

****Lab 4, Feb 4: EDA and OLS and WLS

```
log: C:\Documents and Settings\Default\Desktop\LDA\Data\cows_Lab4.log
log type: text
opened on: 4 Feb 2004, 09:26:19
```

```
. use use "Z:\LDA\Data\LDA\cowsP.dta", clear
```

```
. set matsize 100
```

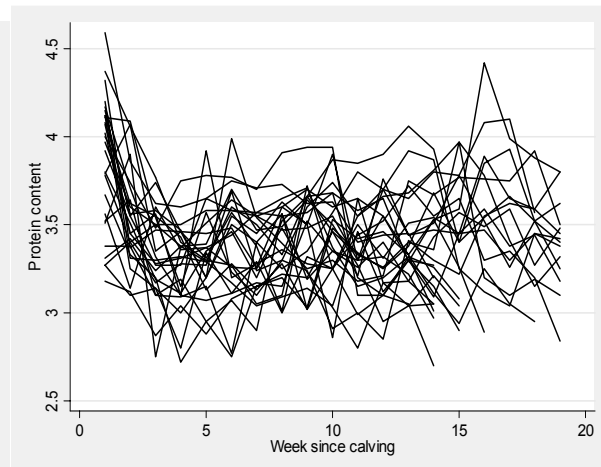
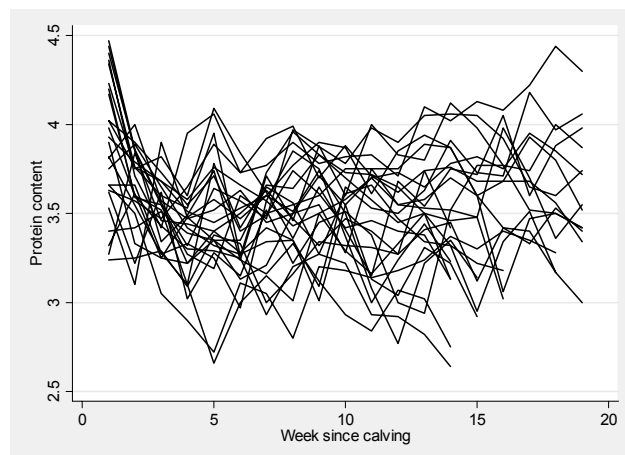
```
. l in 1/3
```

```
+-----+
| id    diet    week    prot |
+-----+
1. | 1    barley    1    3.63 |
2. | 1    barley    2    3.57 |
3. | 1    barley    3    3.47 |
+-----+
```

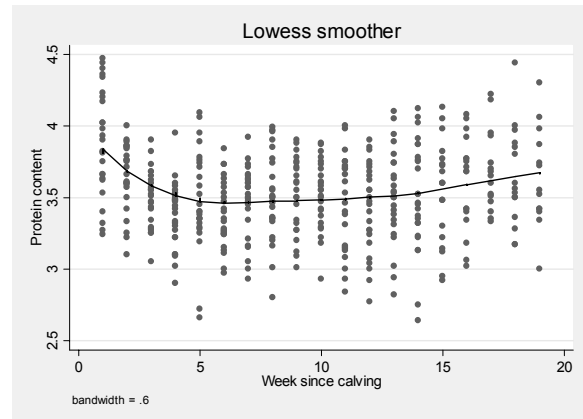
```
. sort id week diet
```

```
. twoway line prot week if diet=="barley", c(l) s(.)
```

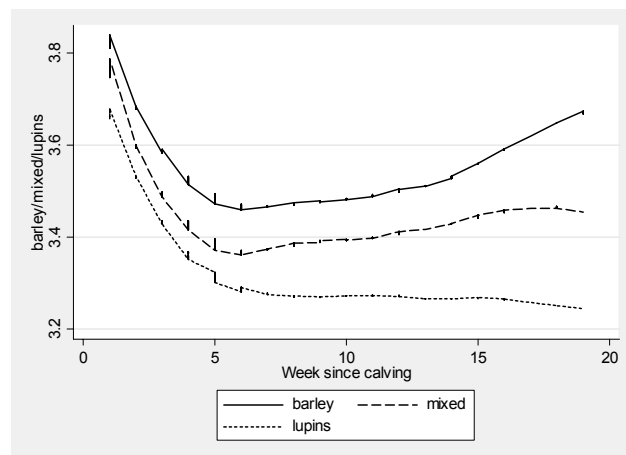
```
. twoway line prot week if diet=="mixed", c(l) s(.)
```



```
. ksm prot week if diet=="barley", gen(sml) lowess bw(.6)
```



```
. ksm prot week if diet=="mixed", gen(sm2) lowess bw(.6)  nograph
. ksm prot week if diet=="lupins", gen(sm3) lowess bw(.6)  nograph
. label var sm1 "barley"
. label var sm2 "mixed"
. label var sm3 "lupins"
. twoway line sm1 sm2 sm3 week, s(x)
. sort week
. twoway line sm1 sm2 sm3 week, s(x)
```



```
. sort diet
. drop sm1 sm2 sm3
. sort diet

. tsset id week
      panel variable: id, 1 to 79
      time variable: week, 1 to 19
. xtides

      id: 1, 2, ..., 79
      week: 1, 2, ..., 19
```

```
n = 79
T = 19
```

```

Delta(week) = 1; (19-1)+1 = 19
(id*week uniquely identifies each observation)

Distribution of T_i:  min      5%      25%      50%      75%      95%      max
                    19      19      19      19      19      19      19

```

Freq.	Percent	Cum.	Pattern
79	100.00	100.00	1111111111111111111
79	100.00		XXXXXXXXXXXXXXXXXXXX

```

. xtsumcorr prot

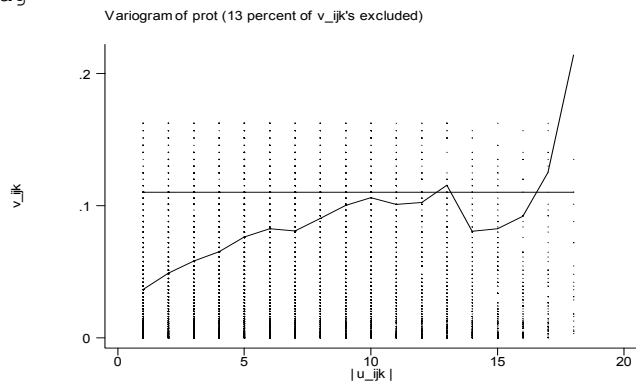
```

Variable		Mean	Std. Dev.	Min	Max	Observations
prot	overall	3.422446	.3317504	2.45	4.59	N = 1337
	between		.1966526	2.937895	3.896842	n = 79
	within		.2670789	2.675112	4.528235	T-bar = 16.9241
	corr. between		.1852145			
	corr. within		.2752343			
	rho		.3117	(betw. fract. of total)		

```

. xtgraph prot, group(diet) bar(no)
. variogram prot, discrete
Computing ANOVA model for v in ulag

```



```

. sort diet
. reshape wide
(note: j = 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19)

```

Data	long	->	wide
Number of obs.	1501	->	79
Number of variables	4	->	21
j variable (19 values)	week	->	(dropped)
xij variables:	prot	->	prot1 prot2 ... prot19

```

. graph matrix prot1- prot19, half

. sort diet

. reshape long
(note: j = 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19)

```

Data	wide	->	long
------	------	----	------

```

Number of obs.          79  ->  1501
Number of variables      21  ->    4
j variable (19 values)   -> week
xij variables:
      prot1 prot2 ... prot19  ->  prot

```

```

. sort diet

```

```

*** OLS
. by diet: reg prot week

```

```

-> diet = barley

```

Source	SS	df	MS	Number of obs = 425		
Model	.003319269	1	.003319269	F(1, 423)	=	0.03
Residual	43.2010991	423	.102130258	Prob > F	=	0.8570
Total	43.2044184	424	.101897213	R-squared	=	0.0001
				Adj R-squared	=	-0.0023
				Root MSE	=	.31958

prot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
week	-.0005398	.0029943	-0.18	0.857	-.0064253	.0053457
_cons	3.536912	.0316892	111.61	0.000	3.474624	3.5992

```

-> diet = lupins

```

Source	SS	df	MS	Number of obs = 453		
Model	2.19538392	1	2.19538392	F(1, 451)	=	20.14
Residual	49.1658411	451	.109015169	Prob > F	=	0.0000
Total	51.361225	452	.113631029	R-squared	=	0.0427
				Adj R-squared	=	0.0406
				Root MSE	=	.33017

prot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
week	-.0135057	.0030096	-4.49	0.000	-.0194203	-.0075912
_cons	3.435963	.0316069	108.71	0.000	3.373848	3.498078

```

-> diet = mixed

```

Source	SS	df	MS	Number of obs = 459		
Model	.217499492	1	.217499492	F(1, 457)	=	2.39
Residual	41.6488597	457	.09113536	Prob > F	=	0.1231
Total	41.8663592	458	.091411265	R-squared	=	0.0052
				Adj R-squared	=	0.0030
				Root MSE	=	.30189

prot	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
week	-.0042163	.0027293	-1.54	0.123	-.0095798	.0011472
_cons	3.468386	.0287369	120.69	0.000	3.411913	3.524859

****WLS, with uniform correlation structure**

. by diet: xtreg prot week, re i(id)

-> diet = barley

Random-effects GLS regression	Number of obs	=	425
Group variable (i): id	Number of groups	=	25
R-sq: within = 0.0036	Obs per group: min	=	12
between = 0.0777	avg	=	17.0
overall = 0.0001	max	=	19
Random effects u_i ~ Gaussian	Wald chi2(1)	=	1.20
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.2742

prot	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
week	-.0027185	.0024862	-1.09	0.274	-.0075914	.0021545
_cons	3.550844	.0453542	78.29	0.000	3.461952	3.639737
sigma_u	.18568774					
sigma_e	.25986115					
rho	.33801291	(fraction of variance due to u_i)				

The within subjects correlation is .33

-> diet = lupins

Random-effects GLS regression	Number of obs	=	453
Group variable (i): id	Number of groups	=	27
R-sq: within = 0.0426	Obs per group: min	=	12
between = 0.1287	avg	=	16.8
overall = 0.0427	max	=	19
Random effects u_i ~ Gaussian	Wald chi2(1)	=	20.03
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000

prot	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
week	-.0114969	.0025687	-4.48	0.000	-.0165315	-.0064623
_cons	3.426385	.0441529	77.60	0.000	3.339847	3.512923
sigma_u	.18282608					
sigma_e	.27580347					
rho	.3052743	(fraction of variance due to u_i)				

-> diet = mixed

Random-effects GLS regression	Number of obs	=	459
Group variable (i): id	Number of groups	=	27
R-sq: within = 0.0061	Obs per group: min	=	14
between = 0.0016	avg	=	17.0
overall = 0.0052	max	=	19
Random effects u_i ~ Gaussian	Wald chi2(1)	=	2.68
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.1015

prot	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
week	-.0042377	.0025874	-1.64	0.101	-.0093089	.0008335
cons	3.468665	.0345676	100.34	0.000	3.400914	3.536416

. ** WLS Exponential correlation structure

. by diet: xtglS prot week, igls corr(ar1) i(id) force

-> diet = barley

Iteration 1: tolerance = 0

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: homoskedastic

Correlation: common AR(1) coefficient for all panels (0.5735)

Estimated covariances	=	1	Number of obs	=	425
Estimated autocorrelations	=	1	Number of groups	=	25
Estimated coefficients	=	2	Obs per group: min	=	12
			avg	=	17
			max	=	19
			Wald chi2(1)	=	5.31
Log likelihood	=	.1876523	Prob > chi2	=	0.0212

prot	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
week	-.009953	.0043188	-2.30	0.021	-.0184177	-.0014882
_cons	3.63699	.0472798	76.92	0.000	3.544323	3.729656

-> diet = lupins

Iteration 1: tolerance = 0

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares

Panels: homoskedastic

Correlation: common AR(1) coefficient for all panels (0.5408)

Estimated covariances	=	1	Number of obs	=	453
Estimated autocorrelations	=	1	Number of groups	=	27
Estimated coefficients	=	2	Obs per group: min	=	12
			avg	=	16.77778
			max	=	19
			Wald chi2(1)	=	25.11
Log likelihood	=	-25.08133	Prob > chi2	=	0.0000

prot	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
week	-.0211642	.0042236	-5.01	0.000	-.0294423	-.012886
cons	3.521171	.0456852	77.07	0.000	3.431629	3.610712

```
-> diet = mixed
Iteration 1: tolerance = 0
```

Cross-sectional time-series FGLS regression

```
Coefficients: generalized least squares
Panels:      homoskedastic
Correlation: common AR(1) coefficient for all panels (0.4469)
```

```
Estimated covariances      =          1      Number of obs      =      459
Estimated autocorrelations =          1      Number of groups   =      27
Estimated coefficients      =          2      Obs per group: min =      14
                                           avg =      17
                                           max =      19
                                           Wald chi2(1)      =      9.42
Log likelihood              = -30.29571      Prob > chi2         =      0.0021
```

```
-----
      prot |      Coef.   Std. Err.      z    P>|z|    [95% Conf. Interval]
-----+-----
      week |  -.0114099   .0037174    -3.07   0.002   - .0186959   - .0041238
      _cons |   3.544331   .0399384    88.74   0.000    3.466053    3.622609
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```

```
. log close
   log: C:\Documents and Settings\Default\Desktop\LDA\Data\cows_Lab4.log
  log type: text
closed on:  4 Feb 2004, 10:04:40
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```