

# Appendices

## Appendix 1: OLS

Model 1: OLS, using observations 1998-2017 (T = 20)

Dependent variable: y1

	coefficient	std. error	t-ratio	p-value	
const	-0.106005	0.0554807	-1.911	0.0754	*
x2	0.000138422	3.17158e-05	4.364	0.0006	***
x3	0.0348059	0.00508991	6.838	5.62e-06	***
x4	7.67103e-05	0.000436801	0.1756	0.8629	
x5	2.21660e-06	6.79925e-06	0.3260	0.7489	
Mean dependent var	0.528000	S.D. dependent var	0.303724		
Sum squared resid	0.126941	S.E. of regression	0.091993		
R-squared	0.927575	Adjusted R-squared	0.908261		
F(4, 15)	48.02741	P-value(F)	2.24e-08		
Log-likelihood	22.21884	Akaike criterion	-34.43769		
Schwarz criterion	-29.45903	Hannan-Quinn	-33.46580		
rho	0.116335	Durbin-Watson	1.521131		

Excluding the constant, p-value was highest for variable 5 (x4)

Source: Gretl output

## Appendix 2: Correlation Matrix

Correlation Coefficients, using the observations 1998 - 2017  
5% critical value (two-tailed) = 0.4438 for n = 20

	x2	x3	x4	x5	
	1.0000	0.6644	0.2386	-0.1546	x2
		1.0000	0.1644	-0.1688	x3
			1.0000	0.1109	x4
				1.0000	x5

Source: Gretl output

## Appendix 3: Autocorrelation test

Breusch-Godfrey test for first-order autocorrelation  
OLS, using observations 1998-2017 (T = 20)  
Dependent variable: uhat

	coefficient	std. error	t-ratio	p-value
const	-0.00561449	0.0582238	-0.09643	0.9245
x2	2.45165e-06	3.29899e-05	0.07432	0.9418
x3	0.000137380	0.00523579	0.02624	0.9794
x4	1.82774e-05	0.000450304	0.04059	0.9682
x5	1.37479e-06	7.57270e-06	0.1815	0.8585
uhat_1	0.146132	0.311372	0.4693	0.6461

Unadjusted R-squared = 0.015489

Source: Gretl output

#### Appendix 4: White test for heteroskedasticity

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White's test for heteroskedasticity  
OLS, using observations 1998-2017 (T = 20)  
Dependent variable: uhat^2

	coefficient	std. error	t-ratio	p-value	
const	0.0726460	0.0543539	1.337	0.2390	
x2	3.72508e-05	1.65327e-05	2.253	0.0740	*
x3	-0.0124220	0.00946739	-1.312	0.2465	
x4	-0.000432176	0.000213235	-2.027	0.0985	*
x5	-6.30219e-06	3.91541e-06	-1.610	0.1684	
sq_x2	1.35593e-09	2.47747e-08	0.05473	0.9585	
X2_X3	-1.69474e-06	4.57096e-06	-0.3708	0.7260	
X2_X4	-1.21554e-07	1.94605e-07	-0.6246	0.5596	
X2_X5	-4.06463e-09	3.34648e-09	-1.215	0.2787	
sq_x3	0.000383394	0.000384311	0.9976	0.3643	
X3_X4	4.56078e-05	3.37553e-05	1.351	0.2346	
X3_X5	8.64952e-07	5.80362e-07	1.490	0.1963	
sq_x4	-1.05262e-07	9.71027e-07	-0.1084	0.9179	
X4_X5	1.44700e-09	3.37885e-08	0.04283	0.9675	
sq_x5	1.80900e-010	3.61156e-010	0.5009	0.6377	

Unadjusted R-squared = 0.706398

Test statistic:  $TR^2 = 14.127961$ ,  
with p-value =  $P(\text{Chi-square}(14) > 14.127961) = 0.440222$

Source: Gretl output

## Appendix 5: Normality test

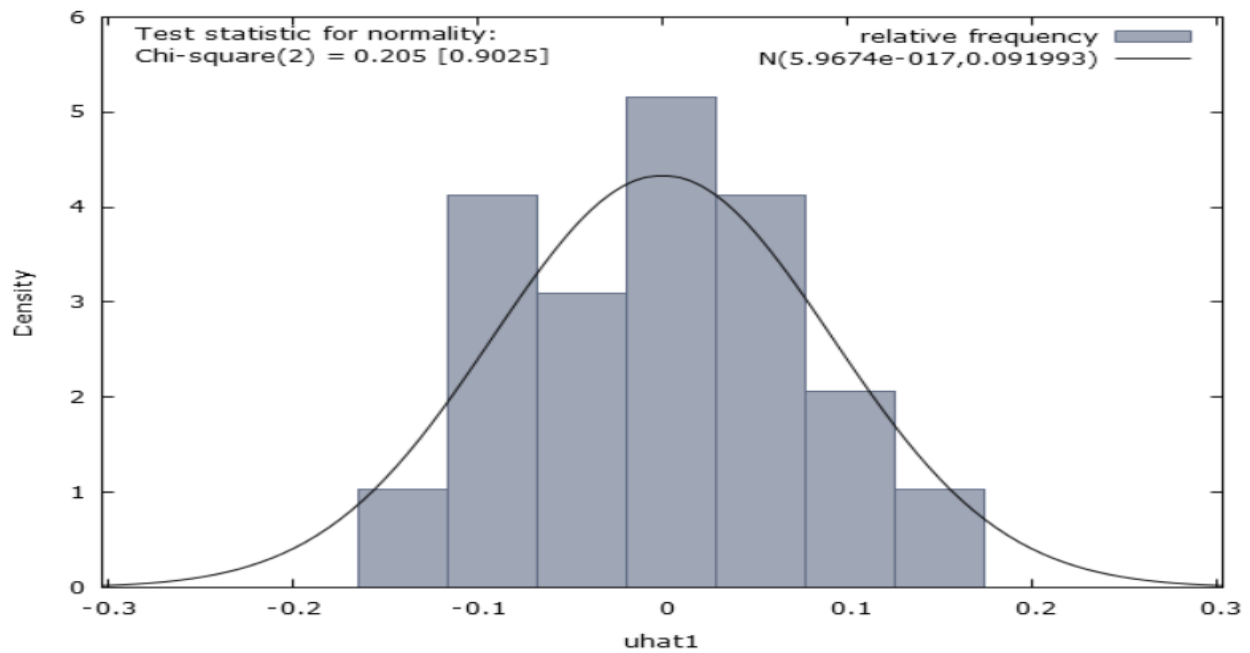
Frequency distribution for uhat1, obs 1-20  
number of bins = 7, mean = 5.96745e-017, sd = 0.0919933

interval	midpt	frequency	rel.	cum.	
< -0.11657	-0.14083	1	5.00%	5.00%	*
-0.11657 -	-0.068045	4	20.00%	25.00%	*****
-0.068045 -	-0.019521	3	15.00%	40.00%	*****
-0.019521 -	0.029002	5	25.00%	65.00%	*****
0.029002 -	0.077525	4	20.00%	85.00%	*****
0.077525 -	0.12605	2	10.00%	95.00%	***
>= 0.12605	0.15031	1	5.00%	100.00%	*

Test for null hypothesis of normal distribution:  
Chi-square(2) = 0.205 with p-value 0.90251

Source: Gretl output

## Appendix 6: Normality – graph



Source: Gretl output