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Assignment 2

Exercise 2 OLS

OLS Table: Continuous Y

	(1) closed_form	(2) bootstrap_49	(3) bootstra~499
X1	1.211***	1.211***	1.211***
	(0.018)	(0.016)	(0.018)
X2	-0.903***	-0.903***	-0.903***
	(0.003)	(0.003)	(0.003)
X3	0.0977***	0.0977***	0.0977***
	(0.022)	(0.023)	(0.021)
_cons	2.522***	2.522***	2.522***
	(0.041)	(0.036)	(0.043)
N	10000	10000	10000

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Exercise 4 Discrete Choice

Discrete Choice Table: Y dummy

	(1) probit	(2) logit	(3) linear_pro~y
main			
X1	1.216***	2.197***	0.147***
	(0.043)	(0.081)	(0.006)
X2	-0.896***	-1.614***	-0.103***
	(0.018)	(0.037)	(0.001)
X3	0.162***	0.299***	0.0173*
	(0.047)	(0.084)	(0.007)
_cons	2.882***	5.164***	0.879***
	(0.098)	(0.182)	(0.014)
N	10000	10000	10000

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Exercise 5 Marginal Effects

```
. // Probit
. quietly probit Y_dum X1 X2 X3

. margins, dydx(X1 X2 X3)

Average marginal effects                        Number of obs     =     10,000
Model VCE    : OIM

Expression   : Pr(Y_dum), predict()
dy/dx w.r.t. : X1 X2 X3
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
X1	.1488271	.0044097	33.75	0.000	.1401841	.15747
X2	-.1097281	.0004504	-243.65	0.000	-.1106108	-.1088454
X3	.0198354	.0056861	3.49	0.000	.0086908	.03098

```
. quietly probit Y_dum X1 X2 X3

. margins, dydx(X1 X2 X3)

Average marginal effects                        Number of obs     =     10,000
Model VCE    : OIM

Expression   : Pr(Y_dum), predict()
dy/dx w.r.t. : X1 X2 X3
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
X1	.1488271	.0044097	33.75	0.000	.1401841	.15747
X2	-.1097281	.0004504	-243.65	0.000	-.1106108	-.1088454
X3	.0198354	.0056861	3.49	0.000	.0086908	.03098

Assignment 3

Exercise 2 First Model

Alternative-specific conditional logit — Number of obs = **44,700**
Case variable: v1 — Number of cases = **4470**

Alternative variable: product — Alts per case: min = **10**, avg = **10.0**, max = **10**

Wald chi2(**1**) = **1458.85**
Log likelihood = **-7464.9321** — Prob > chi2 = **0.0000**

choice_clo~t		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
product	price	**-6.65658**	**.1742793**	**-38.19**	**0.000**	**-6.998161**	**-6.314999**
1		(base alternative)					
2	_cons	**-.9543069**	**.0500462**	**-19.07**	**0.000**	**-1.052396**	**-.856218**
3	_cons	**1.296968**	**.1086515**	**11.94**	**0.000**	**1.084015**	**1.509921**
4	_cons	**-1.717332**	**.0541582**	**-31.71**	**0.000**	**-1.82348**	**-1.611184**
5	_cons	**-2.904005**	**.0714605**	**-40.64**	**0.000**	**-3.044065**	**-2.763945**
6	_cons	**-1.515311**	**.1262303**	**-12.00**	**0.000**	**-1.762718**	**-1.267904**
7	_cons	**.2517683**	**.079164**	**3.18**	**0.001**	**.0966097**	**.4069269**
8	_cons	**1.464868**	**.1180467**	**12.41**	**0.000**	**1.233501**	**1.696236**
9	_cons	**2.357505**	**.133774**	**17.62**	**0.000**	**2.095313**	**2.619697**
10	_cons	**-3.896593**	**.177419**	**-21.96**	**0.000**	**-4.244328**	**-3.548859**

Exercise 3 Second Model

Multinomial logistic regression — Number of obs = 44,700
LR chi2(60) = 693.59
Prob > chi2 = 0.0000
Log likelihood = -22470.269 — Pseudo R2 = 0.0152

choice_mlo~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
0						
income	.004969	.0017398	2.86	0.004	.001559	.008379
fs3_4	-.1175737	.0621134	-1.89	0.058	-.2393137	.0041664
fs5	-.0850946	.0847021	-1.00	0.315	-.2511077	.0809184
college	-.0535497	.0556229	-0.96	0.336	-.1625686	.0554692
whtcollar	.0778141	.0559127	1.39	0.164	-.0317728	.1874011
retired	.1012369	.0750875	1.35	0.178	-.0459319	.2484056
_cons	3.012373	.071308	42.24	0.000	2.872612	3.152134
1	(base outcome)					
2						
income	-.0021271	.0033106	-0.64	0.521	-.0086157	.0043616
fs3_4	.0770609	.1147154	0.67	0.502	-.1477771	.301899
fs5	-.1315033	.1638105	-0.80	0.422	-.452566	.1895595
college	.0402462	.1021828	0.39	0.694	-.1600284	.2405209
whtcollar	-.0249169	.1028285	-0.24	0.809	-.2264571	.1766233
retired	.2371163	.1340013	1.77	0.077	-.0255213	.499754
_cons	-.9447956	.13229	-7.14	0.000	-1.204079	-.6855118
3						
income	.0188907	.003864	4.89	0.000	.0113174	.026464
fs3_4	-.8411266	.1853033	-4.54	0.000	-1.204314	-.4779388
fs5	-.8328322	.2761901	-3.02	0.003	-1.374155	-.2915096
college	.5304638	.149173	3.56	0.000	.23809	.8228376
whtcollar	.5641586	.1713714	3.29	0.001	.2282769	.9000404
retired	1.575692	.189393	8.32	0.000	1.204488	1.946895
_cons	-3.191235	.2174057	-14.68	0.000	-3.617342	-2.765127
4						
income	.0035387	.0032405	1.09	0.275	-.0028125	.00989
fs3_4	.041029	.1242076	0.33	0.741	-.2024135	.2844715
fs5	.4529768	.155278	2.92	0.004	.1486375	.757316
college	-.2143801	.1112885	-1.93	0.054	-.4325016	.0037413
whtcollar	.0130714	.1084015	0.12	0.904	-.1993916	.2255344
retired	-.2176447	.1552778	-1.40	0.161	-.5219836	.0866941
_cons	-1.187655	.1401024	-8.48	0.000	-1.46225	-.913059
5						
income	-.0073712	.0047184	-1.56	0.118	-.0166192	.0018767
fs3_4	.7064026	.174779	4.04	0.000	.3638422	1.048963
fs5	.9640586	.2117937	4.55	0.000	.5489505	1.379167
college	-.3865309	.1452503	-2.66	0.008	-.6712162	-.1018456
whtcollar	.6848047	.1467732	4.67	0.000	.3971346	.9724748
retired	.2951682	.2007109	1.47	0.141	-.098218	.6885544
_cons	-2.459726	.2048278	-12.01	0.000	-2.861181	-2.058271

6						
income	.0280695	.0046411	6.05	0.000	.018973	.0371659
fs3_4	-.5138651	.3525346	-1.46	0.145	-1.20482	.17709
fs5	.8877279	.3666532	2.42	0.015	.1691008	1.606355
college	.1079529	.2807678	0.38	0.701	-.4423419	.6582478
whtcollar	.0291453	.3065475	0.10	0.924	-.5716767	.6299672
retired	1.306963	.3496991	3.74	0.000	.6215655	1.992361
_cons	-4.481253	.3704888	-12.10	0.000	-5.207397	-3.755108
7						
income	-.0052751	.0045601	-1.16	0.247	-.0142127	.0036625
fs3_4	-.504594	.1416044	-3.56	0.000	-.7821335	-.2270545
fs5	-1.276014	.2590568	-4.93	0.000	-1.783756	-.7682716
college	.0833302	.1366892	0.61	0.542	-.1845757	.3512361
whtcollar	-.0480008	.1377734	-0.35	0.728	-.3180316	.2220301
retired	-.7906895	.1964836	-4.02	0.000	-1.17579	-.4055887
_cons	-1.057671	.1637945	-6.46	0.000	-1.378703	-.7366402
8						
income	.0270275	.003836	7.05	0.000	.0195092	.0345459
fs3_4	-.2630911	.1719355	-1.53	0.126	-.6000785	.0738964
fs5	-1.390985	.3448464	-4.03	0.000	-2.066872	-.715099
college	-.4475564	.1788952	-2.50	0.012	-.7981845	-.0969282
whtcollar	-.3192622	.1661463	-1.92	0.055	-.6449029	.0063786
retired	-1.063152	.2739825	-3.88	0.000	-1.600147	-.5261559
_cons	-2.236649	.2008463	-11.14	0.000	-2.630301	-1.842998
9						
income	.0245025	.0037092	6.61	0.000	.0172325	.0317724
fs3_4	-1.163106	.1728905	-6.73	0.000	-1.501965	-.8242466
fs5	-1.719619	.3361417	-5.12	0.000	-2.378445	-1.060794
college	-.3769011	.1680334	-2.24	0.025	-.7062405	-.0475618
whtcollar	.410152	.1759535	2.33	0.020	.0652894	.7550145
retired	.5124467	.1934816	2.65	0.008	.1332297	.8916636
_cons	-2.406309	.2010706	-11.97	0.000	-2.8004	-2.012218
10						
income	-.0035631	.011826	-0.30	0.763	-.0267417	.0196154
fs3_4	.9006243	.6817391	1.32	0.186	-.4355598	2.236808
fs5	2.57364	.6676801	3.85	0.000	1.265011	3.882269
college	-.0707955	.394016	-0.18	0.857	-.8430526	.7014616
whtcollar	2.328057	.7603343	3.06	0.002	.8378289	3.818285
retired	1.006503	.5789976	1.74	0.082	-.1283115	2.141318
_cons	-7.097815	.9142458	-7.76	0.000	-8.889704	-5.305926

Exercise 4 : Marginal Effects

The table from stat is too long so I collect the ME and put into the table here

Conditional Logit ME

	Prob_ product_1	Prob_ product_2	Prob_ product_3	Prob_ product_4	Prob_ product_5	Prob_ product_6	Prob_ product_7	Prob_ product_8	Prob_ product_9	Prob_ product_10
Product 1 Price Change	-1.62007	0.38092	0.156526	0.359811	0.202435	0.04471	0.194866	0.12222	0.14162	0.016959
Product 2 Price Change	0.38092	-0.785545	0.051111	0.117491	0.066102	0.014599	0.063631	0.039909	0.046244	0.005538
Product 3 Price Change	0.156526	0.051111	-0.352902	0.048279	0.027162	0.005999	0.026147	0.016399	0.019002	0.002276
Product 4 Price Change	0.359811	0.117491	0.048279	-0.748524	0.062439	0.01379	0.060104	0.037698	0.043681	0.005231
Product 5 Price Change	0.202435	0.066102	0.027162	0.062439	-0.44844	0.007759	0.033816	0.021209	0.024576	0.002943
Product 6 Price Change	0.04471	0.014599	0.005999	0.01379	0.007759	-0.105088	0.007469	0.004684	0.005428	0.00065
Product 7 Price Change	0.194866	0.063631	0.026147	0.060104	0.033816	0.007469	-0.432938	0.020416	0.023657	0.002833
Product 8 Price Change	0.12222	0.039909	0.016399	0.037698	0.021209	0.004684	0.020416	-0.279151	0.014838	0.001777
Product 9 Price Change	0.14162	0.046244	0.019002	0.043681	0.024576	0.005428	0.023657	0.014838	-0.321105	0.002059
Product 10 Price Change	0.016959	0.005538	0.002276	0.005231	0.002943	0.00065	0.002833	0.001777	0.002059	-0.040265

Multinomial Logit ME

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
income						
_predict						
1	.0001625	.0000984	1.65	0.099	-.0000304	.0003554
2	-.0001884	.0000659	-2.86	0.004	-.0003175	-.0000592
3	-.0001079	.000044	-2.45	0.014	-.0001942	-.0000216
4	.0000756	.0000192	3.94	0.000	.000038	.0001132
5	-.0000161	.0000362	-0.45	0.655	-.000087	.0000548
6	-.0000852	.0000311	-2.74	0.006	-.0001461	-.0000242
7	.0000382	8.29e-06	4.61	0.000	.000022	.0000545
8	-.0000717	.0000302	-2.37	0.018	-.0001309	-.0000125
9	.0001007	.0000169	5.94	0.000	.0000675	.0001339
10	.0000984	.0000176	5.59	0.000	.0000639	.0001329
11	-6.09e-06	8.66e-06	-0.70	0.482	-.0000231	.0000109

Exercise 5 IIA

Mixed Logit Unrestricted

Alternative-specific mixed logit — Number of obs = 44,700
Case variable: **v1** — Number of cases = 4,470

Alternative variable: **product** — Alts per case: min = 10
avg = 10.0
max = 10

Integration points: 0 — Wald chi2(55) = 2022.56
Log likelihood = -7110.3752 — Prob > chi2 = 0.0000

choice_clo~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
product						
price	-6.727506	.1769229	-38.03	0.000	-7.074268	-6.380743
1	(base alternative)					
2						
income	-.0031802	.0037716	-0.84	0.399	-.0105723	.0042119
fs3_4	.0731491	.1279555	0.57	0.568	-.1776392	.3239373
fs5	-.2352675	.1818468	-1.29	0.196	-.5916807	.1211457
college	.0497422	.113986	0.44	0.663	-.1736663	.2731507
whtcollar	-.0394665	.1156033	-0.34	0.733	-.2660449	.1871119
retired	.2625538	.1520035	1.73	0.084	-.0353677	.5604752
_cons	-.9296141	.1485089	-6.26	0.000	-1.220686	-.6385419
3						
income	.0217094	.0042576	5.10	0.000	.0133648	.0300541
fs3_4	-.9008915	.1903256	-4.73	0.000	-1.273923	-.5278601
fs5	-.8852396	.2864282	-3.09	0.002	-1.446629	-.3238506
college	.5795113	.158871	3.65	0.000	.2681299	.8908927
whtcollar	.6047619	.1865997	3.24	0.001	.2390331	.9704907
retired	1.774491	.2018475	8.79	0.000	1.378877	2.170105
_cons	-.018311	.2452193	-0.07	0.940	-.498932	.4623099
4						
income	.0038602	.003531	1.09	0.274	-.0030604	.0107808
fs3_4	.0767795	.1320042	0.58	0.561	-.1819439	.3355028
fs5	.4187164	.1666443	2.51	0.012	.0920997	.7453332
college	-.2531909	.1184884	-2.14	0.033	-.4854238	-.020958
whtcollar	.0455049	.1156703	0.39	0.694	-.1812047	.2722146
retired	-.1570552	.1644688	-0.95	0.340	-.4794081	.1652977
_cons	-1.860976	.1506071	-12.36	0.000	-2.156161	-1.565791
5						
income	-.0072133	.0049865	-1.45	0.148	-.0169866	.00256
fs3_4	.6627287	.1792775	3.70	0.000	.3113514	1.014106
fs5	.9184167	.2185429	4.20	0.000	.4900805	1.346753
college	-.3604242	.1498394	-2.41	0.016	-.654104	-.0667444
whtcollar	.6898882	.1517937	4.54	0.000	.3923779	.9873984
retired	.4102554	.2088182	1.96	0.049	.0009792	.8195316
_cons	-3.663883	.2136511	-17.15	0.000	-4.082632	-3.245135

6						
income	.0303074	.0051936	5.84	0.000	.0201282	.0404867
fs3_4	-.5696844	.3538738	-1.61	0.107	-1.263264	.1238954
fs5	.8469135	.3767976	2.25	0.025	.1084039	1.585423
college	.0944586	.2866385	0.33	0.742	-.4673424	.6562597
whtcollar	.1254906	.315912	0.40	0.691	-.4936855	.7446667
retired	1.481564	.3555819	4.17	0.000	.7846365	2.178492
_cons	-2.937473	.3794526	-7.74	0.000	-3.681186	-2.193759
7						
income	-.0073341	.0049069	-1.49	0.135	-.0169515	.0022832
fs3_4	-.5224593	.1497186	-3.49	0.000	-.8159024	-.2290162
fs5	-1.371098	.2677438	-5.12	0.000	-1.895867	-.8463301
college	.0791834	.1438936	0.55	0.582	-.2028428	.3612097
whtcollar	-.0807929	.145883	-0.55	0.580	-.3667184	.2051326
retired	-.7739959	.207446	-3.73	0.000	-1.180582	-.3674093
_cons	1.017887	.1818105	5.60	0.000	.6615447	1.374229
8						
income	.0289606	.0043108	6.72	0.000	.0205115	.0374096
fs3_4	-.3329098	.1786041	-1.86	0.062	-.6829674	.0171479
fs5	-1.430573	.3511689	-4.07	0.000	-2.118851	-.7422943
college	-.3869989	.1831041	-2.11	0.035	-.7458764	-.0281213
whtcollar	-.4358122	.173086	-2.52	0.012	-.7750545	-.0965699
retired	-.8953734	.2790262	-3.21	0.001	-1.442255	-.3484921
_cons	1.42636	.2282158	6.25	0.000	.9790649	1.873655
9						
income	.026776	.0041764	6.41	0.000	.0185904	.0349617
fs3_4	-1.247258	.1788146	-6.98	0.000	-1.597728	-.8967878
fs5	-1.752459	.3437858	-5.10	0.000	-2.426267	-1.078651
college	-.3315221	.1742426	-1.90	0.057	-.6730313	.0099871
whtcollar	.365318	.1855402	1.97	0.049	.0016659	.7289702
retired	.6922821	.203554	3.40	0.001	.2933236	1.091241
_cons	2.010108	.2406306	8.35	0.000	1.538481	2.481736
10						
income	-.0026379	.0127081	-0.21	0.836	-.0275453	.0222696
fs3_4	.700144	.6743085	1.04	0.299	-.6214765	2.021764
fs5	2.477214	.6664282	3.72	0.000	1.171039	3.783389
college	.0426424	.4003562	0.11	0.915	-.7420414	.8273262
whtcollar	2.171549	.7630716	2.85	0.004	.6759567	3.667142
retired	1.043842	.5954876	1.75	0.080	-.1232923	2.210976
_cons	-6.883823	.9243188	-7.45	0.000	-8.695454	-5.072191

Mixed Logit Restricted

Alternative-specific mixed logit — Number of obs = 24,336
Case variable: **v1** — Number of cases = 2,704

Alternative variable: **product** — Alts per case: min = 9
avg = 9.0
max = 9

Integration points: 0 — Wald chi2(49) = 1212.47
Log likelihood = -4586.4481 — Prob > chi2 = 0.0000

choice_clo~t	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
product						
price	-6.541402	.2500223	-26.16	0.000	-7.031437	-6.051367
2	(base alternative)					
3						
income	.025064	.0050345	4.98	0.000	.0151965	.0349315
fs3_4	-1.024477	.209016	-4.90	0.000	-1.434141	-.6148127
fs5	-.6670088	.3146256	-2.12	0.034	-1.283664	-.050354
college	.5087373	.1771217	2.87	0.004	.1615852	.8558894
whtcollar	.7092231	.2104982	3.37	0.001	.2966543	1.121792
retired	1.540641	.2286481	6.74	0.000	1.092499	1.988783
_cons	.8232693	.2823466	2.92	0.004	.2698801	1.376658
4						
income	.0061418	.0043909	1.40	0.162	-.0024642	.0147478
fs3_4	-.0230969	.1568238	-0.15	0.883	-.330466	.2842722
fs5	.6517611	.2089381	3.12	0.002	.24225	1.061272
college	-.2887353	.1410837	-2.05	0.041	-.5652542	-.0122163
whtcollar	.0879385	.1405666	0.63	0.532	-.1875671	.3634441
retired	-.4278227	.1917822	-2.23	0.026	-.8037089	-.0519365
_cons	-.8802358	.1816977	-4.84	0.000	-1.236357	-.5241149
5						
income	-.0045552	.0056106	-0.81	0.417	-.0155518	.0064414
fs3_4	.5717706	.1976762	2.89	0.004	.1843324	.9592088
fs5	1.187442	.2526398	4.70	0.000	.6922773	1.682607
college	-.4096955	.1685403	-2.43	0.015	-.7400284	-.0793626
whtcollar	.7638407	.1713664	4.46	0.000	.4279688	1.099713
retired	.1939595	.2313076	0.84	0.402	-.259395	.6473141
_cons	-2.695006	.2370591	-11.37	0.000	-3.159634	-2.230379

6						
income	.0345993	.0060144	5.75	0.000	.0228113	.0463873
fs3_4	-.6723283	.3659553	-1.84	0.066	-1.389587	.0449309
fs5	1.092334	.4007968	2.73	0.006	.306787	1.877882
college	-.0073032	.3011727	-0.02	0.981	-.5975907	.5829844
whtcollar	.206439	.3329368	0.62	0.535	-.446105	.8589831
retired	1.267356	.3768807	3.36	0.001	.5286833	2.006028
_cons	-2.084425	.4037925	-5.16	0.000	-2.875844	-1.293007
7						
income	-.0031968	.0054902	-0.58	0.560	-.0139575	.0075639
fs3_4	-.6096283	.1737733	-3.51	0.000	-.9502178	-.2690389
fs5	-1.156037	.2978797	-3.88	0.000	-1.73987	-.5722031
college	.0443738	.162638	0.27	0.785	-.2743909	.3631385
whtcollar	-.0603062	.167094	-0.36	0.718	-.3878044	.267192
retired	-1.066046	.2327104	-4.58	0.000	-1.52215	-.609942
_cons	1.860102	.2166514	8.59	0.000	1.435473	2.284731
8						
income	.0321091	.0050335	6.38	0.000	.0222436	.0419745
fs3_4	-.435653	.1992237	-2.19	0.029	-.8261243	-.0451818
fs5	-1.201947	.3746041	-3.21	0.001	-1.936158	-.4677365
college	-.3657847	.1992594	-1.84	0.066	-.756326	.0247565
whtcollar	-.401545	.1914361	-2.10	0.036	-.7767529	-.0263371
retired	-1.170909	.2976592	-3.93	0.000	-1.75431	-.5875079
_cons	2.284591	.2703887	8.45	0.000	1.754639	2.814544
9						
income	.0300673	.0049374	6.09	0.000	.0203902	.0397443
fs3_4	-1.346716	.1980895	-6.80	0.000	-1.734964	-.9584678
fs5	-1.501866	.3677851	-4.08	0.000	-2.222712	-.7810209
college	-.3441373	.1905586	-1.81	0.071	-.7176252	.0293506
whtcollar	.4402203	.2066915	2.13	0.033	.0351125	.8453281
retired	.4732945	.2305122	2.05	0.040	.0214988	.9250901
_cons	2.803093	.2910207	9.63	0.000	2.232702	3.373483
10						
income	.0005025	.0129322	0.04	0.969	-.024844	.0258491
fs3_4	.5755297	.6806365	0.85	0.398	-.7584932	1.909553
fs5	2.882751	.6848754	4.21	0.000	1.54042	4.225082
college	-.1490437	.4171173	-0.36	0.721	-.9665785	.6684911
whtcollar	2.429342	.7755801	3.13	0.002	.9092325	3.949451
retired	1.045453	.609116	1.72	0.086	-.1483929	2.239298
_cons	-6.08807	.9271339	-6.57	0.000	-7.905219	-4.270921

IIA test

Likelihood-ratio test — LR chi2(7) = **-5047.85**
(Assumption: Mixed_drop nested in Mixed_full) — Prob > chi2 = **1.0000**

Akaike's information criterion and Bayesian information criterion

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
Mixed_drop	**24,336**	.	**-4586.448**	**57**	**9286.896**	**9748.58**
Mixed_full	**44,700**	.	**-7110.375**	**64**	**14348.75**	**14906.04**

Note: N=Obs used in calculating BIC; see **[R] BIC note**.

Assignment 4

Exercise 1 Data

```
. xtset personid timetrnd
       panel variable:  personid (unbalanced)
        time variable:  timetrnd, 0 to 14, but with gaps
                delta:  1 unit

. //NOTE: I don't think we need to restrict to just 5 individual to represent panel dimension
. //So, run the command in the next line will just show a pattern of panel dimension for all individuals
. xtdescribe, patterns(20)

personid:  1, 2, ..., 2178                                     n =       2178
timetrnd:  0, 1, ..., 14                                       T =         15
           Delta(timetrnd) = 1 unit
           Span(timetrnd)  = 15 periods
           (personid*timetrnd uniquely identifies each observation)

Distribution of T_i:   min      5%     25%       50%       75%     95%     max
                         1       2       5         8        11      14      15

     Freq.  Percent    Cum.  |  Pattern
-------------------------------+---------------
        93     4.27    4.27  |  111111111111111
        46     2.11    6.38  |  ........1111111
        45     2.07    8.45  |  ......111111111
        44     2.02   10.47  |  .......11111111
        43     1.97   12.44  |  .11111111111111
        42     1.93   14.37  |  ..1111111111111
        36     1.65   16.02  |  ....11111111111
        35     1.61   17.63  |  ...111111111111
        30     1.38   19.01  |  ..........11111
        30     1.38   20.39  |  .....1111111111
        22     1.01   21.40  |  .........111111
        15     0.69   22.08  |  ............111
        14     0.64   22.73  |  ...........1111
        11     0.51   23.23  |  ...1.1111111111
        11     0.51   23.74  |  ..1.11111111111
        10     0.46   24.20  |  ..............1
        10     0.46   24.66  |  ............11
        10     0.46   25.11  |  ...11..........
         9     0.41   25.53  |  ...11.111111111
         8     0.37   25.90  |  ............1.
      1614    74.10  100.00  |  (other patterns)
-------------------------------+---------------
```

Exercise 2 & 3 Random and Fixed Effects

Panel Regression Table

	(1) RE	(2) Between	(3) Within	(4) FD_no_time~p	(5) FD_time_skip
educ	**0.108***	**0.0931***	**0.124***		
	(0.003)	**(0.005)**	**(0.006)**		
potexper	**0.0388***	**0.0260***	**0.0386***		
	(0.001)	**(0.004)**	**(0.001)**		
D.educ				**-0.0104**	
				(0.015)	
oD.potexper				**0**	
				(.)	
deduc					**0.0384***
					(0.008)
dpotexper					**0.00399**
					(0.004)
_cons	**0.564***	**0.846***	**0.407***	**0.0535***	**0.0495***
	(0.044)	**(0.077)**	**(0.072)**	**(0.003)**	**(0.006)**
N	**17919**	**17919**	**17919**	**13684**	**15741**

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001