

Institutt for sosiologi og statsvitenskap

## **Eksamensoppgave i SOS3003 Anvendt statistisk dataanalyse i samfunnsvitenskap**

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**Informasjon om trykking av eksamensoppgave**

**Originalen er:**

**1-sidig**       **2-sidig**

**sort/hvit**       **farger**

**skal ha flervalgskjema**

## **BOKMÅL**

Besvar følgende tre oppgaver (Hver besvarelse teller en tredjedel av den samlede karakteren)

### Oppgave 1

Vedlegg 1 gjengir en loggfil fra statistikkprogrammet Stata, og viser en analyse av data fra det norske utvalget av European Social Survey fra 2014. Beskriv oppbyggingen av modellene og tolk estimatene fra modell 1 og modell 2 i vedlegg 1, og drøft i hvilken grad forutsetningene for OLS-regresjon er oppfylt ut fra testene i vedlegg 1 (s. 5-16).

### Oppgave 2

Beskriv estimatene fra modell 3 i vedlegg 1 (s. 17-18), og drøft i hvilken grad modell 3 tilfredsstiller forutsetningene for logistisk regresjon.

### Oppgave 3

Hva er problemene med å bruke OLS-regresjon når vi skal analysere paneldata med flere registreringstidspunkt for hver enhet, og data som har en klyngestruktur fordi vi har slått sammen tverrsnittundersøkelser fra flere land i en samlet datamatrise? Beskriv noen metoder som kan brukes for å analysere slike data.

## **NYNORSK**

Svar på alle tre oppgåvene (Kvart svar tel ein tredjedel av den samla karakteren)

### **Oppgåve 1**

Vedlegg 1 er ei loggfil frå statistikkprogrammet Stata, og viser ein analyse av data frå det norske utvalet av European Social Survey frå 2014. Grei ut om oppbygginga av modellane og tolk estimata frå modell 1 og modell 2 i vedlegg 1, og drøft i kva grad føresetnadene for OLS-regresjon er oppfylt ut frå testane i vedlegg 1 (s. 5-16).

### **Oppgåve 2**

Beskriv estimata frå modell 3 i vedlegg 1 (s. 17-18), og drøft i kva grad modell 3 tilfredsstillir føresetnadene for logistisk regresjon.

### **Oppgåve 3**

Kva er problema med å bruke OLS-regresjon når vi skal analysere paneldata med fleire registreringstidspunkt for kvar eining, og data som har ein klyngestruktur fordi vi har slått saman tverrsnittundersøkingar frå fleire land i ei samla datamatrise? Beskriv nokre metodar som kan brukast for å analysere slike data.

## **ENGLISH**

### Task 1.

Appendix 1 presents a log file from the Stata statistics program, and shows an analysis of data from the Norwegian part of the European Social Survey from 2014. Describe the structure of the models and interpret the estimates in Model 1 and Model 2 in Appendix 1. Discuss the extent to which the model assumptions for OLS are satisfied from the tests in Appendix 1 (p. 5-16).

### Task 2.

Describe the estimates from Model 3 in Appendix 1 (pp. 17-18), and discuss the extent to which Model 3 satisfies the assumptions for logistic regression models.

### Task 3.

What are the problems using OLS regression when analysing panel data with multiple registration times for each case and data that have a cluster structure because we have merged several cross-sectional surveys from multiple countries into a single matrix? Describe some methods that can be used to analyse such data.

## Vedlegg 1

```
. * TASK 1
. * Dependent variable
. tab1 trstprl trstlgl trstplc trstplt trstprt
```

-> tabulation of trstprl

Trust in country's parliament	Freq.	Percent	Cum.
0. No trust at all	19	1.32	1.32
1. 1	16	1.11	2.44
2. 2	29	2.02	4.46
3. 3	51	3.55	8.01
4. 4	79	5.50	13.51
5. 5	149	10.38	23.89
6. 6	184	12.81	36.70
7. 7	321	22.35	59.05
8. 8	338	23.54	82.59
9. 9	142	9.89	92.48
10. Complete trust	101	7.03	99.51
88. Don't know	7	0.49	100.00
Total	1,436	100.00	

-> tabulation of trstlgl

Trust in the legal system	Freq.	Percent	Cum.
0. No trust at all	13	0.91	0.91
1. 1	8	0.56	1.46
2. 2	25	1.74	3.20
3. 3	47	3.27	6.48
4. 4	42	2.92	9.40
5. 5	141	9.82	19.22
6. 6	136	9.47	28.69
7. 7	258	17.97	46.66
8. 8	385	26.81	73.47
9. 9	245	17.06	90.53
10. Complete trust	130	9.05	99.58
88. Don't know	6	0.42	100.00
Total	1,436	100.00	

-> tabulation of trstplc

Trust in the police	Freq.	Percent	Cum.
0. No trust at all	17	1.18	1.18
1. 1	7	0.49	1.67
2. 2	17	1.18	2.86
3. 3	31	2.16	5.01
4. 4	40	2.79	7.80
5. 5	107	7.45	15.25
6. 6	132	9.19	24.44
7. 7	276	19.22	43.66
8. 8	395	27.51	71.17
9. 9	267	18.59	89.76
10. Complete trust	144	10.03	99.79
88. Don't know	3	0.21	100.00
Total	1,436	100.00	

-> tabulation of trstplt

Trust in politicians	Freq.	Percent	Cum.
0. No trust at all	31	2.16	2.16
1. 1	29	2.02	4.18
2. 2	79	5.50	9.68
3. 3	114	7.94	17.62
4. 4	175	12.19	29.81
5. 5	310	21.59	51.39
6. 6	289	20.13	71.52
7. 7	256	17.83	89.35
8. 8	115	8.01	97.35
9. 9	20	1.39	98.75
10. Complete trust	11	0.77	99.51
88. Don't know	7	0.49	100.00
Total	1,436	100.00	

-> tabulation of trstprt

Trust in political parties	Freq.	Percent	Cum.
0. No trust at all	26	1.81	1.81
1. 1	19	1.32	3.13
2. 2	72	5.01	8.15
3. 3	116	8.08	16.23
4. 4	179	12.47	28.69
5. 5	339	23.61	52.30
6. 6	272	18.94	71.24
7. 7	231	16.09	87.33
8. 8	125	8.70	96.03
9. 9	29	2.02	98.05
10. Complete trust	13	0.91	98.96
88. Don't know	15	1.04	100.00
Total	1,436	100.00	

```
. recode trstprl trstlgl trstplc trstplt trstprt (88=.)
(trstprl: 7 changes made)
(trstlgl: 6 changes made)
(trstplc: 3 changes made)
(trstplt: 7 changes made)
(trstprt: 15 changes made)
```

```
. alpha trstprl trstlgl trstplc trstplt trstprt
```

```
Test scale = mean(unstandardized items)
```

```
Average interitem covariance:    2.090183
Number of items in the scale:      5
Scale reliability coefficient:      0.8484
```

```
. gen trust=(trstprl+trstlgl+trstplc+trstplt+trstprt)/5
(25 missing values generated)
```

```
. * Independent variables
. * Continous independent variables
. sum agea hinctnta
```

Variable	Obs	Mean	Std. Dev.	Min	Max
agea	1,436	46.76671	18.68344	15	104
hinctnta	1,371	5.321663	2.830123	1	10

```
. * Categorical independent variables
. tab1 female edlvdno polintr prtvtbno mnactic landsdel domicil
```

-> tabulation of female

RECODE of gndr (Gender)	Freq.	Percent	Cum.
Male	764	53.20	53.20
Female	672	46.80	100.00
Total	1,436	100.00	

-> tabulation of edlvdno

Highest level of education, Norway	Freq.	Percent	Cum.
1. Ingen fullfrt utdanning	6	0.42	0.42
2. Barneskole (frste del av obligatori	27	1.89	2.31
3. Ungdomsskole (grunnskole, 7-rig fol	230	16.07	18.38
4. Vitnem fra folkehyskole	18	1.26	19.64
5. Videregende avsluttende utd, allmen	176	12.30	31.94
6. Videregende avsluttende utd., yrkes	289	20.20	52.13
7. Forkurs til universitet/hyskole som	16	1.12	53.25
8. Vitnem fra pbygging til viderege	69	4.82	58.07
9. Universitet/hyskole, < 3 r (hysko	110	7.69	65.76
10. Fullfrt 3-4 rig utd. fra hyskole	195	13.63	79.39
11. Fullfrt 3-4 rig utdanning fra uni	77	5.38	84.77
12. Fullfrt 5-6 rig utdanning fra hy	69	4.82	89.59
13. Fullf 5-6 rig utd fra univ, lengre	149	10.41	100.00
Total	1,431	100.00	

-> tabulation of polintr

How interested in politics	Freq.	Percent	Cum.
1. Very interested	142	9.89	9.89
2. Quite interested	570	39.69	49.58
3. Hardly interested	595	41.43	91.02
4. Not at all interested	129	8.98	100.00
Total	1,436	100.00	

-> tabulation of prtvtbno

Party voted for in last national election, Norway	Freq.	Percent	Cum.
1. The Party Red (RØDT)	11	0.77	0.77
2. Socialist Left Party (SV)	49	3.41	4.18
3. Labour Party (A)	339	23.61	27.79
4. Liberal party (V)	65	4.53	32.31
5. Christian Democratic Party (KRF)	52	3.62	35.93
6. Centre Party (SP)	59	4.11	40.04
7. Conservative Party (H)	328	22.84	62.88
8. Progress Party (FRP)	136	9.47	72.35
9. Coastal Party (KYST)	2	0.14	72.49
10. Green Party (MDG)	27	1.88	74.37
11. Other	15	1.04	75.42
66. Not applicable	309	21.52	96.94
77. Refusal	30	2.09	99.03
88. Don't know	14	0.97	100.00
Total	1,436	100.00	

-> tabulation of mnactic

Main activity, last 7 days. All respondents. Post coded	Freq.	Percent	Cum.
1. Paid work	846	59.12	59.12
2. Education	184	12.86	71.98
3. Unemployed, looking for job	23	1.61	73.58
4. Unemployed, not looking for job	8	0.56	74.14
5. Permanently sick or disabled	56	3.91	78.06
6. Retired	255	17.82	95.88
8. Housework, looking after children, o	48	3.35	99.23
9. Other	11	0.77	100.00
Total	1,431	100.00	

-> tabulation of landsdel

Region	Freq.	Percent	Cum.
Oslo og Akershus	355	24.72	24.72
Hedmark og Oppland	100	6.96	31.69
Sør-Østlandet	283	19.71	51.39
Agder og Rogaland	180	12.53	63.93
Vestlandet	248	17.27	81.20
Trøndelag	140	9.75	90.95
Nord-Norge	130	9.05	100.00
Total	1,436	100.00	

-> tabulation of domicil

Domicile, respondent's description	Freq.	Percent	Cum.
1. A big city	215	14.98	14.98
2. Suburbs or outskirts of big city	249	17.35	32.33
3. Town or small city	404	28.15	60.49
4. Country village	274	19.09	79.58
5. Farm or home in countryside	293	20.42	100.00
Total	1,435	100.00	



. \* Model 1: OLS-model  
 . reg trust agea hinctnta i.female i.edlvdno i.polintr i.prtvtbno i.mnactic i.landsdel i.domicil

Source	SS	df	MS	Number of obs	=	1,346
Model	549.401825	48	11.4458714	F(48, 1297)	=	5.62
Residual	2639.35884	1,297	2.03497212	Prob > F	=	0.0000
				R-squared	=	0.1723
				Adj R-squared	=	0.1417
Total	3188.76066	1,345	2.37082577	Root MSE	=	1.4265

	trust	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
agea		-.0064184	.0036864	-1.74	0.082	-.0136503 .0008135
hinctnta		.019792	.0158731	1.25	0.213	-.0113479 .0509318
female						
Female		-.0537261	.0826459	-0.65	0.516	-.2158603 .1084082
edlvdno						
2. Barneskole (første del av obligatorisk utdanning)		.1957682	.7311213	0.27	0.789	-1.238542 1.630078
3. Ungdomsskole (grunnskole, 7-årig folkeskole, framhaldsskole, ..)		-.560882	.654791	-0.86	0.392	-1.845448 .7236835
4. Vitnem fra folkehøgskole		-.720329	.7422243	-0.97	0.332	-2.176421 .7357628
5. Videregående avsluttende utd, allmennf. studieretninger/studie..		-.3276443	.6586585	-0.50	0.619	-1.619797 .9645086
6. Videregående avsluttende utd., yrkesfaglige studieretninger/ut..		-.6128387	.6577656	-0.93	0.352	-1.90324 .6775624
7. Forkurs til universitet/høgskole som ikke gir studiepoeng		-.4045386	.7436014	-0.54	0.587	-1.863332 1.054255
8. Vitnem fra påbygging til videregående utdanning (fagskoleutd..)		-.5773044	.6751805	-0.86	0.393	-1.90187 .7472612
9. Universitet/høgskole, < 3 år (høgskolekandidat, 2- og 2-årig)		-.3185803	.6664799	-0.48	0.633	-1.626077 .9889165
10. Fullført 3-4 årig utd. fra høgskole (Bachelor,cand.mag.,1.år..)		-.3306843	.6606614	-0.50	0.617	-1.626766 .9653978
11. Fullført 3-4 årig utdanning fra universitet (Bachelor, cand...)		-.3049157	.6707633	-0.45	0.649	-1.620816 1.010984
12. Fullført 5-6 årig utdanning fra høgskole (master, hovedfag)		.1713856	.6779534	0.25	0.800	-1.15862 1.501391
13. Fullført 5-6 årig utd fra univ, lengre prof.utd. (cand.theol/psy..)		-.0588375	.6642503	-0.09	0.929	-1.36196 1.244285
polintr						
2. Quite interested		-.2494821	.1417602	-1.76	0.079	-.5275866 .0286223
3. Hardly interested		-.4608274	.1486661	-3.10	0.002	-.7524798 -.169175
4. Not at all interested		-1.027042	.2065287	-4.97	0.000	-1.432209 -.6218752
prtvtno						
2. Socialist Left Party (SV)		.274787	.4858826	0.57	0.572	-.678415 1.227989
3. Labour Party (A)		.3836495	.4451713	0.86	0.389	-.4896851 1.256984
4. Liberal party (V)		.2594827	.4738291	0.55	0.584	-.6700728 1.189038
5. Christian Democratic Party (KRF)		.2631729	.4860265	0.54	0.588	-.6903114 1.216657
6. Centre Party (SP)		.358557	.4824334	0.74	0.457	-.5878784 1.304992
7. Conservative Party (H)		.0637274	.446517	0.14	0.887	-.8122474 .9397022
8. Progress Party (FRP)		-.7165985	.4581154	-1.56	0.118	-1.615327 .1821298
9. Coastal Party (KYST)		.8482436	1.113782	0.76	0.446	-1.336768 3.033256
10. Green Party (MDG)		.0076467	.5245438	0.01	0.988	-1.021401 1.036694
11. Other		-.7427107	.5748473	-1.29	0.197	-1.870443 .3850218
66. Not applicable		-.0369107	.449445	-0.08	0.935	-.9186295 .8448081
77. Refusal		.7249314	.521387	1.39	0.165	-.2979228 1.747786
88. Don't know		-.312229	.5831885	-0.54	0.592	-1.456325 .8318671
mnactic						
2. Education		.361357	.166485	2.17	0.030	.0347477 .6879663
3. Unemployed, looking for job		-.0345923	.3222693	-0.11	0.915	-.6668186 .5976339
4. Unemployed, not looking for job		-1.983548	.5274753	-3.76	0.000	-3.018346 -.9487498
5. Permanently sick or disabled		-.2864703	.2128195	-1.35	0.179	-.7039784 .1310378
6. Retired		.026916	.1536937	0.18	0.861	-.2745995 .3284314
8. Housework, looking after children, others		-.324552	.2236441	-1.45	0.147	-.7632957 .1141918
9. Other		-1.306275	.4607791	-2.83	0.005	-2.210228 -.4023206
landsdel						
Hedmark og Oppland		-.0406353	.184217	-0.22	0.825	-.4020313 .3207607
Sør-Østlandet		.0596703	.1350345	0.44	0.659	-.2052398 .3245804
Agder og Rogaland		-.1504346	.1435217	-1.05	0.295	-.4319947 .1311255
Vestlandet		-.1228283	.1316321	-0.93	0.351	-.3810634 .1354068
Trøndelag		.1302269	.1555578	0.84	0.403	-.1749456 .4353995
Nord-Norge		-.4137909	.1668985	-2.48	0.013	-.7412115 -.0863704
domicil						
2. Suburbs or outskirts of big city		.0136498	.139175	0.10	0.922	-.259383 .2866826
3. Town or small city		-.0650072	.1405173	-0.46	0.644	-.3406733 .2106588
4. Country village		-.1732776	.1476186	-1.17	0.241	-.462875 .1163198
5. Farm or home in countryside		-.1257507	.150789	-0.83	0.404	-.4215678 .1700665
_cons		7.392606	.8198329	9.02	0.000	5.784262 9.000949

```

. testparm i.female

( 1) 1.female = 0

      F( 1, 1297) =    0.42
      Prob > F =    0.5158

. testparm i.edlvdno

( 1) 2.edlvdno = 0
( 2) 3.edlvdno = 0
( 3) 4.edlvdno = 0
( 4) 5.edlvdno = 0
( 5) 6.edlvdno = 0
( 6) 7.edlvdno = 0
( 7) 8.edlvdno = 0
( 8) 9.edlvdno = 0
( 9) 10.edlvdno = 0
(10) 11.edlvdno = 0
(11) 12.edlvdno = 0
(12) 13.edlvdno = 0

      F( 12, 1297) =    2.30
      Prob > F =    0.0068

. testparm i.polintr

( 1) 2.polintr = 0
( 2) 3.polintr = 0
( 3) 4.polintr = 0

      F( 3, 1297) =    9.38
      Prob > F =    0.0000

. testparm i.prtvtbno

( 1) 2.prtvtbno = 0
( 2) 3.prtvtbno = 0
( 3) 4.prtvtbno = 0
( 4) 5.prtvtbno = 0
( 5) 6.prtvtbno = 0
( 6) 7.prtvtbno = 0
( 7) 8.prtvtbno = 0
( 8) 9.prtvtbno = 0
( 9) 10.prtvtbno = 0
(10) 11.prtvtbno = 0
(11) 66.prtvtbno = 0
(12) 77.prtvtbno = 0
(13) 88.prtvtbno = 0

      F( 13, 1297) =    5.18
      Prob > F =    0.0000

. testparm i.mnactic

( 1) 2.mnactic = 0
( 2) 3.mnactic = 0
( 3) 4.mnactic = 0
( 4) 5.mnactic = 0
( 5) 6.mnactic = 0
( 6) 8.mnactic = 0
( 7) 9.mnactic = 0

      F( 7, 1297) =    4.82
      Prob > F =    0.0000

. testparm i.landsdel

( 1) 2.landsdel = 0
( 2) 3.landsdel = 0
( 3) 4.landsdel = 0
( 4) 5.landsdel = 0
( 5) 6.landsdel = 0
( 6) 7.landsdel = 0

      F( 6, 1297) =    2.09
      Prob > F =    0.0514

. testparm i.domicil

( 1) 2.domicil = 0
( 2) 3.domicil = 0
( 3) 4.domicil = 0
( 4) 5.domicil = 0

      F( 4, 1297) =    0.60
      Prob > F =    0.6640

```

```
. * Link test for model specification
. linktest
```

Source	SS	df	MS	Number of obs	=	1,346
Model	552.962472	2	276.481236	F(2, 1343)	=	140.87
Residual	2635.79819	1,343	1.96261965	Prob > F	=	0.0000
				R-squared	=	0.1734
				Adj R-squared	=	0.1722
Total	3188.76066	1,345	2.37082577	Root MSE	=	1.4009

trust	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	1.969655	.7223751	2.73	0.006	.5525488	3.386762
_hatsq	-.0790334	.0586765	-1.35	0.178	-.194141	.0360742
_cons	-2.93709	2.214007	-1.33	0.185	-7.280378	1.406198

```
. * Ramsey's regression specification error test
. ovtest
```

```
Ramsey RESET test using powers of the fitted values of trust
Ho: model has no omitted variables
F(3, 1294) = 2.20
Prob > F = 0.0863
```

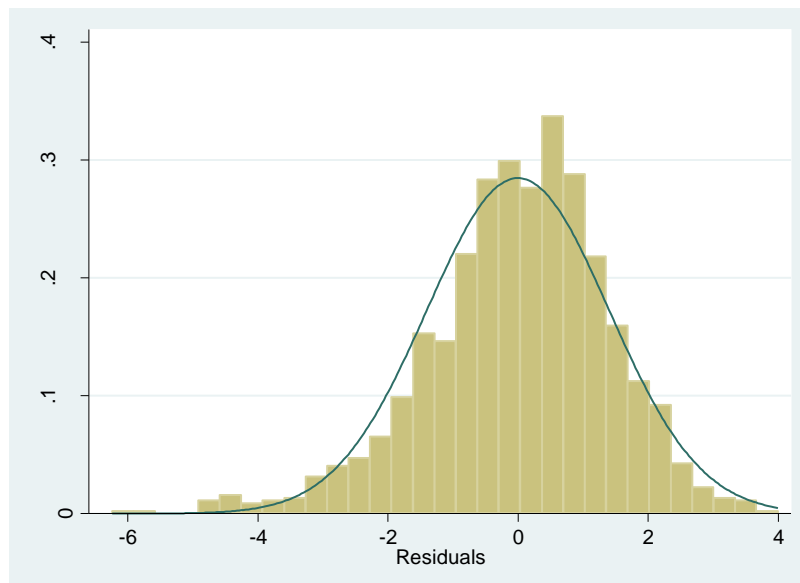
```
. * Breusch-Pagan (1979) and Cook-Weisberg (1983) test for heteroskedasticity
. hettest
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of trust

chi2(1) = 47.90
Prob > chi2 = 0.0000
```

```
. * Tests of residual from Model 1
. predict residuall, residual
(90 missing values generated)

. histogram residuall, normal
(bin=31, start=-6.2375808, width=.33020302)
```



```
. * Do these independent variables have an overall significant effect?  
. testparm agea hinctnta i.female i.landsdel i.domicil
```

```
( 1)  agea = 0  
( 2)  hinctnta = 0  
( 3)  1.female = 0  
( 4)  2.landsdel = 0  
( 5)  3.landsdel = 0  
( 6)  4.landsdel = 0  
( 7)  5.landsdel = 0  
( 8)  6.landsdel = 0  
( 9)  7.landsdel = 0  
(10)  2.domicil = 0  
(11)  3.domicil = 0  
(12)  4.domicil = 0  
(13)  5.domicil = 0
```

```
F( 13, 1297) = 1.66  
Prob > F = 0.0640
```

. \* Model 2: OLD-model  
 . reg trust ib6.edlvdno ib4.polintr ib8.prtvtbno ib2.mnactic

Source	SS	df	MS	Number of obs	=	1,403
Model	540.521821	35	15.4434806	F(35, 1367)	=	7.31
Residual	2887.84994	1,367	2.11254568	Prob > F	=	0.0000
				R-squared	=	0.1577
				Adj R-squared	=	0.1361
Total	3428.37176	1,402	2.44534362	Root MSE	=	1.4535

	trust	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
edlvdno						
1. Ingen fullført utdanning		.8114649	.6123096	1.33	0.185	-.3897033 2.012633
2. Barneskole (første del av obligatorisk utdanning)		.7487744	.3300904	2.27	0.023	-.1012358 1.396313
3. Ungdomsskole (grunnskole, 7-årig folkeskole, framhaldsskole, ..)		.0848945	.1386486	0.61	0.540	-.1870927 .3568817
4. Vitnem fra folkehøgskole		-.0611092	.3690092	-0.17	0.868	-.7849948 .6627764
5. Videregående avsluttende utd, allmennf. studieretninger/studie..		.317337	.1449646	2.19	0.029	.0329599 .6017141
7. Forkurs til universitet/høgskole som ikke gir studiepoeng		.2160294	.3833976	0.56	0.573	-.5360821 .9681409
8. Vitnem fra pøbygging til videregående utdanning (fagskoleutd..)		.0664027	.1973139	0.34	0.737	-.3206682 .4534736
9. Universitet/høgskole, < 3 år (høgskolekandidat, 2- og 2-årig)		.4079493	.1662618	2.45	0.014	.0817935 .7341052
10. Fullført 3-4 årig utd. fra høgskole (Bachelor,cand.mag.,lærer..)		.3994179	.1396628	2.86	0.004	.1254412 .6733946
11. Fullført 3-4 årig utdanning fra universitet (Bachelor, cand...)		.4069725	.1920467	2.12	0.034	.0302344 .7837107
12. Fullført 5-6 årig utdanning fra høgskole (master, hovedfag)		.9062738	.20478	4.43	0.000	.5045566 1.307991
13. Fullf 5-6 årig utd fra univ, lengre prof.utd. (cand.theol/psy..)		.7069302	.1578389	4.48	0.000	.3972975 1.016563
polintr						
1. Very interested		1.110141	.1970697	5.63	0.000	.7235497 1.496733
2. Quite interested		.8450937	.1601729	5.28	0.000	.5308824 1.159305
3. Hardly interested		.6249669	.153782	4.06	0.000	.3232926 .9266411
prtvbno						
1. The Party Red (Rødt)		.7376055	.4631926	1.59	0.112	-.1710398 1.646251
2. Socialist Left Party (SV)		.9940263	.2522046	3.94	0.000	.4992764 1.488776
3. Labour Party (A)		1.080948	.1510514	7.16	0.000	.7846306 1.377266
4. Liberal party (V)		.9191063	.2279266	4.03	0.000	.4719825 1.36623
5. Christian Democratic Party (KRF)		.9215056	.2474525	3.72	0.000	.4360778 1.406934
6. Centre Party (SP)		1.011961	.2329726	4.34	0.000	.5549387 1.468984
7. Conservative Party (H)		.7937255	.1531497	5.18	0.000	.4932915 1.094159
9. Coastal Party (KYST)		1.366935	1.046814	1.31	0.192	-.6866012 3.420472
10. Green Party (MDG)		.7220526	.3230962	2.23	0.026	-.0882344 1.355871
11. Other		-.0608611	.4060142	-0.15	0.881	-.8573394 .7356172
66. Not applicable		.6726718	.1646368	4.09	0.000	.3497036 .9956401
77. Refusal		1.298185	.2961416	4.38	0.000	.7172441 1.879126
88. Don't know		.3974131	.4144603	0.96	0.338	-.415634 1.21046
mnactic						
1. Paid work		-.5973714	.1416039	-4.22	0.000	-.875156 -.3195869
3. Unemployed, looking for job		-.6492116	.3362833	-1.93	0.054	-1.308899 .0104757
4. Unemployed, not looking for job		-2.469897	.544844	-4.53	0.000	-3.538718 -1.401076
5. Permanently sick or disabled		-.9520392	.2350807	-4.05	0.000	-1.413197 -.4908812
6. Retired		-.7497103	.1602752	-4.68	0.000	-1.064122 -.4352982
8. Housework, looking after children, others		-.9538506	.2471541	-3.86	0.000	-1.438693 -.4690081
9. Other		-1.713649	.4591858	-3.73	0.000	-2.614434 -.8128639
_cons		5.178134	.2481447	20.87	0.000	4.691348 5.66492

```
. testparm i.edlvdno
```

```
( 1) 1.edlvdno = 0  
( 2) 2.edlvdno = 0  
( 3) 3.edlvdno = 0  
( 4) 4.edlvdno = 0  
( 5) 5.edlvdno = 0  
( 6) 7.edlvdno = 0  
( 7) 8.edlvdno = 0  
( 8) 9.edlvdno = 0  
( 9) 10.edlvdno = 0  
(10) 11.edlvdno = 0  
(11) 12.edlvdno = 0  
(12) 13.edlvdno = 0
```

```
F( 12, 1367) = 3.37  
Prob > F = 0.0001
```

```
. testparm i.polintr
```

```
( 1) 1.polintr = 0  
( 2) 2.polintr = 0  
( 3) 3.polintr = 0
```

```
F( 3, 1367) = 12.28  
Prob > F = 0.0000
```

```
. testparm i.prtvtbno
```

```
( 1) 1.prtvtbno = 0  
( 2) 2.prtvtbno = 0  
( 3) 3.prtvtbno = 0  
( 4) 4.prtvtbno = 0  
( 5) 5.prtvtbno = 0  
( 6) 6.prtvtbno = 0  
( 7) 7.prtvtbno = 0  
( 8) 9.prtvtbno = 0  
( 9) 10.prtvtbno = 0  
(10) 11.prtvtbno = 0  
(11) 66.prtvtbno = 0  
(12) 77.prtvtbno = 0  
(13) 88.prtvtbno = 0
```

```
F( 13, 1367) = 5.00  
Prob > F = 0.0000
```

```
. testparm i.mnactic
```

```
( 1) 1.mnactic = 0  
( 2) 3.mnactic = 0  
( 3) 4.mnactic = 0  
( 4) 5.mnactic = 0  
( 5) 6.mnactic = 0  
( 6) 8.mnactic = 0  
( 7) 9.mnactic = 0
```

```
F( 7, 1367) = 7.13  
Prob > F = 0.0000
```

```
. * Link test for model specification
. linktest
```

Source	SS	df	MS	Number of obs =	1,403
Model	545.495778	2	272.747889	F(2, 1400) =	132.45
Residual	2882.87598	1,400	2.05919713	Prob > F =	0.0000
				R-squared =	0.1591
				Adj R-squared =	0.1579
Total	3428.37176	1,402	2.44534362	Root MSE =	1.435

trust	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
_hat	2.182732	.7634975	2.86	0.004	.6850099 3.680455
_hatsq	-.0961454	.0618623	-1.55	0.120	-.2174981 .0252073
_cons	-3.595386	2.346916	-1.53	0.126	-8.199236 1.008464

```
. * Ramsey's regression specification error test
. ovtest
```

```
Ramsey RESET test using powers of the fitted values of trust
Ho: model has no omitted variables
F(3, 1364) = 4.08
Prob > F = 0.0068
```

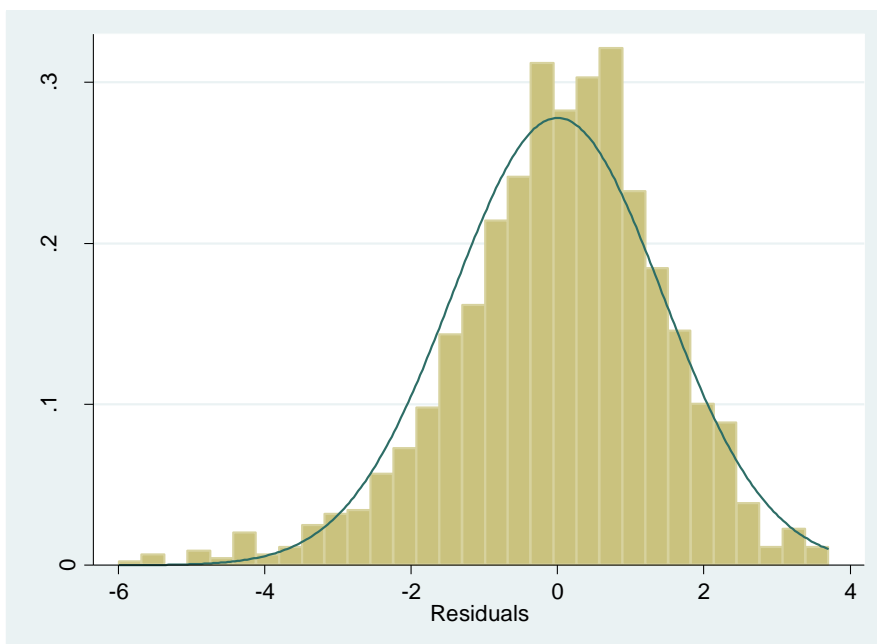
```
. * Breusch-Pagan (1979) and Cook-Weisberg (1983) test for heteroskedasticity
. hettest
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of trust

chi2(1) = 68.10
Prob > chi2 = 0.0000
```

```
. * Tests of residual from Model 1
. predict residual2, residual
(33 missing values generated)
```

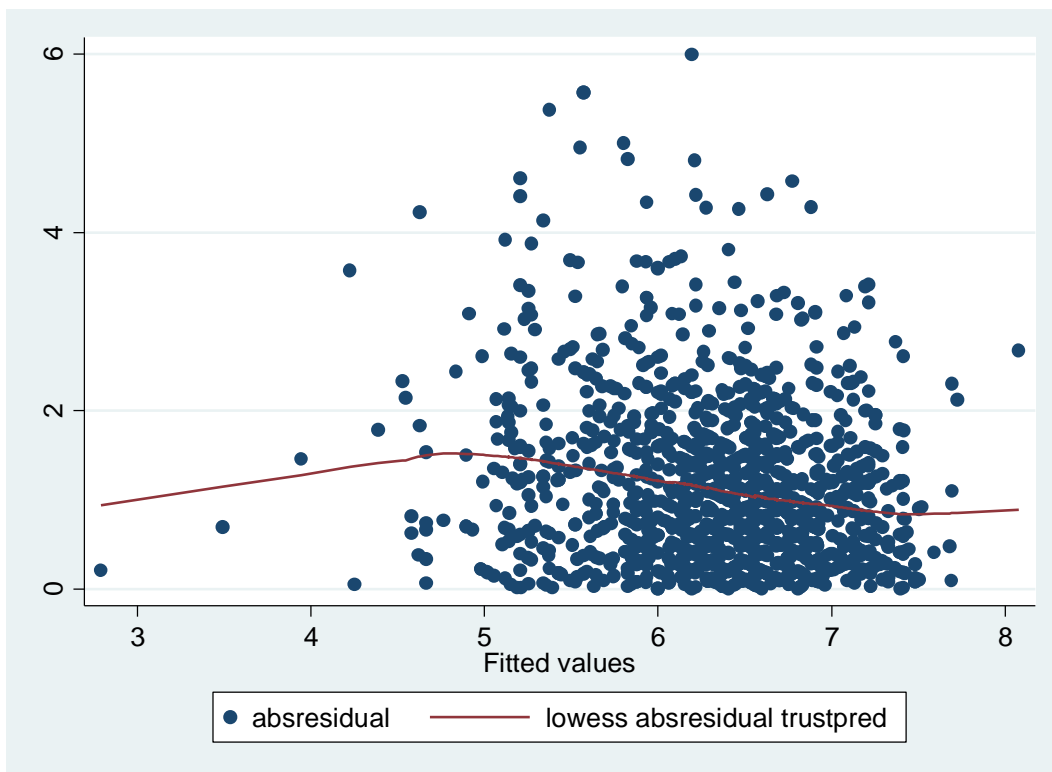
```
. histogram residual2, normal
(bin=31, start=-5.9957385, width=.31280275)
```



```
. * Absolute residual-versus-predictor plots from Model 2
. predict trustpred
(option xb assumed; fitted values)
(9 missing values generated)

. gen absresidual=abs(residual2)
(33 missing values generated)

. scatter absresidual trustpred || lowess absresidual trustpred
```





```

. * TASK 2
. * Model 3: Logistic Regression Model
. recode trust (0/6.5=0)(6.5/10=1), gen(trust2)
(1408 differences between trust and trust2)

. logit trust2 ib6.edlvdno ib4.polintr ib8.prtvtbno ib2.mnactic

```

```

Iteration 0: log likelihood = -970.8851
Iteration 1: log likelihood = -879.93017
Iteration 2: log likelihood = -879.58033
Iteration 3: log likelihood = -879.57876
Iteration 4: log likelihood = -879.57876

```

```

Logistic regression          Number of obs   =    1,403
                             LR chi2(35)          =    182.61
                             Prob > chi2         =    0.0000
Log likelihood = -879.57876   Pseudo R2      =    0.0940

```

	trust2	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
edlvdno							
	1. Ingen fullført utdanning	1.858084	1.154373	1.61	0.107	-.4044445	4.120613
	2. Barneskole (første del av obligatorisk utdanning)	1.456267	.5201597	2.80	0.005	.4367724	2.475761
3.	Ungdomsskole (grunnskole, 7-årig folkeskole, framhaldsskole, ..)	.2648927	.2026795	1.31	0.191	-.1323518	.6621372
	4. Vitnem fra folkehøgskole	.0637823	.53267	0.12	0.905	-.9802316	1.107796
5.	Videregående avsluttende utd, allmennf. studieretninger/studie..	.5078569	.209316	2.43	0.015	.0976051	.9181087
	7. Forkurs til universitet/høgskole som ikke gir studiepoeng	.2919887	.5513964	0.53	0.596	-.7887283	1.372706
8.	Vitnem fra pøygging til videregående utdanning (fagskoleutd..	.4730971	.2806779	1.69	0.092	-.0770215	1.023216
9.	Universitet/høgskole, < 3 år (høgskolekandidat, 2- og 2-årig)	.8545245	.2407539	3.55	0.000	.3826556	1.326393
10.	Fullført 3-4 årig utd. fra høgskole (Bachelor,cand.mag.,1-år..	.7276182	.2014826	3.61	0.000	.3327196	1.122517
11.	Fullført 3-4 årig utdanning fra universitet (Bachelor, cand...)	.4939258	.27446	1.80	0.072	-.044006	1.031858
12.	Fullført 5-6 årig utdanning fra høgskole (master, hovedfag)	1.694957	.34039	4.98	0.000	1.027805	2.362109
13.	Fullf 5-6 årig utd fra univ, lengre prof.utd. (cand.theol/psy..	1.39895	.2433173	5.75	0.000	.9220568	1.875843
polintr							
	1. Very interested	1.059268	.2986336	3.55	0.000	.4739568	1.644579
	2. Quite interested	.8723948	.2421534	3.60	0.000	.397783	1.347007
	3. Hardly interested	.4414031	.2327731	1.90	0.058	-.0148238	.89763
prtvbno							
	1. The Party Red (Rødt)	.6170036	.7132638	0.87	0.387	-.7809678	2.014975
	2. Socialist Left Party (SV)	.9298258	.3848354	2.42	0.016	.1755623	1.684089
	3. Labour Party (A)	.9751178	.228455	4.27	0.000	.5273543	1.422881
	4. Liberal party (V)	.7176417	.3383925	2.12	0.034	.0544045	1.380879
5.	Christian Democratic Party (KRF)	1.08663	.3664616	2.97	0.003	.3683787	1.804882
	6. Centre Party (SP)	1.02507	.3442507	2.98	0.003	.3503508	1.699789
	7. Conservative Party (H)	.7810074	.230836	3.38	0.001	.3285773	1.233438
	9. Coastal Party (KYST)	.8873169	1.446872	0.61	0.540	-1.9485	3.723133
	10. Green Party (MDG)	.7526288	.4747483	1.59	0.113	-.1778607	1.683118
	11. Other	-1.300731	.8204575	-1.59	0.113	-2.908798	.3073364
	66. Not applicable	.7816332	.2492015	3.14	0.002	.2932072	1.270059
	77. Refusal	1.472129	.449069	3.28	0.001	.5919701	2.352288
	88. Don't know	-.0123331	.6782685	-0.02	0.985	-1.341715	1.317049
mnactic							
	1. Paid work	-.6650974	.2062163	-3.23	0.001	-1.069274	-.2609208
	3. Unemployed, looking for job	-.3999947	.4893833	-0.82	0.414	-1.359168	.5591789
4.	Unemployed, not looking for job	-2.193635	1.128329	-1.94	0.052	-4.405119	.0178495
	5. Permanently sick or disabled	-.6721268	.3397123	-1.98	0.048	-1.337951	-.0063029
	6. Retired	-.8450976	.2342442	-3.61	0.000	-1.304208	-.3859873
8.	Housework, looking after children, others	-1.13089	.3700789	-3.06	0.002	-1.856231	-.4055486
	9. Other	-1.564818	.729137	-2.15	0.032	-2.9939	-.1357357
	_cons	-1.240465	.3743745	-3.31	0.001	-1.974225	-.5067043

```
. * Hosmer-Lemeshows goodnes-of-fit Statistics
. estat gof, table group(10)
```

**Logistic model for trust2, goodness-of-fit test**

(Table collapsed on quantiles of estimated probabilities)

Group	Prob	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.2819	29	29.9	112	111.1	141
2	0.3700	44	46.6	97	94.4	141
3	0.4374	62	58.3	83	86.7	145
4	0.4855	65	67.2	81	78.8	146
5	0.5270	64	65.3	65	63.7	129
6	0.5636	88	85.0	65	68.0	153
7	0.6200	78	77.5	51	51.5	129
8	0.6725	94	93.3	49	49.7	143
9	0.7614	105	98.6	31	37.4	136
10	0.9065	106	113.4	34	26.6	140

```
number of observations = 1403
number of groups = 10
Hosmer-Lemeshow chi2(8) = 5.13
Prob > chi2 = 0.7439
```

```
. * Link test for model specification
. linktest
```

```
Iteration 0: log likelihood = -970.8851
Iteration 1: log likelihood = -879.66264
Iteration 2: log likelihood = -879.15247
Iteration 3: log likelihood = -879.15128
Iteration 4: log likelihood = -879.15128
```

```
Logistic regression          Number of obs   = 1,403
                             LR chi2(2)           = 183.47
                             Prob > chi2           = 0.0000
Log likelihood = -879.15128   Pseudo R2       = 0.0945
```

trust2	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_hat	1.011865	.083597	12.10	0.000	.8480179	1.175712
_hatsq	-.0742761	.0813524	-0.91	0.361	-.233724	.0851717
_cons	.0357003	.0694909	0.51	0.607	-.1004993	.1718998

```
.
end of do-file
```