4.000188	-1.469901
78	-1.744269	.645353	-2.70	0.007	-3.009412	-.4791253
79	5.688083	.645353	8.81	0.000	4.422939	6.953226
80	-4.443287	.645353	-6.89	0.000	-5.708431	-3.178144
81	-4.14593	.645353	-6.42	0.000	-5.411073	-2.880786
82	-4.785723	.645353	-7.42	0.000	-6.050866	-3.520579
83	-3.828204	.645353	-5.93	0.000	-5.093348	-2.563061
84	-4.700998	.645353	-7.28	0.000	-5.966141	-3.435854
85	-4.411584	.645353	-6.84	0.000	-5.676728	-3.146441
86	-2.380325	.645353	-3.69	0.000	-3.645468	-1.115181
87	-2.501125	.645353	-3.88	0.000	-3.766268	-1.235982
88	-5.227596	.645353	-8.10	0.000	-6.49274	-3.962453
89	-.900681	.645353	-1.40	0.163	-2.165824	.3644622
90	-4.520257	.645353	-7.00	0.000	-5.785401	-3.255114
91	-3.858013	.645353	-5.98	0.000	-5.123156	-2.592869
92	-2.856521	.645353	-4.43	0.000	-4.121664	-1.591377
93	.3832855	.645353	0.59	0.553	-.8818578	1.648429
94	-4.256308	.645353	-6.60	0.000	-5.521452	-2.991165
95	-4.171619	.645353	-6.46	0.000	-5.436762	-2.906476
96	-5.261856	.645353	-8.15	0.000	-6.526999	-3.996713
97	4.941089	.645353	7.66	0.000	3.675946	6.206233
98	-3.930475	.645353	-6.09	0.000	-5.195618	-2.665331
99	2.91987	.645353	4.52	0.000	1.654727	4.185013
100	-3.770992	.645353	-5.84	0.000	-5.036135	-2.505848
101	-4.13243	.645353	-6.40	0.000	-5.397574	-2.867287
102	.4942529	.645353	0.77	0.444	-.7708903	1.759396
103	-2.791056	.645353	-4.32	0.000	-4.056199	-1.525912
104	-4.941557	.645353	-7.66	0.000	-6.2067	-3.676414
105	-3.646751	.645353	-5.65	0.000	-4.911895	-2.381608
106	-5.073405	.645353	-7.86	0.000	-6.338548	-3.808262
107	-3.679438	.645353	-5.70	0.000	-4.944582	-2.414295
108	-4.607226	.645353	-7.14	0.000	-5.872369	-3.342082
109	-4.858157	.645353	-7.53	0.000	-6.1233	-3.593014
110	-4.706094	.645353	-7.29	0.000	-5.971237	-3.440951
111	-4.628273	.645353	-7.17	0.000	-5.893416	-3.36313
112	6.76293	.645353	10.48	0.000	5.497787	8.028073
113	-4.744689	.645353	-7.35	0.000	-6.009832	-3.479546
114	6.468334	.645353	10.02	0.000	5.203191	7.733478
115	-4.840617	.645353	-7.50	0.000	-6.10576	-3.575474
116	-3.198145	.645353	-4.96	0.000	-4.463288	-1.933002
117	-1.53468	.645353	-2.38	0.017	-2.799824	-.269537
118	-4.583168	.645353	-7.10	0.000	-5.848311	-3.318024
119	-2.328837	.645353	-3.61	0.000	-3.59398	-1.063694
120	3.537956	.645353	5.48	0.000	2.272813	4.803099
121	-4.903066	.645353	-7.60	0.000	-6.168209	-3.637923
122	-4.399257	.645353	-6.82	0.000	-5.664401	-3.134114
123	-3.730955	.645353	-5.78	0.000	-4.996098	-2.465812
124	-2.883669	.645353	-4.47	0.000	-4.148812	-1.618525
125	-3.91029	.645353	-6.06	0.000	-5.175434	-2.645147
126	-4.147117	.645353	-6.43	0.000	-5.41226	-2.881973
127	-3.864778	.645353	-5.99	0.000	-5.129921	-2.599635
128	-1.473463	.645353	-2.28	0.022	-2.738606	-.2083193
129	-.1202265	.645353	-0.19	0.852	-1.38537	1.144917
130	-4.537601	.645353	-7.03	0.000	-5.802744	-3.272458
131	-4.070799	.645353	-6.31	0.000	-5.335942	-2.805656
132	-4.347549	.645353	-6.74	0.000	-5.612693	-3.082406
133	-2.758069	.645353	-4.27	0.000	-4.023212	-1.492926
134	-2.942074	.645353	-4.56	0.000	-4.207217	-1.67693
135	-4.827747	.645353	-7.48	0.000	-6.09289	-3.562603
136	-4.176109	.645353	-6.47	0.000	-5.441253	-2.910966
137	-4.257219	.645353	-6.60	0.000	-5.522362	-2.992075
138	-4.456349	.645353	-6.91	0.000	-5.721493	-3.191206
139	-3.442303	.645353	-5.33	0.000	-4.707446	-2.17716
140	-1.556216	.645353	-2.41	0.016	-2.821359	-.2910723
141	-4.472818	.645353	-6.93	0.000	-5.737962	-3.207675
142	-2.412541	.645353	-3.74	0.000	-3.677684	-1.147398
143	9.765928	.645353	15.13	0.000	8.500785	11.03107
144	.3742963	.645353	0.58	0.562	-.890847	1.63944

145	-4.243346	.645353	-6.58	0.000	-5.508489	-2.978203
146	-4.353792	.645353	-6.75	0.000	-5.618935	-3.088649
147	1.446372	.645353	2.24	0.025	.1812283	2.711515
148	-5.129339	.645353	-7.95	0.000	-6.394483	-3.864196
149	-3.880535	.645353	-6.01	0.000	-5.145679	-2.615392
150	-3.562787	.645353	-5.52	0.000	-4.827931	-2.297644
151	-3.412235	.645353	-5.29	0.000	-4.677378	-2.147092
152	-.8175055	.645353	-1.27	0.205	-2.082649	.4476378
153	-3.418071	.645353	-5.30	0.000	-4.683214	-2.152928
154	-3.933964	.645353	-6.10	0.000	-5.199108	-2.668821
155	-3.53725	.645353	-5.48	0.000	-4.802393	-2.272106
156	-3.005625	.645353	-4.66	0.000	-4.270768	-1.740481
157	-3.112807	.645353	-4.82	0.000	-4.37795	-1.847663
158	-4.602697	.645353	-7.13	0.000	-5.867841	-3.337554
159	-3.806547	.645353	-5.90	0.000	-5.071691	-2.541404
160	-4.632064	.645353	-7.18	0.000	-5.897208	-3.366921
161	-2.440271	.645353	-3.78	0.000	-3.705414	-1.175128
162	-5.618929	.645353	-8.71	0.000	-6.884072	-4.353786
163	-2.098864	.645353	-3.25	0.001	-3.364007	-.8337206
164	5.9711	.645353	9.25	0.000	4.705957	7.236243
_cons	4.532296	.4563335	9.93	0.000	3.637705	5.426888

```
42 . predict eq, residuals

43 .
44 . * regress einv on eq, the partitioned regression, partialing out result
45 . reg einv eq
```

Source	SS	df	MS
Model	2.13557517	1	2.13557517
Residual	28.4481498	5,738	.004957851
Total	30.583725	5,739	.005329104

Number of obs	= 5,740
F(1, 5738)	= 430.75
Prob > F	= 0.0000
R-squared	= 0.0698
Adj R-squared	= 0.0697
Root MSE	= .07041

einv	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
eq	.007249	.0003493	20.75	0.000	.0065643	.0079337
_cons	1.59e-12	.0009294	0.00	1.000	-.0018219	.0018219

```
46 .
47 . * Follow up questions addressed in the LaTex write-up
48 .
49 . *pause Part C completed
50 .
51 .
52 . *** Part D
53 . * Purely analytical and addressed in the LaTex write-up
54 . * Not asked to compute anything in Stata
55 .
56 .
57 . *** Part E
58 . * Regress inv on eq
59 . reg inv eq
```

Source	SS	df	MS
Model	2.13557518	1	2.13557518
Residual	44.349736	5,738	.007729128
Total	46.4853111	5,739	.008099897

Number of obs	= 5,740
F(1, 5738)	= 276.30
Prob > F	= 0.0000
R-squared	= 0.0459
Adj R-squared	= 0.0458
Root MSE	= .08792

inv	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
eq	.007249	.0004361	16.62	0.000	.0063941	.0081039
_cons	.1686158	.0011604	145.31	0.000	.166341	.1708906

```
60 .
61 . * Follow up questions addressed in the LaTex write-up
62 .
63 . *pause Part E completed
64 .
   end of do-file

65 .
66 . do $programdir/stata_32.do

67 . /*
   > Grant Aarons
   > gaarons@london.edu
   > Econometrics 1, London Business School
   > Assignment 3
   > */
68 . * Load the data
69 . import excel "$datadir/ps3.xls", sheet("Sheet1") firstrow clear

70 . *pause Dataset has been loaded
71 .
72 . * Need to identify panelists/firms
73 . gen individual = _n

74 .
75 . * Reshape the data from wide to long
76 . reshape long w ed a, i(individual) j(year)
   (note: j = 0 1 2)
```

Data	wide	->	long
Number of obs.	1500	->	4500
Number of variables	10	->	5
j variable (3 values)		->	year
xij variables:			
	w0 w1 w2	->	w
	ed0 ed1 ed2	->	ed
	a0 a1 a2	->	a

```
77 . replace w = log(w)
   variable w was long now double
   (4,500 real changes made)

78 . gen xp = a-ed-6

79 . gen xp_p2 = xp^2

80 .
81 . * Create necessary variables
82 . by individual: egen luwe=mean(w)

83 . by individual: egen educ=mean(ed)

84 . by individual: egen exp=mean(xp)

85 . by individual: egen exp_p2=mean(xp_p2)

86 .
87 . *pause Check the means calculated above by individual
88 .
89 . *** Part A
90 . * For the 1990 portion of the data, regress log(wage) on constant, educ, exp, exp2
91 . * NOT SURE THAT THE PSET is written correctly, want the means of the individual over each variable..
   > .?
92 .
93 . * should we regress the average over all individuals or just 1990
94 . * (average by individual used later) NOT THIS: reg luwe educ exp exp_p2
```

95 . reg w ed xp xp_p2 if year==0

Source	SS	df	MS		Number of obs	=	1,500
					F(3, 1496)	=	46.28
Model	91.6141861	3	30.538062		Prob > F	=	0.0000
Residual	987.209592	1,496	.65989946		R-squared	=	0.0849
					Adj R-squared	=	0.0831
Total	1078.82378	1,499	.719695649		Root MSE	=	.81234

w	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ed	.1440517	.0131358	10.97	0.000	.1182852	.1698182
xp	.026499	.0284373	0.93	0.352	-.0292823	.0822802
xp_p2	.0009687	.0013386	0.72	0.469	-.0016571	.0035945
_cons	7.384689	.2795876	26.41	0.000	6.836263	7.933114

96 .
97 . * Pooled Regression (1990-1992)
98 . reg w ed xp xp_p2

Source	SS	df	MS		Number of obs	=	4,500
					F(3, 4496)	=	164.80
Model	318.441207	3	106.147069		Prob > F	=	0.0000
Residual	2895.83354	4,496	.64409109		R-squared	=	0.0991
					Adj R-squared	=	0.0985
Total	3214.27475	4,499	.714442043		Root MSE	=	.80255

w	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ed	.1479199	.0072281	20.46	0.000	.1337493	.1620905
xp	.0273553	.0165968	1.65	0.099	-.0051826	.0598931
xp_p2	.0005749	.0007205	0.80	0.425	-.0008377	.0019874
_cons	7.385116	.1622288	45.52	0.000	7.067067	7.703164

99 .
100 . *pause Part A completed
101 .
102 .
103 . *** Part B
104 . * Purely analytical and addressed in the LaTex write-up
105 . * Not asked to compute anything in Stata
106 .
107 . *** Part C
108 . * Purely analytical and addressed in the LaTex write-up
109 . * Not asked to compute anything in Stata
110 . * The problem set should have asked us to compute the FE estimated coefficients
111 . xi year

112 . reg w ed xp xp_p2 i.year

Source	SS	df	MS		Number of obs	=	4,500
					F(5, 4494)	=	99.14
Model	319.315949	5	63.8631898		Prob > F	=	0.0000
Residual	2894.9588	4,494	.644183089		R-squared	=	0.0993
					Adj R-squared	=	0.0983
Total	3214.27475	4,499	.714442043		Root MSE	=	.80261

w	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ed	.1464139	.0074734	19.59	0.000	.1317624	.1610655
xp	.0253395	.0167407	1.51	0.130	-.0074805	.0581595
xp_p2	.0006004	.0007209	0.83	0.405	-.0008129	.0020136
year						
1	.0340731	.0298066	1.14	0.253	-.0243624	.0925086
2	.0247063	.0312118	0.79	0.429	-.0364843	.0858968
_cons	7.403881	.1652676	44.80	0.000	7.079875	7.727887

```
113 . estimates store fixedEffects

114 . * Year fixed effect
115 . * FOR between each year demean the average over all firms, year fixed effect
116 .
117 . *** Part D
118 . * Only MATLAB
119 .
120 . *** Part E
121 . * Estimate the within estimator \tilde{\beta}_W for the wage equation
122 .
123 . preserve

124 . * Need demeaned variables
125 . replace w = w - luwe
    (4,500 real changes made)

126 . replace ed = ed - educ
    variable ed was byte now float
    (4,500 real changes made)

127 . replace xp = xp - exp
    (4,500 real changes made)

128 . replace xp_p2 = xp_p2 - exp_p2
    (4,500 real changes made)

129 . * Need to do this to get the same coefficient names for Hausman test
130 .
131 . * Pooled Regression (1990-1992) but after demeaned/Within/FixedEffects
132 . *reg w_dm ed_dm xp_dm xp_p2_dm
133 . reg w ed xp xp_p2
```

Source	SS	df	MS
Model	10.5005623	3	3.50018743
Residual	676.6235	4,496	.150494551
Total	687.124063	4,499	.152728176

Number of obs = 4,500
F(3, 4496) = 23.26
Prob > F = 0.0000
R-squared = 0.0153
Adj R-squared = 0.0146
Root MSE = .38794

w	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ed	.0637628	.0264373	2.41	0.016	.0119326	.1155929
xp	.1301495	.0250195	5.20	0.000	.081099	.1791999
xp_p2	-.0035098	.0011127	-3.15	0.002	-.0056913	-.0013284
_cons	-1.05e-08	.005783	-0.00	1.000	-.0113376	.0113375

```
134 . estimates store fixedEffectsWithin

135 . restore

136 . * Firm fixed effect
137 . * FOR within each individual demean the average over time, firm fixed effect
138 .
139 . * Follow up questions addressed in the LaTex write-up
140 .
141 . *pause Part E completed
142 .
143 . *** Part F
144 . * Only MATLAB
145 .
146 . *** Part G
147 . * Only Stata
148 . * Check if the results match with Stata by using the command xtgls on the
149 . * variable from the original wage equation.
150 .
```

```
151 . *xtset year
152 . xtset year individual
        panel variable:  year (strongly balanced)
         time variable:  individual, 1 to 1500
                 delta:  1 unit

153 . xtgls w ed xp xp_p2

    Cross-sectional time-series FGLS regression

    Coefficients:  generalized least squares
    Panels:        homoskedastic
    Correlation:   no autocorrelation

    Estimated covariances      =          1      Number of obs      =      4,500
    Estimated autocorrelations =          0      Number of groups   =          3
    Estimated coefficients     =          4      Time periods       =       1500
                                                 Wald chi2(3)       =     494.84
    Log likelihood             = -5393.413       Prob > chi2        =     0.0000
```

w	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
ed	.1479199	.0072249	20.47	0.000	.1337594	.1620804
xp	.0273553	.0165894	1.65	0.099	-.0051594	.0598699
xp_p2	.0005749	.0007202	0.80	0.425	-.0008367	.0019864
_cons	7.385116	.1621567	45.54	0.000	7.067294	7.702937

```
154 . estimates store gls

155 .
156 . * Follow up questions addressed in the LaTex write-up
157 .
158 . *pause Part G completed
159 .
160 .
161 . *** Part H
162 . * Are the FGLS (MATLAB should match) results different than the FE ones? Perform a Hausman test.
163 .
164 . hausman fixedEffects gls
```

	—— Coefficients ——			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixedEffects	gls	Difference	S.E.
ed	.1464139	.1479199	-.001506	.0019113
xp	.0253395	.0273553	-.0020158	.0022455
xp_p2	.0006004	.0005749	.0000255	.0000319

```
                    b = consistent under Ho and Ha; obtained from regress
            B = inconsistent under Ha, efficient under Ho; obtained from xtgls

       Test:  Ho:  difference in coefficients not systematic

                     chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                             =          0.88
                  Prob>chi2 =         0.8314

165 .
166 . * Follow up questions addressed in the LaTex write-up
167 .
168 . *pause Part H completed
169 .
170 .
    end of do-file

171 .
172 . log close _all
        name:  Grant Aarons Assignment 3
         log:  C:\Users\gaarons\Git\Notes\Stata\2016F\Metrics\logs\stata_3.smcl
    log type:  smcl
   closed on:  11 Jan 2017, 14:33:04
```