HW 2

Exercise 2

	Y	X1
Y	1.0000	
X1	0.0227	1.0000

The correlation is limited from -1 to 1, so only thing we can tell is that there is a strong positive correlation between these two variables, which match the fact that the coef on X1 is positive.

OLS and bootstrape

Variable	X_Y	boot49	boot499
X1	.43835034	.43835034	.43835034
	.54743723	.58697341	.56666169
X2	-1.0103868	-1.0103868	-1.0103868
	.08909115	.10057932	.09150773
X3	.37314107	.37314107	.37314107
	.67303555	.74072512	.62863732
_cons	22.541928	22.541928	22.541928
	1.2817391	1.4386829	1.3610506

legend: b/se

Exercise 3&4&5

Linear, Probit, Logit

Variable	linear_	probit_	probit_m	probit_m~a	logit_	logit_md~a
_						
X1	.01874188					
	.02669155					
X2	-.03834067					
	.00434384					
X3	.04659131					
	.03281539					
_cons	.67081067					
	.06249412					
Y_dum						
X1		.04497207	.04497207	.04497207	.07525617	.07525617
		.07120618	.07120618	.07120618	.11528701	.11528701
X2		-.10744515	-.10744515	-.10744515	-.17363591	-.17363591
		.01280879	.01280879	.01280879	.02137843	.02137843
X3		.12439279	.12439279	.12439279	.20079145	.20079145
		.08770008	.08770008	.08770008	.14189878	.14189878
_cons		.48680797	.48680797	.48680797	.77878889	.77878889
		.1690792	.1690792	.1690792	.27359913	.27359913

legend: b/se

The coefficient varies largely across these three methods, but the sign on the coefficients are the same, and all X3 coefs are not significant. For Probit and logit, without calculating the marginal effect, we can only interpret the sign. Higher X2 can decrease the probability of ydum = 1, which means higher X2 is

likely to generate Y below mean. Higher X1 and X3 can increase the probability of ydum = 1, which means that higher X1 and X3 is likely to generate Y above mean. This match the sign in the data generating process. For linear probability model, X1: one unit increase in X1 likely to increase the likelihood of ydum = 1 by 1.9%; X2: one unit increase in X2 likely to decrease the likelihood of ydum = 1 by 3%; X3: one unit increase in X3 likely to increase the likelihood of ydum = 1 by 4.6%.

HW3

Exercise 1

Variable	Obs	Mean	Std. Dev.	Min	Max
ppk_stk	4,470	.5184362	.1505174	.19	.67
pbb_stk	4,470	.5432103	.1203319	.19	1.01
pfl_stk	4,470	1.01502	.0428952	.95	1.16
phse_stk	4,470	.4371476	.1188312	.19	.64
pgen_stk	4,470	.3452819	.0351661	.25	.55
pimp_stk	4,470	.7807785	.1146461	.33	2.3
pss_tub	4,470	.8250895	.0612116	.5	.98
ppk_tub	4,470	1.077409	.0297261	.98	1.24
pfl_tub	4,470	1.189376	.0140545	.69	1.47
phse_tub	4,470	.5686734	.072455	.33	1.27

choice	Freq.	Percent	Cum.
1	1,766	39.51	39.51
2	699	15.64	55.15
3	243	5.44	60.58
4	593	13.27	73.85
5	315	7.05	80.89
6	74	1.66	82.55
7	319	7.14	89.69
8	203	4.54	94.23
9	225	5.03	99.26
10	33	0.74	100.00
Total	4,470	100.00	

choice_type	Freq.	Percent	Cum.
stk	3,690	82.55	82.55
tub	780	17.45	100.00
Total	4,470	100.00	

choice_brand	Freq.	Percent	Cum.
pbb	699	15.64	15.64
pfl	468	10.47	26.11
pgen	315	7.05	33.15
phse	626	14.00	47.16
pimp	74	1.66	48.81
ppk	1,969	44.05	92.86
pss	319	7.14	100.00
Total	4,470	100.00	

Exercise 2&3&4

Conditional Logit

Variable	c_logit	m_logit	mix_logit
alt			
Price	-6.6565793		-6.6596692
	.17427926		.17476978
2			
income		-.00308874	-.00425993
		.00311397	.00343921
_cons	-.95430683	-.84532415	-.84067337
	.05004624	.09313545	.10384458
3			
income		.01458623	.01434397
		.00382546	.00392209
_cons	1.2969683	-2.3998576	.88860693
	.10865147	.13358016	.15945855
4			
income		.00405043	.00409985
		.00309258	.00320421
_cons	-1.7173324	-1.2013265	-1.8284916
	.05415816	.0971021	.10321797
5			
income		-.00125359	-.00118286
		.00420238	.00429708
_cons	-2.9040048	-1.6905817	-2.8734104
	.07146052	.12699518	.13475726
6			
income		.03061202	.02980895
		.00467399	.00472672
_cons	-1.5153112	-4.1397672	-2.4571185
	.12623034	.21098899	.21542599
7			
income		-.00693258	-.00924559
		.0044161	.00459348
_cons	.25176838	-1.5310415	.49686917
	.07916402	.12804344	.14248236
8			
income		.02288616	.02199646
		.00362167	.00382029
_cons	1.4648684	-2.8483523	.80306
	.1180467	.13938482	.17091994
9			
income		.01774297	.01699109
		.0037623	.0039155
_cons	2.3575051	-2.5755973	1.8641255
	.13377396	.13614002	.1799469
10			
income		.01079092	.00875958
		.01013005	.01030074
_cons	-3.8965935	-4.2822699	-4.1423856
	.17741899	.34579197	.35065634

legend: b/se

Pr(choice = 1|1 selected) = .41862592

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	-1.62007	.045076	-35.94	0.000	-1.70841	-1.53172		.51844
	2	.38092	.016377	23.26	0.000	.348821	.413019		.54321
	3	.156526	.010709	14.62	0.000	.135537	.177515		1.015
	4	.359811	.016943	21.24	0.000	.326602	.393019		.43715
	5	.202435	.012376	16.36	0.000	.178178	.226691		.34528
	6	.04471	.005301	8.43	0.000	.034319	.0551		.78078
	7	.194866	.011804	16.51	0.000	.171731	.218001		.82509
	8	.12222	.008972	13.62	0.000	.104636	.139804		1.0774
	9	.14162	.009996	14.17	0.000	.122027	.161213		1.1894
	10	.016959	.002973	5.71	0.000	.011133	.022785		.56867

Pr(choice = 2|1 selected) = .13669617

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.38092	.016377	23.26	0.000	.348821	.413019		.51844
	2	-.785545	.030158	-26.05	0.000	-.844654	-.726436		.54321
	3	.051111	.003765	13.57	0.000	.043731	.058492		1.015
	4	.117491	.006448	18.22	0.000	.104853	.130129		.43715
	5	.066102	.004433	14.91	0.000	.057414	.07479		.34528
	6	.014599	.001779	8.20	0.000	.011112	.018087		.78078
	7	.063631	.004253	14.96	0.000	.055295	.071966		.82509
	8	.039909	.003145	12.69	0.000	.033744	.046074		1.0774
	9	.046244	.003507	13.18	0.000	.03937	.053118		1.1894
	10	.005538	.000986	5.62	0.000	.003605	.007471		.56867

Pr(choice = 3|1 selected) = .05617075

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.156526	.010709	14.62	0.000	.135537	.177515		.51844
	2	.051111	.003765	13.57	0.000	.043731	.058492		.54321
	3	-.352903	.02284	-15.45	0.000	-.397668	-.308137		1.015
	4	.048279	.003651	13.22	0.000	.041124	.055434		.43715
	5	.027162	.002319	11.71	0.000	.022618	.031707		.34528
	6	.005999	.000796	7.53	0.000	.004438	.00756		.78078
	7	.026147	.002223	11.76	0.000	.02179	.030504		.82509
	8	.016399	.001554	10.56	0.000	.013354	.019444		1.0774
	9	.019002	.001757	10.82	0.000	.015559	.022445		1.1894
	10	.002276	.000422	5.40	0.000	.001449	.003102		.56867

Pr(choice = 4|1 selected) = .12912093

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.359811	.016943	21.24	0.000	.326602	.393019		.51844
	2	.117491	.006448	18.22	0.000	.104853	.130129		.54321
	3	.048279	.003651	13.22	0.000	.041124	.055434		1.015
	4	-.748524	.031316	-23.90	0.000	-.809901	-.687146		.43715
	5	.062439	.00431	14.49	0.000	.053992	.070886		.34528
	6	.01379	.001698	8.12	0.000	.010462	.017118		.78078
	7	.060104	.004135	14.54	0.000	.052	.068209		.82509
	8	.037698	.003025	12.46	0.000	.031768	.043627		1.0774
	9	.043681	.003386	12.90	0.000	.037046	.050317		1.1894
	10	.005231	.000933	5.60	0.000	.003402	.00706		.56867

Pr(choice = 5|1 selected) = .07265429

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.202435	.012376	16.36	0.000	.178178	.226691		.51844
	2	.066102	.004433	14.91	0.000	.057414	.07479		.54321
	3	.027162	.002319	11.71	0.000	.022618	.031707		1.015
	4	.062439	.00431	14.49	0.000	.053992	.070886		.43715
	5	-.44844	.025561	-17.54	0.000	-.498539	-.398341		.34528
	6	.007759	.001001	7.75	0.000	.005796	.009721		.78078
	7	.033816	.002681	12.61	0.000	.028561	.039071		.82509
	8	.021209	.0019	11.16	0.000	.017485	.024933		1.0774
	9	.024576	.002144	11.46	0.000	.020374	.028778		1.1894
	10	.002943	.000538	5.47	0.000	.001888	.003998		.56867

Pr(choice = 6|1 selected) = .01604447

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.04471	.005301	8.43	0.000	.034319	.0551		.51844
	2	.014599	.001779	8.20	0.000	.011112	.018087		.54321
	3	.005999	.000796	7.53	0.000	.004438	.00756		1.015
	4	.01379	.001698	8.12	0.000	.010462	.017118		.43715
	5	.007759	.001001	7.75	0.000	.005796	.009721		.34528
	6	-.105088	.012245	-8.58	0.000	-.129087	-.081089		.78078
	7	.007469	.000963	7.76	0.000	.005582	.009355		.82509
	8	.004684	.000634	7.39	0.000	.003441	.005927		1.0774
	9	.005428	.000726	7.47	0.000	.004005	.006851		1.1894
	10	.00065	.000136	4.78	0.000	.000384	.000916		.56867

Pr(choice = 7|1 selected) = .06992927

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.194866	.011804	16.51	0.000	.171731	.218001		.51844
	2	.063631	.004253	14.96	0.000	.055295	.071966		.54321
	3	.026147	.002223	11.76	0.000	.02179	.030504		1.015
	4	.060104	.004135	14.54	0.000	.052	.068209		.43715
	5	.033816	.002681	12.61	0.000	.028561	.039071		.34528
	6	.007469	.000963	7.76	0.000	.005582	.009355		.78078
	7	-.432938	.024519	-17.66	0.000	-.480995	-.384882		.82509
	8	.020416	.001828	11.17	0.000	.016833	.023999		1.0774
	9	.023657	.002057	11.50	0.000	.019625	.027689		1.1894
	10	.002833	.000518	5.47	0.000	.001817	.003849		.56867

Pr(choice = 8|1 selected) = .04385975

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.12222	.008972	13.62	0.000	.104636	.139804		.51844
	2	.039909	.003145	12.69	0.000	.033744	.046074		.54321
	3	.016399	.001554	10.56	0.000	.013354	.019444		1.015
	4	.037698	.003025	12.46	0.000	.031768	.043627		.43715
	5	.021209	.0019	11.16	0.000	.017485	.024933		.34528
	6	.004684	.000634	7.39	0.000	.003441	.005927		.78078
	7	-.279151	.019602	-14.24	0.000	-.31757	-.240731		1.0774
	8	.014838	.001434	10.35	0.000	.012027	.017649		1.1894
	9	.001777	.000334	5.33	0.000	.001123	.002431		.56867

Pr(choice = 9|1 selected) = .05082152

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.14162	.009996	14.17	0.000	.122027	.161213		.51844
	2	.046244	.003507	13.18	0.000	.03937	.053118		.54321
	3	.019002	.001757	10.82	0.000	.015559	.022445		1.015
	4	.043681	.003386	12.90	0.000	.037046	.050317		.43715
	5	.024576	.002144	11.46	0.000	.020374	.028778		.34528
	6	.005428	.000726	7.47	0.000	.004005	.006851		.78078
	7	.023657	.002057	11.50	0.000	.019625	.027689		.82509
	8	.014838	.001434	10.35	0.000	.012027	.017649		1.0774
	9	-.321105	.021545	-14.90	0.000	-.363332	-.278878		1.1894
	10	.002059	.000384	5.36	0.000	.001306	.002811		.56867

Pr(choice = 10|1 selected) = .00608591

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.016959	.002973	5.71	0.000	.011133	.022785		.51844
	2	.005538	.000986	5.62	0.000	.003605	.007471		.54321
	3	.002276	.000422	5.40	0.000	.001449	.003102		1.015
	4	.005231	.000933	5.60	0.000	.003402	.00706		.43715
	5	.002943	.000538	5.47	0.000	.001888	.003998		.34528
	6	.00065	.000136	4.78	0.000	.000384	.000916		.78078
	7	.002833	.000518	5.47	0.000	.001817	.003849		.82509
	8	.001777	.000334	5.33	0.000	.001123	.002431		1.0774
	9	.002059	.000384	5.36	0.000	.001306	.002811		1.1894
	10	-.040265	.007011	-5.74	0.000	-.054006	-.026523		.56867

Pr(choice = 1|1 selected) = .42172362

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	-1.62411	.045171	-35.96	0.000	-1.71264	-1.53558		.51844
	2	.385102	.016615	23.18	0.000	.352538	.417666		.54321
	3	.156859	.010841	14.47	0.000	.135611	.178107		1.015
	4	.366243	.017247	21.24	0.000	.33244	.400045		.43715
	5	.20521	.012577	16.32	0.000	.18056	.229859		.34528
	6	.040343	.00515	7.83	0.000	.030249	.050437		.78078
	7	.195568	.011974	16.33	0.000	.172099	.219036		.82509
	8	.117449	.008947	13.13	0.000	.099913	.134986		1.0774
	9	.140182	.010078	13.91	0.000	.12043	.159935		1.1894
	10	.017157	.003023	5.68	0.000	.011232	.023082		.56867
casevars									
	income	-.000958	.000546	-1.75	0.079	-.002028	.000113		27.664

Pr(choice = 2|1 selected) = .13711827

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.385102	.016615	23.18	0.000	.352538	.417666		.51844
	2	-.787951	.030373	-25.94	0.000	-.847481	-.728421		.54321
	3	.051001	.003796	13.44	0.000	.043561	.05844		1.015
	4	.119079	.00655	18.18	0.000	.106241	.131918		.43715
	5	.066721	.004491	14.86	0.000	.057919	.075523		.34528
	6	.013117	.001716	7.64	0.000	.009754	.01648		.78078
	7	.063586	.004295	14.81	0.000	.055169	.072004		.82509
	8	.038187	.003113	12.27	0.000	.032086	.044288		1.0774
	9	.045579	.003517	12.96	0.000	.038685	.052472		1.1894
	10	.005578	.000999	5.59	0.000	.003621	.007536		.56867
casevars									
	income	-.000896	.000368	-2.43	0.015	-.001617	-.000174		27.664

Pr(choice = 3|1 selected) = .05585072

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.156859	.010841	14.47	0.000	.135611	.178107		.51844
	2	.051001	.003796	13.44	0.000	.043561	.05844		.54321
	3	-.351174	.022984	-15.28	0.000	-.396222	-.306125		1.015
	4	.048503	.003699	13.11	0.000	.041254	.055753		.43715
	5	.027177	.002338	11.62	0.000	.022594	.03176		.34528
	6	.005343	.000755	7.08	0.000	.003863	.006822		.78078
	7	.0259	.002229	11.62	0.000	.021531	.030268		.82509
	8	.015554	.001515	10.26	0.000	.012584	.018525		1.0774
	9	.018565	.001745	10.64	0.000	.015145	.021984		1.1894
	10	.002272	.000424	5.36	0.000	.001442	.003102		.56867
casevars									
	income	.000674	.000189	3.56	0.000	.000303	.001045		27.664

Pr(choice = 4|1 selected) = .13040323

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.366243	.017247	21.24	0.000	.33244	.400045		.51844
	2	.119079	.00655	18.18	0.000	.106241	.131918		.54321
	3	.048503	.003699	13.11	0.000	.041254	.055753		1.015
	4	-.755195	.03158	-23.91	0.000	-.817091	-.693299		.43715
	5	.063454	.004389	14.46	0.000	.054851	.072057		.34528
	6	.012475	.001645	7.58	0.000	.00925	.0157		.78078
	7	.060472	.004196	14.41	0.000	.052248	.068696		.82509
	8	.036317	.003007	12.08	0.000	.030423	.042211		1.0774
	9	.043346	.003412	12.71	0.000	.03666	.050033		1.1894
	10	.005305	.000951	5.58	0.000	.00344	.00717		.56867
casevars									
	income	.000238	.000326	0.73	0.464	-.0004	.000876		27.664

Pr(choice = 5|1 selected) = .07306635

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.20521	.012577	16.32	0.000	.18056	.229859		.51844
	2	.066721	.004491	14.86	0.000	.057919	.075523		.54321
	3	.027177	.002338	11.62	0.000	.022594	.03176		1.015
	4	.063454	.004389	14.46	0.000	.054851	.072057		.43715
	5	-.451044	.025776	-17.50	0.000	-.501565	-.400523		.34528
	6	.00699	.000961	7.27	0.000	.005106	.008873		.78078
	7	.033883	.002708	12.51	0.000	.028576	.039191		.82509
	8	.020349	.001872	10.87	0.000	.01668	.024018		1.0774
	9	.024287	.002147	11.31	0.000	.020079	.028496		1.1894
	10	.002973	.000547	5.44	0.000	.001901	.004044		.56867
casevars									
	income	-.000252	.000272	-0.93	0.354	-.000786	.000282		27.664

Pr(choice = 6|1 selected) = .01436436

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.040343	.00515	7.83	0.000	.030249	.050437		.51844
	2	.013117	.001716	7.64	0.000	.009754	.01648		.54321
	3	.005343	.000755	7.08	0.000	.003863	.006822		1.015
	4	.012475	.001645	7.58	0.000	.00925	.0157		.43715
	5	.00699	.000961	7.27	0.000	.005106	.008873		.34528
	6	-.094288	.011858	-7.95	0.000	-.117528	-.071047		.78078
	7	.006661	.000917	7.27	0.000	.004865	.008458		.82509
	8	.004	.00058	6.90	0.000	.002864	.005137		1.0774
	9	.004775	.000681	7.01	0.000	.00344	.006109		1.1894
	10	.000584	.000126	4.65	0.000	.000338	.000831		.56867
casevars									
	income	.000396	.000065	6.13	0.000	.000269	.000522		27.664

Pr(choice = 7|1 selected) = .06963319

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.195568	.011974	16.33	0.000	.172099	.219036		.51844
	2	.063586	.004295	14.81	0.000	.055169	.072004		.54321
	3	.0259	.002229	11.62	0.000	.021531	.030268		1.015
	4	.060472	.004196	14.41	0.000	.052248	.068696		.43715
	5	.033883	.002708	12.51	0.000	.028576	.039191		.34528
	6	.006661	.000917	7.27	0.000	.004865	.008458		.78078
	7	-.431443	.024732	-17.44	0.000	-.479916	-.38297		.82509
	8	.019393	.00179	10.83	0.000	.015885	.022901		1.0774
	9	.023146	.002048	11.30	0.000	.019131	.027161		1.1894
	10	.002833	.000521	5.43	0.000	.001811	.003855		.56867
casevars									
	income	-.000802	.000279	-2.88	0.004	-.001348	-.000256		27.664

Pr(choice = 8|1 selected) = .0418186

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.117449	.008947	13.13	0.000	.099913	.134986		.51844
	2	.038187	.003113	12.27	0.000	.032086	.044288		.54321
	3	.01554	.001515	10.26	0.000	.012584	.018525		1.015
	4	.036317	.003007	12.08	0.000	.030423	.042211		.43715
	5	.020349	.001872	10.87	0.000	.01668	.024018		.34528
	6	.004	.00058	6.90	0.000	.002864	.005137		.78078
	7	.019393	.00179	10.83	0.000	.015885	.022901		.82509
	8	-.266852	.019513	-13.68	0.000	-.305096	-.228608		1.0774
	9	.013901	.001387	10.02	0.000	.011182	.016619		1.1894
	10	.001701	.000323	5.27	0.000	.001069	.002334		.56867
casevars									
	income	.000825	.000137	6.02	0.000	.000556	.001094		27.664

Pr(choice = 9|1 selected) = .04991288

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.140182	.010078	13.91	0.000	.12043	.159935		.51844
	2	.045579	.003517	12.96	0.000	.038685	.052472		.54321
	3	.018565	.001745	10.64	0.000	.015145	.021984		1.015
	4	.043346	.003412	12.71	0.000	.03666	.050033		.43715
	5	.024287	.002147	11.31	0.000	.020079	.028496		.34528
	6	.004775	.000681	7.01	0.000	.00344	.006109		.78078
	7	.023146	.002048	11.30	0.000	.019131	.027161		1.1894
	8	.013901	.001387	10.02	0.000	.011182	.016619		1.0774
	9	-.315812	.021622	-14.61	0.000	-.358189	-.273434		1.1894
	10	.002031	.000381	5.32	0.000	.001283	.002778		.56867
casevars									
	income	.000735	.000169	4.36	0.000	.000404	.001065		27.664

Pr(choice = 10|1 selected) = .00610877

variable		dp/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
Price									
	1	.017157	.003023	5.68	0.000	.011232	.023082		.51844
	2	.005578	.000999	5.59	0.000	.003621	.007536		.54321
	3	.002272	.000424	5.36	0.000	.001442	.003102		1.015
	4	.005305	.000951	5.58	0.000	.00344	.00717		.43715
	5	.002973	.000547	5.44	0.000	.001901	.004044		.34528
	6	.000584	.000126	4.65	0.000	.000338	.000831		.78078
	7	.002833	.000521	5.43	0.000	.001811	.003855		.82509
	8	.001701	.000323	5.27	0.000	.001069	.002334		1.0774
	9	.002031	.000381	5.32	0.000	.001283	.002778		1.1894
	10	-.040434	.007078	-5.71	0.000	-.054306	-.026561		.56867
casevars									
	income	.00004	.000062	0.64	0.520	-.000081	.00016		27.664

Conditional logit Interpretation: The signs on the intercepts indicating that, holding other variables constant, people's general preference (+:prefer; -: not prefer) over that choice compared to the reference choice, which is PPk_Stk. The negative sign on the price coefficient indicating that as the price of one choice increases, the individual is less likely to buy that choice (Holding other variables constant).

Multinomial Interpretation: (Holding other variables constant) The signs on the income indicating that, holding other variables constant, people's preference when they have more income (+:more prefer; -: less prefer) over that choice compared to the reference group.

Clogit margin: Each unit increase in price of an alternative decrease the probability of selecting that alternative and increases the probability of the other alternatives, by certain percent.

Mlogit margin: Each unit increase in the income increases/decreases (as the sign) the probability of selecting alternative j by certain percent.

Exercise 5

```
. hausman mix_logit mix_logit_alt
```

	——— Coefficients ———			
	(b) mix_logit	(B) mix_logit_~t	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Price	-6.659669	-6.662263	.0025942	.

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

  Test:  Ho:  difference in coefficients not systematic

              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =    -0.01    chi2<0 ==> model fitted on these
                                    data fails to meet the asymptotic
                                    assumptions of the Hausman test;
                                    see suest for a generalized test
```

we reject the null hypotheses fail to reject and state that IIA is hold.

HW 4

Exercise 1

```
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	.1111111111111
42	1.93	14.37	..111111111111
36	1.65	16.02	11111111111
35	1.61	17.63	...111111111111
30	1.38	19.01	11111
1764	80.99	100.00	(other patterns)
2178	100.00		XXXXXXXXXXXXXXX

Unbalanced panel

Exercise 2&3

Panel Methods

Variable	re	be	fe	fd
educ	.10793802	.09309987	.12366202	
	.00338321	.00466849	.00576187	
potexper	.03876449	.02599874	.03856107	
	.00071784	.00360489	.00075848	
educ_D				.04310838
				.01517918
potexper_D				.05353695
				.00292212
_cons	.56352057	.84556882	.40680158	
	.0438846	.07701791	.0717348	

legend: b/se

Coefficients are close for with-in and random effect, not so close for others

Exercise 4

Individual Fixed effect w/ robust se

Variable	idfix	idfix_ti~v
educ	.21221346	
	.02754153	
potexper	.03111244	
	.00366892	

…

ability		-.08042965
		.04629738
mothered		.01284107
		.01966345
fathered		.01322399
		.01818227
brknhome		.13128376
		.11424438
siblings		.04448888
		.02111306
_cons	-.5690275	-.55284123
	.31318466	.24296302

legend: b/se